

# Branch Manual: Design And Construction Of Joint Use Attachments CEOM7150.1

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## 2.0 PURPOSE

To establish the design and construction requirements for joint use attachments on Essential Energy structures.

The joint use attachments covered by this manual include:

- Banner systems and associated banners;
- decorative painting
- mobile phone base stations (eg. small cells);
- security cameras;
- Internet of Things (IoT) devices;
- solar panels;
- regulatory signage.

The requirements for communication cables are covered under CEOM7150 - Attachment of communication cable to Essential Energy’s Network by External Telecommunications Carriers: Design and Construction Requirements

Other attachment types require approval on a case-by-case basis by Account Specialist - Telco Infrastructure, or their delegate.

## 3.0 ACTIONS

### 3.1 General

Only approved private attachments are permitted on assets. An attachment is considered approved if it has been assessed by Essential Energy and satisfies the requirements of this manual. An approved attachment must be authorised in writing by Essential Energy before being installed.

Essential Energy recommends that applicants consider all options for the installation of signs and banners prior to applying to utilise assets defined by this manual as it is often more efficient and cost-effective to use alternatives, such as the applicant installing a banner pole.

Applications to install signs and banners will only be considered by Essential Energy if they are approved by the relevant local authority.

A new application will need to be submitted whenever a sign or banner changes. If the applicant submits all banner designs in the one application that will be used over a defined period of time (eg. two years) this may be considered as one application at the discretion of Essential Energy.

Promotional content is limited to community activities such as festivals, charity events, and other non-commercial public notices. Signs of para-commercial nature may be permitted provided the applicant can demonstrate a public benefit outcome and that no business or product names are displayed.

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Examples of where such signs may be appropriate are private hospitals, veterinary clinics, and public swimming pools.

**3.2 Design requirements**

**3.2.1 Permitted attachment locations**

The following attachments are permitted to be installed on network poles and columns in locations A, B and/or C. These permitted locations are based on the type of equipment already installed and whether the attachment is being proposed to be installed on a pole or column, as described in the sections below.

**Table 1: Attachments permitted to be installed on network poles and columns at locations A, B and/or C.**

Attachment	Location		
	A	B	C
Banner Systems and associated banners	✓	x	x
Mobile phone base station	✓	✓	x
IoT (including security cameras)	✓	✓	✓
Solar panels	✓	✓	x

**3.2.1.1 Poles**

Only poles that are unencumbered with network equipment and that have not been modified are to be used for attachments (excluding decoratively painted poles), as summarised in Table 2.

**Table 2: Prohibited poles for attaching equipment.**

Type of asset	Example
<b>Operational poles</b>	<ul style="list-style-type: none"> <li>• HV Underground / Overhead</li> <li>• LV or HV regulator</li> <li>• Pole top transformer</li> <li>• HV switches, including enclosed switch, sectionalisers, reclosers and air break switches</li> <li>• Directly below HV or LV underslung links or fuses</li> </ul>
<b>Modified poles</b>	<ul style="list-style-type: none"> <li>• Caisson poles (rebutted)</li> <li>• Reinforced poles (nailed)</li> </ul>
<b>Other poles</b>	<ul style="list-style-type: none"> <li>• Pole where the EME will impact the ability to perform works on a neighbouring pole.</li> <li>• Transmission poles (= &gt; 66 kV)</li> <li>• Powered attachments on conductive HV poles</li> </ul>

The possible attachment locations for poles with HV and/or LV conductors are shown in Figure 1 and Figure 2 (excluding decorative painting which is covered in Figure 4). Any brackets used for attachments at locations B shall not be more than 1.5 m above the pole top.

Where a pole only has LVABC or streetlight conductor installed, mobile phone base station antennas may be installed at location B with the module box installed at location A however, the associated

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cabling between the antenna and module box must be installed on the opposite side of the LVABC or insulated streetlight conductor (typically on the property side of the pole).

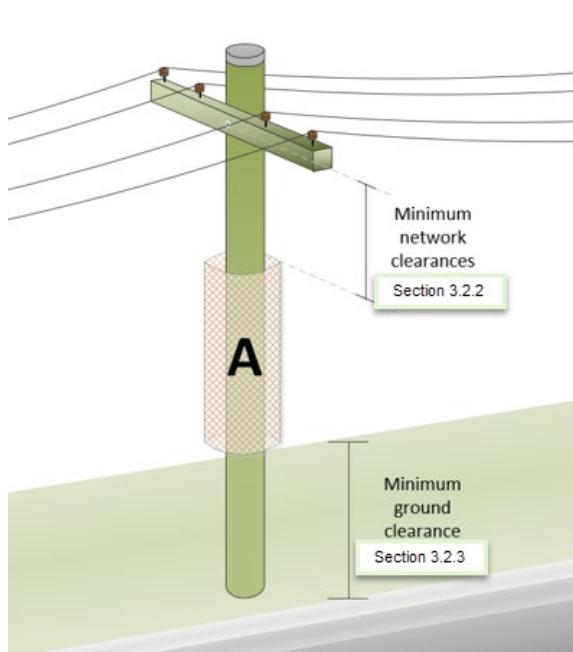


Figure 5: Available attachment locations for a pole with bare HV or LV conductors.

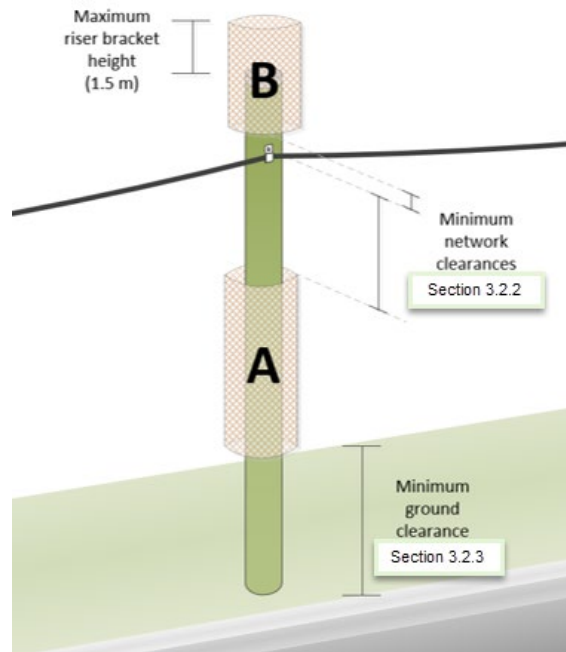


Figure 6: Available attachment locations for a pole with LVABC or insulated streetlight conductor.

Where location A is used for attachments, 180° of the pole face must be left vacant to allow the network equipment to be accessed by a ladder, as shown in Figure 3. This would typically be on the side of the pole that is opposite to the flow of traffic, on the side of the pole in the same direction of the resultant pole loading forces (typical ladder placements are shown in ANNEXURE A) or on the side of the pole that will permit access due to local access issues (eg. steep land or near an embankment).

The area reserved for ladder access does not need to line up with the orientation of the pole steps provided the equipment does not obstruct the ability to access the pole steps from a ladder.

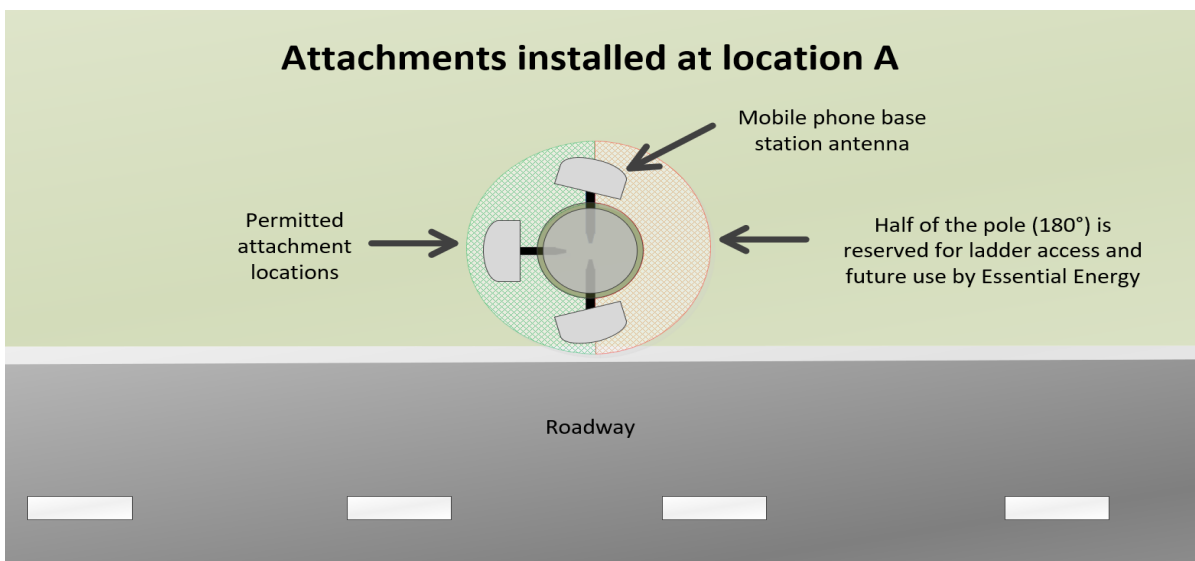


Figure 7: Attachments installed in location A must reserve half of the pole (180°) of the pole for ladder access to the network equipment and future use by Essential Energy. Example shown with mobile phone base station antennas (network conductors and crossarm not shown for clarity).

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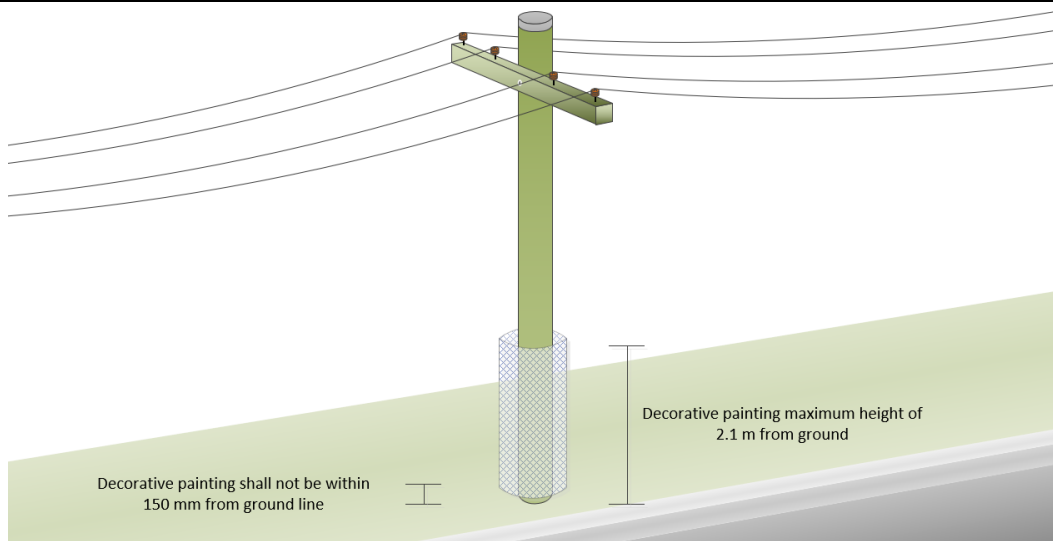
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Decorative painting can occur in the allowable area shown in Figure 4 provided the requirements listed in Table 3 are satisfied. When the pole is replaced as part of the pole replacement program the decorative painting will not be reinstated and the applicant must submit a new application to Essential Energy to conduct the decorative painting on the replaced pole.

New Street Signage is not permitted on Essential Energy poles or columns. In the cases where existing Street Signage exists, the signs will not be removed unless a safety hazard has been identified but it may not be reinstated as part of pole replacement programs. Signage with commercial advertising and political messaging will be removed at the cost of the sign owner.

**Table 3: Pole conditions where decorative painting is permitted or prohibited.**

Pole arrangement	Decorative painting
The pole only has LV and/or HV mains	✓
The pole is non-conductive (ie. the pole material is timber or composite)	✓
The pole has open defects that impact the ability to conduct the painting safely	✗
The pole is modified (ie. rebuted or nailed)	✗
The pole is conductive (ie. the pole material is concrete or steel)	✗
Steel streetlight column	✗
The existing network equipment on the pole has an earth downlead or UGOH attached	✗



**Figure 8: Allowable area for decorative painting of poles.**

### 3.2.1.2 Streetlight columns

The following streetlight columns are not suitable for attachments (see ANNEXURE B for photos of the column types):

- see-saw columns;
- potbelly columns;
- triangular columns; or,
- heritage columns.

Possible attachment locations on columns are shown in Figure 5 where attachments installed at location A shall be below the join of the outreach arm to the column. Any brackets used for attachments at C shall not be more than 0.5 m above the pole.

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Frangible columns that are required to minimise collision risks (typically located within impact zone 1 or 2 from the roadway as determined by AS/NZS 1158.1.2) require a risk assessment to be completed to evaluate the risk to the public in the event of a vehicle collision.

Decorative painting of streetlight columns is not permitted.

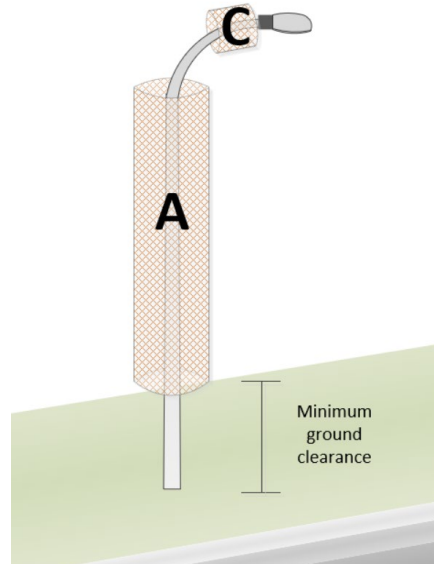


Figure 9: Possible attachment locations on streetlight columns.

### 3.2.1.3 Other network equipment

Painting of housings for pillars, switching cubicles and pad mounted substations is permitted if it is required to satisfy council development requirements or the proposal is approved by council and satisfies the other requirements in this standard. When the network equipment is replaced, the decorative painting will not be reinstated by Essential Energy and the applicant must submit a new application to Essential Energy to conduct any decorative painting on the replaced asset.

Other network equipment not outlined in this standard shall not be used for mounting attachments unless approval is provided by the Account Specialist, Telecommunications Infrastructure, or their delegate.

### 3.2.2 Attachment network clearances

The minimum clearances between the attachment and the network are shown in Table 4. However, if regular maintenance is required on the attachment, the network clearance shall also maintain the safe approach distances to live exposed conductors in CEOP8030 – Electrical Safety Rules for an Authorised Person or Telecommunication Person.

Table 4: The clearance requirements from the attachment to parts of the network for each location.

Network clearances	Location (m)		
	A	B	C
Bare HV	2.00		
Bare LV/streetlight (see note 1)	Banner: 0.50 + banner length Other: 1.50		
Bare LV service (see note 1)	Banner: 0.50 + banner length Other: 0.60		
LV/streetlight ABC	1.50	0.50	
Insulated LV service cables	0.60	0.50	
Stay wire	0.15	0.15	



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Pole steps (see note 2)	0.15	0.15	
Communication cables	0.30	0.30	
LV overhead to underground transition cable	0.05	0.05	
LV overhead to underground transition joint	0.70	0.70	
Earth down-lead cables	0.05	0.05	
Streetlight outreach	0.15	0.15	
Other unpowered attachments	0.15	0.15	0.15
Other LV powered attachments	0.60	0.50	0.50

**Note 1:** To reduce the risk of banners flipping up and being entangled in bare overhead conductors under high winds, the length of the banner must be added to the network clearances.

**Note 2:** Where pole steps are installed on the pole, the preferred attachment location is below the pole steps when attaching at location A and above the pole steps when attaching at location B. However, the attachment may be installed between pole steps if that will not impair Essential Energy staff climbing the pole to access the network equipment.

**3.2.3 Attachment ground clearances**

The minimum ground clearances for attachments on poles and columns are outlined in Table 5. A minimum ground clearance of 5.5 m is required if the attachment overhangs any part of a roadway or is within 1m of the roadway to reduce the risk of collision from wide and high load vehicles. In all other cases, a minimum of 3 m ground clearances is required.

**Table 5: Ground clearances for attachments.**

Ground clearance case	Min ground clearance (m)
Overhangs part of a roadway or the attachment is within 1m of the roadway	5.5
All other areas	3.0

**3.2.4 Other network clearances**

Pits or cabinets are to be installed at least 3 m away from the pole.

Underground communication cables must be installed at least 100 mm away from low voltage cables and 300 mm from high voltage cables.

**3.2.5 Multiple joint use attachments on a structure**

Multiple attachments are permitted in each attachment zone provided suitable supporting documentation is submitted as required by the application process which may include:

- a pole loading calculation or design;
- Safety in Design report conducted by a Level 3 Accredited Service Provider (ASP) in accordance with the Safe Design of Structures Code of Practice July 2012, Work Health and Safety Act 2011 and Work Health and Safety Regulation 2017;
- evidence that field staff will not be impeded accessing the network equipment; and,
- owners of the existing attachments are not impacted by the attachment.

### 3.2.6 *Electrical supply*

#### 3.2.6.1 *Special small service*

Where the power consumption of the attachment can be accurately assessed and is under 10 A, the Attachment Owner may apply for a special small service which is to be installed in accordance with Section 2.2.1 of the Service and Installation Rules of NSW.

The maximum power consumption is to be calculated by summing the maximum current rating of each electrical component in the attachment. The applicable datasheets must be supplied to Essential Energy. The maximum power consumption is required to be recalculated and supplied to Essential Energy if any upgrades are conducted to existing attachments which will change the maximum power consumption.

Where the electrical load cannot be accurately assessed due to the high variability in load, the attachment owner may install a suitable load monitoring device to determine the load profile for billing purposes. Test certificates are required demonstrating accuracy level to  $\pm 1\%$ .

Typical method of supplies for attachments on poles and streetlight columns are shown in drawings CEOM7302 and CEOM7115.29 respectively.

#### 3.2.6.2 *Battery backup supply*

Backup supply from a battery is permitted provided a changeover device is used to open all active conductors from the normal supply when loss of supply is detected and the backup supply is connected, in accordance with AS/NZS 3000:2018 section 7.3.8. Back feeding into the network from the battery is not permitted.

A warning sign must be installed on the pole 3 m from the ground due to the possible alternate supply. The electrical isolation of the attachment from the network may be operated by Essential Energy field staff when work is being completed on the electrical network.

#### 3.2.6.3 *Stand-alone installations*

Photovoltaic (PV) arrays in combination with a battery can be installed as a standalone system instead of obtaining a supply from the network provided the installation complies with AS/NZS 3000, AS/NZS 4509 series for stand-alone power systems and AS/NZS 5033 for PV arrays.

#### 3.2.6.4 *EPR for conductive poles with HV assets*

Powered attachments on conductive poles with HV assets are not permitted due to the difficulty in managing the potential HV EPR risks onto the LV MEN, and the potential damage to the powered attachment and cabling.

However, in cases where no alternative pole locations are available, and replacing the conductive pole with a non-conductive pole is not feasible, the Attachment Owner may request approval to install the attachment on the conductive pole. To support their application, the attachment owner will be required to submit a detailed earthing study and risk assessment, which demonstrates the MEN can support a HV fault on the pole (eg. due to a line insulator failure), whilst not introducing a risk to customers via the MEN, or damage to the powered attachment.

A final decision will be made by Essential Energy's Network Earthing Manager. If approval is granted it may be subject to special conditions.

### 3.2.7 Shutdown of EME attachments

Where an attachment emits EME exceeding the exposure limits in the ARPANSA RPS3 Standard for an Essential Energy worker accessing the pole, a separate isolation switch is required for shutting down an emitting antenna. The isolation switch must:

- send a control signal to the remote radio unit which is to isolate supply to the emitting antenna;
- be installed 3m up the pole or column for use by Essential Energy (in addition to the connection point termination box requirements); and,
- show the isolation status clearly and be operable without encroaching within any EME or electrical clearances.

The Attachment Owner must select an attachment location that will not require shutdown when Essential Energy are performing works on the surrounding network (ie. on a nearby pole that does not have the attachment installed).

### 3.2.8 Equipment design

#### 3.2.8.1 General

The materials and equipment of the attachment shall be such that low maintenance is required and has a low network and community impact. This includes, but is not limited to:

- attachment aesthetics must minimise impact to the community by painting or installing shrouds to match the background or existing attachments on the pole;
- attachments should be as small as possible to serve the Attachment Owner's purpose by taking up minimal space on the pole or column;
- protected against UV damage which would be typical for the environmental conditions;
- protected against being damaged by rodents, birds, and insects;
- installed with mechanical protection where damage to the attachment is possible from Essential Energy workers climbing the pole, or the use of ladders or temporary pole platforms;
- withstand the wind actions determined from AS/NZS 1170.2;
- durable enough to remain safely attached for at least 20 years;
- possible to inspect the condition of the materials visually from the ground to identify and replace the attachment before it may fail;
- without any sharp edges or protrusions that may create a cutting or impact hazard to staff working on the network;
- low noise level that cannot be heard from the public at ground level or in surrounding structures;
- the equipment does not cause interference with Essential Energy's or any other network in the area, including power quality and radio interference;
- materials are suitable for the local climate; and,
- materials do not adversely chemically react with network equipment (eg. galvanic corrosion).

The materials and methods used for attaching to poles and streetlight columns are to be in compliance with Section 3.3.2 Attachment methods.

#### 3.2.8.2 Banners

Specific design requirements for banners include:

- banner connectors securing the side and bottom of the banner to the pole or column are required to be mechanical weak link connectors (breakaway connectors) which detach under winds exceeding 500 Pa (the connectors securing the top of the banner shall not detach under high winds);

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- where the banners are to be changed by non-electrically qualified workers (eg. a member from councils), the banner system must enable changing of the banners from the ground without the use of an EWP or extended tools (refer to Section 3.3.4.2 for requirements to change out banners); and,
- all banners and their associated attachments are to comply with Section 14 of AS/NZS 7000.

**3.2.8.3 Mobile phone base stations and IoT devices**

Specific design requirements for mobile phone base stations and IoT devices include:

- compliant with electromagnetic compatibility standards including AS/NZS 61000.3.2;
- compliant with Telecommunication (Low-impact Facilities) Determination 1997; and,
- electronics or batteries have suitable protection or durability to prevent fire or explosion.

**3.2.8.4 Decorative painting poles**

The decorative paint must be:

- durable;
- for outdoor use;
- suitable for the environmental conditions; and
- non-metallic and non-oil based;
- artwork and designs should depict community-oriented themes and not be offensive.

**3.2.9 Make ready and alteration works**

**3.2.9.1 Existing defects or open tasks**

Once an authority to proceed has been approved (refer to section 3.2.10.3 Approvals), Essential Energy will advise the Attachment Owner of any open Category 1, 2 or 3 defects.

One of the following actions are to be taken by the Attachment Owner if the network pole or streetlight column is identified as having an open task (existing defect) with a rating of category 1, 2 or 3:

- a. conduct make ready works to replace affected equipment (refer to CEOM7097 Overhead Design Manual, for contestable works process); or
- b. wait until Essential Energy have completed the rectification work.

**3.2.9.2 Congestion on the pole**

Where the existing assets installed on the pole impairs the ability to install the attachment, the Attachment Owner can propose remediation works to simplify the congestion via Essential Energy's Contestable Works process. However, congestion from LV services can be rearranged provided it is in line with CEOM7302, the standard Essential Energy notification/outage process is followed, and the works is completed by a Level 2 ASP. If the services cannot be rearranged in line with CEOM7302, the LV services may be replaced.

**3.2.9.3 Inadequate ground or electrical clearances**

Where the required ground or network clearances cannot be maintained, the Attachment Owner's Level 3 ASP must assess whether any remediation works are necessary to achieve the required clearances. This may include but are not limited to:

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- conversion of street lighting from a street lighting control circuit to direct LV photo-electric controlled luminaires;
- increasing the attachment height of the mains;
- replacing bare mains with insulated mains;
- relocating of street lighting outreaches and associated fixtures;
- relocating electricity mains and services;
- conductor re-tensioning; and
- pole replacement (including condemned and nailed poles).

All proposed remediation work must be submitted to Essential Energy via the Contestable Works process. The Attachment Owner is responsible for all costs associated with the design and construction of the remediation works.

**3.2.9.4 Inadequate pole strength or condition**

If the mechanical loadings of the attachment exceed the pole rating, the pole will require replacement at the cost of the Attachment Owner. Likewise, any requirement to straighten a leaning pole prior to the attachment of equipment will be the responsibility of the Attachment Owner.

**3.2.9.5 Inadequate pole location or height**

If a pole or streetlight column is required to be moved or replaced in order to meet the requirements of the Attachment Owner, the Attachment Owner must ensure any make ready works will preserve the existing functionality of the network.

For example, if a streetlight within impact zone 2 of a roadway is required to be moved to impact zone 3 to allow an attachment, the Attachment Owner is required to conduct a lighting design or to select a suitable outreach to ensure the lighting levels are compliant with AS/NZS 1158. Changes to lighting levels will require approval from the Public Lighting Customer which may be RMS or the Local Council.

**3.2.10 Application, network design and approvals**

**3.2.10.1 Applications**

Each attachment and painting application must be submitted to Essential Energy and will be assessed against the requirements of this standard, requirements outlined in the application process and Essential Energy's policies. Supporting documentation will be required as outlined in the application process which may include:

- pole loading calculations, based on AS/NZS7000 and AS/NZS1170.2 for appropriate design environment conditions (eg. wind pressure, load factors, and strength reduction factors), which demonstrate:
  - the existing structural loading (eg. from overhead conductors) on the network pole, and the remaining available capacity for an attachment; and,
  - the structural loading which will be added by the attachment
- drawings of the attachment onto the pole or column;
- Safety in Design report conducted in accordance with the Safe Design of Structures Code of Practice July 2012, Work Health and Safety Act 2011 and Work Health and Safety Regulation 2017 by a Level 3 ASP;
- datasheets showing the maximum consumption of the equipment or test certificates demonstrating the accuracy of the load monitoring device to  $\pm 1\%$ ;

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- evidence of the attachment meeting the requirements of this manual;
- high-resolution site photos showing the proposed pole or column; and,
- electrical schematics of the electricity supply connection and isolation methods.

### 3.2.10.2 Design Software

Where a design or pole loading calculation is required, the Attachment Owner must identify the design software package (eg. NEARA, PLS CADD, Poles 'n' Wires, etc.) used and provide an extract of the design parameters used demonstrating compliance with the requirements of AS/NZS 7000 and Essential Energy standards.

### 3.2.10.3 Approvals

Proposed private attachments or decoration/painting of assets must meet Essential Energy approval before authority to proceed may be given.

The approval process is as follows:

1. The proposed attachment must be approved by Essential Energy.
2. Parties seeking to install private attachments or decorate assets must lodge a Branch Form (Network) – Essential Energy Equipment: Agreement & Application to Decorate or Install Private Attachments – CEOF6595 (available on Essential Energy Standards Online) and a Level 3 ASP design with [CommunityRelations@essentialenergy.com.au](mailto:CommunityRelations@essentialenergy.com.au) for processing.
3. Written approval from the Council, or a copy of the applicant's public liability insurance must be provided with the application.
4. Written approval from Transport for NSW (TfNSW) must be provided with the application, or written confirmation from the Council that the adjoining road is not RMS controlled.
5. Copies of banner design/decorating designs must be provided with the application.
6. Level 3 design and Designer Safety Report must be provided with the application – as required.
7. The Applicant may arrange installation once authority to install an attachment or proposed asset decoration design is received in writing from Essential Energy.
8. Installations of attachments must be carried out by an Accredited and Authorised Level 1 or 2 ASP.
9. Asset decoration must be carried out as per the requirements of this document.

Installations not meeting these criteria will be removed where practicable and authority cancelled

## 3.3 Construction requirements

### 3.3.1 Electricity supply from the network

For attachments using the overhead low voltage network for supply:

- the service mains must be a minimum of 6 mm<sup>2</sup> single core double insulated cable in a 20 mm flexible conduit between the overhead mains and the connection point termination box;
- the connection point termination box must be located at 3 m above ground level on the opposite side to traffic flow;
- the connection point termination box shall contain an inline fuse, tilt switch (for mobile phone base stations only) and an earth leakage circuit breaker. The network side of the service mains is the point of connection and the remaining installation from that point on is the responsibility of the Attachment Owner;



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- the consumer mains shall run from the customer connection box to the attachment in a 20 mm flexible conduit;
- where electrical supply is required for street mounted equipment the consumer mains shall be installed in a 20 mm conduit and be flexible for at least 1 m away from the pole with polymeric cable covers to provide mechanical protection; and,
- flexible conduit shall be secured with saddles every 300 mm.

For attachments on streetlight columns using the streetlight cable for supply:

- an existing streetlight cable can be used if it:
  - is uncontrolled (ie. the streetlight is individually controlled from a PE cell);
  - has a cross sectional area of at least 6 mm<sup>2</sup>;
  - is visually inspected showing no insulation deterioration (insulation cracking) or core corrosion; and,
  - is adequately rated to meet the proposed and existing load;
- where the streetlight cable is showing signs of deterioration, a loop impedance test is required in accordance with AS/NZS 3000 to determine whether the cable is suitable for use;
- if the streetlight cable is not suitable, the streetlight cable must be replaced from the base of the streetlight column to the point of supply;
- supply for the attachment is obtained from the streetlight supply cable at the base of the column by installing a 4-port LV connector on the active and neutral cores as shown in drawing CEOM7115.29;
- the supply from the connector to the attachment must be independently fused with a rating twice the maximum load of the attachment;
- the point of supply is the inline fuse for the active core and four port connectors for the neutral;
- consumer main must be a minimum of 6 mm<sup>2</sup> single core double insulated cable;
- if the streetlight cable internally to the column is not also fused, notify Essential Energy;
- a tilt switch (for mobile phone base stations only) and an earth leakage circuit breaker must be installed with the attachment;
- drilling of the column to pull the electrical supply to the PUMS enclosure must only be done using a hole saw with a controlled depth to a maximum of 4 mm or to the thickness of the column wall (the pilot drill piece must not extend more than 5 mm from the hole saw piece); and
- sharp edges from the hole must be removed, treated with a galvanising spray and a grommet installed to protect the cable being passed through the hole in the column.

### 3.3.2 Attachment methods

It is understood that the equipment listed in CEOM7004 Standard Contestable (Approved) Materials List may not always be suitable for the attachment types. To cater for this, Table 6 outlines which equipment must use the equipment from CEOM7004 Standard Contestable (Approved) Materials List and when it is to be used where possible.



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**Table 6: Overview of what type of materials shall be sourced from CEOM7004 and where it is to be used where possible.**

Equipment	Required to use equipment from CEOM7004	
	Mandatory	Where possible
Brackets		✓
Pole bands		✓
Cable guards		✓
Screws and bolts		✓
Glands	✓	
Lubricants	✓	
Conduits	✓	

3.3.2.1 General

The general construction requirements outlined in Table 7 are to be used for all attachment types.

**Table 7: General construction requirements for attaching to different poles and columns.**

Network asset	Construction requirements
<b>Timber poles</b>	<ul style="list-style-type: none"> <li>Attachment methods onto timber poles shall be using galvanised bolts and fasteners.</li> <li>Volute stainless steel spring washers shall be used on bolted components to prevent working loose or where shrinkage/expansion of the surrounding materials (such as timber) is likely to result in the bolted component becoming loose.</li> <li>Any equipment used for attaching to the pole or column shall be made from a suitable grade stainless steel (minimum 304) or galvanised to AS/NZS 4680 with the performance, material, general requirements to AS/NZS 1154.</li> <li>Tek screws used in CCA treated poles shall be CCA coated.</li> <li>Galvanised threaded rods and bolts shall be lightly greased with an approved lubricant (eg. Shell Alvania RL3) to help prevent corrosion in the presence of CCA treatments.</li> <li>Any holes drilled by error in the wrong position on Essential Energy's poles and are not required for use, shall be filled in immediately with a suitable size pole plug (eg. plugs supplied Preschem Pty. Ltd.)</li> <li>Cabling longer than 1 m shall be installed within conduit that will provide adequate mechanical protection from workers accessing the pole from climbing or ladders.</li> <li>conduits/cables saddles are to be installed at a maximum distance of 800 mm.</li> <li>Module or control boxes are to be installed on the property side of a pole.</li> <li>Use cable guards at a maximum height of 2.5m above ground and 300 mm below ground. The cable guard shall be made from a non-conductive, durable, UV resistant, black or grey material self-extinguishing materials equivalent to the requirements of AS/NZS 2053.1. The profile of the cover guard shall be selected to closely match the size of the conduit underneath that it is protecting so that it minimises the profile on the pole.</li> </ul>

<b>Concrete poles</b>	<ul style="list-style-type: none"> <li>• Attachments require a minimum of two band straps using a suitable grade stainless steel (minimum 316) to prevent corrosion with the performance, material, general requirements to AS/NZS 1154.</li> <li>• The ultimate rating of pole band straps shall be selected so that the maximum forces from the attachment have a safety factor of 4.</li> <li>• Pole bands around conduits/cables are to be installed at least every 1 m.</li> <li>• Poles with an insulating coat cannot be drilled into or damaged.</li> <li>• Cabling longer than 1 m shall be installed within conduit</li> <li>• Materials coming into contact with the steel pole or column shall be compatible materials to avoid galvanic corrosion.</li> <li>• Any other equipment used for attaching to the pole or column shall be made from a suitable grade stainless steel (minimum 304) or galvanised to AS/NZS 4680 with the performance, material, general requirements to AS/NZS 1154.</li> <li>• Module or control boxes are to be installed on the property side of a pole.</li> <li>• Use cable guards at a maximum height of 2.5m above ground and a minimum 300 mm below ground. The cable guard shall be made from a durable, UV resistant, black, or grey material self-extinguishing materials equivalent to the requirements of AS/NZS 2053.1. The profile of the cover guard shall be selected to closely match the size of the conduit underneath that it is protecting so that it minimises the profile on the pole. The cable guard must be non-conductive for use on composite poles and can be conductive for use on conductive poles and columns if the cable guard is suitably bonded to earthed.</li> <li>• The cable guard must protect the cable around the ragbolt or screw-in footing of the streetlight and cannot leave the cable exposed.</li> </ul>
<b>Composite poles</b>	
<b>Steel poles</b>	
<b>Steel streetlight columns</b>	

**3.3.2.2 Banners**

Banners are to be installed in accordance with the manufacturer’s instructions provided the requirements in Section 3.3.2.1 are satisfied, which includes:

- using pole bands for installing on steel columns; and,
- using suitably rated bolts and fasteners for installing on timber poles.

Where banners are to be changed by non-electrically qualified workers (eg. a member from councils), the part of the banner system used for changing out the banner must be accessible from ground without the use of extendable tools or an EWP. Refer to Section 3.3.4.2 for requirements to change out banners.

**3.3.2.3 Mobile phone base stations**

Where a communication cable is required to be installed from the underground network, it must be:

- installed in a suitably sized flexible conduit underground for at least 2 m away from the pole with polymeric cable cover to provide mechanical protection;
- installed in the smallest sized conduit up the pole to meet the size of the communication cable. Alternatively, an anaconda style flexible metal conduit may be used provided is it suitably bonded to earth;
- be mechanically protected using a cable guard, however a cable guard is not required if an anaconda style flexible metal conduit is used that provides suitable mechanical protection.

Stringing overhead communication cables must be done in accordance with CEOM7150 and have approval from Essential Energy.

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Riser brackets that are less than 1.5 m are permitted for attaching antennas on poles.

Pits for communication cables must be separate to the electrical service pits. Communication pits cannot encroach on areas reserved for the purposes of distributing electricity.

Standard arrangements for the attachment of mobile phone base stations on poles and columns are shown in drawing CEOM7115.25 and CEOM7115.26 respectively.

**3.3.2.4 IoT devices**

IoT devices are to meet the same requirements of Section 3.3.2.3. Additionally, temporary attachments (less than 6 months) on timber poles can use a tensioned chain provided it is suitably rated for the load of the attachment. These are not permitted for permanent or long-term solutions due to possible changes in the pole diameter overtime and will require regular maintenance.

Standard arrangements for the attachment of IoT devices on poles and columns are shown in drawing CEOM7115.27 and CEOM7115.28 respectively.

**3.3.2.5 Decorative painting poles**

The application of paint on poles shall not paint:

- within 200 mm of any pole nameplate discs;
- within 150 mm of the groundline of the pole to allow for water to seep out;
- above 2.1 m from the ground level;
- any metallic fittings or conductors, such as earth stakes or downleads;
- warning or danger signage;
- asset label or numbers; or
- cable guards or cables.

**3.3.3 Attachment signage and identification labelling**

Labels and signs shall be manufactured from long life UV resistant materials that will be readable and remain attached for at least the design life of the attachment (note that typical design life for poles is 40+ years). The preferred sign material is a sticker on aluminium sheet with an edge sealer. An example is Scotchal Reflective Class 2 from Artcraft suppliers and 3M edge sealer 3950. Individual numbers and letters shall be readable from ground which would typically require the text to be at least 30 mm high.

Attachment to wood poles could be by M12 x 75mm long coach screw and with a pole band for the other pole and column types.

Labels and signs can be combined provided the minimum level of detail for each purpose is included as outlined in Table 8. Example attachment signs are also shown in Figure 6: Example attachment signs.

**Table 8: Minimum requirements for signage and identification labelling requirements.**

Sign type	When required	Location	Minimum detail
Radiation hazard zone	EME risk to Essential Energy workers.	Limit of approach of an EME source for untrained workers. Multiple signs	<ol style="list-style-type: none"> <li>1. Explain the attachment (eg. transmitting antenna)</li> <li>2. Explain the risk above the sign location (eg. RF hazard above this point)</li> <li>3. Actions required to remove risk (eg. Isolation of transmitting antenna required when working above this point)</li> </ol>

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		required under each antenna.	
Owner Label	For all installations	On or near the attachment	<ol style="list-style-type: none"> <li>1. Owner's name</li> <li>2. Contact number</li> <li>3. Attachment address</li> <li>4. Unique equipment number</li> <li>5. If relevant, a link to site specific safety information (eg. <a href="https://www.rfnsa.com.au/2444001">https://www.rfnsa.com.au/2444001</a>)</li> </ol>
Isolation switch	EME risk to Essential Energy workers or alternate power supply.	Adjacent to the isolation switch	<ol style="list-style-type: none"> <li>1. Explain the attachment (eg. transmitting antenna)</li> <li>2. When the isolation switch is to be used</li> <li>3. Contact number for isolation</li> <li>4. How to use the isolation switch</li> <li>5. How to verify the successful operation of the isolation switch</li> </ol>
Battery backup supply	Connected to the network but also has a battery backup supply	Adjacent to the customer connection point box.	<ol style="list-style-type: none"> <li>1. BATTERY BACKUP SUPPLY INSTALLED</li> </ol>

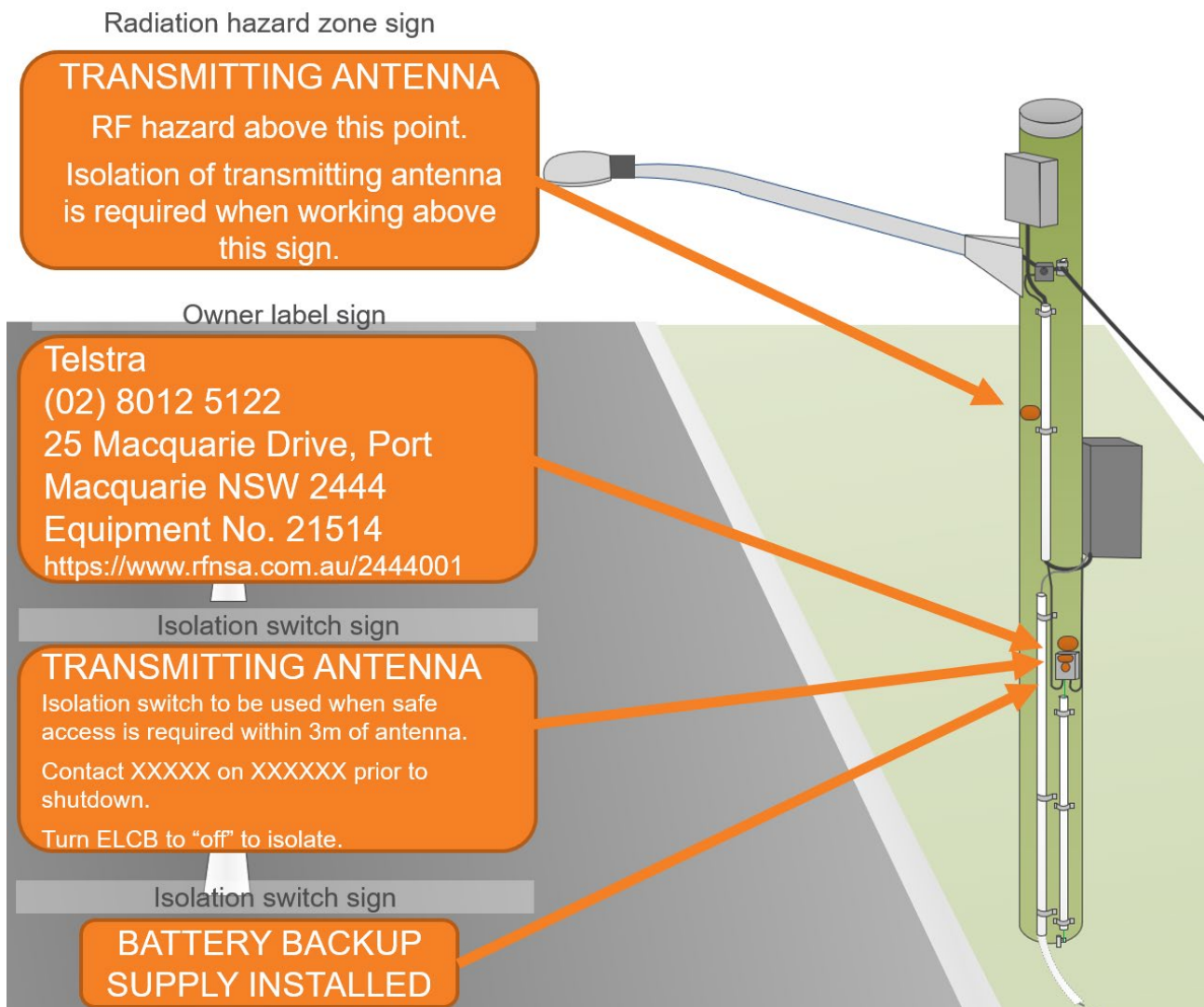


Figure 10: Example attachment signs.

### **3.3.4 Authorisations to complete work**

#### **3.3.4.1 General**

A Level 1 or 2 ASP is required to install any attachments on the network.

#### **3.3.4.2 Changing banners**

A Level 1 or 2 ASP must be used to change out banners where extendable tools or an EWP is required to complete the work.

Where the banner system allows the banner to be changed from the ground, the banners may be raised and lowered by non-electrically qualified workers if compliance is made with WHS Regulation 2017 and a safe work method statement (refer to Division 7 Clause 166 (1) of the WHS Regulation 2017) is supplied with the application to Essential Energy. It is the Attachment Owner's responsibility to assess whether the raising and lowering of the banners is best performed by Level 1 or 2 ASP in order to fulfil their WHS obligations.

Poles and columns require a Safe to Approach Test to be completed in accordance with CEOP2422 - Safe Approach: Assess Electrical Apparatus before work can commence to check whether a network fault has resulted in the asset becoming live. Work must not commence, and Essential Energy must be notified on 13 20 80, if the test confirms the detection of a voltage on the pole or column.

#### **3.3.4.3 Maintaining mobile phone base stations and IoT devices**

The maintenance of mobile phone base stations and IoT devices must be completed by an Authorised Person (Level 1 or 2 ASP) or an authorised Telecommunication Person using the appropriate Safe Approach Distances outlined in Section 3.3.5.

#### **3.3.4.4 Decorative painting of assets**

Painting of poles or equipment housings can be conducted by non-electrically qualified workers provided that compliance is made with WHS Regulation 2017 and a safe work method statement (refer to Part 6.3 Division 2 of the WHS Regulation 2017) is supplied with the application to Essential Energy. The applicant may assess that an electrically qualified person always remains on site to fulfil their WHS obligations.

A Safe to Approach Test must be completed in accordance with CEOP2422 - Safe Approach: Assess Electrical Apparatus before work can commence to check whether a network fault has resulted in the asset becoming live.

### **3.3.5 Safe Approach to the network**

The Safe Approach Distances for Personnel and Equipment are set out in detail in CEOP8030 Electrical Safety Rules. It is a requirement of Essential Energy that all individuals and organisations involved with the design and attachment of equipment on Essential Energy's Network understand all the requirements of CEOP8030.

It is a mandatory requirement that all Essential Energy Workers, Contractors and ASPs conduct, an electrical leakage test (Safe to Approach Test) in accordance with CEOP2422 - Safe Approach: Assess Overhead Electrical Apparatus, prior to working on any pole or column.



### **3.3.6 Underground works**

Any electrical, non-electrical and civil works close to Essential Energy's electrical network must be undertaken in accordance with CEOP8030 - Essential Energy's Electrical Safety Rules subject to specific accreditation requirements. Additionally, the requirements of NSW WorkCover Code of Practice: Work Near Overhead Powerlines and the CEOP8041 - Operational Procedure: Work Near Essential Energy's Underground Assets shall be followed prior to undertaking any works.

### **3.3.7 Clearances to joint use attachments when working on the network**

When working on the network near attachments with a power supply, they must be treated as an earth potential or as an object with a different potential and wrapped in insulating barriers to avoid unintentional contact in accordance with Procedure CEOP8034 – Energised Work.

Breakaway connectors on the bottom of banners can detach under high winds and be a risk to field workers on the pole or column. A risk assessment must be completed before working on an asset with a banner attached under high winds to assess whether the banner should be removed for the duration of the work.

Mobile phone base stations are required to be isolated using the isolation switch on the pole if the work will be within 3 m of the antenna. Workers are to also read and abide by any site-specific safety signage.

### **3.3.8 Defects found after the installation of joint use attachment**

Where Essential Energy has found that the installation of attachments has resulted in or contributed to a defect, the Attachment Owner is responsible for the costs to remediate the construction to an acceptable level. Defects may include, but are not limited to:

- the pole leaning;
- inadequate ground clearances;
- inadequate clearance to Essential Energy assets;
- materials and equipment are not fit for purpose or compliant with this standard;
- attachment materials are not compliant with CEOM7004 Standard Contestable (Approved) Materials List;
- the equipment interferes with the electricity distribution function;
- attachment is not as per the proposed or as-built design; or
- the pole is overloaded.

### **3.3.9 Removal of attachments**

Where the Attachment Owner decides to no longer continue with an occupancy license or where it has been cancelled, the Attachment Owner is responsible for removing the attachment and reinstating Essential Energy's poles back to a reasonable standard which includes:

- plugging holes with a suitable size pole plug supplied by Preschem Pty Ltd.
- removing conduits, risers and protective guards to a minimum of 300mm below ground level to facilitate Essential Energy pole asset inspections; and
- grinding off any fasteners that break during removal such that the remaining part shall be made flush with the surface of the pole or column and all sharp edges and burrs removed.

Where an unapproved attachment is identified, attempts shall be made to contact the Attachment Owner to remove the attachment using a Level 1 or 2 ASP. If the attachment is not removed by the Attachment Owner within the agreed timeframe, the equipment will be removed, and all costs will be passed onto the attachment owner in line with Essential Energy's procedures.

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**3.4 Other requirements**

**3.4.1 Asset Maintenance or Replacement**

If decorations or private attachments are installed on an Essential Energy asset and the asset needs to be changed for maintenance or safety reasons, the use of the asset will be terminated, and a new agreement will need to be made.

**3.4.2 Removal of Essential Energy Assets**

If Essential Energy removes its electricity assets from a pole (eg. relocating overhead assets to underground) the ownership of the pole may be required to be transferred to the owner of the remaining attachments installed on the pole. Otherwise, the Attachment Owner must remove their equipment in a timely manner as required by Essential Energy.

**3.4.3 Proposed future use of a pole**

Where it has been identified by Essential Energy as requiring the use of poles for future network equipment, these poles will be excluded from the available attachment sites.

**3.4.4 Maintenance of attachment**

It is the Attachment Owner's responsibility to conduct routine inspection and maintenance of the attachment. If the equipment is identified as having a defect that may impact the safe attachment to the pole or the ability to operate the attachment, the Attachment Owner must conduct repairs. If repairs cannot be conducted to adequately address the defect, the attachment must be replaced or removed.

**4.0 AUTHORITIES AND RESPONSIBILITIES**

Title	Responsibility
<b>Head of Engineering</b>	<ul style="list-style-type: none"> <li>• Approving the standard and variations.</li> <li>• Delegating authority as required.</li> </ul>
<b>Manager Engineering Overhead Assets</b>	<ul style="list-style-type: none"> <li>• Implementing the standard.</li> <li>• Updating and assessing variations to the standard.</li> <li>• Clarifying all the technical aspects of this manual to the stakeholders.</li> </ul>
<b>Account Specialist - Telco Infrastructure</b>	<ul style="list-style-type: none"> <li>• Processing and managing applications not covered in this standard</li> </ul>
<b>Contestable Works Design &amp; Certification Manager</b>	<ul style="list-style-type: none"> <li>• Processing and managing applications in accordance with this standard</li> </ul>
<b>Network Earthing Manager</b>	<ul style="list-style-type: none"> <li>• Making recommendations concerning the approval of earthing studies and risk assessments.</li> </ul>
<b>Community Relations Manager</b>	<ul style="list-style-type: none"> <li>• Liaising with Regional Planners to ensure that attachments are in accordance with Essential Energy's policies.</li> </ul>



## 5.0 DEFINITIONS

### **Accredited Service Provider (ASP)**

An individual or entity accredited through a ministerially recognised accreditation scheme to undertake contestable work.

### **Asset**

Includes all Essential Energy power poles, streetlight poles, pillars, padmount substations, switching stations and network equipment connected to the electricity network that is not installed to AS/NZS3000.

### **Australian Radiation Protection and Nuclear Safety Agency (ARPANSA)**

The Australian Government's primary authority on radiation protection and nuclear safety. ARPANSA regulates Commonwealth entities using radiation with the objective of protecting people and the environment from the harmful effect of radiation. ARPANSA undertakes research, provides services, and promotes national uniformity and the implementation of international best practice across all jurisdictions.

### **Attachment Owner**

The party legally responsible for any private attachment or decoration (authorised or unauthorised) that is installed or decorated on an electricity network asset as defined by this standard.

### **Communication cable**

A cable used to provide communication services to an attachment.

### **Decorative painting**

Includes painting an artwork or design onto an asset.

### **EME**

Electromagnetic energy

### **High Voltage (HV)**

For the purpose of this document is nominally 3.3kV, 6.6kV, 6.9kV, 11000, 12700, 19100, 22000 and 33000 Volts.

### **Internet of Things (IoT)**

Any device that gathers and transfers data over a network, eg. cameras, traffic monitors, parking sensors.

### **Low Voltage (LV)**

For the purpose of this document is nominally 400/230 Volts.

### **Low Voltage Aerial Bundled Cable (LVABC)**

The low voltage cable system consists of four compacted stranded hard-drawn aluminium conductors individually insulated with black crosslinked polyethylene (XLPE).

### **Mobile phone base station**

A mobile phone radiocommunications transmitter and its associated infrastructure including any antennas, housings, and other equipment.

### **Photovoltaic panel (PV)**

A panel that converts energy of light directly into electricity for the purposes of providing power supply to a Powered Attachment.

### **Powered Attachment**

Any attachment that requires a power supply from the network or from PV. **Private Attachment**

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Any mounted device that is neither owned by Essential Energy nor installed for an Essential Energy core business purpose on an asset. This includes banner attachments and banners themselves.

### **Radiofrequency Electromagnetic Energy (EME)**

The transfer of energy by radio waves in the frequency range between 3 kilohertz (kHz) to 300 gigahertz (GHz).

### **Remote Radio Unit (RRU)**

A radio transceiver used in mobile phone base stations.

### **Review date**

The review date displayed in the header of the document is the future date for review of a document. The default period is three years from the date of approval. However, a review may be mandated at any time where a need is identified due to changes in legislation, organisational changes, restructures, occurrence of an incident or changes in technology or work practice.

### **Safe Approach Distances (SAD)**

The minimum separation in air from an exposed conductor that shall be maintained by a person or any object (other than insulated objects designed for contact with live conductors) held by or in contact with that person.

### **Sign/Banner**

Any sign or banner that identifies and or promotes non-profit services, events, or activities for community.

### **Streetlight (SL) conductor**

Cable or conductor used to provide electricity to streetlights.

### **Street Signage**

Any signage including street name signs, regulatory signs, warning signs, advisory signs, stock signs or temporary roadwork signs.

### **Small cells**

Low-powered mobile phone base stations.

### **Structure**

Timber, steel or concrete power poles or steel streetlight columns.

### **Underground to Overhead (UGOH)**

Transition from an underground cable to overhead conductors.

### **Unpowered attachment**

Any attachment that does not require a power supply.

### **WHS**

Work Health and Safety

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## 6.0 REFERENCES

<b>Internal</b>
CEOF6595 - Branch Form – Essential Energy Equipment: Agreement & Application to Decorate or Install Private Attachments
CEOM7004 - Standard Contestable (Approved) Materials List
CEOM7011 - Standard Overhead Conductor: Current Rating Guide
CEOM7097 - Overhead: Design Manual
CEOM7098 - Underground: Design Manual
CEOM7099 - Overhead Construction Manual
CEOM7115.25 – General arrangement mobile phone base station on a pole with supply from the overhead network
CEOM7115.26 - General arrangement mobile phone base station on a column with supply from the underground network
CEOM7115.27 - General arrangement IoT on a pole with supply from the overhead network
CEOM7115.28 - General arrangement IoT on a column with supply from the underground network
CEOM7115.29 – Electrical supply from SL columns for joint use attachments
CEOM7150 - Attachment of communication cable to Essential Energy’s Network by External Telecommunications Carriers: Design and Construction Requirements
CEOM7302 – Overhead manual
CEOP2422 - Safe Approach: Assess Electrical Apparatus
CEOP8034 – Energised Work
CEOP8030 – Electrical Safety Rules
CEOP8041 - Work Near Essential Energy’s Underground Assets

<b>External</b>
AS/NZS 1154 - Structural steel welding - Welding of steel structures
AS/NZS 1158.1.2 – Lighting for roads and public spaces. Vehicular traffic (Category V) lighting – Guide to design, installation, operation and maintenance.
AS/NZS 1170.2 – Structural Design, Wind Actions
AS/NZS 2053.1 - Conduits and fittings for electrical installations General requirements

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AS/NZS 3000 – Wiring Rules
AS/NZS 4509 - Stand-alone power systems
AS/NZS 4680 - Hot-dip galvanized (zinc) coatings on fabricated ferrous articles
AS/NZS 5033 - Installation and safety requirements for photovoltaic (PV) arrays
AS/NZS 61000.3.2 – Electromagnetic compatibility (EMC)
AS/NZS 7000 – Overhead line design
ARPANSA RPS3 - Radiation Protection Standard for Maximum Exposure Levels to Radiofrequency Fields - 3 kHz to 300 GHz
Austrroads: Road Design – Guides
Service and Installation Rules of NSW
Safe Design of Structures Code of Practice July 2014
Work Health and Safety Act 2011
Work Health and Safety Regulation 2017

## 7.0 RECORDKEEPING

The table below identifies the types of records relating to the process, their storage location and retention period.

Type of Record	Storage Location	Retention Period
Application forms	SharePoint online	Retain minimum of 7 years after disposal or decommissioning of the asset, or where the project is not linked to a specific asset or infrastructure component, 7 years after action completed, then destroy).GA40-6.4
Construction designs and supporting documentation		
Designer Safety Report		
Project Safety & Environment Plans		

\* The following retention periods are subject to change, eg. if the records are required for legal matters or legislative changes. Before disposal, retention periods should be checked and authorised by the Records Management Team.

## 8.0 REVISIONS

Issue Number	Section	Details of changes in this revision	Change Risk Impact?
2	3.1	Combined sections from CEOP8037	Low
	3.2.10.3 Approvals	Combined sections from CEOP8037	Low

15 September 2022 – Issue 3 (Refer revisions section)  
Approved By: Head of Engineering (Full review May 2022)  
Next review date: May 2025  
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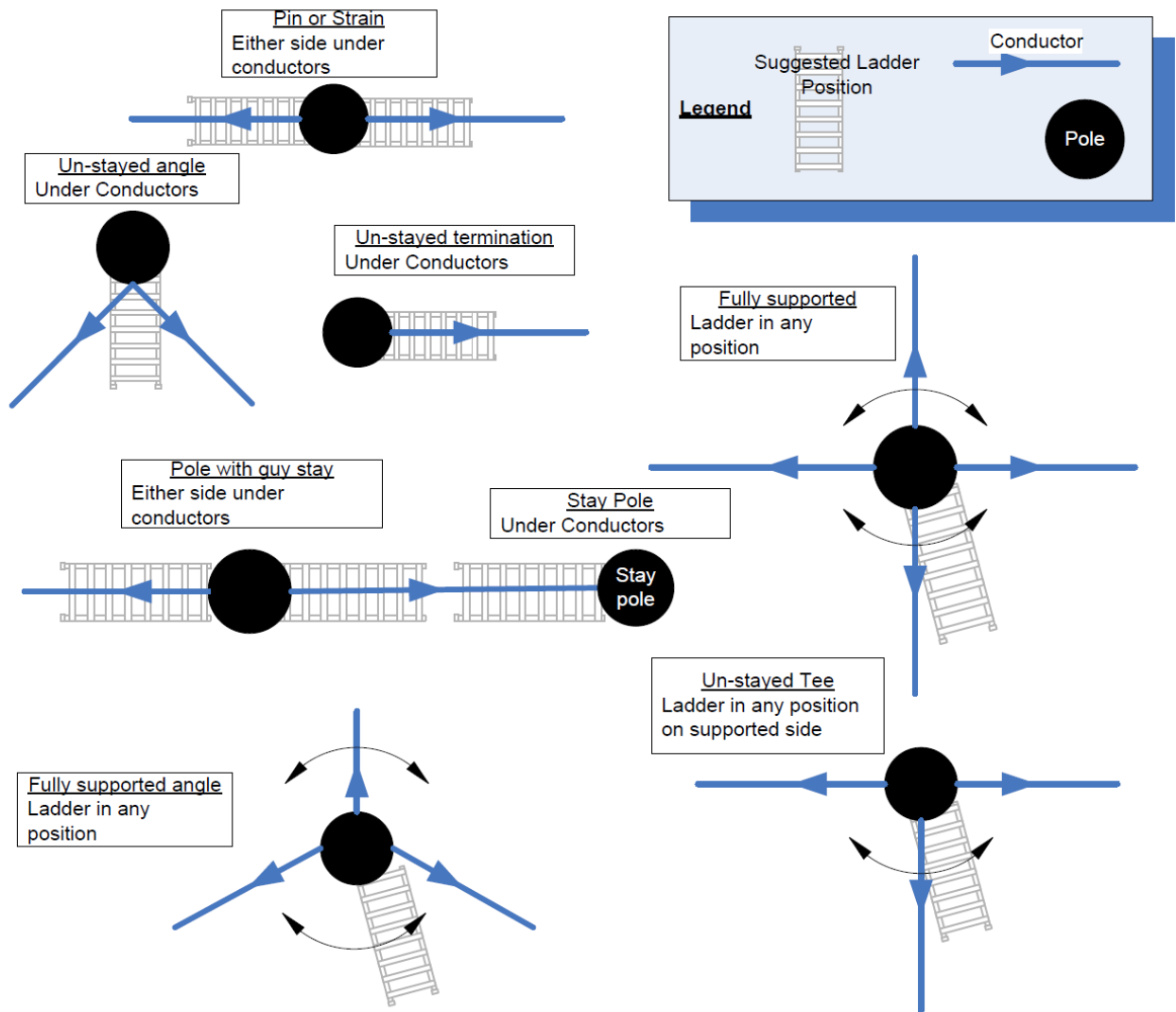
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### ANNEXURE A: Typical ladder locations based on conductor locations



**ANNEXURE B: Street light column types**



**Figure 11: See-saw column typically installed in road round about.**



**Figure 12: Pot belly column**



**Figure 13: Triangular column**



**Figure 14: Heritage columns**