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### 1 SCOPE

This Work Category Specification *WCS*73 documents the *Service* requirements for *Wireless Installations* on *Overhead Assets*.

General

- (a) As part of and in conjunction with this *WCS*73, read *WCS*133 for the general standards and conditions, where they are relevant to, and are incorporated into this category of work.
- (b) Standards and conditions of this *WCS*73 are to be taken as the definitive specified requirements for works under this *WCS*73, where they vary from that of *WCS*133.
- (c) For the avoidance of doubt, a breach of a general standard or condition contained in *WCS*133 is a breach of *WCS*73.

### 1.1 Application

The Services include, and are not limited to, the following:

- (a) Wireless Installation component design, testing and certification.
- (b) Acceptance consideration of Wireless Installations by *Ergon Energy* and *Energex*.
- (c) Selection of eligible Overhead Assets for Wireless Installations.
- (d) Attachment, inspection, maintenance, upgrade, and recovery of *Wireless Installation* components.

### 1.2 Exclusions

This WCS73 excludes the following work and / or tasks:

- (a) *Wireless Installations* not installed on *Overhead Assets* including adjacent sites, for example land, building and towers, owned by external parties.
- (b) *Wireless Installations* installed directly on Ergon Energy or *Energex* easements, landholdings and buildings including substation yards.
- (c) *Wireless Installations* installed on *Ergon Energy* or *Energex* telecommunications infrastructure, for example towers.
- (d) Establishing a point of electricity supply including:
  - (i) Consumers mains attached to wood Poles.
  - (ii) Second point of supply to a Wireless Installation on a Column.



### 2 AMENDMENT RECORD

Version	Date	Author
5	19 April 2022	Shea Barnes
Amendment Overview		

Updated to reflect dual branding across both networks, formatting network terminology, and various training requirements have also been updated to reflect new course codes with EsiTrain.

### 3 AIMS / OBJECTIVES

The aims and objectives of this WCS73 is to ensure:

- (a) The overall aims and objectives detailed in *WCS*133, Section 3 Aims and Objectives, are met by the application of requirements herein; and
- (b) The following specific WCS73 category of work requirements are met:
  - (i) Wireless Installations on Overhead Assets are safe and do not unnecessarily interfere with Ergon Energy and Energex electricity network infrastructure integrity, performance, operations, reliability, and / or associated works programs for example and including:
    - i. Do not constitute a hazard to electricity supply workers, pedestrian and vehicular traffic or any other party or their property.
      - ii. Do not damage, structurally weak, or overload Overhead Assets.
    - iii. Do not unnecessarily interfere with *Ergon Energy* and *Energex* in the discharge of its responsibilities, operations, or works programs.
  - (ii) *Wireless Installations* on *Overhead Assets* have all required Authorisations and comply with all relevant *Laws*.
  - (iii) *Wireless Installations* on *Overhead Assets* are appropriately engineered and are safe to install and operate.
  - (iv) Operators are appropriately trained and competent to perform all required works associated with Wireless Installations on Overhead Assets.

### 4 COMPETENCIES, TRAINING AND QUALIFICATIONS

- (a) Service Providers / Operators / subcontractors performing Services are suitable, licensed, and trained in accordance with WCS133, Section 4 Competencies, Training and Qualifications.
- (b) For competencies, training and qualification requirements specific to this *WCS*73 refer to the below included references, clauses and tables.

#### 4.1 Telecommunications Licensing

For all telecommunications installation related work under this WCS73, including:

- (a) Wireless Installations; and
- (b) Supporting telecommunications cable related infrastructure (for example fibre optic cable),



*Operators* are to be suitably and lawfully licensed, trained, and authorised to provide all *Client Services*.

### 4.2 External Party Installation Training

- (a) Overhead Assets may support External Party installations including and not limited to:
  - (i) BBI cable networks installed on Poles; and
  - (ii) Wireless, *RFR* emitting telecommunications installations installed on or adjacent to *Overhead Assets*.
- (b) Operators accessing any Overhead Assets are to be appropriately trained (through EsiTrain or an EsiTrain approved Registered Training Organisation) and authorised to identify all External Party installations in the field and to apply safe work procedures to undertake works safely in their vicinity, including procedures for antenna de-energisation, isolation and re-energisation.

### 4.3 Dogger / Rigger

For the lifting and placement of components on *Overhead Assets* using mobile plant, for example mobile crane; the Dogger / Rigger is to be qualified and trained to carry out this work in accordance with the *Service Provider's* safe system of work.

### 4.4 Tower Operations

On *Ergon Energy* and *Energex* steel lattice *Towers*, only *Operators* who are qualified and trained in accordance with the *Service Provider's* safe system of work are to carry out *Tower* works, for example, accessing / working, and rescue from *Towers* at heights.

### 4.5 Licensed Electrical Contractor

A *Licensed Electrical Contractor* is to have the appropriate additional competencies required to perform electrical installation works associated with *Wireless Installations* located on each specific type of *Overhead Asset* site.

### 4.6 Ergon Energy and Energex Competencies

<u>Table 1</u> specifies the *Ergon Energy* and *Energex* competencies / *Authorisations* (or combinations thereof) that are Ergon Energy and *Energex* requirements to be held by *Operators*.



#### Table 1 – Operator Competencies

Course Code	Competency Description	Operator Requirements		
Operators hold the following competencies.				
AOILS E296 / 1583	Oil Spill Management ( <u>Note 1</u> )	МО		
ASOIL E298 / 1584	Sediment Control Awareness (Note 1)	МО		
AVIRO E295 / 1582	Environmental Awareness ( <u>Note 1</u> )	R		
T0911 / 1656	Introduction to Electrical Network Infrastructure for Authorised Persons ( <u>Note 4</u> )	R		
T0911 / 1656	Authorised Person (where required under, as defined in Electricity Safety Regulation 2013) Introduction to Electrical Network Infrastructure for Authorised Persons	R		
Operators hold t	Operators hold the following competencies when the relevant work activity is being undertaken.			
ACONN M292 / 1961	Connections to the Low Voltage Network (Note 3)	AR		
E297 /1003	Biosecurity Awareness ( <u>Note 1</u> )	МО		
T0839 / 1013	Access Electrical Network Infrastructure for the Individual of Workgroup (IWG) in QLD ( <u>Note 2</u> )	AR		
M593 / 1353	Low Voltage Switching Operator ( <u>Note 5</u> )	AR		
T0841 / 1017	Access Electrical Network Infrastructure for the Recipient in QLD ( $Note 6$ )	AR		
T0841 / 1017	Switching Operator's Assistant in QLD	AR		
T0727 / 1692	Broadband Infrastructure Awareness	AR		
T0726 / 1691	Radio Frequency Radiation Awareness	AR		
	Qualifications in Illumination Engineering which allow entry into the Illumination Engineering Society of Australia and NZ as a member. (Note $7$ )	AR		

#### Legend:

- R Required
- AR As required; subject to the work activity being undertaken and the operating environment
- MO A minimum of one person on *Worksite* holds this competency



- Note 1: Service Providers with their own environmental training system equivalent as a minimum to the Ergon Energy and Energex environmental training system; may train and assess their own Operators as competent.
- Note 2: Hold this *Authorisation* if required to sign onto an Access Permit as a *Work Group* member, for *HV* circuit(s) isolated as per SAHV<sup>1</sup> procedures.
- Note 3: This "Testing Connections to LV Distribution Network" competency is to be held by any *Operator* who performs part or all of the electrical work and is responsible for bringing the electrical installation to a state of readiness for connection to a source of electricity.
- Note 4: This "Introduction to Electrical Network Infrastructure" competency is to provide Service Provider and Operators with an understanding of electrical distribution network and the associated hazards.
- Note 5: A minimum requirement of one *Operator* with "Low Voltage Switching Operator" *Authorisation* is assisted at all times by a competent assistant as defined in Manual 00301<sup>2</sup>.
- Note 6: *Operators* hold this "Access Electrical Network Infrastructure for the Recipient in QLD" competency when required to accept a network switching access permit.

Note 7: In order to maintain public lighting performance criteria, the Registered Professional Engineer Electrical certifying public lighting designs to be installed on *Overhead Assets* is to hold this additional qualification.

### 4.7 Authorised Persons

- (a) The *Service Provider* is to ensure all *Operators* are *Authorised Persons* where required under, and as defined in, Electricity Safety Regulation 2013
- (b) Ensure no work is undertaken on any *Wireless Installation* components that are within the relevant statutory exclusion zones that apply for each individual *Operators* as an *Authorised Person*, including to energisable conductors and uninsulated electrical equipment (plant), for example and not limited to:
  - (i) Public lighting supply circuits.
  - (ii) Column and Pole brackets / outreaches.
  - (iii) *LV* and *HV* energisable conductors and uninsulated electrical equipment (plant).
  - (iv) External Party broadband network strandwire and / or cabling.

### 4.8 Required Accredited Service Provider Ratings

- (a) *Overhead Asset* condition assessment of *Columns* and *Poles* in accordance with *WCS5.1*.
- (b) Electrical distribution network augmentation design in accordance with *WCS*47.3 and *WCS*47.4.
- (c) Electricity network *Make Ready Work* on the relevant *Overhead Assets* in accordance with *WCS*6.2, *WCS*25, *WCS*31, *WCS*37, *WCS*90 and *WCS*91.3.
- (d) A current ASP third party shared asset rating under *WCS*73 is required for the initial installation of *Wireless Installations*, in relation to:

<sup>&</sup>lt;sup>1</sup> Queensland Electricity Entity Procedures for Safe Access to High Voltage Electrical Apparatus.

<sup>&</sup>lt;sup>2</sup> For *Ergon Energy and Energex* related references refer to Section 13 – References.



- (i) Obtaining line of sight data (for example utilising insulated telescopic extendable equipment to position cameras for line of site imaging).
- (ii) Component attachment externally on Column.
- (iii) Internal telecommunications cabling installation within the Column.
- (iv) Internal electrical power cabling installation (e.g. electrical sub-mains) within the *Column*.
- (v) Drilling of holes in *Column* to enable internal cabling egress to externally mounted *Wireless Installation* components.
- (vi) Underground telecommunications cabling installation into *Column* from external telecommunications conduit network via the foundation entry.
- (e) A current ASP third party shared asset rating under *WCS*37 is required for the initial installation of *Wireless Installations*, in relation to:
  - (i) Any additional excavation or augmentation on or in the vicinity of the *Column* foundation.
  - (ii) Any installation of a new foundation including new conduit entries.
  - (iii) Any installation of a new *Column* or the transfer of an existing *Column* to a new foundation.
- (f) Wood *Poles* the *Service Provider* is to be ASP third party shared asset rated to *WCS*25 as a minimum to:
  - (i) Obtaining line of sight data (for example utilising insulated telescopic extendable equipment to position cameras for line of site imaging).
  - (ii) Undertake any *Wireless Installation* construction or maintenance works on a wood *Pole.*
- (g) *Tower* the *Service Provider* is to be ASP rated to *WCS*90 and / or *WCS*91.3 as a minimum to undertake any *Wireless Installation* construction or maintenance works on or in the vicinity of a *Tower*.

### 4.9 Provision of Ergon Energy and Energex Assistance

- (a) Ergon Energy or Energex may agree to perform Make Ready Works and / or Wireless Installation related works under this Work Category Specification WCS73 at the Service Provider's or Client's sole cost.
- (b) If requested by the *Service Provider* or *Client*, and at the *Service Provider's* or *Client's* sole cost; *Ergon Energy* or *Energex* may agree, subject to any relevant contractual agreement provisions and at its discretion; to:
  - (i) Assist with Overhead Asset design.
  - (ii) Supply new, modified or replacement *Overhead Assets* with required height and structural (strength) rating to accommodate *Ergon Energy or Energex*, other party, and *Wireless Installation* attachments.
  - (iii) Manage switching and isolation of *Ergon Energy* or *Energex* network.
  - (iv) Undertake Worksite construction and maintenance activities.



### 5 VEHICLES AND PLANT

For vehicles and plant requirements, refer to *WCS*133, Section 5 – Vehicles and Plant, except for the following variation:

(a) The Service Provider will not display any Ergon Energy or Energex logos on the vehicle(s) when not engaged in the activity of providing Services to or on behalf of Ergon Energy or Energex.

### 6 MATERIALS, TOOLS AND EQUIPMENT

- (a) For materials, tools, equipment requirements, refer to *WCS*133, Section 6 Materials Tools and Equipment.
- (b) For materials, tools, equipment requirements specific to this category of work refer to the below included references and clauses.

### 6.1 Specialised Plant and Equipment

The *Service Provider* is to source all appropriate specialised plant and equipment to perform attachment, maintenance, and recovery of *Wireless Installations* on all types of *Overhead Assets*.

### 6.2 Nominated Tools and Equipment

Table 2 specifies the nominated materials, tools and equipment required when providing *Services* under *WCS*73.

#### 6.3 Consumables

The *Service Provider* and / or *Operator* is to supply all consumable materials required for the *Services* being provided.

### Table 2– Materials, Tools and Equipment

Description	Supplier
Suitable range of trade tools and equipment for establishing and maintaining <i>Wireless Installations</i> .	Service Provider
All required <i>RFR</i> safety and testing instruments and devices.	Service Provider
Low Voltage Proximity Testers *	Service Provider
*These items of equipment are required under WP1202 <sup>3</sup> Specification, when bringing an electrical	

installation to a state of readiness for connection to a source of electricity.

<sup>&</sup>lt;sup>3</sup> For *Ergon Energy and Energex Network* related references refer to Section 13 – References.



### 7 SAFETY

- a) For safety requirements, refer to WCS133, Section 7 Safety.
- b) For safety requirements specific to this WCS73 refer to the below included references and clauses.
- c) The Service Provider is to abide by the Law, *Ergon Energy* and *Energex* and relevant Authority safety, engineering and personnel training and competency requirements in relation to safely working on and in the vicinity of *Ergon Energy* or *Energex* assets, electrical conductors, plant and equipment, and on roadways, as a minimum.
- d) The Service Provider is to implement control measures to eliminate and / or reduce all risk exposures, including:
  - (i) Work on / or in the vicinity of any parties *RFR* emitting telecommunications installation installed on *Overhead Assets* and other party adjacent infrastructure.
  - (ii) Work on / or in the vicinity of any parties aerial BBI network including:
    - i. Earthed / electrically conductive strand wire and electrically energised telecommunications cables; and
    - ii. Laser light emitting fibre optic cables.
  - (iii) Overhead Assets being conductors of electricity, including earth leakage on Overhead Assets supporting HV.
  - (iv) Overhead Assets supporting multiple infrastructure components of Ergon Energy or Energex and External Parties at various attachment points including and not limited to energised (live) cables transitioning down wood Poles.
  - (v) Ascending and descending of transmission structures (for example *Towers*).
  - (vi) Disturbance and / or removal of paints and coatings on *Tower* legs at and / or near ground surface level containing hazardous substances (for example asbestos containing material).
- e) The Service Provider is to ensure that onsite Overhead Asset condition assessments and engineering design calculations (certified by an RPEQ) are undertaken, when the physical loading of any Overhead Asset is impacted by a Wireless Installation, so that there is adequate structural capacity in the Overhead Asset to accommodate the structural loading change caused by any Wireless Installation.
- f) As part of the Service Provider's safe system of work, ensure:
  - (i) It has a safety inspection procedure (including training) for working on *Overhead Assets* to ensure the structural integrity of the *Overhead Asset* is satisfactory for accessing the *Overhead Asset* and for the intended works on the *Overhead Asset*.
  - (ii) For each *Wireless Installation* type proposed to be installed on, the *Service Provider* has a safe system of work for each combination of *Wireless Installation* type and the accommodating *Overhead Asset*.
  - (iii) That no *Column* is to be accessed by or used to support an extension ladder of any type as a minimum requirement.
  - (iv) Operators are only to gain above ground access to Poles ensuring EWP or ladder (insulated) used as a minimum.
  - (v) Legislated electrical exclusion zones (approach distance limits) to energised conductors and other apparatus (plant and equipment), are to be complied with and not encroached upon.



- (vi) Operators are to take specific care when working on Poles to avoid contact with existing energised conductors, exposed parts (that are or could become energised, for example public lighting outreach brackets), cables and other attachments owned by Ergon Energy or Energex and other external parties including aerial broadband telecommunications network metallic earthed strand wire and attached cables.
- (vii) All work is subject to a manual handling risk assessment by the *Operator* and restrictions identified during the *Service Provider's* risk assessment.
- g) The *Service Provider* is to ensure that all *Wireless Installation* components are designed manufactured tested and installed in accordance with the relevant *RPEQ* design criteria and certifications to ensure safe installation and ongoing operation.
- h) The *Client* and / or *Service Provider* is to immediately (or as soon as is practicable after the occurrence) notify in writing the relevant *Ergon Energy or Energex Officer* in the event of any of the following:
  - (i) A Wireless Installation structural failure.
  - (ii) Damage to or failure of an Overhead Asset which supports a Wireless Installation.
  - (iii) An event that has affected the health or safety of any party, or causes damage to, or an outage on, the electricity network or other party's infrastructure.
- i) When undertaking *Wireless Installation* works in the vicinity of energised *LV* or *HV* overhead conductors, it is possible that *Wireless Installation* components or cables may become energized during construction and / or maintenance due to induction from existing energised electrical conductors.
- j) It is essential that procedures are in place to ensure electricity network auto reclosers are set to NON-AUTO for the duration of the works where HV feeders with auto reclosing plant are in close vicinity to the Wireless Installation is being constructed and / or maintained.

### 8 SERVICE PROVIDER REQUIREMENTS RELATING TO PRIMARY CONTRACTORS AND SUB-CONTRACTORS

### 8.1 Carrier Requirements

- (a) If the Carrier intends to perform work as a Service Provider as covered by this WCS73 then the Carrier must be WCS73 rated and is to ensure that all Operators are Authorised Persons as per Clause 4.7 of this WCS73.
- (b) The Carrier may appoint as many Primary Contractors as they deem necessary to perform the work covered by this WCS73. Primary Contractors may be an Accredited Service Provider under this WCS73 or manage Service Providers under this WCS73. Primary Contractors must be WCS73 rated whether they are not performing work as a Service Provider or managing Service Providers only. The Primary Contractor is to ensure that all Operators are Authorised Persons in accordance with Clause 4.7 of the WCS73.

### 8.2 Primary Contractor Requirements

a) The Primary Contractor may appoint as many Primary Subcontractors as they deem necessary to perform the work covered by this WCS73. Primary Subcontractors must be an Accredited Service Provider rated under this WCS73. Primary Subcontractors are not permitted to be a second level of Service Provider management. The Primary Subcontractor is to ensure that all Operators are Authorised Persons in accordance with Clause 4.7 of the WCS73.



b) Only two levels of contractor appointment are permitted: A *Primary Contractor* and a *Primary Subcontractor*.

### 9 ENVIRONEMENT

- a. For environmental requirements, refer to WCS133, Section 8 Environment.
- b. For environmental requirements specific to this *WCS*73 refer to the below included references and clauses.
- c. Assess and manage the additional environmental risks associated with this *WCS*73, including and not limited to:
  - (i) Visual impact management.
  - (ii) Energy (for example *RFR* management).
- d. Before commencing works, *Site* specific inductions are required to be undertaken in areas covered under the Code of Practice Maintenance of Electricity Corridors in Queensland's Parks and Forests 2016 and Wet Tropics World Heritage Areas specific requirements.
- e. The Service Provider must complete a cultural heritage assessment to ensure their works do not impact on any registered Indigenous and non-indigenous cultural heritage (including state and local government listed).

Where impacts will occur to a heritage listed site the Service Provider is responsible for gaining the appropriate exemption certificate and/or approvals.

### 10 EXTENT OF WORK

### 10.1 General

- (a) For the general extent of work requirements, refer to *WCS*133, Section 9 Extent of Work.
- (b) For extent of work requirements specific to this *WCS*73 refer to the below included references and clauses.
- (c) Provide *Services* under this *WCS*73 in accordance with (and not limited to):
  - i. Work Category Specification WCS5.1 Poles Inspect and Treatment.
  - ii. Work Category Specification WCS6.2 Public Lighting Maintenance.
  - iii. Work Category Specification WCS25 Overhead Mains Electrical Construction.
  - iv. Work Category Specification WCS31 Commissioning and Operation.
  - v. Work Category Specification WCS34 Earthing Systems.
  - vi. Work Category Specification WCS37 Public Lighting Installations.
  - vii. Work Category Specification WCS47.4 Electrical Network Planning and Design.
  - viii. Work Category Specification 72 External Party Communications Cables.
  - ix. Work Category Specification 72.1 External Party Underground Communications Cables.
  - x. Work Category Specification 72.2 External Party Aerial Communications Cables.



xi.	Work Category Specification WCS73 - External Party Wireless Telecommunications Installations On Overhead Electricity Network Assets.
xii.	Work Category Specification WCS90 - Overhead Transmission Construction and Maintenance.
xiii.	Work Category Specification WCS91.3 - Overhead Transmission Tower Maintenance
xiv.	Work Category Specification WCS125 - Mobile Cranes.
XV.	Work Category Specification WCS133 - General Standards and Conditions.
xvi.	Energy Queensland Manual 00302 - Overhead Design Manual⁴.
xvii.	Energy Queensland Overhead Construction Manual, Doc. No. 4920 <sup>6</sup> .
xviii.	Energy Queensland Overhead Transmission Construction Standards <sup>6</sup> .
xix.	Energy Queensland Procedure 00237 - Shared Network Asset Works Management <sup>6</sup> .
XX.	Energy Queensland Manual 00294 - Queensland Electricity Connection and Metering Manual <sup>6</sup> .
xxi.	Energy Queensland Standard 00310 - Energy Queensland Environmental Management System: Environmental Standard <sup>6</sup> .
xxii.	Energy Queensland Manual 00354 – Overhead Network Condition Assessment Manual <sup>6</sup> .
xxiii.	Energy Queensland Manual 00502 - Lines Defect Classification Manual.
xxiv.	Energy Queensland Manual 00369 - Pole Inspection Guidelines.
XXV.	Energy Queensland Manual 00796 – Queensland Public Lighting Construction Manual.
xxvi.	Energy Queensland Standard 01037 - As Constructed Drawing Standard.
xxvii.	Energy Queensland Work Practice WP1202 - Low Voltage Connections.
xxviii.	Energy Queensland Work Practice WP1249 - Earth Resistance Testing Transmission Structures.
xxix.	Energy Queensland Work Practice WP9524 - Inspecting Poles and Crossarms for Safe Work.
XXX.	Queensland Electricity Entity Procedures for Safe Access to High Voltage Electrical Apparatus (SAHV).
xxxi.	Energy Queensland Group Form 1206 – Network Connection Application.
xxxii.	Energy Queensland Group – Electrical Work Request.
xxxiii.	The Service Provider's safe system of work.
xxxiv.	Documentation (with RPEQ certification) detailing the relevant procedures for the design, installation, maintenance and recovery of each type of Shared Asset Installation proposed to be installed by the Service Provider / Operator for each Client.
XXXV.	Measures designed to avoid contacting underground infrastructure based on obtained current plans detailing existing underground essential services infrastructure in the immediate area and surrounding the <i>Worksite</i> .

<sup>&</sup>lt;sup>4</sup> For Ergon *Energy and Energex* related references refer to Section 13 – References.



xxxvi.	Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) Radiation Protection Standard for Maximum Exposure Levels to Radio Frequency Fields – 3 kHz to 300 Ghz.
xxxvii.	Telecommunications Act 1997 (Cth) as amended or replaced.
xxxviii.	Telecommunications Code of Practice 1997 as amended or replaced.
xxxix.	Telecommunications (Low-Impact Facilities) Determination 1997 as amended or replaced.
xl.	AS 1199.1:2003 – Sampling procedures for inspection by attributes – Sampling schemes indexed by acceptance quality limit (AQL) for lot-by-lot inspection.
xli.	AS 2550.5-2016 - Cranes, hoists and winches - Safe use - Mobile cranes.
xlii.	AS 1418.5:2013 – Cranes, hoists and winches – Elevated work platforms (EN 13000:2010,MOD).
xliii.	AS 1319-1994 - Safety signs for the occupational environment.
xliv.	AS/NZS 1170.2:2011 - Structural design actions - Wind actions.
xlv.	AS/NZS 3000:2018 – Wiring Rules (Known as the Australian/New Zealand Wiring Rules).
xlvi.	AS/NZS 7000:2010 - Overhead line design - Detailed procedures
xlvii.	AS 4702-2000 (R2013) - Polymeric cable protection covers.
xlviii.	AS/NZS 2053.1:2001 (R2016) - Conduits and fittings for electrical installations -General requirements
xlix.	AS/NZS 4676:2000 - Structural design requirements for utility services poles.
I.	AS/NZS 3015 – 2004 - Electrical Installations - Extra-Low Voltage D.C. Power Supplies And Service Earthing Within Public Telecommunications Networks.
li.	AS/NZS 61558.1:2008 - Safety of Power Transformers, Power Supplies, Reactors and Similar Products - General requirements and test (IEC 61558-1 Ed 2, MOD.
lii.	Work Health and Safety Act 2011 - Managing risks of plant in the workplace Code of practice 2013
liii.	Work Health and Safety Act 2011 – Mobile Crane Code of Practice 2006.
liv.	Work Health and Safety Act 2011 – Lifter Borer Code of Practice 2006

### **10.2 Generic Wireless Installation Requirements**

- Note: Ergon Energy and Energex preference for a low powered / small cell Wireless Installation on a Pole or Column is for a packaged equipment arrangement which combines the power supply, RF module and antenna (including GPS antenna) module within one lightweight, compact, integrated unit. This type of installation has the advantage of reduced drilling of Columns and eliminates the need for cabling between the RF module and antennas.
  - (a) Where applicable to the *Client* (for example a registered telecommunications carrier); physical dimension and volumetric limits and colour matching for *Wireless Installations* installed on any *Overhead Asset* is to comply with relevant co-located facility requirements applicable to the actual commercial; industrial; residential or rural location of the *Wireless Installation*; as stipulated within Telecommunications Act related legislation, including Telecommunications (Low-Impact Facilities) Determination 1997 and its Schedule (as



amended by Amendment No. 1 of 1999 and as further amended or replaced from time to time).

- (b) Attach the agreed antenna unit to the *Overhead Asset* at antenna unit height above ground specified by *Client*, and ensure that the height and installation arrangement is in accordance with requirements of the Telecommunications Act and all relevant *Laws*.
- (c) Utilise adaptor mounts suitable for fitting to a range of *Column* and *Pole* diameters and cross sections, where vertical antenna unit adjustment is required in either vertical or horizontal planes.
- (d) Design omni antennas so that they are able to be tilted away and downwards to facilitate EWP access to a Column or Pole for any works at or above the antenna position.
- (e) All Wireless Installation component attachments are to be made via agreed standard, RPEQ certified, durable stainless or galvanised steel adaptor mounts.

#### **10.2.1** The Client in conjunction with the Service Provider is to

- (a) Ensure all necessary notifications, approvals, permits, and licences have been obtained to co-locate, install, maintain and operate each *Wireless Installation*.
- (b) Ensure all owners and occupiers of land (*Landholders* and *Occupiers*), relevant *Authorities* (including the road controlling *Authority*), and members of the public / local community have been notified, consulted and objections addressed (including as required by *Law*) regarding the proposed *Wireless Installation* to be installed and operated, and the work to be performed
- (c) Obtain *Ergon Energy* or *Energex Authorisation* for each combination of *Wireless Installation* type and Electricity network infrastructure.
- (d) Provide one point of contact should *Ergon Energy* or *Energex* get into an operational situation which requires the *Wireless Installation* owner to undertake

remedial works.

#### 10.2.2 Every Wireless Installation installed on an Overhead Asset

- (a) Is to be of a compact design so once installed it has:
  - (i) Minimum overall community impact; and
  - Where applicable, is classed as a low impact facility, in accordance with Telecommunications (Low-Impact Facilities) Determination 1997 (as amended by Amendment No. 1 of 1999) and as further amended or replaced from time to time.
- (b) Is to have components and Overhead Asset attachment systems, components and fittings, operation methods and electrical / electronic components which are to be:
  - (i) Designed, tested and certified by an RPEQ; and
  - (ii) Submitted to Ergon Energy or Energex for acceptance / consideration.
- (c) Is to incorporate appropriately engineered (RPEQ–certified) design and construction methods; using Overhead Asset attachment system(s) which are suited to the type and size of Overhead Asset used for Wireless Installation, which RPEQ(s) are to collectively hold all relevant electrical, mechanical and / or structural engineering disciplines to undertake such engineering certification of each proposed Wireless Installation.
- (d) Is to have components and fittings which are:
  - (i) Weatherproof;



- (ii) Ultra violet light resistant;
- (iii) Corrosion resistant;
- (iv) Electrically non-conductive (where achievable); and
- (v) Designed and positioned in close vicinity to each other where possible to:
  - i. Minimise the aesthetic impact of the total Wireless Installation; and
  - ii. Reduce possibility of mechanical damage occurring during future works.
- (e) Is to use standard, compact, proprietary Wireless Installation components, specifically designed for external applications within the public domain.
- (f) Is to be of durable stainless or galvanised steel or alternative material frameworks, fittings and attachments with:
  - (i) Low structural stress in components using generous welds.
  - (ii) Durable sub-components, with a minimum of corrosion points.
  - (iii) All connections of components to be welded joints or bolted connections.
  - (iv) Each batch of subassemblies manufactured; load tested in accordance with AS 1199.1.
- (g) Is to comply with and manufactured in accordance with all relevant legislation, Australian Standards and / or other applicable industry codes.
- (h) Is to have negligible probability of failure due to fatigue, impact or vibration by ensuring all stresses experienced by the Wireless Installation do not exceed fatigue limit for:
  - (i) Materials;
  - (ii) Welds; and
  - (iii) Bolted connections;

used to manufacture installation.

- (i) Is to ensure wind flutter or any other type of rapid oscillation and transfer of same to any Overhead Asset is minimised.
- (j) Is to be constructed and installed so no component of the Wireless Installation will come adrift, release or fall to ground; including under high wind / adverse weather conditions.
- (k) Is to be readily attached to and disconnected from any Overhead Asset using common hand tools.
- (I) Stainless strap and buckle style fittings (for example, "Band-It" strap type fittings) that require cutting to remove are NOT permitted for any Wireless Installation component attachment, excluding the below listed Wireless Installation components only on galvanised steel tapered Columns:
  - (i) RFR and site identification signage.
  - (ii) Isolation switches.
- (m) Zip ties that require cutting to remove are NOT permitted for any Wireless Installation component attachment).
- (n) Is not to have bird proofing and other fauna proofing systems of any type.
- (o) Is to be designed to minimise damage to or deterioration / corrosion of any part of an Overhead Asset.
- (p) Will not require the welding of a Column or Tower.



- (q) Will not require the drilling of a Column to enable attachment of a Wireless Installation; other than with formal written agreement from *Ergon Energy* or *Energex* for cable and Conduit access from internal Column cavity to externally mounted Wireless Installations.
- (r) Is to be installed so as not to interfere with, obscure or reduce the effectiveness or impact of:
  - (i) Overhead Asset Site identification numbers.
  - (ii) Public lighting.
  - (iii) Any existing Column / Pole attachments of any party, including:
    - i. Roadway traffic control and safety assets and systems; or
    - ii. Other Authority official devices and signage; or
    - iii. Other External Party wireless telecommunications network infrastructure.
- (s) Will not negatively impact on the safe operations or property of any party, including *Ergon Energy* or *Energex*.
- (t) Will not impede repair or maintenance of the Overhead Asset.
- (u) Will not detract visually from streetscape; adversely affect local community or contravene local Authority or other Authority Regulations or By-Laws including:
  - (i) Council consultation and planning requirements; and
  - (ii) Regulations or industry codes of practice where wireless telecommunications facilities are proposed to be installed within the community.
- (v) Will not consist of any moving or motorised parts, or unrestrained attachments.

#### 10.3 Wireless Installation Design Acceptance Process

- (a) Refer to Diagram 1 below for a flowchart of the Wireless Installation components design acceptance process.
- (b) Written *Ergon Energy* or *Energex* acceptance of each Wireless Installation design is to be obtained prior to the design being constructed and placed into service on any Overhead Asset.
- (c) The Wireless Installation component(s) design, acceptance and certification process is to be repeated after any change in components(s), design parameters, source materials, or fabrication process.
- (d) Acceptance / consideration by *Ergon Energy* or *Energex* does not indicate or grant:
  - (i) An engineering approval or certification; or
  - (ii) Acceptance of liability for any activities or operation of or incidents associated with or related to any Wireless Installation under any circumstances.
- (e) *Ergon Energy* or *Energex* may, at its discretion and for an agreed fee, upon a request from a Client or Service Provider, be able to provide RPEQ consultancy services related to Wireless Installation design and certification, where the Wireless Installation is to be co-located on an Overhead Asset.



### **Diagram 1 - Wireless Installation Components Design Acceptance Process**





#### 10.4 Generic Overhead Asset Selection Requirements

- (a) The Service Provider is to differentiate between Overhead Assets owned by Ergon Energy or Energex and those owned by other Authorities, and public or private bodies when selecting potential Wireless Installation Sites. If in doubt; confirm Ergon Energy or Energex ownership before proceeding with application to install Wireless Installations.
- (b) The attachment of *Wireless Installation* to any *Overhead Asset* on which existing *Wireless Installations*, for example, mobile telephone infrastructure of any type are installed is not permitted without formal written agreement by *Ergon Energy* or *Energex* and all affected *External Parties*.
- (c) Contact the *Ergon Energy* or *Energex Officer* to make a final determination on *Overhead Asset Site* use issues; where unresolved conflicts regarding the use of *Ergon Energy* or *Energex* assets occur between *Clients* and between *Service Providers*.
- (d) At any time, subject to contractual agreement provisions, Ergon Energy or *Energex* may remove or require temporary or permanent removal by *Service Provider* of *Wireless Installation* or component thereof:
  - (i) For *Ergon Energy* or *Energex* asset replacement, relocation, and maintenance; or
  - (ii) For any other planned or emergency work related purpose including for adjacent site works (for example, temporary construction infrastructure for developments).

#### 10.5 Structural Assessment of Overhead Asset

- (a) Prior to accessing and / or working on any *Overhead Asset* to carry out a permitted work activity, or where proposed works or attachment of *Wireless Installation* components could affect the structural loading or integrity of an *Overhead Asset*:
  - (i) The *Client* or the *Service Provider* is to undertake, and have certified by an *RPEQ*, the required engineering calculations and assessments to ensure the structural integrity of the *Overhead Asset* is maintained with the increased or otherwise altered structural loadings on the *Overhead Asset*; and
  - (ii) The *Operator* is to ensure that the structural integrity of the *Overhead Asset* is satisfactory for the intended works by on *Site* visual inspection, testing and evaluation, as part of the *Service Providers* safe system of work.
- (b) The Service Provider is to confirm to Ergon Energy or Energex that the Overhead Asset can safely accommodate the maximum additional loading permitted under this WCS73 for Wireless Installation attachment; by:
  - (i) Site inspection; and
  - (ii) RPEQ certified structural assessment / analysis
  - of Overhead Asset in accordance with Ergon Energy or Energex requirements.
- (c) The Service Provider is to arrange for a full onsite Overhead Asset condition assessment prior to initial attachment or subsequent addition, replacement or recovery of a Wireless Installation on any Overhead Asset which alters Overhead Asset structural tip loads. Appropriately trained Competent Persons are to perform these condition assessments in accordance with Ergon Energy or Energex requirements.
- (d) Mechanical load testing of any *Overhead Asset* is not permitted for undertaking any structural assessment to determine the *Overhead Asset's* structural capacity to accommodate a *Wireless Installation*.



- (e) Only existing or replaced *Overhead Assets* may be used for attachment of *Wireless Installations* which are:
  - (i) Assessed as structurally sound, considering the maximum applied structural loading allowed on *Overhead Asset* due to the combined loads of the *Wireless Installation* and all existing infrastructure; as determined in consultation with *Ergon Energy* or *Energex* is not to be exceeded;
  - (ii) Found to be free of damage and defects; and
  - (iii) Approved for shared use in writing by *Ergon Energy* or *Energex*, under a formal contractual agreement asset use license.
- (f) Report to *Ergon Energy* or *Energex* on the same *Business Day* or at commencement of next *Business Day* (where an after hour *Overhead Asset* inspection has been undertaken) any *Overhead Asset* found in a suspect or unserviceable condition, due to any cause; for example and not limited to:
  - (i) Corrosion.
  - (ii) Rot.
  - (iii) Termite infestation.
  - (iv) Terminal panel door missing.
  - (v) Excessive leaning.
  - (vi) Vehicle impact damage.

#### 10.6 Attachment of Wireless Installations

- (a) The Service Provider is to provide a works program to the Client, Ergon Energy or Energex, Landowner / Occupier, all relevant Authorities including the road reserve manager, and affected local community parties, that schedules each stage of planned work including and not limited to:
  - (i) Establishment of *Worksite* facilities;
  - (ii) Overhead Asset inspection and assessment to accommodate the Wireless Installation components;
  - (iii) Overhead Asset installation works and commissioning;
  - (iv) Subsequent *Wireless Installation* construction, maintenance, routine inspection, and recovery programs; and
  - (v) Worksite demobilisation.
- (b) The *Operator* is to ensure that the structural integrity of the *Overhead Asset* is satisfactory for the intended works by on site visual inspection, testing and evaluation, as part of the *Service Providers* safe system of work.
- (c) The Service Provider is to:
  - Manage, coordinate and is responsible for *Client* relationships and for obtaining necessary *Authority* approvals (in conjunction with the *Client*) for use of *Wireless Installations* on *Overhead Assets*;
  - (ii) Liaise with other *Service Providers* and *Clients*, requiring use of same *Overhead Asset* site(s);
  - (iii) Be responsible for supply, installation and maintenance of *Wireless Installation* components;



- (iv) Initiate and manage appropriate site and service checks to ensure accommodation of the *Wireless Installation*; and
- (v) In conjunction with *Client*, manage community and *Authority* consultations and code of practice negotiations in relation to *Wireless Installation*.
- (d) Existing attachments of any party (including those of *Ergon Energy* or *Energex*, telecommunications carriers, Government agencies and *Authorities*) are not to be removed, relocated, replaced, obstructed or interfered with to install a *Wireless Installation* on an *Overhead Asset*.
- (e) The *Client / Service Provider* is responsible at its cost to notify and obtain required approvals from *Ergon Energy* or *Energex* and all relevant parties and *Authorities* in relation to relocating existing infrastructure (for example, *Authority* signage) located within or on external surface of the *Overhead Asset* prior to such works occurring.
- (f) The *Client / Service Provider* is to arrange to have these assets carefully removed and reinstated (without damage and only where absolutely required) to enable the installation of *Wireless Installation* components.
- (g) Where the *Wireless Installation* transceiver enclosure is agreed by *Ergon Energy* or *Energex* to be mounted on the *Overhead Asset*, it will be mounted on the property / footpath side of the *Overhead Asset*, and not be mounted over any part of the roadway including the kerb.
- (h) The *Wireless Installation* transceiver enclosure will be mounted on a *Overhead Asset* within a mounting height range of 3.5 metres to 4.5 metres above ground level. Mounting at this height allows:
  - (i) Ease of authorised access, whilst avoiding interference from general public;
  - (ii) For the installation of *RFR* isolation tilt switch and contact detail signage below the transceiver enclosure; and
  - (iii) For the installation of *Authority* signage on the *Column*; for example, council traffic management and street identification signage.
- (i) Legislated exclusion zones (approach distance limits) to energised conductors and other apparatus (plant and equipment) are to be complied with and not encroached upon.
- (j) Where required by *Ergon Energy* or *Energex*, the *Service Provider* is to engage an Ergon Energy or *Energex* approved person(s) to perform safety observe role and / or oversee the works. All costs associated with these additional *Ergon Energy* or *Energex* requirements will be at the *Service Provider's* sole cost.

### **10.7** Wireless Installations Site Interconnections

- (a) Telecommunications interconnections to and from each *Wireless Installation* at an *Overhead Asset* site are not the responsibility of *Ergon Energy* or *Energex*.
- (b) Telecommunications interconnection of a *Wireless Installation* may be via wireless, or underground fibre as follows:

#### (i) Underground Fibre Installation:

i. Subject to the negotiation of a separate *Ergon Energy* or *Energex* facilities access agreement, *Ergon Energy* or *Energex* underground *Pit* and *Conduit* assets may be available on formal commercial agreed terms and conditions for limited installation of underground optical fibre cabling to interconnect *Wireless Installation* sites.



- ii. Refer to WCS72 and WCS72.1 for underground optical fibre cabling installation within *Ergon Energy* or *Energex* underground *Pit* and *Conduit* assets requirements.
- iii. Conductive (for example, co-axial) underground cable / cabling is not to be used unless agreed in writing by *Ergon Energy* or *Energex*.
- iv. Alternatively, the *Client* may independently negotiate with other underground asset owners (for example telecommunications carriers) to install the *Client's* telecommunications cables.

#### (ii) Wireless Links:

i. Interconnection of *Wireless Installations* (on *Overhead Assets*) by radio frequency links may be permitted by *Ergon Energy* or *Energex* on a site by site basis with agreement in writing.

#### (iii) Overhead Fibre Cable Network

- i. The use of a separate, stand-alone aerial fibre cable network installed on *Poles* is generally not permitted. This is due to issues relating to:
  - 1. Ongoing maintenance of clearances;
  - 2. To avoid vehicle impacts;
  - 3. Available Pole space for attachments;
  - 4. Existing contractual obligations to maintain space for existing *External Parties* using *Poles*; and
  - 5. *Ergon Energy* or *Energex* staff access for *Ergon Energy* and *Energex* network works.
- ii. Where no other viable options exist **AND** only if agreed by *Ergon Energy* and *Energex* in writing; certain *Wireless Installation* aerial optical fibre cable networks may be able to be installed, including directly onto existing broadband cable network catenary wires and cables (via wire lashing). *Ergon Energy and Energex* will not be responsible for negotiating, managing or maintaining *Wireless Installation* cabling arrangements. The *Client* is to ensure that the relevant broadband network owner is contacted and negotiates any such arrangements and agreements directly with the relevant aerial broadband network owner.
- iii. The *Client* (and not *Ergon Energy or Energex*) bears the responsibility for structurally assessing all resulting additional *Pole* tip loadings and ensuring all aerial *Wireless Installation* cable network clearances are safely achieved and maintained.

#### **10.8 Wireless Installations Electrical Installations**

- (a) All *Wireless Installations* electricity supply will comply with the requirements of all applicable legislation and standards including, and not limited to:
  - (i) Queensland Electricity Act and Regulations;
  - (ii) Queensland Electrical Safety Act and Regulations;
  - (iii) AS/NZS 3000;
  - (iv) AS/NZS 7000;



- (v) Energy Queensland Manual 002945; and
- (vi) Energy Queensland WP1202<sup>7</sup>,

as amended from time to time.

- (b) The Service Provider is to ensure all electrical work is undertaken by a Licensed Electrical Contractor.
- (c) For each new *Wireless Installation* site, a *Licensed Electrical Contractor* is to complete and forward to *Ergon Energy* or *Energex* and the relevant energy retailer an *EWR* for initial connection, including and not limited to:
  - (i) Inspect, certify and notify *Ergon Energy* or *Energex* that the electrical installation is electrically safe and ready for connection to the electricity distribution network;
  - (ii) The date supply is required for a permanent electrical installation or period of supply required for approved temporary electrical installations;
  - (iii) The *Overhead Asset* identification number and address at which electrical installation is installed;
  - (iv) The details of type and electrical loading (including maximum and average electricity consumption demands) of each electrical installation to be installed; and
  - (v) What *Ergon Energy* or *Energex* work (for example overhead / underground supply) is requested to supply electrical installation.
- (d) Generally, electricity supply to the *Wireless Installation* electrical reticulation installation is:
  - (i) By a *Low Voltage* supply;
  - (ii) Serviced from a point of *Low Voltage* electricity supply as determined by *Ergon Energy* or *Energex*; and
  - (iii) Supplied via an *Ergon Energy* or *Energex* standard service arrangement to the *Customer's* designated consumer terminal.
- (e) As determined by *Ergon Energy or Energex*, options for electricity supply includes (and is not limited to):
  - (i) Metered or unmetered supply;
  - (ii) The supply of a drop down service on a *Pole*;
  - (iii) A service from an existing or new supply pillar or underground Pit;
  - (iv) Supply taken from within the *Column*, providing the *Column* has a continuous electricity supply and the total electrical loading (including for the luminaire and *Wireless Installation*), voltage drop and fault loop impedance on the public lighting / *Low Voltage* circuit is within the required *Ergon Energy* or *Energex* limits; or
  - (v) A service to a property pole servicing consumers' mains to a *Wireless Installation* on a *Tower* site which is located within an easement.
- (f) Ergon Energy or Energex may provide a Make Ready Work estimate of cost to perform Make Ready Works to install a new or upgraded permanent supply where:
  - (i) The selected Overhead Asset requires replacement or modification; or
  - (ii) An existing continuous electricity supply is not available or does not have sufficient spare capacity to supply additional *Wireless Installation* electrical load.

<sup>&</sup>lt;sup>5</sup> For *Ergon Energy and Energex Network* related references refer to Section 13 – References.



- (g) The provided cost estimate for *Make Ready Works* may include (and is not limited to):
  - (i) All electricity supply infrastructure upgrades; and
  - (ii) Replacement and / or modification costs, for example, costs for changing the public lighting *Column* to non –switched photo electric cell control if required.
- (h) Each Wireless Installation will not:
  - (i) Consist of *Low Voltage* sub-circuits (including powered socket outlets on unmetered supply) other than the hard wired *Wireless Installation* supply.
  - (ii) Be directly connected to the *Ergon Energy* or *Energex* public lighting circuit (other than as outlined above).
  - (iii) Have electrical equipment or electrical loads connected, other than *Wireless Installation* sub circuit(s).
  - (iv) Have any additional electrical sub-circuits or extensions installed.
- (i) Before any final service connections to the *Low Voltage* distribution network are undertaken by *Ergon Energy* or *Energex*, the *Licensed Electrical Contractor* is to provide a Certificate of Test which certifies all required tests have been carried out and the electrical reticulation is electrically safe and ready for connection; as required by Section 155 and 156 of the Queensland Electrical Safety Regulation 2013 (as amended from time to time).
- (j) *Ergon Energy* or *Energex* will install the *Ergon Energy* or *Energex* electrical service, and conduct appropriate tests to check and confirm electrical installation is safe to connect to the *LV* distribution network as detailed in the WP1202<sup>6</sup>.
- (k) The *Wireless Installation's* electricity consumption is to be charged in accordance with the appropriate Electricity Retailer's metering and tariff policy as amended.
- (I) The Service Provider or Client will provide an "As Constructed" drawing indicating the exact location(s) and depth(s) of all underground Wireless Installation's cables within the public domain, including Authority approved footpath allocation / installations. The Service Provider or Client will provide Ergon Energy or Energex and relevant Authorities with "As Constructed" drawings in accordance with clause 10.1.
- (m) The *Client* will ensure a new *EWR* is forwarded to *Ergon Energy* or *Energex* and the relevant energy retailer should:
  - (i) A change of electrical loading occur; or
  - (ii) An existing Wireless Installation no longer requires electricity supply.
- (n) The Wireless Installation will remain connected to electricity supply once initially commissioned (for example, the primary fuse remains installed), and isolation and reenergisation of the Wireless Installation will only occur through the operation of the Wireless Installation's electrical main switch.
- (o) For each *Wireless Installation*, have an appropriate maintenance program in place to ensure electrical and mechanical (including earthing systems) integrity or otherwise disconnect from the electricity supply and remove from service if the *Wireless Installation* has not been maintained for an extended period.

<sup>&</sup>lt;sup>6</sup> For *Ergon Energy or Energex* related references refer to Section 13 – References.



### 10.9 Wireless Installations Telecommunication Earthing

- (a) Insulated earth cable for earthing the *Wireless Installation* metallic components is to comply with all relevant Australian Standards including electrical fault condition management.
- (b) Ensure the installation and maintenance of all metallic *Wireless Installation* component earthing systems is in accordance with all relevant legislation and standards including and not limited to the requirements of Queensland Electrical Safety Code of Practice 2010 – Works; (management of electrical safety risks associated with earthing systems, underground cable systems, and supporting structures for overhead lines forming parts of the works of an electricity entity), and the Electrical Safety Act 2002, AS/NZS 3000, and AS 3015.
- (c) No *Wireless Installation* telecommunications earth cable, conduit, earth electrode, or earth electrode pit is to be installed within *Ergon Energy* or *Energex* underground electricity alignment or *Column* or *Pole* alignment on the footpath.
- (d) The *Service Provider* is responsible for the maintenance of all *Wireless Installation* telecommunication earthing components, including maintaining the impedance of the *Wireless Installation* telecommunication earthing system in accordance with relevant:
  - (i) *Client* technical requirements.
  - (ii) Industry standards.
  - (iii) Australian Standard(s).

#### 10.10 Civil Works on Footpaths and Easements

# Note: Refer to attached Figure B-1and B-2 at Appendix B for typical foundation and *Conduits* arrangement.

- (a) *Wireless Installations* to be installed within a road reserve / footpath or within an easement necessitates (where *Lawfully* required) the approval of the relevant *Authority*, including (and not limited to):
  - (i) Road management *Authority*;
  - (ii) Local Council; or
  - (iii) Property and easement owner (*Landholder*);

and then conform to the Law and negotiated access rights and use conditions.

- (b) As a minimum, the requirements for *Landholder*, *Occupier* and public consultation(s) regarding each proposed *Wireless Installation* site will be in accordance with the Telecommunications Act (Cth); where the communication installations are operated by telecommunications carriers, and are subject to the Telecommunications Act (Cth).
- (c) Written notification to, and approval from *Ergon Energy* or *Energex* is required prior to *Wireless Installation* related works or installations being constructed on the footpath over and / or within the *Ergon Energy* or *Energex* underground and overhead (for example, *Pole* and *Column*) electricity and public lighting alignments.
- (d) Footpath mounted *Wireless Installation* related components and equipment (for example power supply / radio frequencies module cabinet), are to be supported on either:
  - (i) A culvert with new through *Conduits* from side to side, where there is no pre-existing underground electricity network and where *Ergon Energy* or *Energex* advises there may be future installation of underground electricity network; or



- (ii) A reinforced concrete footing / foundation (for example a plinth where *Conduits* and or electricity distribution cables already exist in dedicated underground areas [for example, Central Business Districts (CBD) or major arterial roads]).
- (e) In less populated areas where it is less likely underground electrical infrastructure will be constructed, the concrete plinth supporting the plant and equipment is to have the structural capacity and be supported on four corner concrete piers to allow excavation under the foundation and the foundation including the plinth, and the footpath mounted *Wireless Installation* related components and equipment to be self-supporting.
- (f) No footpath mounted *Wireless Installation* related components and equipment (for example power supply / radio frequencies module cabinet) are to be installed on the *Overhead Asset* alignment.
- (g) The *Client* and the *Service Provider* are responsible for all works including (and not limited to):
  - (i) Supplying and installing all *Wireless Installation* ground mounted plant (above and below ground) on site; for example, housing of remote ground level *Wireless Installation* related transceiver equipment positioned:
    - i. On the footpath / road reserve; and
    - ii. On the underground electricity alignment.
  - (ii) Satisfying *Authority* requirements associated with civil construction works and locating existing underground essential services.
  - (iii) Installation, maintenance and recording the as constructed locations of *Wireless Installation* underground infrastructure, including and not limited to:
    - i. Co-axial cables.
    - ii. Optical fibre cables.
    - iii. Conduits.
    - iv. Electricity reticulation cables.

in footpaths, roadways and easements.

- (h) Wireless Installation earthing electrodes are not to be driven within the Ergon Energy or Energex underground or overhead (for example, Pole and Column) electricity footpath alignments; and they may be installed hard against roadside edge of the culvert foundation if permitted by:
  - (i) The relevant *Authority*; and
  - (ii) No other underground essential services are affected.
- (i) Horizontal earth straps may be used as alternative to driven earth electrodes, and:
  - (i) May be installed on the footpath and parallel to real property boundary; and
  - (ii) Outside the *Ergon Energy* or *Energex* underground or overhead (for example, *Pole* and *Column*) electricity footpath alignments.
- (j) The Service Provider is responsible for the accurate recording of the alignment<sup>7</sup> and depth<sup>9</sup> of all as constructed Wireless Installation related underground assets; for example and not limited to:

<sup>&</sup>lt;sup>7</sup> All levels (to Australian Height Datum) and positions (to GPS northing and easting), that are determined using equipment that is sufficiently accurate for a survey plan, although it is only a requirement for this information to be captured by a *Competent Person* (not a licenced surveyor).



- (i) Conduits;
- (ii) Telecommunications cabling; and
- (iii) Electricity (consumer mains) cabling;

which is to be supplied to the *Client*, *Ergon Energy* or *Energex*, all relevant *Authorities* and *Landholders* and "Dial Before You Dig" service.

- (k) The Service Provider is to:
  - (i) Backfill, compact and re-surface open cut excavation(s) to ensure the surface and underlying soil structure is able to perform its original function;
  - (ii) Carry out the permanent reinstatement of surfaces as soon as practicable after completion of backfilling and excavation reinstatement; and
  - (iii) Ensure ground surfaces removed or damaged during the provision of the *Services* are reinstated to the original surface levels (within agreed tolerance) with similar material; or as agreed with the *Authority* or owner;
  - (iv) Restoration including associated costs of any damaged heritage sites/places is the responsibility of the Service Provider.
  - (v) Including in situations where Make Ready Works are undertaken, for example the installation of a new or replacement *Column* foundation, earth pit and electrode, conduits and cable and transceiver units on footpaths.

### **10.11 Ground and Conductors Clearances**

The Service Provider is to:

- (a) Ensure all parts of *Wireless Installation* components on *Columns* and *Poles* are in accordance with relevant *Authority* statutory clearance requirements, and in any case installed and maintained at least:
  - (i) 3.0 metres above pedestrian footpath or walkway not used by vehicles.
  - (ii) 4.5 metres over designated vehicle parking lane or bay, driveway or where a vehicle may normally park.
  - (iii) 4.8 metres over any part of vehicle roadway or kerb line.
  - (iv) 7.0 metres above any part of designated "over dimension" route (for example, a high load route).
- (b) Ensure the Wireless Installation mounting height and dimensions; comply with requirements of Authorities with statutory responsibility for the associated roadway's management. The requirement of the relevant road controlling Authority, takes precedent with respect to clearances, where clearances specified by Ergon Energy or Energex are less than those required by the road controlling Authority.
- (c) Immediately report any conflicting clearance requirements to the nominated *Ergon Energy* or *Energex Officer* for consideration / resolution.
- Note: Should the road controlling *Authority* authorise a lower *Wireless Installation* clearance height, the clearance height required by *Ergon Energy* or *Energex* applies. *Ergon Energy* or *Energex* reserves the right to accept or reject any alternative clearance height on an individual *Overhead Asset* basis.



#### **10.12 Radio Frequency Radiation Management**

- (a) The Client will ensure that its Wireless Installation telecommunications components and operations comply with the requirements of the Law, relevant Australian Standards (including the Standard for Maximum Exposure Levels to Radio Frequency Fields – 3 kHz to 300 Ghz.), Codes of Practice, and the Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) for:
  - (i) Radiation management; and
  - (ii) All radio frequency spectrum use requirements.
- (b) These will include:
  - (i) Verification of compliance with ARPANSA standard's restrictions and reference levels;
  - (ii) Determination of boundaries of exclusion zone areas within which general public *EME* exposure levels may exceed ARPANSA standard limits for the general public (category of "general public" person includes *Ergon Energy* or *Energex* personnel, contractors and other non – *RFR* / wireless telecommunications trained parties);
  - (iii) Design and placement of appropriate *RFR* signage at each affected *Overhead Asset* site complying with the relevant Australian Standards (including AS 1319), C564 Mobile Phone Base Station Deployment, and any *Ergon Energy* or *Energex* specific requirements; and
  - (iv) Minimising *RFR* exposure for all persons who may reside, be present or work in the vicinity of each *Wireless Installation*, including so that no member of general public is exposed to *RFR* levels in excess of general public limits.
- (c) Wireless Installation energised antenna calculations for positioning and approach distances of persons will be in accordance with the above ARPANSA standard. Ergon Energy or Energex personnel and contractors are considered as members of general public for this purpose. Use the relevant general public specific absorption rate (SAR) in exposure limit calculations. This classification is the most conservative and safe RFR risk classification available.
- (d) Service Providers are to have a safe system for the management of Radio Frequency Radiation in the vicinity of any Worksite.
- (e) Unless otherwise agreed by *Ergon Energy* or *Energex*, the *Client* is to arrange for onsite isolation and testing to ensure that *RFR* emitting antennas have been de-energised in the situation where *Ergon Energy* or *Energex* planned works are proposed for the impacted *Overhead Asset*.
- (f) Where Ergon Energy or Energex emergency works are required at the impacted Overhead Asset site, the Client is to provide Ergon Energy or Energex with a documented safe system of work, on site facilities (for example isolation switch) and procedure to be used for de energising or powering down any RFR emitting Wireless Installation mounted on or in the vicinity of any impacted Overhead Asset, so that safe access for Ergon Energy or Energex or other External Party works can proceed.
- (g) In addition, *Ergon Energy* or *Energex* requires that ongoing *RFR* isolation involving *Overhead Assets* is undertaken in accordance with Procedure 00237<sup>8</sup>, as a minimum.

<sup>&</sup>lt;sup>8</sup> For Ergon Energy and Energex Network related references refer to Section 13 – References.



#### 10.12.1 RFR Isolation – Manual Switches

- (a) A manual *RFR* isolation switch is to be installed on all *Overhead Assets*, to provide for manual on site *RFR* power down of the *Wireless Installation*.
- (b) Externally on each Column or Pole, the Service Provider is to install a clearly identified, Ergon Energy or Energex accepted RFR manual isolation switch externally within a weatherproof enclosure within a mounting height range of 3.0 metres to 3.5 metres above ground level (out of the reach of vandalism and below the transceiver unit mounting position), that is clearly identified, to allow for antenna RFR de-energisation and re-energisation.
- (c) On each *Tower* site telecommunication base station building / equipment shelter, the *Service Provider* is to install clearly identified, *Ergon Energy* or *Energex* accepted *RFR* manual *DC* supply isolation switches, to allow for onsite antennas isolation.
- (d) *RFR* isolation can then be achieved by either:
  - (i) Isolation of the *LV* circuit supplying the *Wireless Installations* electrical installation; or
  - (ii) Isolation of the antenna *DC* supply circuit.
- (e) Where this switch isolates the electrical installations *LV AC* electricity supply as the means of powering down the antennas for example at a *Column / Pole* site, it is not to act as the main switch for the electrical installation and an separate dedicated main switch is to be installed at the electrical installation enclosure. The isolation switch is to be installed on the load side of the main switch.

# Note: Refer the specific *Overhead Asset* type for the location and installation specification for the *RFR* isolation / tilt switch.

#### 10.12.2 RFR Isolation – Tilt Switch

- (a) Additionally, a *RFR* tilt switch is also required to be installed on / at the relevant *Column* and *Pole* sites to de-energise the co-located *Wireless Installation*.
- (b) The tilt switch component is to be installed on *Columns* and *Poles*, to provide for reactive onsite *RFR* power down of the *Wireless Installation*, in the case where a *Column* or *Pole* is damaged causing the *Column* or *Pole* to lean from the vertical position.
- (c) The tilt switch component is to de-energise all operational antenna units in situations where a *Column / Pole* leans or falls to the ground.
- (d) The switches may be separate units or a combination unit and of compact design.
- (e) Separate switch unit installations are to be vertically orientated one above the other on the *Column* or *Pole*.
- (f) The isolation / tilt switch enclosure is to have integrated LED indicator lights to indicate whether the antenna(s) is operational or switched off.
- (g) Tilt switch component is not required on a *Tower* which supports a *Wireless Installation*.



#### 10.12.3 RFR - Signage

Note: Refer to attached Figure A-1 at Appendix A for details of typical generic *Column* and *Pole* site signage layout arrangements.

- (a) The *Service Provider* is to install signage, with design characteristics in accordance with the relevant Australian Standards, for *RFR* generating *Wireless Installations* prior to commissioning any antennas or microwave link dishes.
- (b) *RFR* signage is to be clearly visible to all persons, including *Ergon Energy* or *Energex* personnel (workers) and contractors, who are on or in the vicinity of the *RFR* generating *Wireless Installation* at:
  - (i) Ground level:
    - i. On *Poles* and *Columns*; within a mounting height range of 3.0 metres to 3.5 metres above ground level and below the level of the *RFR* isolation / tilt switch on the road side and the footpath side of each *RFR* affected *Ergon Energy or Energex* asset; and
    - ii. For *Towers*; on each of the four *Tower* legs, just below the *Tower's* anti climbing device position; and
  - (ii) Elevated working positions for example, from a ladder or EWP bucket or other means of access, on the road side and footpath side of each RFR – affected Ergon Energy or Energex asset at the point which is:
    - i. On *Poles*, *Columns* and *Towers*, in an elevated position which is at the greater of either:
      - 1. 2 metres below the base of the lowest transmitting antenna; or
      - 2. Below the level of general public access restriction on each co-located site, to eliminate the risk of entering the *RFR* Hazard Zone during *Operator (Worker)* access,

whichever is the greater.

- (c) As the actual calculated minimum safe approach distances to operational antennas in the horizontal plane (for example, in front of the energised antenna) at a *Wireless Installation* site may be variable at each antenna and between antenna depending on antenna output and orientation, *Ergon Energy* or *Energex* will record *RFR* site types within *Ergon Energy or Energex* graphical information data base, to indicate the minimum clearances to be observed from operational antennas by *Ergon Energy* or *Energex* personnel and contractors and other *Competent Persons* performing works at each *Wireless Installation* site.
- (d) As access to *Towers* is more restricted and less common, apply a nominal 15 metres general public approach limit, due to the usual presence of high powered antennas at such *Tower* sites.

#### 10.12.4 Ownership Identification, RFR Site Type and Contact Details Signage

# Note: Refer to attached Figure A-1 at Appendix A for details of typical generic *Column* and *Pole* site signage layout arrangements.

(a) The *Service Provider* is to install at a height which is visible from ground level, and maintain on *Poles, Columns* and *Towers*, durable, weatherproof, UV resistant signage which displays the *Client's* identity and 24 hour, 7 days per week contact details (which includes the relevant *Wireless Installation's* unique site identification code).



- (b) The *Client's* contact details may then be used by any party (for example, *Ergon Energy* or *Energex* or a *Authority*), to contact the *Client* regarding the *Wireless Installation* including:
  - (i) A *Wireless Installation* requiring powering down to enable nearby works to proceed; or
  - (ii) A Wireless Installation being damaged, requiring maintenance / repair; or
  - (iii) A *Wireless Installation* needing to be recovered, as a result of *Overhead Asset* works; for example *Overhead Asset* relocation, replacement or recovery.

### 10.12.5 RFR Affected Wireless Installation Sites – Access

Detailed in *Energy Queensland* Procedure 00237<sup>9</sup> are the required Ergon Energy or Energex access procedures for *RFR* affected sites (*Overhead Assets*) including notifications of:

- (a) Proposed Ergon Energy and *Energex* works; and
- (b) Antenna de-energisation; and
- (c) Re-energisation.

### 10.12.6 RFR Hazard Zone Profile Records

- (a) The *Client* is to provide the nominated *Ergon Energy* or *Energex Officer(s)* with an electronic soft copy (in an agreed format) of the typical worst case general public electromagnetic radiation approach limit profiles in plan and elevation views for each of the proposed *Wireless Installation's* operational antennas and microwave link dishes.
- (b) This profiling is to conform to the requirements of the current Australian / ARPANSA standards and all relevant *Authorities* and be calculated and produced by an appropriately qualified, NATA accredited organisation.
- (c) Profiles are to clearly indicate the actual measurements in horizontal and vertical planes for non-access areas in all planes; whilst the antennas and microwave link dishes are operating at the planned maximum levels; for at least general public persons, including all *Competent Persons* and other *Ergon Energy* or *Energex* personnel and contractors.
- (d) Information may then be recorded (as required) by *Ergon Energy* or *Energex* in *Ergon Energy* or *Energex's* electricity network graphical information system databases for each *RFR* affected *Overhead Asset* site location.

### **10.13 Wireless Installation Maintenance**

The Service Provider is to remove and satisfactorily replace or repair any Wireless Installation that fails or fractures, which is erected on an Overhead Asset, undertake all remedial works, and advise Ergon Energy or Energex of any such instances.

### 10.14 Worksite Condition

- (a) The *Service Provider* is to, during and following completion of works, ensure the *Worksite* is:
  - (i) Maintained and left in a safe condition.
  - (ii) Maintained in a tidy condition, and attractive appearance of *Wireless Installations* at all times.

<sup>&</sup>lt;sup>9</sup> For Ergon Energy and Energex Network related references refer to Section 13 – References.



- (iii) Reinstated to at least the condition which existed prior to the commencement of works.
- (iv) Free from all unused *Wireless Installation* fittings and equipment which is to be recovered from the *Worksite*.
- (v) On a roadway corridor; reinstated in accordance with the requirements of the relevant road management *Authority*.
- (b) The *Service Provider* is to ensure the completed *Wireless Installation* conforms to all statutory and regulatory requirements, including and not limited to:
  - The Telecommunication Act, including the requirements of the telecommunications (Low Impact Facilities) Determination 1997, (as amended) and further amendments or replacements from time to time;
  - (ii) The Queensland Electrical Safety Act / Regulation; and
  - (iii) The specific structural and dimensional limitations of the Overhead Assets.

#### 10.15 Completion of Work And As Constructed Wireless Installation Certification Process

- (a) The *Service Provider* is to ensure that each *Wireless Installation* is constructed and placed into service on *Overhead Assets* in accordance with:
  - (i) The *RPEQ* approved engineering design and construction drawings, specifications and relevant Australian Standards all statutory requirements, approvals, *Authorisations* and *RPEQ* construction certifications pertaining to the *Wireless Installation*.
  - (ii) A satisfactory standard of workmanship.
- (b) The Service Provider will ensure any deviations from the original RPEQ certified design and construction drawings have been inspected and approved by the relevant RPEQ(s).
- (c) The *Service Provider* is to confirm to *Ergon Energy* or *Energex* and all relevant *Authorities* completion of *Wireless Installation* construction and or maintenance when they have finalised all construction and maintenance works at each *Overhead Asset* site.
- (d) On completion of the works, the Service Provider is to provide to Ergon Energy or Energex and relevant Authorities, RPEQ signed and certified "As Constructed Drawings" including all Wireless Installation component attachment locations, and RPEQ certification of any Ergon Energy or Energex accepted variations to the original RPEQ certified and Ergon Energy or Energex accepted design, within 5 Business Days of commissioning of the Wireless Installation infrastructure.

### **10.16 Inspection of Wireless Installations**

- (a) The *Client* will ensure that the responsible *Service Provider* is to routinely inspect each *Wireless Installation*; including connection hardware, point of attachment surface and all electrical wiring; as part of an appropriate site inspection and maintenance program, and each time a *Overhead Asset* site is visited, for:
  - (i) Damage ,failure, mal-operation or deterioration of the *Wireless Installation* components; and
  - (ii) Any degradation of the structural integrity of the supporting *Overhead Asset*, at the *Wireless Installation* attachment interface.
- (b) The Service Provider is to:



- (i) Inspect each established *Wireless Installation* on an *Overhead Asset*; within 24 hours of any high wind conditions occurring; for example, a cyclonic or severe storm event; and
- (ii) Recover any damaged *Wireless Installation* components within a time frame based upon the assessed risk; and no later than 1 *Business Day* after the *Service Provider* first becomes aware, or is notified of the damage, failure or deterioration.
- (c) Wireless Installation reattachment is to occur only after:
  - (i) The *Wireless Installation* design has been recertified by the relevant *RPEQ* and confirmed to be satisfactory for installation.
  - (ii) Satisfactory work conditions for *Wireless Installation* reinstatement occur.
  - (iii) The Overhead Asset is in an appropriate structural condition.
  - (iv) The Wireless Installation can be totally and safely reinstated.

### 11 PUBLIC LIGHTING COLUMNS

#### **11.1** Public Lighting Columns – Detailed Requirements

Note: Refer to Appendix C, Figures C-1 to C-4 (inclusive), for typical *Wireless Installations* arrangements on *Columns*.

#### 11.1.1 Selection Of Column

- (a) This WCS73 does not cover Wireless Installations on any Rate 3 or Rate 8 public lighting sites as these are not Ergon Energy or Energex owned assets, for example columns owned by Government Authorities and private entities.
- (b) Do not install *Wireless Installations* on *Columns*:
  - (i) Which are concrete;
  - (ii) Which are hinged *Columns* of any type;
  - (iii) That are painted, powder coated or anodised (unless specific written permission is granted by *Ergon Energy* or *Energex* and *Ergon Energy* or *Energex* accepts the *Column* connection and finished surface protection methods proposed to be used);
  - (iv) With a slip base foundation; or
  - (v) Fitted with either a single outreach of length greater than 4.5 metres, or double or more outreaches..
- (c) Do not use minor road *Columns* in suburban residential areas, unless agreed in writing by *Ergon Energy* or *Energex*.
- (d) *Columns* with an overhead aerial service cable of any type attached may only be used if the structural wind loading permits, and there is sufficient internal chamber space to install telecommunications cabling, particularly in the upper section of the *Column*.

Note: *Columns* with overhead services may not have lead in *Conduits* to facilitate underground fibre optic cable access.

(e) *Columns* fitted with banners, decorative attachments or associated attachment hardware may be used. The *Service Provider* is to contact the *Ergon Energy* or *Energex Officer* to arrange for removal of banners decorative attachments or associated attachment hardware; prior to *Wireless Installation* establishment.



#### 11.1.2 On Site Condition Inspection Of Column

- (a) As Ergon Energy or Energex may have inconclusive records of an individual Column's structural parameters on a site by site basis, an RPEQ qualified Competent Person (for example a structural engineer representing the Column manufacturer) is to ascertain the Column type, structural characteristics, and current level of damage and / or deterioration from the Column being in service for an extended period.
- (b) Regardless of the proposed *Wireless Installation* configuration, a *Competent Person* (for example an *RPEQ* structural engineer representing the *Column* manufacturer, or their approved representative) is to undertake a full on-site *Column* condition inspection including:
  - (i) An above ground inspection for rag bolt foundation *Columns*, including ground line rag bolt foundation interface; and
  - (ii) An above and below ground inspection for buried in ground Columns,

to obtain data for Column structural loading assessment.

- (c) Give particular attention to the inspection of *Columns* which have larger than normal access covers and the structural integrity of the *Column*'s wall material at this aperture.
- (d) Columns which are:
  - (i) Marked on site with a band of yellow / black tape or yellow fluorescent paint applied to black tape at a height of approximately 2.5 metres are considered unserviceable or a risk to any party's safety; or
  - (ii) Found to be physically damaged (for example, rust, subjected to significant impacts or dents, etc.); or
  - (iii) Appropriately inspected and tested and found to be unserviceable,

are not to be accessed, worked on, or utilised for *Wireless Installation* attachments and is to be immediately reported to *Ergon Energy* or *Energex*.

- (e) Prior to the commencement of any structural design, the physical *Column* characteristics including the onsite *Column* tag details (if available) are to be obtained to enable the confirmation of the *Column* type and physical capacity including and not limited to:
  - (i) *Column* height;
  - (ii) Column tip load strength when new; and
  - (iii) Column manufacture date.
- Note: Column rag bolt foundation construction details, for example foundation depth and diameter, foundation type (e.g. precast concrete with stabilised backfill or poured in situ reinforced concrete) are not generally available on a *Column* site by site basis.
- 11.1.3 Structural Load Calculations For Column
- Note: Only establish new or replacement *Wireless Installations* on *Columns* inspected and assessed as structurally capable of accommodating the proposed *Wireless Installation* components. Static weight and wind loading changes related to any *Wireless Installation* design are not to exceed the safe capacity of the *Column*.



- (a) For any Column serviced by an overhead electricity supply, the RPEQ designer of the Wireless Installation is to allow for a 1.8kN (Limit State) load located at the overhead service attachment point on the Column to account for the presence of the overhead service cable and associated wind loads.
- (b) If the Column has been inspected on site and been determined to be in a sound condition, then an RPEQ qualified Competent Person (for example a Structural Engineer representing the Column manufacturer) is to undertake structural analysis, in accordance with Ergon Energy or Energex design requirements, including the foundation, with allowance for:
  - (i) Existing *Ergon Energy* or *Energex Column* structural loads, including the outreach bracket and any aerial service cables;
  - (ii) Additional holes or slots required for the internal to external transition of permitted telecommunications and electrical cables and conduits;
  - (iii) Existing external party attachments (including existing *Wireless Installation* components, and traffic management signage on each *Column*); and
  - (iv) Additional or changed structural loads, relating to the attachment or replacement / upgrading of proposed *Wireless Installation* components.
- (c) Due to a population of *Columns* with varying physical and structural characteristics, *Wireless Installation* related structural assessment is to include the following considerations:
  - (i) Column design type (for example round or octagonal cross section);
  - (ii) Column manufacturer;
  - (iii) Column age;
  - (iv) Column condition on site (for example damage, or corrosion);
  - (v) *Column* foundation type (for example buried in ground or base plate mounted); and
  - (vi) Existing *Column* structural load conditions (for example presence of overhead service cable, outreach length, and luminaire type).
- (d) Design the Wireless Installation and association attachments ensuring that the total applied limit state structural load, based on the relevant Regional Wind Speed with a minimum Average Recurrence Interval (ARI) of 50 years or greater (≥V<sub>50</sub>), is in accordance with AS/NZS 7000 and AS/NZS 1170.2, and does not exceed the safe capacity of the structure and foundation.
- (e) Determine the appropriate ARI wind speed for the *Wireless Installation* in accordance with AS1170.2 and *Client* requirements (for example if the *Wireless Installation is* considered essential post-disaster infrastructure, then a higher ARI wind speed may be required).
- (f) Steel streetlight columns are excluded from structural upgrade. In order for a steel streetlight column to be eligible for attachment of a Wireless Installation, the structural capacity of the existing streetlight column (or its foundations) must not exceed strength limits of the existing streetlight column (or it's foundations) as determined by the column manufacturers structural requirements and analysis. Should the applied loads due to the proposed *Wireless Installation* exceed the strength limit of the column or column foundation, then the streetlight column will be ineligible for the *Wireless Installation* and either an alternate site will need to be selected, or the loads reduced in such a way as to comply with the structural loading criteria.



#### 11.1.4 Base Plate Mounted Columns On Rag Bolt Foundations

(a) Column rag bolt foundation construction details, for example foundation depth and diameter, foundation type (for example precast concrete with stabilised backfill or poured in situ reinforced concrete) are not generally available on a Column site by site basis.

#### 11.1.5 Columns With Buried In Ground Foundations

- (a) As parts of the lower section of the *Column* are directly in contact with the ground and the associated soil and moisture conditions these *Columns* are prone to corrosion and are to be assessed to determine remaining structural capacity of the *Column*.
- (b) If the replacement of the *Column* is required as part of the make ready works the replacement *Column* is to be of a current Queensland Electricity Supply Industry standard rag bolt foundation *Column* assembly.

#### 11.1.6 Columns and Foundations Requiring Replacement

Should a *Column* or a *Column* foundation be required to be replaced, the following requirements needs to be addressed and / or considered:

- (a) The replacement *Column* foundation is to be located on the same alignment and at a distance of no greater than 1.2 metres between the centre line of the existing foundation and the new foundation, clear of all existing essential service infrastructure located in the area.
- (b) The existing foundation is to be recovered and the excavation left by the removal is to be reinstated in accordance with the controlling *Authority's* specification.
- (c) Some *Authorities* may require the replacement foundation to be installed in the same location (requiring the removal of the existing foundation and replacing it with the new foundation in the existing excavation on the same day).
- (d) In situations where the incoming foundation entry *Ergon Energy* or *Energex Conduit* is inadequate to accommodate existing and proposed additional cabling, a new rag bolt assembly foundation can be installed, incorporating three conduits, as follows:
  - (i) Separate conduits are to be used for electrical cables and telecommunications cables (the preferred option); and
  - (ii) Electrical conduits are to be installed below telecommunications conduits.
- (e) Electrical conduits and telecommunications conduits are to be installed in accordance with the following installation configurations:
  - (i) One 40 mm diameter orange underground heavy duty PVC electrical Conduit(s) for the Ergon Energy or Energex public lighting LV electricity supply cables, with a Conduit depth of cover of 600 mm minimum below the finished ground surface level. Or an allocated equivalent cross sectional area of the internal bore space in a shared larger diameter multi use Conduit with Wireless Installation's telecommunications cabling and the Wireless Installation's power and earthing cables that has available internal bore space to allow the unobstructed installation and removal of the Ergon Energy or Energex public lighting LV electricity supply cables. All shared multi use Conduit(s) with Ergon Energy or Energex public lighting LV electricity supply cables is to be orange underground heavy duty PVC electrical Conduit.



- (ii) Separate appropriate diameter conduits for the Wireless Installation's telecommunications cabling and the Wireless Installation's power and earthing cables. Or a larger single conduit appropriately sub-ducted for Wireless Installation's telecommunications cabling installation there in. Wireless Installation's telecommunications cabling ducting (including sub-ducting) is to be white medium duty telecommunications conduit. Wireless Installation's power and earthing cable's conduit type and installation depth below the finished ground surface level is to be in accordance with AS 3000 or Queensland Electrical Safety Code of Practice 2010 Works requirements. The Wireless Installation's telecommunications cabling conduit depth of cover is to be 450 mm minimum below finished ground surface level.
- (iii) Where a single shared *Conduit* is used for the *Ergon Energy* or *Energex* public lighting *LV* electricity supply cables and *Wireless Installation's* telecommunications cabling and the *Wireless Installation's* power and earthing cables, a black *HDPE* Type 4 *Pit* (including lid) is to be installed as close as practical to the *Column* foundation and not greater than 1.5 metres from the *Column* foundation concrete surface, and clear of all existing essential service infrastructure located in the area, specifically for the separation of the cabling into individual conduits for the *Ergon Energy* or *Energex* public lighting *LV* electricity supply cables and *Wireless Installation's* power and earthing cables exiting the *Pit*.
- (iv) The Service Provider will be required to construct / install the new Ergon Energy or Energex public lighting foundation shared entry Conduit and transition Pit (black HDPE Type 4 Pit [including lid]) in accordance with the relevant RPEQ certified design as agreed by Ergon Energy or Energex and complying with Ergon Energy or Energex construction standards as a minimum, at the Clients cost, to accommodate the Ergon Energy or Energex public lighting LV electricity supply cables and Wireless Installation's telecommunications cabling and the Wireless Installation's power and earthing cables. Once installed and accepted, Ergon Energy or Energex will own and manage the public lighting foundation shared entry Conduit and transition Pit. Earth electrodes and / or coils of optical fibre cabling are not permitted to be installed in the transition Pit.
- (f) The foundation may be precast or cast in situ reinforced concrete in accordance with the relevant *RPEQ* certified design as agreed by *Ergon Energy* or *Energex* and complying with *Ergon Energy* or *Energex* construction standards as a minimum.
- (g) For a base plate mounted *Column*, where there is no spare capacity within the existing *Ergon Energy* or *Energex* public lighting *Conduit*, the *Service Provider* will be required to construct a new *Column* rag bolt foundation at the *Clients* cost to accommodate the existing or new base plate mounted *Column* and associated structural loadings, and the installation of the above entry conduit arrangements.
- (h) For a buried in ground Column, where there is no spare capacity within the existing Ergon Energy or Energex public lighting Conduit, the Service Provider will be required to install a replacement base plate mounted Column on a rag bolt foundation at the Client's cost, which will accommodate the new base plate mounted Column and associated structural loadings, and the installation of the above entry conduit arrangements.
- (i) A new *Column's* rag bolt foundation is to be designed and constructed to be equivalent to the current *Ergon Energy* or *Energex* public lighting design and construction standards for both structural performance and whole of life span performance.



- (j) Only an existing *Column*, outreach bracket and luminaire head that is free from defects and deterioration, and is certified by an *RPEQ* as being structurally sound and serviceable (including adequate capacity of the *Column* to accommodate proposed additional structural loadings) may be relocated onto a new foundation, otherwise a new *Column* and /or outreach bracket and / or luminaire head will be required.
- (k) Where the position and / or type of luminaire is to be changed (for example a replacement *Column* and / or foundation in a new position is to be installed to accommodate the *Wireless Installation*), a reassessment of the lighting design for the site is to undertaken by an *RPEQ* electrical with qualifications in Illumination Engineering which allow entry into the Illumination Engineering Society of Australia and NZ as a member.

#### 11.1.7 Permitted Wireless Installation Components On Column

Once the candidate *Column* has been inspected and has been determined to be in a serviceable condition, the *Service Provide* is to meet the following requirements for individual *Wireless Installation* components on a *Column*:

- (a) Due to the typically limited structural loading capacity and internal chamber cross sectional area of *Columns*, the general permitted arrangement for *Wireless Installation* components on and within *Columns* will be as follows:
  - (i) Antennas interfacing with hand held devices;
  - (ii) *RFR* Isolation / Tilt Switch;
  - (iii) Coaxial telecommunications feeder cabling connected to ground mounted transceiver unit containing the power supply unit / radio frequency modules;
  - (iv) Fibre back haul telecommunications cabling;
  - (v) Telecommunications component earth cable (if required);
  - (vi) Electrical installation wiring including consumers mains; and
  - (vii) Electrical installation *MEN* earth cable.
- (b) The following *Wireless Installation* components will generally not be permitted on a *Column* except as agreed in writing *by Ergon Energy* or *Energex* on a case by case basis:
  - (i) Back haul antenna; and
  - (ii) Antenna signal improvement related components, for example mast head amplifiers and combiners are not permitted on *Columns*.
- (c) The following *Wireless Installation* components will not be permitted on a *Column*:
  - (i) Large / high power panel antennas; and
  - (ii) Fibre interface enclosure.
- (d) All Wireless Installation hardware is to:
  - (i) Withstand prolonged vibration;
  - (ii) Not be susceptible to failure from vehicular impact to Column; and
  - (iii) Not damage Column's galvanised surface.
- (e) *Wireless Installation* attachment systems:
  - (i) Will facilitate installations on the Column's cross section and shape; and


- (ii) Will securely attach externally mounted *Wireless Installation* components, including transceiver unit enclosure (where permitted); and the antennas to the *Column* by hot dipped galvanised steel or stainless steel fittings with material installed between the *Column* and the fittings to protect the surface of the *Column* from mechanical damage, for example:
  - i. Bolted clamps;
  - ii. U-bolts; or
  - iii. Other Ergon Energy or Energex accepted means.
- (f) All cabling is to be installed internally with in the *Column* chamber and there will be no cabling on / down external face of *Column* to ground surface level, except where cabling transitions directly from the *Column* chamber to adjacent externally mounted *Wireless Installation* components.
- (g) Do not use metallic (conductive) conduit or similar enclosure to mechanically protect the *Wireless Installation* cabling.
- (h) The total static weight\* for the enclosure unit (accounting for additional static weight associated with the other *Wireless Installation* components) will be subject to *Column* structural load limit not being exceeded.
- (i) The *Wireless Installation* component's total weight and identified appropriate lifting point(s) is to be included on a warning label manufactured from a UV resistant durable material on the front of the relevant component.

# \* Note: Subject to a manual handling risk assessment by the *Operator* and restrictions identified during the *Service Provider's* risk assessment and / or as part of the *Service Provider's* safe system of work.

#### 11.1.8 Packaged Wireless Installation On Column (If Installed)

- (a) Ergon Energy or Energex preference for a low powered / small cell Wireless Installation on a Column is for a packaged equipment arrangement which combines the power supply, RF module and antenna (including GPS antenna) module within one lightweight, compact, integrated unit. This type of installation has the advantage of reduced drilling of Columns and eliminates the need for cabling between the RF module and antennas.
- (b) Unless otherwise agreed in writing by *Ergon Energy* or *Energex*, keep the number of packaged units to a maximum of two.
- (c) Where permitted in writing by *Ergon Energy* or *Energex* on an individual *Column* basis, the packaged unit, including the integral power supply unit and radio frequency modules, where installed on a *Column*, will not exceed the following dimensions:
  - (i) 0.6 metres in height;
  - (ii) 0.45 metres in width;
  - (iii) 0.4 metres in depth.
- (d) The total static weight\* for each Wireless Installation packaged unit will not exceed 15 kg, unless permitted otherwise in writing by Ergon Energy or Energex on an individual Column basis and the Wireless Installation packaged unit (accounting for additional static weight associated with the other Wireless Installation components) will always be subject to the total Column structural load limit not being exceeded.



- (e) The *Wireless Installation* component's total weight and identified appropriate lifting point(s) is to be included on a warning label manufactured from a UV resistant durable material on the front of the relevant component.
- \* Note: Subject to a manual handling risk assessment by the *Operator* and restrictions identified during the *Service Provider's* risk assessment and / or as part of the *Service Provider's* safe system of work.

#### 11.1.9 Antennas And Adapter Mount on Column

- (a) Ensure that the antenna unit utilises the most compact, vertically orientated, omni directional antenna or compact panel antenna arrays where possible.
- (b) Unless otherwise agreed in writing by *Ergon Energy* or *Energex*, keep the number of antennas to a minimum, as follows:
  - (i) A maximum of two omni antennas; or
  - (ii) A maximum of two compact panel antennas.
- (c) The total static weight\* for antenna(s) and adapter mount (accounting for additional static weight associated with the other *Wireless Installation* components) will be subject to *Column* structural load limit not being exceeded.
- (d) The *Wireless Installation* component's total weight and identified appropriate lifting point(s) is to be included on a warning label manufactured from a UV resistant durable material on the front of the relevant component.

# \* Note: Subject to a manual handling risk assessment by the *Operator* and restrictions identified during the *Service Provider's* risk assessment and / or as part of the *Service Provider's* safe system of work.

#### 11.1.10 Transceiver Unit Enclosure On Column (If Installed)

- (a) The preferred physical location for a transceiver unit enclosure is on the footpath of the road reserve and not mounted on the *Column*.
- (b) Where permitted in writing by *Ergon Energy* or *Energex* on an individual *Column* basis, the lockable transceiver unit enclosure, including the integral power supply unit and radio frequency modules, where installed on a *Column*, will not exceed the following dimensions:
  - (i) 0.6 metres in height;
  - (ii) 0.5 metres in width;
  - (iii) 0.4 metres in depth.
- (c) The total static weight\* for the transceiver unit enclosure (accounting for additional static weight associated with the other *Wireless Installation* components) will be subject to the *Column* structural load limit not being exceeded.
- (d) The *Wireless Installation* component's total weight and identified appropriate lifting point(s) is to be included on a warning label manufactured from a UV resistant durable material on the front of the relevant component.

# \* Note: Subject to a manual handling risk assessment by the Operator and restrictions identified during the Service Provider's risk assessment and / or as part of the Service Provider's safe system of work.



#### 11.1.11 RFR Isolation Switch and Tilt Switch On Column

The automatic tilt switch is not to be mounted in the area of the control panel behind the access plate as vehicle impact may cause the *Column* to buckle and or fail at or above this point rendering the tilt switch as not sensing the movement of the *Column* and attached antennas and therefore not de-energising the *RFR*.

#### 11.1.12 Access To Column

- (a) Operators are only to undertake access to Columns in accordance with the Service Provider's safe system of work, including Column inspection to confirm safe working may be undertaken.
- (b) Only *EWP* access to a *Column* is permitted.
- (c) Using a *Column* to support a ladder is not permitted.

#### 11.1.13 Electrical Isolation of Column

Before performing work that requires the drilling of holes into the *Column*, the *Service Provider* is to ensure that the luminaire electrical sub-circuit(s) are de-energised and isolated from switched or permanent *Low Voltage* public lighting electricity supply.

#### 11.1.14 Drilling Of Column

- (a) The drilling of breakout holes is only permitted in steel *Columns* for the passage of:
  - (i) LV and Extra Low Voltage power supply cables; and
  - (ii) Wireless Installation telecommunications cables; and
  - (iii) Their rigid corrugated conduit protection.
- (b) The position of each drilled break out hole is to be located either:
  - (i) Directly behind the relevant Wireless Installation component; or
  - (ii) Directly below and as close as possible to (and no further than 200 mm from) the *Wireless Installation* component.
- (c) Exercise caution when drilling breakout holes to avoid contact with and / or damage to existing internal cables within the *Column*.
- (d) Unless otherwise agreed in writing by *Ergon Energy* or *Energex*, for breakout holes:
  - (i) The point of entry is to be centre punched and drilled using a step drill and cutting compound at all times;
  - (ii) In the first instance a 6 mm pilot hole is to be drilled to check existing cable locations in column chamber;
  - (iii) Set drill to high speed and drill until penetration of the column chamber achieved and then drill the remainder of the *Column* wall with the drill set to a slow speed and using cutting compound until the full penetration of the column wall is achieved;
  - (iv) The drilling of only one hole for cable and conduit access to and from the transceiver enclosure is permitted;
  - The drilling of only one hole for cable and conduit access to each antenna is permitted;
  - (vi) No two holes are to be in the same horizontal plane around a *Column*;



- (vii) A preferred maximum hole size is 35 mm diameter;
- (viii) Holes for transceiver unit and antenna cabling and conduit access are to be minimised and size and location specified by *RPEQ* in the *Column* assessment;
- (ix) The holes are to be drilled in a manner which prevents metal fragments from falling inside the *Column*;
- (x) The edges where there is exposed steel are to be treated with galvanising paint to prevent corrosion in accordance the *Column* manufacturer's repair procedure; and
- (xi) The holes are to have a threaded spigot inserted to ensure water tight seal, preventing water ingress into internal cavity of the *Column*.
- (e) After the drilling of any break out hole(s) and the fitting of components (for example threaded spigot), all electrical cable(s) inside the column chamber is to have an insulation test perform on the electrical cable(s) to confirm no damage has occurred to electrical cable(s) on re-energisation of the public lighting supply circuit by the Service Provider's Licensed Electrical Contractor. Test instruments and results should be recorded and made available to Ergon Energy and *Energex* prior to any re-energisation of the lighting circuit.

#### 11.1.15 Wireless Installation Component Positioning On Column

Vertical and radial clearances between any *Wireless Installation* components (including earthed metallic antenna adaptor mounts and associated earthing cables) and energised conductors under any conditions (including strong wind conditions) are to conform to Ergon Energy or *Energex* construction standards and requirements for *Wireless Installations* on *Columns* including:

- (a) On a *Column*, all *Wireless Installation* components and associated cabling access holes are to be installed on the *Column* structure itself and not on any public lighting outreach, luminaire head or *LV* overhead service cable.
- (b) On a *Column* supporting public lighting *LV* overhead service cable:
  - (i) Maintain a minimum radial clearance of 0.8 metres below the *LV* service cable.
  - (ii) Maintain a minimum radial and vertical clearance of 0.5 metre to any part of the outreach bracket and luminaire.
  - (iii) Maintain a minimum radial and vertical clearance of 1.5 metres to any part of another *Wireless Installation*.

## 11.1.16 Wireless Installation Telecommunications Feeder / Backhaul Cabling Within Column

- (a) Only install *Wireless Installation* telecommunications cabling in the internal chamber of *Columns*.
- (b) No cabling is to run between *Wireless Installation* components on the external surface of the *Column*.
- (c) Do not install *Wireless Installation* telecommunications and *Low Voltage* electrical supply cables in the same, shared conduit enclosure. This excludes the *Ergon Energy* or *Energex* public lighting foundation shared entry *Conduit*. Any *Wireless Installation* telecommunications cables that share *Ergon Energy* or *Energex* public lighting

foundation shared entry *Conduit* are to be all dielectric non-conductive or double-insulated cables.



- (d) Use underground rigid *PVC* (non-conductive) conduit to enclose and mechanically protect incoming *Wireless Installation* telecommunications cabling within the vicinity of *Column* foundation / base from damage at all levels below the ground surface.
- (e) Within the *Column* chamber, use medium duty corrugated *PVC* conduit to envelope the *Wireless Installation* telecommunications cabling installed within each *Column*; from ground level to the transceiver enclosure past the DIN rail position where the cables are not all dielectric non-conductive or insulated cables.
- (f) The *Client / Service Provider* is to install the *Wireless Installation* antenna cabling and earth cabling:
  - (i) Internally within the *Column*; and
  - (ii) Through cabling apertures (breakout holes) in *Column* to antenna(s) and transceiver unit; and
  - (iii) Exiting the *Column* base through the relevant allocated conduits within the *Column's* foundation assembly (for example, reinforced concrete rag bolt foundation); and
  - (iv) Through the *Wireless Installation* telecommunications pit and duct system to *Client's* network.
- (g) Cable entry will not be permitted by removal of any *Column* foundation material (for example grouting, concrete).
- (h) No ground surface entry of cable into the *Column* will be permitted including by under any metallic cable protection cover at the ground surface.

#### 11.1.17 Wireless Installation Telecommunications Component Earthing At Column

- Note: An earthed *Wireless Installation* situation may be present on a *Column* due to direct earthing cable connection and / or co-axial feeder cables from on *Wireless Installation* components to the ground.
  - (a) Install earth cable inside the *Columns*:
    - (i) In accordance with Ergon Energy or Energex requirements;
    - (ii) Parallel to antenna feeder cables vertically down the inside of the *Column* chamber.
  - (b) The underground Wireless Installation's telecommunications earth cable is to:
    - (i) Be installed within an appropriate rigid underground *PVC* coloured grey or white telecommunications conduit (to distinguish itself from the electrical earth conduit); and
    - (ii) Have appropriate warning tape installed immediately above the earthing cable conduit for identification and the purpose of preventing damage.
  - (c) The *Wireless Installation* telecommunications earth cable is to clearly identify the owner and the *Wireless Installation* being protected:
    - (i) At a point on the *Column*, which is immediately above the end of the cable protection conduit;
    - (ii) Behind Column chamber access cover;
    - (iii) Within the footpath alignment; and
    - (iv) Within the footpath earthing pit.



- (d) Connect the *Wireless Installation* telecommunications earth cable to an earthing system independent of the *Column* earthing system that includes:
  - (i) A suitable earth electrode or horizontal earthing strip / tape (where it may be hazardous to drive an electrode vertically downwards due to presence of existing underground cables and essential services), installed on a footpath alignment agreed with relevant *Authority*:
    - i. A minimum of 2 metres from the *Column* face to a telecommunications antennae earth electrode and associated pit.
    - ii. A minimum of 2 metres from the *Column* face to any ground / footpath mounted telecommunications equipment (for example cabinet).

#### 11.1.18 Wireless Installation Telecommunications Electrical Installation Switchboard / Main Switch At Column

- (a) Ensure the switchboard / main switch installation at a Column for a Powered Wireless Installation comply with the installation requirements of Manual 00796<sup>10</sup>, Section 10 – Joint Use, Drawings:
  - (i) No. 7-1 For electricity supply to the *Powered Wireless Installation* through an additional un-switched *Low Voltage* electricity supply circuit (a typical dedicated supply circuit wiring arrangement within a *Column*).
  - (ii) No. 7-2 For electricity supply to the *Powered Wireless Installation* through the existing un-switched *Low Voltage* electricity supply circuit (a typical shared supply circuit wiring arrangement within a *Column* for public lighting and *Powered Wireless Installation* electricity supply).
- (b) The Service Provider is to install internally within a Column:
  - (i) The DIN rail-mounted switchboard / circuit breaker and associated terminal panel immediately behind the *Column's* internal access panel and adjacent to the existing streetlight circuit breaker assembly; and
  - (ii) The consumer's sub-mains cable (for electrical supply) from the Wireless Installation electrical circuit breaker at the Column terminal panel position and up and through a small diameter conduit aperture in Column and into the back of the externally mounted switchboard; and
  - (iii) Consumer's mains from nominated point of supply (for example *Ergon Energy* or *Energex* underground *Pit* connector or pillar).
- (c) There is to be no installation of powered outlet sub circuits at an unmetered power supply electrical installation.
- Note: The Service Provider is to contact the nominated Ergon Energy or Energex customer connection officer for internal access to the Column and to determine co-location requirements where inadequate space exists for the mounting or positioning of the DIN rail-mounted switchboard / circuit breaker and associated terminal panel.

<sup>&</sup>lt;sup>10</sup> For Ergon Energy and Energex Network related references refer to Section 13 – References.



#### 11.1.19 Wireless Installation Electrical Installation Earthing At Column

- (a) Where a separate point of electricity supply is brought into the *Column* to supply the *Wireless Installation* electrical installation, the *Wireless Installation* electrical installation earth cable may need to be connected to an independent earthing system in accordance with the specifying electrical *RPEQ's* certified design and requirements.
- (b) Where a separate point of electricity supply is brought into the *Column* to supply the *Wireless Installation* electrical installation, the *Wireless Installation* electrical installation earthing system is required to comply with the requirements of AS3000.
- (c) The *Wireless Installation* electrical installation earthing system may be bonded to the *Wireless Installation's* telecommunications earthing system (including antennas unit, antenna mounting adaptor and transceiver unit), in accordance with AS3015.
- (d) Where a Wireless Installation earth electrode needs to be installed in the footpath, it is to be suitably mechanical protected, and located to avoid contacting any underground electricity cables and essential services.
- (e) The underground earth cable is to:
  - (i) Be installed within a rigid underground *PVC* orange electrical conduit; and
  - (ii) Have appropriate warning tape installed immediately above the earthing cable conduit for identification and the purpose of preventing damage.
- (f) No *Wireless Installation* electrical installation earth cable, conduit, earth electrode, or earth electrode pit is to be installed within *Ergon Energy* or *Energex* underground electricity alignment or *Column* alignment on the footpath.
- (g) This electrical installation earth cable is to clearly identify the owner and the *Wireless Installation* being protected:
  - (i) At a point on the *Column*, which is immediately above the end of the cable protection conduit; and
  - (ii) Within the footpath earthing pit.
- (h) The *Service Provider* is responsible for the maintenance of all *Wireless Installation* electrical installation earthing components, including maintaining the impedance of the *Wireless Installation* electrical installation earthing system in accordance with relevant Australian Standard(s).
- (i) Maintain a minimum of 2 metres separation from the *Column* face to the *Wireless Installation's* electrical installation earth electrode and associated pit.
- (j) Maintain a minimum of 2 metres separation from any *Wireless Installation's* telecommunications earth electrode to the electrical installation earth electrode and associated pit.

#### 11.1.20 Wireless Installation Electrical Supply At Column

(a) Ensure the switchboard / main switch installation at a Column for a Powered Wireless Installation comply with the installation requirements of Manual 00796<sup>11</sup>, Section 10 – Joint Use, Drawings:

<sup>&</sup>lt;sup>11</sup> For Ergon Energy or Energex Network related references refer to Section 13 – References.



- (i) No. 7-1 For electricity supply to the *Powered Wireless Installation* through an additional un-switched *Low Voltage* electricity supply circuit (a typical dedicated supply circuit wiring arrangement within a *Column*).
- (ii) No. 7-2 For electricity supply to the *Powered Wireless Installation* through the existing un-switched *Low Voltage* electricity supply circuit (a typical shared supply circuit wiring arrangement within a *Column* for public lighting and *Powered Wireless Installation* electricity supply).
- (b) As *Ergon Energy* or *Energex* records may be inaccurate with respect to the type of electricity supply to a *Column*, the *Service Provider's* licensed electrical worker is to perform on site checks to determine whether the *Column* is fed by either a switched electricity supply or un-switched / continuous electricity supply.
- (c) In all cases, *Ergon Energy* or *Energex* determines the specific *Customer* connection arrangements on a site by site basis.
- (d) *Ergon Energy* or *Energex* will determine the specific method, type, and source of electricity supply to the *Customer* connection point, which may be either :
  - (i) Wireless Installation transceiver unit on footpath (preferred option); or
  - (ii) Wireless Installation transceiver unit, if permitted on Column.
- (e) As *Ergon Energy* or *Energex* determines, *Wireless Installation* electricity supply works that may include:
  - (i) Existing un-switched electricity supply upgrading;
  - (ii) Additional un-switched electricity supply installation; and
  - (iii) Associated augmentation of the electricity distribution network (for example, *Ergon Energy* or *Energex* service pillar or *Pit* installation.
- (f) Single phase, unmetered electricity supply from *Ergon Energy* or *Energex* network is typically provided via:
  - (i) Depending on connected electrical loads, voltage drop, fault loop impedance; the existing or upgraded un-switched public lighting circuit, for example directly looped in and out of the *Column* or from a public lighting supply circuit tee joint in an adjacent underground *Pit*; or
  - (ii) An existing or new small *Ergon Energy* or *Energex* service *Pit* fuse, fed from a jointed *LV* underground cable connection from which consumer's mains cable installation is connected to the *Wireless Installation* main switch board established within *Column* chamber; or
  - (iii) An existing or new underground *LV* electricity supply pillar located in the footpath alignment, which will house a new primary fuse from which consumer's mains cable installation is connected to the *Wireless Installation* main switch board established within *Column* chamber.

#### 11.1.21 Switched Public Lighting Circuit At Column

Note: Refer to Manual 00796<sup>12</sup>, Section 10 – Joint Use, Drawing No. 7-1 for electricity supply to the *Powered Wireless Installation* through an additional un-switched *Low Voltage* electricity supply for a typical dedicated supply circuit wiring arrangement within a *Column*.

<sup>&</sup>lt;sup>12</sup> For Ergon Energy or Energex Network related references refer to Section 13 – References.



- (a) *Columns* may be supplied via a switched, controlled street light supply circuit (such supply circuits occur within CBD areas). Should this be the case at a *Column*, an additional un-switched dedicated *Low Voltage* electricity supply (to the *Wireless Installation's* electrical installation) is required by either:
  - (i) The installation of an *Ergon Energy* or *Energex* service cable to the *Wireless Installation's* electrical installation main switch and neutral link on the switchboard panel (mounted behind the access cover); or
  - (ii) The installation of consumer's mains in appropriate conduits to a primary fused external point of electricity supply determined by *Ergon Energy* or *Energex* (for example from fuses in an *Ergon Energy* or Energex *Pit* or pillar).
- (b) At all installations where there is an unfused service connection, for example an underground LV supply cable directly from a tee jointed cable, the Service Provider is to supply and install a suitable electrical installation main switch, fault limiting device, and circuit protection (if a main circuit breaker is used as the main switch, it can also act as the circuit protection device).
- (c) Where applicable, apply a suitable durable label to the outside of the *Column* and one adjacent to the consumers main switchboard with text indicating "Warning- X Sources of Electricity Supply", with "X" being equal to the actual number of supply sources to the specific *Column* site (including any public lighting circuit and the *Wireless Installation's* electrical supply circuit). In cases where the point of supply to the *Wireless Installation's* electrical switch board is not obvious on site, the *Service Provider* is to provide and leave a laminated "as constructed route plan" drawing attached to the DIN rail within the *Column*. This drawing is to indicate the location of the point of electricity supply and cable route to the *Wireless Installation*.

#### 11.1.22 Non-Switched Public Lighting Circuit At Column

- (a) In locations other than where a relay controlled / switched public lighting circuit exists (for example those with photo electric (PE) cell operated lighting fed from a permanent LV supply), where required Ergon Energy or Energex will install an additional fault rated circuit breaker on the public lighting terminal panel at the Column base.
- (b) This Ergon Energy or Energex circuit breaker is the point of connection of the Wireless Installation electrical supply circuit, from which the Service Provider is to install consumer's mains to the Wireless Installation electrical supply circuit main switch. Ergon Energy or Energex is responsible for the ongoing maintenance of this circuit breaker.
- (c) The *Service Provider* will install the *Wireless Installation's* electrical installation main switch and neutral link on the switchboard panel (mounted behind the access cover).



## 12 DISTRIBUTION POLES

#### **12.1** Distribution Wood Poles – Detailed Requirements

Note: Refer to Appendix D, Figures D-1 to D-3 (inclusive), for typical *Wireless Installation* arrangements on *Poles*.

#### 12.1.1 Selection Of Pole

- (a) Wireless Installations are not to be installed on:
  - (i) Concrete or steel poles (excluding steel Columns).
  - (ii) *Poles* with Single Wire Earth Return (SWER) construction.
  - (iii) Poles supporting conductors energised at or above 33 kV.
  - (iv) Poles which support plant and equipment including:
    - i. Air break switches.
    - ii. Transformers.
    - iii. Sectionalisers / reclosers.
    - iv. *HV* and / or *LV* overhead to underground transition cable terminations, including *Poles* with *Ergon Energy* or *Energex* metallic cable guards at ground level.
- (b) Where installing Wireless Installations above 11kV or 22kV conductors, unless otherwise agreed in writing by Ergon Energy or Energex, Wireless Installations are only to be installed on Pole(s) supporting flat open wire geometry construction (for example a pin or shackle crossarm construction) or bundled cable construction to co-locate Wireless Installations.
- (c) *Wireless Installations* are not to be installed above conductors energised at 11kV and 22kV on *Poles*:
  - (i) Supporting overhead earthwires, wishbone, triangular, trident; vertical; or other vertically orientated constructions.
  - (ii) That have been designed and installed for future *HV* circuit installation (for example, those that have a *Pole* an unused portion of the *Pole* above the *LV* crossarm position) will not be available for *Wireless Installation* attachment.
- (d) Poles that have been reinforced by nailing or staking with structural steel components may be used, if found to be structurally capable, providing the Wireless Installation components on the Pole remain clear of the structural steel nail or stake and the associated fixing components (including bolts and ferrules) do not obstruct access for any works by maintaining 150 mm clear separation.
- (e) *Poles* that have been reinforced by a steel collared concrete butt may be used if found to be structurally capable.

#### 12.1.2 On Site Condition Inspection Of Pole

- (a) For those *Poles* that comply with the above selection criteria, when installing a new or replacement *Wireless Installation* that alters the *Pole* structural tip load, the *Service Provider* is to arrange for a full inspection and assessment of a candidate wood *Pole*, including:
  - (i) An above and below ground inspection;



- (ii) Recording the physical *Pole* characteristics data including from the onsite *Pole* disc details; and
- (iii) Identification of *Ergon Energy* or *Energex* conductors and *External Party* broadband network cables types, spans and mounting heights,

to obtain data for Pole structural loading assessment.

(b) When works are not altering the *Pole* structural tip load, the *Service Provider* is to ensure as a minimum, their safe system of work is consistent with WP9524<sup>13</sup>, including the following requirements:

Pole Access Type	Minimum Inspection Requirement
Work on a Pole from an EWP (not altering	Visual above ground inspection of Pole being
tip load)	worked on and adjacent <i>Poles</i> affected by the work.
Work on a Pole from a ladder (not altering	Visual above ground inspection and either rope test
tip load)	or below ground inspection of <i>Pole</i> being worked on
	and adjacent Poles affected by the work.

- (c) The *Service Provider* is to undertake such assessment in accordance with the following documents:
  - (i) Work Category Specification WCS5.1 Poles Inspect and Treat.
  - (ii) Energy Queensland Manual 00354 Overhead Network Condition Assessment Manual<sup>12</sup>.
  - (iii) Energy Queensland Manual 00369 Pole Inspection Guidelines<sup>15</sup>.
  - (iv) Energy Queensland Manual 00502 Lines Defect Classification Manual<sup>15</sup>.
- (d) All *Poles* that are classified as suspect or unserviceable at the time of inspection, are immediately deemed as unsuitable for any *Wireless Installation* attachment or for other associated works to proceed and are to be reported to Ergon Energy or *Energex* for further investigation.
- (e) The *Service Provider* is not to access, work on, or attach a *Wireless Installation* on any *Pole* which is:
  - (i) Marked on Site as suspect (with a painted diagonal marking); or
  - (ii) Marked on Site as scheduled for replacement (with a painted cross marking); or
  - (iii) Found to be in a condition which is considered unserviceable or a risk to any party's safety,

and is to immediately report these Poles to Ergon Energy or Energex.

- (f) Prior to the commencement of any structural design, the physical *Pole* characteristics including the onsite *Pole* disc (typically at 3 metres above ground level) details are to be obtained to enable the conformation of the *Pole* type and physical capacity including and not limited to:
  - (i) *Pole* length (including the buried section).
  - (ii) Pole tip load strength when new.
  - (iii) Pole installation date.
  - (iv) Pole treatment date.
  - (v) Pole species and strength group.

<sup>&</sup>lt;sup>13</sup> For Ergon Energy or Energex Network related references refer to Section 13 – References.



- Note: *Pole* foundation construction details, for example sinking depth, foundation material (for example, concrete strength / stabilised backfill, depth and diameter) are not generally available on a *Pole* site by site basis. The *Pole* sinking depth may be determined by subtracting the *Pole* out of ground height away from the total *Pole* length.
- 12.1.3 Structural Load Calculations For Pole
- Note: Only establish new or replacement *Wireless Installations* on *Poles* inspected and assessed as structurally capable of accommodating the proposed *Wireless Installation* components. Static weight and wind loading changes related to any *Wireless Installation* design are not to result in the maximum allowable *Pole* tip load to be exceeded.
  - (a) Once the *Pole* is fully inspected on *Site* and determined to be in a sound condition and *Pole* details are obtained, the *Service Provider* is to arrange for or undertake in accordance with *Ergon Energy* or *Energex* electricity distribution design requirements, all required tip load and foundation design calculations; including allowance for:
    - (i) Existing *Ergon Energy* or *Energex* asset component structural loadings including *Pole* and conductor loadings;
    - (ii) Existing External Party asset structural loadings; and
    - (iii) Additional or revised applied structural loads resulting from proposed *Wireless Installation* component attachment, relocation or replacement.
  - (b) Design the Wireless Installation and association attachments ensuring that the total applied limit state structural load, based on the relevant Regional Wind Speed with a minimum Average Recurrence Interval (ARI) of 50 years or greater (≥V<sub>50</sub>), is in accordance with AS/NZS7000 and AS/NZS 1170.2, and does not exceed the safe capacity of the *Pole* and the *Pole's* foundation.

## Note: The electricity distribution network is generally designed to withstand a 1 in 50 year average recurrence interval wind speed ( $V_{50}$ ).

- (c) Determine the appropriate ARI wind speed for the *Wireless Installation* in accordance with AS1170.2 and *Client* requirements (for example if the *Wireless Installation* is considered essential post-disaster infrastructure, then a higher ARI wind speed may be required).
- (d) Note that a new Pole(s) and / or on alternative Site(s) may need to be established to replace existing undersized Pole(s), due to the additional height, wind loading and resulting Pole foundation depth requirements, resulting from the proposed attachment of a Wireless Installation, particularly where the Wireless Installation components (for example antenna) are installed at a Pole top position.
- (e) Where a Pole is considered for the co-location of a large Wireless Installation; structural load calculations may require the installation of a replacement Pole with greater structural strength and / or longer length to cater for increased tip loads due to the Wireless Installation attachment. Installation of replacement Pole(s) is at the Clients cost.

#### 12.1.4 Wireless Installation Component Requirements for Pole

The *Service Provider* is to meet the following requirements for individual *Wireless Installation* components established on *Poles*:



- (a) Design *Wireless Installation* attachments such that they facilitate installations on *Poles* of varying cross sections and with inconsistent surfaces; for example knots.
- (b) Securely fix each *Wireless Installation* component, for example transceiver enclosure and antenna assembly, to wood *Pole* by galvanised or stainless steel bolts.
- (c) Are not to utilise chain attachments, bandit straps or any other strapping method of circumferential attachment for *Wireless Installation* attachment:
  - (i) On a wood *Pole*; or
  - (ii) Around wood *Pole*; or
  - (iii) Placed over or under existing earth down leads, cables, *Conduits* and isolation switch handles.

#### 12.1.4.1 Packaged Wireless Installation On Pole (If Installed)

- (a) Ergon Energy or Energex preference for a low powered / small cell Wireless Installation on a Pole is for a packaged equipment arrangement which combines the power supply, *RF* module and antenna (including GPS antenna) module within one lightweight, compact, integrated unit. This type of installation has the advantage of a reduced number of Wireless Installation component fixings on a Pole and eliminates the need for cabling between the *RF* module and antennas.
- (b) Unless otherwise agreed in writing by *Ergon Energy or Energex*, keep the number of packaged units to a maximum of two.
- (c) Where permitted in writing by Ergon Energy or *Energex* on an individual *Pole* basis, the packaged unit, including the integral power supply unit and radio frequency modules, where installed on a *Pole*, will not exceed the following dimensions:
  - (i) 0.6 metres in height;
  - (ii) 0.4 metres in width;
  - (iii) 0.4 metres in depth;
- (d) The total static weight\* for each Wireless Installation packaged unit will not exceed 15 kg, unless permitted otherwise in writing by Ergon Energy or Energex on an individual Pole basis and the Wireless Installation packaged unit (accounting for additional static weight associated with the other Wireless Installation components) will always be subject to the total Pole structural load limit not being exceeded.
- \* Note: Subject to a manual handling risk assessment by the *Operator* and restrictions identified during the *Service Provider's* risk assessment and / or as part of the *Service Provider's* safe system of work. The *Wireless Installation* component's total weight and identified appropriate lifting point(s) is to be included on a warning label manufactured from a UV resistant durable material on the front of the relevant component.

#### 12.1.4.2 Antennas And Adapter Mount On Pole

- (a) Ensure the antenna unit utilises the most compact possible vertically orientated, omni directional antenna, or enclosed mini-panel antenna arrays where possible.
- (b) The number of antennas is to be kept to a minimum.
- (c) Unless otherwise agreed in writing by *Ergon Energy* or *Energex*, for *Wireless Installation* antennas installed in the vicinity of the *Pole* mid-section, the number of permitted antennas is as follows:



- (i) A maximum of two omni antennas; and
- (ii) A maximum of two (unless otherwise agreed with *Ergon Energy* or *Energex*) compact panel antennas.
- (d) The full perimeter of the *Pole* cannot be blocked by antennae. A climbing zone is required to allow ladder access to the *Pole* top in a position that does not require the ladder to be placed on the road pavement. This will be assessed on a site by site basis.

#### 12.1.4.3 Transceiver Unit Enclosure On Pole (If Installed)

- (a) Where permitted by *Ergon Energy* or *Energex* on a site by site basis, ensure the lockable transceiver enclosure with an integral power supply and radio frequency units, where installed on a *Pole* does not exceed:
  - (i) 0.6 metres in height;
  - (ii) 0.5 metres in width; and
  - (iii) 0.4 metres in depth.
- (b) The total static weight\* for the transceiver unit enclosure (accounting for additional static weight associated with the other *Wireless Installation* components) will be subject to the *Pole* structural load limit not being exceeded.
- \* Note: Subject to a manual handling risk assessment by the *Operator* and restrictions identified during the *Service Provider's* risk assessment and / or as part of the *Service Provider's* safe system of work. The *Wireless Installation* component's total weight and identified appropriate lifting point(s) is to be included on a warning label manufactured from a UV resistant durable material on the front of the relevant component.

#### 12.1.4.4 Electrical Installation Switchboard / Main Switch On Pole

Ensure switchboard / main switch utilises a proprietary compact integral consumer's terminal / main switch package board.

#### 12.1.4.5 Wireless Installation Component Positioning On Pole

- (a) *Ergon Energy* or *Energex* preference is for all *Wireless Installation* components to be installed on a *Pole* below the *LV* conductors, crossarms, fuses and service cables while maintaining the nominated clearances below.
- (b) Vertical and radial clearances between any Wireless Installation components (including antenna adaptor mounts, radio frequency feeder cables and associated earthing cables) and energised conductors under any conditions (including strong wind conditions) are to conform to Ergon Energy or Energex construction standards and requirements for Wireless Installations on Poles including:
  - (i) Apply and maintain, minimum required phase to earth separations and working clearances between earthed *Wireless Installation* component metalwork and *Ergon Energy* or *Energex* energised conductors, to cater for all standard crossarm types and insulator layout arrangements.
  - (ii) On a *Pole* supporting *HV* only or *HV* and *LV*:
    - i. If any *Wireless Installation* component is mounted below *HV*, maintain a minimum clearance of 2.0 metres below any 11 kV bare or insulated conductors.



- ii. If any *Wireless Installation* component is mounted above *HV*, maintain a minimum radial clearance of 0.45 metres separation between any *Wireless Installation* component (including the lowest part of the antenna adaptor mounting bracket metalwork when mounted on *Pole*) and the *High Voltage* conductor(s).
- iii. Maintain a minimum clearance of 1.0 metres below any bare or insulated *LV* conductors.
- iv. If any *Wireless Installation* component is mounted above *LV*, maintain a minimum radial clearance of 0.45 metres separation between any *Wireless Installation* component (including the lowest part of the antenna adaptor mounting bracket metalwork when mounted on *Pole*) and the *Low Voltage* conductor(s).
- v. No antenna is to be mounted on a wood *Pole* between *HV* and *LV* conductors.
- (iii) On any Pole, maintain:
  - i. 0.8 metres minimum radial clearance around any LV overhead service lines.
  - ii. 0.15 metres minimum from the *Pole* top surface for the drilling of any mounting holes (to avoid splitting the *Pole*).
  - iii. 0.5 metres minimum clearance to an aerial stay wire attached to the *Pole*.
  - iv. 0.5 metres minimum clearance above or below any part of a public lighting outreach bracket.
  - v. 0.3 metres minimum clearance above or below any part of a broad band cable network.
  - vi. A minimum clearance of 0.2 metres to any pole step.
  - vii. Access to overhead service fuse holders to allow for fuse extraction, and operation of disconnect links, when working from the ground surface.
- (iv) A minimum number of *Pole* steps may be removed to accommodate the installation of a *Wireless Installation* component as a last resort.
- (v) Whilst maintaining adequate working clearances to all other parties attachments, the *Service Provider* is to install all *Wireless Installation* components and cabling down the same side of *Pole* in a single vertical alignment, including:
  - i. Antenna earth cable;
  - ii. Antenna feeder cables;
  - iii. Consumers mains;
  - iv. Protective cable enclosure; and
  - v. Cable guard.
- (vi) All *Wireless Installation* cabling between the transceiver unit and the antenna is to be installed down the *Pole* in no more than two separate groups, each protected by a polymeric cable guard.
- (vii) All *Wireless Installation* cabling, including antenna unit feeder cables and earthing cables, behind the cable protection cover are to be independently fixed to the pole by galvanised two fixing point saddles.
- (viii) Where required, all *Wireless Installation* signal improvement and multiplexing components, for example mast head amplifiers and combiners, are to installed directly behind the antennas and not directly to the *Pole* at an intermediate position.



#### 12.1.4.6 Wireless Installation Telecommunications Component Earthing On Pole

- Note: An earthed *Wireless Installation* situation may be present on a *Pole* due to direct earthing cable connection and / or co-axial feeder cables from on *Pole* antenna components to the ground.
  - (a) On any Pole:
    - (i) Ensure that there is no potential for contact with bare earthed *Wireless Installation* components (for example while *Operators* are working in close vicinity to electrical conductors, public lighting brackets and broadband strand wire) by electrically insulating such components or other *Ergon Energy* or *Energex* accepted means.
    - (ii) *Wireless Installation* components do not require earthing provided no exposed components are below 2.4 metres above ground on the *Pole* and is to be in strict accordance with the *RPEQ* certified design.
  - (b) On a *Pole* supporting *HV*:
    - (i) Ensure that there is no alternative for a earth leakage path to be established through the *Wireless Installation* earthing system, via the installation of an intermediate stand-off insulators between the Pole surface and the earthed Wireless Installation components (e.g. antennae) or other *Ergon Energy or Energex* accepted means.
  - (c) The *Wireless Installation* metallic telecommunications component (including antennas unit, antenna mounting adaptor and transceiver unit) earthing system is to be bonded to the *Wireless Installation* electrical installation earthing system in accordance with requirements of AS 3015 as amended.
  - (d) The *Wireless Installation* metallic telecommunications component (including antennas unit, antenna mounting adaptor and transceiver unit) earthing system is not to be connected / equi-potentially bonded to:
    - (i) *Ergon Energy* or *Energex* electricity network earthing system;
    - (ii) Any *External Party* network earthing system, for example aerial broad band cable network strand wires.
  - (e) The *Wireless Installation* telecommunications earth cable on the *Pole* (where fitted and / or required) for earthing the antennas' metallic components is to be capable of clearing all electrical fault conditions.
  - (f) Install the *Wireless Installation* telecommunications earth cable on the *Pole* (where fitted and / or required):
    - (i) In accordance with Ergon Energy or Energex requirements;
    - (ii) Parallel to antenna feeder cables and under the same shared cable mechanical protection cover; and
    - (iii) By two point fixing galvanised saddles.
  - (g) Connect the *Wireless Installation* telecommunications earth cable on the *Pole* (where fitted and / or required) to an independent earthing system that includes:
    - (i) A minimum of 2 metres in all common earthed areas and 4 metres in all separately earthed areas separation from the *Pole* face to a telecommunications antennae earth electrode and associated pit.
    - (ii) A minimum of 2 metres in all common earthed areas and 4 metres in all separately earthed areas separation from the *Pole* face to any ground / footpath mounted telecommunications equipment (for example cabinet).



- (iii) A minimum of 4 metres separation from any separate HV earth (including to any Ergon Energy or Energex under - pole butt earths and any Ergon Energy or Energex network remote earth electrodes installed away from the pole) to any Wireless Installation telecommunications component (e.g. antenna) earth electrode and associated pit.
- (iv) A suitable horizontal earthing strip / tape (where it may be hazardous to drive an electrode vertically downwards due to presence of existing underground cables and essential services), installed on a footpath alignment agreed with relevant *Authority*.

#### 12.1.4.7 Wireless Installation Electrical Installation Earthing On Pole

- (a) The *Wireless Installation* electrical installation earthing system is not to be connected / equi-potentially bonded to:
  - (i) Ergon Energy or Energex electricity network earthing system; or
  - (ii) Any External Party network earthing system.
- (b) Where a *Wireless Installation* earth electrode needs to be installed, it is to be suitably mechanical protected, and located to avoid contacting any underground electricity cables and essential services.
- (c) Underground earth cable to:
  - (i) Be installed within a rigid underground *PVC* orange electrical *Conduit*; and
  - (ii) Have appropriate warning tape installed immediately above the earthing cable *Conduit* for identification and the purpose of preventing damage.
- (d) No *Wireless Installation* earth cable, earth electrode, or earth electrode pit is to be installed within *Ergon Energy* or *Energex* underground electricity alignment or *Pole* alignment on the footpath.
- (e) This earth cable is to clearly identify the owner and the *Wireless Installation* being protected:
  - (i) At a point on the *Pole*, which is immediately above the end of the cable protection *Conduit*; and
  - (ii) Within the footpath earthing pit.
- (f) The *Service Provider* is responsible for the maintenance of all *Wireless Installation* earthing components, including maintaining the impedance of the *Wireless Installation* earthing system in accordance with relevant:
  - (i) Legislation; and
  - (ii) Industry standards; and
  - (iii) Australian Standard(s).

#### 12.1.4.8 Mechanical Cable Protection On Pole

- (a) On / down a Pole, Wireless Installation cabling is to be mechanically protected by an Ergon Energy or Energex accepted non- electrically conductive, non-metallic UV and impact resistant (for example polymeric) cable protection cover (not pipes or Conduits), continuously attached up the Pole and fixed to the Pole on both sides of the guard at regular centres by galvanised hexagonal head screws of a minimum size of M10 x 65 mm length.
- (b) More than two cable protection cover installations on a *Pole* will not be permitted.



(c) The cable protection cover is to provide appropriate mechanical protection to such cables and is to be capable of preventing mechanical damage from climbing devices; including ladders and pole platform chain impact and related compression and wildlife (for example Cockatoos' and Galahs).

#### 12.1.4.9 Ground Level Mechanical Cable Protection On Pole

- (a) At ground level if extra mechanical protection is required, non-metallic UV and impact resistant (for example polymeric) cable guards are required to be installed instead of electrically conductive metallic cable guards, unless specifically otherwise agreed by *Ergon Energy* or *Energex* on a case by case basis.
- (b) A maximum of two *Wireless Installation* cable guards (for example, one for each of the on pole mechanical cable protection covers) are permitted to be installed on the *Pole*.
- (c) Where a ground level *Wireless Installation* metallic cable guard is permitted, it is to be:
  - (i) Hot dipped galvanised; and
  - (ii) Fabricated with suitable hole at the top of the guard to allow for immediate or future attachment of bolted earth bonding lugs.
- (d) The *Wireless Installation* metallic cable guard may be equi-potential bonded to metalwork of an *External Party* (excluding that of *Ergon Energy* or *Energex*) at the *Pole* base:
  - (i) Where such metalwork is accessible to general public, or
  - (ii) Where any part of the metallic cable guard is at or within 2.4 metres of ground surface level
  - (iii) using an earth bond that it is not removable by the general public without using hand tools.
- (e) The *Wireless Installation* metallic cable guard is not installed on any *Pole* that has an *Ergon Energy* or *Energex* metallic cable guard installed.
- (f) Metallic cable guards are not to be installed above 2.4 metres from ground surface level.
- (g) The metallic cable guard is to be fixed to the *Pole* on both sides of the guard at regular centres by galvanised hexagonal head coach screws of a minimum size of M10 x 65 mm length.

#### 12.1.5 Electricity Supply To Wireless Installation On Pole

- (a) *Ergon Energy* or *Energex* will determine the specific method, type, and source of electricity supply to the customer connection point, which may be either :
  - (i) Wireless Installation transceiver unit on footpath (preferred option); or
  - (ii) *Wireless Installation* transceiver unit on *Pole*.
- (b) On a *Pole* supporting *LV* mains, a drop down service and primary fuse will generally be installed by *Ergon Energy* or *Energex* on the *Pole* to the mains connection box.
- (c) A Wireless Installation electrical installation may typically include:
  - (i) A mains connection box;
  - (ii) A consumer's switchboard;
  - (iii) *MEN* earthing cable;
  - (iv) Non-metallic Conduits; and
  - (v) Consumer mains, attached to a Pole in accordance with Network requirements.



### 13 LATTICE TRANSMISSION TOWERS

#### 13.1 Towers – Detailed Requirements

#### 13.1.1 Tower Selection

- (a) Undertake selection of potential eligible *Tower* sites for establishment of *Wireless Installation* in conjunction with *Ergon Energy* or Energex on a *Tower* site by *Tower* site basis.
- (b) *Wireless Installations* are not to be installed on:
  - (i) Mono concrete transmission poles;
  - (ii) Mono steel transmission poles; or
  - (iii) On any *Tower* on which other existing *Wireless Installations* are established, for example, mobile telephone infrastructure of any type owned and / or operated by another party, unless otherwise agreed in writing by *Ergon Energy* or *Energex*

#### 13.1.2 Tower Site Access

- (a) A *Tower* would typically be located on an electricity easement within private property or *Authority* controlled land.
- (b) The electricity easement conditions do not include any *External Party* telecommunication facility related permissions.
- (c) The establishment of easements and leases for *Wireless Installations* (including for base station building / equipment enclosure, earthing grids, and cable corridors to the *Tower* site) and pedestrian and vehicular access for the purposes of *Wireless Installations* on land, are to be negotiated between the *Client / Service Provider* and the relevant *Landowner / Occupier / Authority*.

#### 13.1.3 On Site Condition Inspection of Tower

- (a) The Service Provider is to contact Ergon Energy or Energex to confirm if asbestos containing material is present at each *Tower* site selected for potential *Wireless Installations*, as an asbestos containing material paint coating may be present on *Tower* legs at and / or near ground surface level.
- (b) The Service Provider is not to disturb any such paint coating.
- (c) The *Service Provider* is to inspect each *Tower* for general condition, damage, physical characteristics of individual *Tower* structural components (including steel lattice work) for *Wireless Installation* attachment.

#### 13.1.4 Wireless Installation Component Positioning At Tower Site

Ergon Energy or Energex preference for the attachment of *Wireless Installation* components is as follows:

- (a) Ensure that the number of antennas, microwave dishes and cables installed on a *Tower* are kept to a minimum.
- (b) Antennas and micro wave dishes are to be mounted on the *Tower* lattice work at a position below the lowest conductors with a minimum of 3 metres vertical separation.
- (c) Only one *Tower* leg is to be used for the installation of radio frequency feeder cables to the antennas.
- (d) Equipment shelter / base station enclosure is to be installed outside of the *Tower* leg perimeter and clear of any *Tower* earth grid.



#### 13.1.5 Structural Load Calculations For Tower Site

- (a) The *Client's RPEQ* is to structurally assess each *Tower* in accordance with requirements outlined by *Ergon Energy* or *Energex* for an electricity transmission industry steel lattice *Tower* (and not the engineering requirements for telecommunications structures).
- (b) At *Ergon Energy* or *Energex* discretion, *Ergon Energy* or *Energex* may provide structural engineering services, as a part of the overall *Tower* site assessment process, for an agreed fee.
- (c) *Ergon Energy* or *Energex* may not have detailed design and construction drawings for each individual *Tower*.
- (d) Where available, *Ergon Energy* or *Energex* may provide upon request from the *Service Provider*, structure and foundation detailed engineering drawings based upon the *Tower* construction type and not necessarily the site specific as constructed drawings, and overhead conductor types utilised at each site.
- (e) Alternatively / additionally, *Ergon Energy* or *Energex* or appropriately rated *Service Provider* may need to attend the *Tower* site to measure steel lattice component dimensions and assess their condition, at the *Client's* / *Service Provider's* cost.
- (f) Due to a population of *Towers* of varying design types, ages, structural capacities, load conditions (for example, angle deviation, straight line supports), ensure the total *Wireless Installation* is designed so as to prevent:
  - (i) Excessive wind loads and wind-related vibrations caused by any *Wireless Installations* components from being transferred to the *Tower*; and
  - (ii) The combined structural loads of existing *Ergon Energy* or *Energex* infrastructure and proposed *Wireless Installation* components exceeding the *Tower's* allowable structural load limit and *Tower* foundation capacity.
- (g) Due to a population of *Towers* of varying design types, ages, structural capacities they may not meet current design standards, and they meet the design standards from when the *Towers* were initially designed and constructed. Use of any of these *Towers* for *Wireless Installation* will require the *Service Provider* to undertake make ready works to bring the *Tower(s)* up to the current design standards at the *Clients* cost.
- (h) Design the Wireless Installation and association attachments ensuring that the total applied limit state structural load, based on the relevant Regional Wind Speed with a minimum Average Recurrence Interval (ARI) of 100 years or greater (≥V<sub>100</sub>), is in accordance with AS/NZS7000 and AS/NZS 1170.2, and does not exceed the safe capacity of the structure and foundation.
- (i) Determine the appropriate ARI wind speed for the *Wireless Installation* in accordance with AS1170.2 and *Client* requirements (for example if the *Wireless Installation is considered* essential post-disaster infrastructure, then a higher ARI wind speed may be required).

#### 13.1.6 Tower Access and Works At Tower Site

- (a) Do not attach individual *Wireless Installation* components to any *Tower* that has not been assessed as being suitable for such an installation to the complete satisfaction of *Ergon Energy* or *Energex* on a *Tower* site by *Tower* site basis.
- (b) Only *Service Providers* which are rated under *WCS*90 and / or *WCS*91.3, and *Operators* who are qualified and trained, are to carry out steel lattice *Tower* work (for example accessing / working, and rescue from heights) on *Towers*.

#### 13.1.7 Wireless Installation Component Requirements At Tower Site

(a) *Wireless Installation* components and associated attachment hardware are to:



- (i) Withstand static and wind loads, cyclic vibration and any foreseeable and reasonable potential physical impacts; and
- (ii) Not damage the *Tower's* galvanised or other protective surfaces.
- (b) All *Wireless Installation* fixings to be in accordance with manufacturer's recommendations.
- (c) The majority of *Towers* provide for a 700 mm maintenance climbing corridor above the waist of a *Tower* and up one or more *Tower* legs. *Wireless Installation* components are not to impinge on this climbing area without the written permission of *Ergon Energy* or *Energex*. *Ergon Energy* or *Energex* reserves the right to review and reject designs which in *Ergon Energy* or *Energex* opinion have *Wireless Installation* components excessively protruding into this climbing area.
- (d) Ensure no part of any *Wireless Installation* components, in any direction; have less than 3 metres clearance from any 110 kV / 132 kV energisable conductors or plant including under high wind conditions.
- (e) Securely fasten all externally mounted *Wireless Installation* components (including antennas) onto the *Tower* steel lattice components by:
  - (i) Hot dipped galvanised steel bolted clamps; or
  - (ii) Stainless steel bolted clamps; or
  - (iii) Other *Ergon Energy* or *Energex* approved means.
- (f) Communication component attachment by steel banding strap or like systems is not permitted under any circumstances.
- (g) Drilling of any *Tower* structural members is not permitted.
- (h) Modification of *Tower* leg foundations or earthing grids is not permitted without written *Ergon Energy* or *Energex* approval.
- (i) The removal of steel lattice members from any *Tower*, including to make space for a base station enclosure / shelter, is not permitted.

#### 13.1.8 Cable Trays And Mounting Brackets

- (a) All *Wireless Installation* cable trays and ladders are to be installed in such a manner as to be:
  - (i) Hot dip galvanised or stainless steel metal construction;
  - (ii) Electrically continuous for the full length;
  - (iii) Bonded to the Wireless Installation fault protection earthing system; and
  - (iv) Provided with screw fixed proprietary covers to eliminate cable damage in trafficable areas and movement.
- (b) Each cable mounting brackets on the *Tower* is to:
  - (i) Not require drilling and / or the modification of the *Tower* leg;
  - (ii) Be a clamped V-bracket assembly, installed on and aligned flush with the inside of the *Tower* leg galvanised steel angle; and
  - (iii) Incorporate a fin plate and associated propriety tele-cleats which attach the radio frequency feeder cables.



#### **13.1.9** Tower Foundations

- (a) *Ergon Energy* or *Energex* may only be able to provide generic foundation design drawings for the *Tower* type used in the design of an individual site, and not the specific foundation as constructed drawings for an individual *Tower* site.
- (b) Individual site foundation may need to be physically inspected on site and assessed for structural capability to support any additional / changed structural loadings.
- (c) Foundations may need to be augmented to accommodate the additional / changed structural loads from the attachment of *Wireless Installation* components.
- (d) Due to a population of *Towers* of varying design types, ages, structural capacities the in situ reinforced concrete foundations may not meet current design standards and they meet the design standards from when the *Towers* in situ reinforced concrete foundations were initially designed and constructed. Use of any of these *Towers* for *Wireless Installation* will require the *Service Provider* to undertake make ready works to bring the *Tower's* in situ reinforced concrete foundations up to the current design standards for the *Tower's* in situ reinforced concrete foundations at the *Clients* cost.

#### 13.1.10 Civil Works At Tower Site

- (a) Prior to commencing any excavation works (including those works to install *Conduits*, cabling or earthing), the *Service Provider* is to contact *DBYD* and *Ergon Energy* or *Energex* to obtain available underground infrastructure records and employ a professional underground service locator to verify the exact location of all existing essential services and infrastructure on site, including *Tower* earthing grids along all planned underground cable routes / easements.
- (b) All costs of locating existing essential services and repairing damaged existing essential services, are borne by the *Service Provider* causing that damage.

#### 13.1.11 Base Station Building Enclosure / Equipment Shelter At Tower Site

- (a) The base station enclosure / equipment shelter is to accommodate all ground-mounted telecommunications and electrical equipment for the *Wireless Installation* site.
- (b) Each base station enclosure / equipment shelter design will be considered by *Ergon Energy* or *Energex* on a site by site basis. Typical base station enclosure / equipment shelter building construction type may be metal clad or masonry block. For all structural and civil works, supplied materials, workmanship, structural integrity and build quality is to comply with relevant:
  - (i) Australian Standards and building codes;
  - (ii) Industry Standards; and
  - (iii) Manufacturer specifications.
- (c) The base station enclosure / equipment shelter roof is to incorporate an anti-climbing device, for example galvanised barbed wire strings, so that *Tower* access cannot be achieved by climbing onto the roof of the base station enclosure / equipment shelter.
- (d) Position base station enclosure / equipment shelter immediately adjacent to the *Tower* along the conductor centre line and away from any exiting underground earthing grids for the *Tower* (where adequate space under the *Tower* and in between the *Tower* legs is not available).
- (e) *Ergon Energy* or *Energex* is to be consulted and determine the final position of the base station enclosure / equipment shelter on a site by site basis so that Energy Queensland Tower site access for maintenance is maintained, including where the base station



enclosure / equipment shelter is intended to be installed within the area bounded by the four *Tower* legs.

(f) The consumer's electricity supply installation design and installation parameters (including and not limited to: step and touch potentials, incoming LV supply and any required mitigation of the transfer of electrical potential during a fault at the *Tower* site) associated with the base station enclosure / equipment shelter on a site by site basis is to be certified by the *Client's* electrical *RPEQ* as being compliant with all the required legislation, regulation, codes of practice, Australian Standards and industry guidelines.

#### 13.1.12 Wireless Installation Telecommunications Backhaul At Tower Site

- (a) Wireless telecommunications to and from each *Wireless Installation* on a *Tower* and interconnections between *Tower* sites are not the responsibility of *Ergon Energy* or *Energex*.
- (b) Microwave links between Wireless Installations and other Client transceiver sites are preferred to potentially conductive wireless telecommunications cable landline installations on Tower easements and electricity alignments. Alternatively, where "line of sight" microwave links are not achievable, interconnection of Wireless Installations by underground optical fibre cable networks is permissible within a white, heavy duty underground PVC wireless telecommunications Conduit.
- (c) Electrically conductive or metallic (for example copper pair telephony or co-axial) wireless telecommunications cables are not to be installed to any *Tower* site; unless:
  - (i) They are appropriately electrically isolated at the *Tower* site and any other required locations, including to manage any fault or interference conditions; and
  - (ii) Written approval is granted by *Ergon Energy* or *Energex*, the relevant telecommunications carrier / retailer, and the appropriate Authority(s).
- (d) Overhead cable networks of any type are not to be used for interconnection of *Wireless Installations* at any *Tower* site.
- (e) The *Client* may independently negotiate with other underground essential service asset owners (for example wireless telecommunications carriers) to install the *Client's* wireless telecommunications cables, in order to interconnect *Wireless Installations*.
- (f) Alternatively, subject to separate Ergon Energy or Energex agreement and requirements, Ergon Energy or Energex established underground Pit and Conduit network may be available at Ergon Energy or Energex discretion on formal agreed terms and conditions for limited installation of optical fibre cabling to interconnect Wireless Installation network sites.
- (g) Install cable identification markers at the *Tower* site that indicate the following:
  - (i) Crossings of property boundaries, road, kerbs; and
  - (ii) Changes of cable direction.

#### 13.1.13 Electrical Supply To Wireless Installation At Tower Site

- (a) The Service Provider / Client's Licensed Electrical Contractor is to liaise with Ergon Energy or Energex to confirm and co-ordinate the proposed consumer's installation electricity supply and service requirements.
- (b) A typical electricity supply arrangement may consist of the following and not limited to:
  - (i) Underground or aerial point of supply;
  - (ii) Consumers mains;



- (iii) Electricity supply meters;
- (iv) Electricity supply main switch;
- (v) Underground electrical sub-mains (without neutral and earth conductors);
- (vi) Phase failure protection device;
- (vii) AC delta-star isolation transformer;
- (viii) AC mains / generator change over switch;
- (ix) AC switch board;
- (x) AC DC rectifier;
- (xi) DC supply / battery backup change over switch; and
- (xii) *DC* switch board.
- (c) The *Licensed Electrical Contractor* is to provide *Ergon Energy* or *Energex* with supply requirements including the number of phases and total electrical loading.
- (d) The *Wireless Installation* will be generally supplied with a 3 phase, *LV* supply, or as required by calculations carried out by the relevant *Service Provider / Licensed Electrical Contractor* in line with AS/NSZ 3000 requirements.
- (e) *Ergon Energy* or *Energex* will make electrical supply available to a point of supply nominated and agreed by *Ergon Energy* or *Energex*.
- (f) Electricity supply will generally be via an *Ergon Energy* or *Energex* service:
  - (i) Aerially to a property pole (which may also support the metering installation); or
  - (ii) From an underground pillar which will supply a separate independent metering installation at the easement boundary or on the base station / equipment shelter),

from which the *Client's Licensed Electrical Contractor* is to install underground consumers mains and associated *Conduits* within a negotiated easement alignment, to the *Wireless Installation* electrical installation main switch board located on the base station / equipment enclosure at the *Tower* site.

#### 13.1.14 Metering – Single Wireless Installation

- (a) The Service Provider / Client's Licensed Electrical Contractor is to liaise with Ergon Energy or Energex to determine the final location and requirements for metering.
- (b) A new metering panel is to be supplied and installed:
  - (i) Within an above ground, weather proof enclosure; and
  - (ii) Complete with a lock, keyed to Ergon Energy or Energex access requirements.

#### 13.1.15 Metering - Co-location on Site With Wireless Installation of Another Party

A shared metering co-location on site will only proceed if agreed by *Ergon Energy* or *Energex* and all other affected parties.

#### 13.1.16 Wireless Installation – AC Electrical Installation At Tower Site

(a) The electrical installation is to comply with AS/NSZ 3000 requirements and Queensland Electricity Connections Manual and Queensland Electricity Metering Manual and energy retailer requirements.



- (b) Where the *Client* intends to co-locate on a *Tower* (if agreed by *Ergon Energy* or *Energex* and all other affected parties) with an existing *Wireless Installation* of another party / wireless telecommunications carrier:
  - (i) A separate electrical installation for the additional *Wireless Installation* is required, for which *Ergon Energy* or *Energex* may be required to upgrade the existing electrical supply and service; and
  - (ii) Underground consumers mains to new *Ergon Energy* or *Energex* supplied and installed meters within the existing meter position may be required. The existing meter position may require modification to accommodate the additional metering equipment.
- (c) The costs to facilitate the above works, borne by the *Client* requiring the additional electrical installation and metering.
- (d) From the agreed metering position, the *Licensed Electrical Contractor* is to install underground consumers mains to the main switch within the electrical switch board in accordance the *Client's* electrical *RPEQ* certified design and installation drawings.
- (e) Unless otherwise agreed by *Ergon Energy* or *Energex*, the electrical switch board is to be installed externally on the base station building / equipment enclosure.
- (f) The *LV* consumer mains may be installed parallel to the aerial *HV* transmission line conductors provided that the total length of the route (run) is less than 200 metres through the electrical transmission easement from the point of supply to the equipment base station / equipment enclosure building.
- (g) Where possible, run the consumers mains well outside the electrical transmission easement and only cross the easement perpendicular to the transmission line to enter the equipment base station / equipment enclosure building. The final approach of the consumers mains to the *Wireless Installation* base station building is to be:
  - (i) At right angles to the side of that equipment base station / equipment enclosure building; and
  - (ii) Perpendicular to the centre-line of the Tower,

to avoid contact with any existing buried counterpoise earthing conductors possibly radiating out from the *Tower* legs.

- (h) Install cable identification markers over underground electrical cables:
  - (i) At crossings of property boundaries and easements; and
  - (ii) At changes of cable direction at or in the vicinity of the *Tower* site.
- (i) A single line diagram of the total electrical installation is to be provided for each individual facility at the main switch board and a copy provided to *Ergon Energy* or *Energex*.

#### 13.1.17 AC Electricity Supply Isolation At Tower Site

- (a) Isolate the *Wireless Installation's* consumer mains from the *Tower* structure and earth systems.
- (b) There is to be no physical electrical connection between the *Wireless Installation's* consumers mains to the *Wireless Installation's* equipment base station / equipment enclosure building and any other part of the *Tower* site.
- (c) Install *Low Voltage* phases from the agreed metering position to an isolation transformer positioned within the *Wireless Installation's* equipment base station / equipment enclosure building.



(d) Connect the neutral and earth locally on site.

#### 13.1.18 Fault Protection – AC Isolation Transformer Guidelines At Tower Site

- (a) Install an isolation transformer within the *Wireless Installation* base station building to protect outgoing circuits from any faults at the *Tower* site.
- (b) Isolation transformer specifications are as follows:
  - (i) Construction to AS 3108 or its replacement standard, except that the *HV* test between the primary and secondary windings is varied as shown in table below.
  - (ii) Provide details of the isolation transformer type and capacity to *Ergon Energy* or *Energex* for acceptance before installation at each *Tower* site.
  - (iii) Install the isolation transformer enclosure within the *Wireless Installations* equipment base station / equipment enclosure building, and bond to the *Wireless Installation's* main distribution switchboard earthing system.
- (c) A phase failure protection device is to be fitted to all installations to prevent back feed from the isolation transformer as a result of the loss of an electricity supply phase.
- (d) Additional primary transient surge protection devices (for example metal oxide varistors) may be required to be installed as part of the *Wireless Installation* by the *Client*, at their discretion.
- (e) Any metal enclosure associated with the isolating transformer that requires earthing is to be earthed with an appropriately sized earth conductor run directly to the *Wireless Installation* base station building earth bar.

Typical Minimum Isolation Transformer Requirements		
Rated kV.A	30 kV.A	
Phases	3	
Primary Rated Volts	415 V	
Secondary Rated Volts	415 V	
Frequency	50 Hz	
Pressure Rating Primary and Secondary to Earth and Primary to Secondary	28 kV For 60 Seconds	
Cooling Type	AN	
Service Location	Indoors	
Connection Vector	D11 Neutral Provided On Sec	
Insulation Rating	Class H; 180 °C	
Electrostatic Screens	Under Primary, Between Pri and Sec Over Sec	

#### Table 3 – Isolation Transformer Requirements

#### 13.1.19 AC Supply Isolator / Transfer Switch At Tower Site

On the equipment base station / equipment enclosure building external wall, supply and install a lockable, vandal / weatherproof IP56 rated main switch board enclosure, which is to incorporate an *AC* two position (MAINS, OFF) or a three position (MAINS, OFF, GENERATOR) 3 pole manual transfer switch, on the load side of the isolation transformer and generator input sub-circuit, and on the line side of the *AC* distribution board.

#### 13.1.20 Typical On-Site Mobile Generator Installation (Where Required) At Tower Site

(a) The generator supply is to consist of phase, neutral and earthing conductors.



- (b) Connect the generator socket neutral and earth pins to provide the *MEN* point when a transportable / portable generator is in use.
- (c) Terminate the generator supply sub-mains on the *AC* supply isolator / transfer switch / *RCD* to be installed in the main switchboard located on the *Wireless Installation* equipment base station / equipment enclosure building external wall.
- (d) An unbroken neutral conductor is to connect the secondary of the isolation transformer to the neutral link.
- (e) An *MEN* connection is to be installed between the neutral link and the *Wireless Installation* equipment base station / equipment enclosure building earth bar.
- (f) Safety and operating signs are to be erected on the outside of the equipment base station / equipment enclosure building near the generator supply socket (where installed) to highlight the presence of the isolating transformer and to warn of a possible touch potential hazard.
- (g) Extend the earthing system is to include the generator pad in the case of a permanent or long-term generator installation at the *Tower* site.

#### 13.1.21 Wireless Installation - DC Supply / RFR Isolation

- (a) The AC distribution board will feed an AC to DC rectifier which supplies DC to the *Wireless Installations'* telecommunications equipment.
- (b) A *DC* battery backup system may also be installed within the base station building / equipment enclosure.
- (c) The *Wireless Installation's DC* distribution board is then typically supplied via a *DC* supply changeover switch via the rectified *DC* supply or the backup batteries.
- (d) So that the Wireless Installation base station building / equipment enclosure does not have to be unlocked and entered by Ergon Energy or Energex, the DC sub-circuits on the DC distribution board that supply the Wireless Installation's radio transmission equipment is to have the individual DC sub-circuits extended to an externally mounted antenna / RFR shut down enclosure.
- (e) This *DC* antenna shut down enclosure is to be separate to the main *AC* switch board enclosure.
- (f) Clearly labelled *RFR* isolation switches are to be installed within this *DC* enclosure to isolate *DC* supply sub-circuits that feed each of the antennas.
- (g) Each *RFR* isolation switch is to have an adjacent *DC* voltmeter and voltmeter monitor selector switch or alternative indicator light system to verify that each antenna is deenergised by *DC* shut down.
- (h) All *RFR* isolation devices / *DC* circuit breakers are to undertake periodic testing by the *Service Providers* to ensure that they remain operational.

#### 13.1.22 Wireless Installation - Electrical Installation Earthing At Tower Site

- (a) The *Service Provider* is to ensure all electrical earthing requirements are considered and managed, including earth potential rise, lightning / fault protection and induction.
- (b) All earthing installations are to be tested and achieve the specified performance criteria.
- (c) Where the existing *Tower* site earthing system is to be augmented or modified by the attachment / equi-potential bonding of additional *Wireless Installation* electrical and or telecommunications earths to the *Tower* earthing system, the following specified requirements will apply:



- (i) Any modifications to the existing *Tower* site earthing system are agreed in detail with *Ergon Energy* or *Energex* prior to any works being undertaken.
- (ii) The *Service Provider* is to install an appropriate fault earthing system comprising of the following:
  - 1. Steel reinforcing bars and mesh in both the *Wireless Installation* base station building / equipment enclosure concrete floor and roof slab is to be solidly bonded together by welding.
  - 2. Weld together and bond (by welding or brazing) at least two steel reinforcement starter bars and the associated vertical steel reinforcing rods in each of the *Wireless Installation* base station building / equipment enclosure block walls (when constructed) to both the roof and floor slab steel reinforcing mats. Install wire ties at each other crossover.
  - 3. Connect by a bolted or compression connection, 2 copper earth straps (25 mm x 3 mm section), or 2 x 70 mm<sup>2</sup> earth cables, onto the *Wireless Installation* base station building / equipment enclosure floor steel reinforcing mat. Bring the 2 earth connections out of and 200 mm above the finished concrete floor level; adjacent to the walls inside the base station building / equipment enclosure for bolting to the *Wireless Installation* base station building "common earth bar(s)". Insulate these straps with *PVC* to prevent corrosion at the concrete / air interface. Locate these 2 earth connections in an accessible positions (near diagonal corners) and clear of equipment and racks set against the walls.
  - 4. Install a copper earth bar (40 mm x 6 mm section) on the *Wireless Installation* base station building / equipment enclosure walls:
    - i. Around the inside of the base station building / equipment enclosure building; and
    - ii. Approximately 150 mm above finished floor level.
  - 5. This is to become a "common earth bar", mounted off the wall (where necessary), to allow for easy connection of earth tails from adjacent equipment. It is to be set flush with the wall (as required); so as not to interfere with wall-mounted *Wireless Installation* equipment racks.
  - 6. Bond by a crimped and bolted, or brazed connection to the "common earth bar" all equipment within the *Wireless Installation* base station building / equipment enclosure (other than *Wireless Installation* telecommunications circuits), which is required to be earthed. Each unit (piece) of equipment is to have its own cable for connection to the earth bar. Items, which are well separated, including the wall-mounted air conditioning units and each unit's security cage, may have separate connections on the earth bar. Those items in close vicinity, share a common bond to the "common earth bar", or are connected to it as closely as possible. Earthing cables are to be as short as possible.
  - 7. Provide a separate earth bar for the *Wireless Installation* telecommunications equipment. Install this bar on insulating mountings (insulated from building and other equipment) and connected to the "common earth bar".
  - 8. Bond the *Wireless Installation's* isolation transformer enclosure, if metallic, to the earthing system of the *Wireless Installations* electrical distribution switchboard.



- 9. For anti-climbing wires on the base station building / equipment enclosure building roof, use 2 separate earth bonds connected to the base station building / equipment enclosure building earth "cage" through mounting bolts for the wire supports. Earth bonds welded to the roof steel reinforcing mat and cast into the concrete slab. Use stainless steel bolts of adequate structural strength for protection against corrosion.
- 10. Install a coaxial cable earth bar below the gland plate on the base station building / equipment enclosure building external wall. This bond is to have its own separate 70 mm<sup>2</sup> PVC insulated copper earth bonding cable connected directly to the *Wireless Installation* base station building or equipment enclosure building / *Tower* earth grid. This bond is to be mechanically protected by galvanised steel cover over cable and fixed to the cabin wall. Below ground, the cable is to be protected against long-term corrosion by being placed in a glued *PVC Conduit*. The connection onto the *Tower* earth grid is to be either "cad-welded" or an approved crimp connection.

#### 13.1.23 Equi-Potential Bonding to Existing Earthing Grid At Tower Site

- (a) Implement control measures from *Service Provider's* safe system of work to eliminate risk exposure from disturbing and / or removal of paints and coatings on *Tower* legs at and / or near ground surface level containing hazardous substances (for example, asbestos containing material) for earthing connections works.
- (b) If a substantial *Tower* earthing grid already exists around the base of the *Tower*, there is to be no necessity to establish an additional earth grid for the *Wireless Installation* base station building / equipment enclosure building.
- (c) Connection is to be made from the "common earth bar" to the existing *Tower* earthing grid, via at least 2 separate connection positions on the *Tower* (for example, connection to the *Tower* legs).
- (d) Where an existing serviceable *Tower* earthing grid is present, use similar materials to those that already exist to construct augmentation works to the earthing grid.

#### 13.1.24 Equi-Potential Bonding to Replacement / New Earthing Grid At Tower Site

- (a) As directed by *Ergon Energy* or *Energex*, replace the *Tower* earthing grid if the existing earthing grid:
  - (i) Is not constructed of copper; or
  - (ii) Is in a degraded state.
- (b) As directed by *Ergon Energy* or *Energex*, install a new earthing grid if there is not an existing *Tower* earthing system, other than that provided by / through the *Tower* leg concrete footings.
- (c) *Ergon Energy* or *Energex* may be able to supply upon request a design drawing of the earthing system for the *Tower* type.
- (d) *Tower* sites, which are accessible by *Operators* or other persons, require a gradient control earthing grid in the form of either:
  - (i) An inner and outer earth rings positioned 1 metre from any *Tower* leg surrounding the *Tower* leg footprint for smaller *Tower* structures; or
  - (ii) Individual outer earth rings positioned 1 metre radius from and surrounding from each *Tower* leg of larger *Tower* structures, with adequate separation



between the *Tower* legs of footprint and ground clearance to underside of waist of *Tower*.

- (e) One strip encircles the base of the *Tower*, including outside of the generator pad area, and laid 1 metre to 1.5 metres, out from the *Tower* legs unless noted other wise and agreed by *Ergon Energy* or *Energex*.
- (f) The other strip encircles the cabin and laid 0.5 metres to 1 metres inside the *Tower* legs.
- (g) Construct the new *Wireless Installation* base station building or equipment enclosure building / *Tower* earth grid of bare 25 mm x 3 mm section copper strips, buried at 400 mm below finished surface level. It consists of 2 separate buried earth conductor strips:
- (h) Install a vertical earthing electrode adjacent to each *Tower* leg and bonded by 'cad-welding" to the copper strip. These electrodes are to be either:
  - (i) A minimum of 13 mm diameter copper plated steel rods;
  - (ii) 25 mm x 3 mm section copper strip dropped in as continuous vertical length into a pre-drilled hole and filled with a bentonite slurry; or
  - (iii) Counterpoise conductors with vertical earth electrodes if these are already installed as the *Tower* earthing system.
- (i) The length of the earth electrodes are to be determined from on-site soil resistivity tests arranged by the *Service Provider* to provide sufficiently low grid impedance for protection of the earthing installation, but in any case, not be less than 2.4 metres in total length.
- (j) Bond the *Tower* leg carrying the coaxial cable earthing conductor and the diagonally opposite leg to the *Wireless Installation* base station building or equipment enclosure building / *Tower* earthing grid by 25 mm x 3 mm section copper straps.
- (k) Wrap bonds (welded or crimped) with *High Voltage* self-amalgamating ethylene propylene rubber (EPR) tape to provide a moisture barrier and to prevent corrosion.
- (I) Install in glued *PVC Conduit* to prevent ingress of moisture, the main and back-up earth bonding cables connecting the "common earth bar" to the buried *Wireless Installation* base station building or equipment enclosure building / *Tower* earthing grid.
- (m) Bury all *Conduits*, at a minimum depth of 600 mm and cover with a heavy duty polymeric cable protection cover strip:
  - (i) To AS/NZS 4702;
  - (ii) At least 200 mm wide and 5 mm thick; and
  - (iii) Laid a minimum of 75 mm above the *Conduit*.
- (n) The polymeric cover strip may be substituted with a plastic marker tape where the *Conduits* are located under asphalt paving.
- (o) Seal the ends of all *Conduit*s exposed to the weather or below ground with either *PVC* end caps and / or sealant to prevent the ingress of moisture and contaminants.
- (p) Use PVC insulated 70 mm<sup>2</sup> stranded copper earth bonding conductors for connections between the Wireless Installation's feeder cable earth bars and the Tower legs. Insert a galvanised washer, which is easily replaceable, between the tinned copper termination lug and the galvanised surface of the Tower leg.
- (q) Make earthing terminations with a tinned copper single hole crimp lug and secure with an M12 stainless steel bolt and nut, as a minimum. Carry out no penetrations, drilling, welding or other intrusive action on the *Tower* structure, without prior written approval from *Ergon Energy* or *Energex*. Where approval from *Ergon Energy* or *Energex* has



been obtained to drill a hole through galvanised steelwork on the *Tower*, the bare metal inside and around each hole is to be coated with a zinc-rich paint (for example, "Galmet", or "Durazinc" epoxy or approved equivalent), to replace the lost galvanising, before the insertion of a bolt. A splint may need to be installed to maintain the structural integrity of the steel member being drilled. Also paint over the lug, bolt, nut and splint (if installed) of finished connections with the zinc-rich paint to prevent corrosion.

- (r) On the *Tower*, position another coaxial cable (tinned copper) earth bar near the top of the *Conduit* bends where the *Conduit*s swing away from the leg towards the base station building / equipment enclosure building in order to keep the earth tails as short as possible. Bond the co-axial cable sheaths and any metallic protective enclosures (for example pipes) to the earth bar. Fix this bar to the *Tower* leg and provide a separate 70 mm<sup>2</sup> insulated copper earthing cable, connected directly to the earthing point at the bottom of the *Tower* leg. Install this cable in a galvanised steel pipe mounted on the *Tower* steelwork.
- (s) Install all earth cables with minimal bends, and within a galvanised metallic pipe, which is securely attached to the *Tower* by screwed saddles.

#### 13.1.25 Earthing System Testing At Tower Site

- (a) Testing, recording and reporting procedures for *Tower* earthing system works are detailed in *WCS*34 including but not limited to:
  - (i) Resistance measurements of isolated earthing systems.
  - (ii) Soil resistivity measurements.
- (b) The *Service Provider* is to employ a specialist *Ergon Energy* or *Energex* rated subcontractor to test the fault protection earthing system impedance at the approved earth test point.
- (c) Carry out testing of earthing systems in accordance with the *Service Providers* documented safe system of work and the guidelines set out below:
  - (i) Wear as a minimum Class 0 (*HV*) insulating gloves whilst inspecting and testing exposed earthing systems (earth grid) and avoids touching such earthing systems (earth grid) with any other non-insulated body areas (for example shoulders or torso).
  - (ii) Do not test during thunderstorm conditions or when adverse weather conditions exist in the area where the likelihood of conductor failure causing ground fault is increased.
  - (iii) Test for presence of a voltage on earthing system (independent earth to be used).
  - (iv) Earthing systems at *Tower* sites may be energised, treat earthing system as such until proven de-energised.
  - (v) To prove the system de-energised, follow the steps outlined in WCS34.
  - (vi) If earthing system is energised at greater than 10 volts, cease work and immediately report the condition to Worksite Supervisor and Ergon Energy or Energex Officer.
  - (vii) If the earthing system is at 10 volts or less, proceed with agreed earthing works.
  - (viii) The earthing system is to achieve a resistance to earth of less than 10 ohms when tested at the test point.



- (ix) If the system fails to comply, the *Service Provider* is to extend the base station building / equipment enclosure building earthing conductor system to achieve the required earthing resistance.
- (x) Do not unnecessarily compromise the integrity of existing *Tower* earthing system(s) while undertaking earthing work(s). Report any damage to existing pole / structure earthing system(s) to the relevant *Ergon Energy* or *Energex Officer / Worksite Supervisor*, repair the damage and restore the system to its original state by only using approved jointing methods and materials.
- (xi) The *Service Provider's* earthing sub-contractor is to submit the measurement results from earthing system tests to *Ergon Energy* or *Energex* for approval.

#### 13.1.26 Wireless Installation Maintenance At Tower Site

Inspect all Wireless Installation components installed on a Tower site as follows:

- (a) A visual inspection every 12 months;
- (b) An inspection by climbing or close above ground inspection from *EWP* every 2 years;
- (c) An isolation transformer test before each storm season; and
- (d) An earthing system test every 3 years.

#### 13.2 Damage

- (a) The Service Provider is to prevent damage to infrastructure, for example and not limited to, Overhead Assets, External Party equipment on Overhead Assets and elsewhere, road surfaces, footpaths, lawns and driveways, and private property, for example, fences and gates.
- (b) In the event of Wireless Installation or associated works causing damage to or deterioration (including corrosion) of any Overhead Asset, the Service Provider is to notify this damage or deterioration to Ergon Energy or Energex for assessment as soon as possible. If damage or deterioration is caused by actions of Service Provider, then all repairs are to be at Service Provider's sole cost.
- (c) Where damage has occurred, carry out repairs to the satisfaction of *Ergon Energy* or *Energex*, the *Client*, the property owner and relevant *Authority*, at the *Service Provider's* cost.

### 14 RECORDS

- (a) For records requirements, refer to WCS133, Section 10 Records.
- (b) For records requirements specific to this category of work refer to the below included references and clauses.

#### 14.1 As Constructed Drawings

- (a) "As Constructed" drawings are to be provided to the *Ergon Energy* or *Energex Officer* within 5 *Business Days* of completion of the *Services* and *Wireless Installation* equipment installation.
- (b) Make available to the relevant *Ergon Energy* or *Energex Officer* for reference; "As Constructed" drawings containing details of construction completed to date and progression of the construction.



(c) Provide "As Constructed" drawings of underground cable and *Conduit* installations to the relevant *Authorities* and make available to "Dial Before You Dig" service (Australian Association of Dial Before You Dig Services Ltd) within 10 *Business Days* of completing construction. This is the *Service Provider's / Client's* responsibility and not *Ergon Energy* or *Energex*.

#### 14.2 Overhead Assets Site Records

- (a) Maintain accurate usage records for each Overhead Asset used for a Wireless *Installation*; including:
  - (i) *Ergon Energy* or *Energex* site identification number and site address (real property details);
  - (ii) The type of Wireless Installation components currently attached;
  - (iii) The proposed time period of Wireless Installation attachment;
  - (iv) Identification of the owner of the Wireless Installation (Client), for example:
    - 1. The relevant telecommunications carrier; or
    - 2. The actual network unit owner under a Telecommunications Act related nominated carrier declaration arrangement with a telecommunications carrier / network operator.
  - (v) The *RFR* profile clearly indicating the general public minimum approach distances to every energisable antenna at each *Wireless Installation* site; (see clause 9.12 – Radio Frequency Radiation Management);
  - (vi) All *Authority* and general public / community consultations undertaken; for example those involving briefings regarding proposed *Wireless Installation*;
  - (vii) All relevant Authority approvals obtained;
  - (viii) All easements and other rights of way negotiated with Landholders and Authorities; for example, Wireless Installation base station cabins, electrical consumers mains installations, and vehicular and personal access routes with Landholders, Occupiers and other easement users;
  - (ix) The as constructed routes and depths below ground surface level of all underground *Wireless Installation* cables / *Conduits* that run from / to any *Overhead Asset*; and
  - (x) All Wireless Installation inspections conducted.
- (b) The *Service Provider* is to ensure all *Wireless Installation* site records are maintained and updated each time a *Wireless Installation* site is established or modified, and are emailed to the nominated *Ergon Energy* or *Energex Officer* Additional contractual licensing requirements may also be required as part of establishing the *Wireless Installation*.
- (c) These records may be used by *Ergon Energy* or *Energex* to record *Wireless Installation* sites within *Ergon Energy* or *Energex* databases for:
  - (i) Site attachment recording;
  - (ii) Billing reconciliation purposes; and
  - (iii) Responding to any queries from within or external to *Ergon Energy* or *Energex* including *Clients* or *Authorities* concerning the status of any *Overhead Asset* used; or proposed to be used for *Wireless Installation* attachment.



#### 14.3 Privacy

- (a) The *Service Provider* is to comply with any *Laws* in relation to the collection, storage, transmission and disclosure of personal information, and for all works performed.
- (b) When the *Service Provider* and their *Operators* receive personal information, either from *Ergon Energy* or *Energex* or another source, they are to strictly comply with:
  - (i) Privacy Act 1988 (Cth); and
  - (ii) The National Privacy Principles;
  - (iii) The Privacy Amendment (Private Sector) Act 2000 (Cth);.and
  - (iv) Any *Laws* in relation to the collection, storage, unauthorised access or use / misuse, transmission and disclosure, damage or destruction of *Ergon Energy or Energex Customers'* personal information.
- (c) The *Service Provider* acknowledges that *Ergon Energy* or *Energex* has obligations under the *Laws* and the Privacy Amendment (Private Sector) Act.
- (d) If the *Service Provider* and their *Operators* require access to the *Ergon Energy* or *Energex* electronic systems (for example, web portals via the internet) to undertake the *Services* being provided, the *Service Provider* and their *Operators* will ensure that they strictly comply with the requirements of access advised to them by *Ergon Energy or Energex*.

### 15 WORK VERIFICATION

- (a) The Service Provider is responsible for continuous auditing of Services.
- (b) *Ergon Energy* or *Energex* reserves the right to undertake separate assessment / auditing as detailed in the Work Category Specification Assessment (*WCS* Assessments) for this category of work.



#### 16 GLOSSARY

- (a) For standard definition of words, acronyms and abbreviations used in this *WCS*, refer to *WCS*133, Section 12 Glossary.
- (b) For addition definition of words, acronyms and abbreviations specific to this category of work, refer below.

Term	Definition
AC	Means alternating electrical current.
ASP	Accredited Service Provider.
Authorisation	All consents, licences, approvals, certificates, and permits of, and notifications, exemptions, declarations, filings and registrations with, any authority required for the performance of the <i>Services</i> .
Authorised Person	Has the meaning as defined in Queensland Electricity Safety Regulation 2013.
Authority	Any government or regulatory body, minister, agency, court, tribunal with jurisdiction over the activity or thing about which the reference to an authority is made, including to manage, control or permit <i>Wireless Installation</i> related activities to occur within road reserves and other property.
BBI	Means broadband cable infrastructure owned by telecommunications carriers installed on <i>Poles</i> .
Business Day	A day other than Saturday, Sunday, statutory holiday or public holiday in Queensland.
Carrier	Licenced Telecommunication Carrier who has entered into a Facilities Access Agreement with Energex and/or Ergon Energy for the installation of wireless devices on Energex and/or Ergon Energy assets covered by this WCS 73.
Client / External Party	An <i>Wireless Installation</i> owner who is formally acceptable to or contracted under an agreement with <i>Ergon Energy or Energex</i> ; including agreed telecommunications carriers, commercial businesses, Government bodies, and <i>Authorities</i> who are lawfully authorised to own / operate the relevant <i>Wireless Installation</i> .
Column	A dedicated <i>Ergon Energy</i> or <i>Energex</i> owned steel (not wood or concrete) public lighting column, principally designed and installed to support public lighting infrastructure supplied under Rate 1 and Rate 2 conditions.
Competent Person	A person who has acquired through training, qualification, experience or a combination of these, the knowledge, skill, and <i>Authorisations</i> enabling that person to correctly perform the required task.
Conduit	An <i>Ergon Energy</i> or <i>Energex</i> owned underground facility which is an underground duct, typically installed under a road reserve footpath within and along the allocated <i>Ergon Energy</i> or <i>Energex</i> underground network alignment for electricity, between points of termination (for example, pillars and or <i>Pits</i> ).



Term	Definition
Customer	A person who receives electricity generated, transmitted or distributed by an electricity entity.
DC	Means direct electrical current.
EWR	Electrical Work Request.
Energy Queensland	Any member of the Energy Queensland Group of companies for example <i>Energex</i> , <i>Ergon Energy</i> Network etc.
Ergon Energy or Energex Officer	The responsible <i>Ergon Energy or Energex</i> person(s) who serves as the interface between <i>Ergon Energy or Energex</i> and the <i>Service Provider</i> with respect to all aspects of performance of the <i>Services</i> .
EWP	An appropriate elevated work platform which is fit for purpose.
Extra Low Voltage (ELV)	Means extra low voltages of 50 V or less AC RMS, or 120 V or less ripple-free DC.
HDPE	Means high-density polyethylene.
High Voltage (HV)	Means high voltages greater than 1000 Volts AC RMS phase to phase.
Laws	All relevant Acts and Regulations of the Commonwealth of Australia, State or Territory and Local Government <i>Authority</i> relating to the <i>Services</i> which are carried out (as amended).
Licensed Electrical Contractor	Means a person who is a holder of an electrical work licence in force under the Queensland Electricity Act 1994.
Low Voltage (LV)	Means voltages greater than extra low voltage (e.g. voltages of 50 V or less AC RMS or 120 V or less ripple-free $DC$ ) but not more than 1000 V AC RMS or 1500 V ripple-free $DC$ .
Landholder	The person, entity or <i>Authority</i> having jurisdiction over the particular parcel of land, easement, road reserve or similar.
Make Ready Work(s) / MRW	Means augmentation work to an <i>Overhead Asset</i> or the electricity distribution network required to accommodate a <i>Wireless Installation</i> , under the relevant category of work with <i>WCS</i> coverage, for example <i>Overhead Asset</i> replacement undertaken by an <i>Ergon Energy</i> or <i>Energex</i> rated <i>Service</i> <i>Provider</i> .
MEN	Means multiple earth neutral.
Occupier	The tenant, who may not necessarily be the owner of the land.
Operator / Worker	A person engaged by the Service Provider to perform any part of the Services (with the relevant licences, Authorisations and certifications to undertake the tasks on or in the vicinity of the relevant Overhead Asset).
Overhead Asset	An <i>Ergon Energy</i> or <i>Energex</i> owned electricity distribution or transmission network <i>Column, Pole, or Tower</i> upon which a <i>Wireless Installation</i> is or may be installed.
Pit	A formed <i>Ergon Energy or Energex</i> component for installation in the ground to provide a below ground compartment (chamber) to install and join underground cables.


Term	Definition	
Pole	An <i>Ergon Energy</i> or <i>Energex</i> owned distribution wood (and not concrete or steel) pole which supports electricity distribution network <i>LV</i> and <i>HV</i> apparatus, plant and conductors energised up to but excluding 33 kV, and which satisfies the requirements of this <i>WCS</i> for potential attachment of nominated <i>Wireless Installations</i> .	
Primary Contractor	A firm contracted to the Carrier to perform works covered by WCS 73.	
Primary Subcontractor	A firm contracted to the Primary Contractor to perform part or all the works covered by the Primary Contractors contract as it relates to this WCS73.	
Proximity	Means:	
	(a) Outside the exclusion zones under Schedule 2 of the Electrical Safety Regulation (Queensland) 2013 for an exposed <i>High Voltage</i> conductor or part, and at a distance where caution is required to avoid harm; or	
	(b) Within reach of an exposed <i>Low Voltage</i> conductor or part.	
PVC	Means poly vinyl chloride.	
RCD	Means residual current device.	
RF	Means radio frequency.	
RFR	Means radio frequency electro-magnetic energy radiation produced by <i>Wireless Installation</i> components, for example, antennas, microwave dishes or other radio frequency radiation emitting devices.	
RPEQ	Means a Registered Professional Engineer of Queensland (under the relevant Electrical, Mechanical and / or Structural Division), required to undertake particular type(s) of engineering assessment and / or certification in accordance with and required under this <i>WCS</i> 73.	
Services / Service	The work / task to be performed by the <i>Service Provider</i> under this <i>WCS</i> 73, for example <i>Wireless Installation</i> design, supply, attachment, maintenance, upgrading, and / or recovery to or on behalf of their <i>Client</i> .	
Service Provider	The company or organisation (including contractors and or subcontractors) authorised and or rated by <i>Ergon Energy or Energex</i> to perform <i>Services</i> under this <i>WCS</i> 73, including <i>Make Ready Work</i> .	
Tower	An <i>Ergon Energy</i> or <i>Energex</i> owned, <i>High Voltage</i> steel lattice transmission tower (that is not a concrete, wood or steel mono pole construction) which supports electricity transmission network apparatus, plant and conductors energised at up to and including <i>HV</i> ; and which satisfies the requirements of this <i>WCS</i> 73 for potential attachment of nominated <i>Wireless Installations</i> .	
QA	Means Quality Assurance.	
WCS	Means Work Category Specification.	



Term	Definition	
Wireless Installation	<ul> <li>An <i>External Party</i> owned wireless telecommunications installation, including antennae, cabling, isolation switches, and transceiver units associated with microcell, macrocell, small cell, Wi-Fi, base station, fixed broadband, or other radio frequency emitting telecommunications infrastructure as agreed by <i>Ergon Energy or Energex</i>, which is specifically designed to safely operate, attach to, and be maintained on and recovered from an <i>Overhead Asset</i>; in accordance with this <i>WCS</i>73, the relevant <i>Ergon Energy or Energex</i> facilities access agreement, legislation and <i>Authority</i> requirements, and which supports:</li> <li>(a) Commercial telecommunications carrier business activities; and / or</li> <li>(b) Non-commercial management of community amenity and essential services.</li> </ul>	
Work Group	All <i>Operators</i> and persons performing associated functions, providing <i>Services</i> at a <i>Worksite</i> .	
Worksite	A clearly defined immediate area in the vicinity of where <i>Services</i> are being provided, or are to be performed by <i>Operators</i> including all vehicles, plant and equipment being utilised.	
Worksite Supervisor	The person appointed by the <i>Service Provider</i> to be in full charge and with total responsibility for all matters pertaining to the operational activities on the <i>Worksites</i> while performing <i>Services</i> .	



### 17 REFERENCES

#### 17.1 Available Documents

For any *Services* being provided under this WCS73, the *Service Provider* is to make available (at all times) to infield *Operators*, all of the documents / forms listed in <u>Table 4</u>.

#### **Table 4 – Available Documents**

Document Reference	Detail / Description
Work Category Specification WCS5.1	Poles Inspect and Treat.
Work Category Specification WCS73	External Party Wireless Telecommunications Installations On Overhead Electricity Network Assets
Work Category Specification WCS133	General Standards and Conditions
Energy Queensland Group Document Number 4920-A4	Energex Manual 4920-A4 - Overhead Construction Manual <sup>14</sup> .
	Ergon Energy Network Overhead Construction Manual. <sup>16</sup>
	Energex Manual - Overhead Transmission Construction Standards <sup>16</sup> .
Energy Queensiand Group Manual	Ergon Energy Network Overhead Transmission Construction Standards <sup>16</sup>
	Energex Manual 00369 - Pole Inspection Guidelines <sup>16</sup> .
Work Category Specification WCS3.1         Work Category Specification WCS73         Work Category Specification WCS133         Energy Queensland Group Document         Number 4920-A4         Energy Queensland Group Manual         00369         Energy Queensland Group Manual         00369         Energy Queensland Group Manual         00502         Energy Queensland Group Manual         00796         Energy Queensland Group Manual         00796	Ergon Energy Network Standard STNW0002 - Standard for Inspection of Wood Poles <sup>16</sup> .
	Ergon Energy Network Standard STNW0005 - Standard for Inspection of Steel Poles <sup>16</sup> .
Energy Queensland Group Manual	Energex Manual 00502 - Lines Defects Classification Manual <sup>16</sup> .
00502	Ergon Energy Network Manual NA000403R435 - Lines Defect Classification Manual Definitions <sup>16</sup> .
Energy Queensland Group Manual 00796	Queensland Public Lighting Construction Manual <sup>15</sup> .
Energy Queensland Group Work Practice WP9524	Energex Work Practice WP9524 - Inspecting Poles and Crossarms for Safe Work <sup>16</sup> .

<sup>&</sup>lt;sup>14</sup> Previously an Energex only reference document or form. For Southeast Region utilise Energex equivalent reference document or form. For Northern and Southern Regions utilise Ergon Energy Network equivalent reference document or form.

<sup>&</sup>lt;sup>15</sup> This is Energy Queensland Group combined documentation to be utilised across Northern, Southern and Southeast Regions of Queensland.

<sup>&</sup>lt;sup>16</sup> Previously an Energex only reference document or form. For Southeast Region utilise Energex equivalent reference document or form. For Northern and Southern Regions utilise Ergon Energy Network equivalent reference document or form.



Document Reference	Detail / Description
	Ergon Energy Network Standard Work Practice SP0201 - Pole Assessment <sup>18</sup> .
Document reference not applicable.	<i>Wireless Installation</i> equipment manufacturers installation, operation and maintenance documentation.
Document reference not applicable.	The Service Provider's safe system of work.
Document reference not applicable.	Construction drawing(s) and documentation (with <i>RPEQ</i> certification) detailing the procedures for design, installation, maintenance and recovery of the <i>Shared Asset Installation</i> , which are site specific and current.
Document reference not applicable.	All necessary certificates, licences, consents, permits, approvals and requirements for the <i>Services</i> being performed.
Document reference not applicable.	All relevant associated work practices for tasks to be undertaken.

#### 17.2 Recommended Documents

- (a) For recommended documents and references, refer to WCS133, Section 13.2 Recommended Documents.
- (b) Refer below for the additional recommended references, as amended or replaced, that are of relevance for undertaking secondary activities associated with for *Wireless Installations* on *Overhead Asset* sites.

#### 17.2.1 Energy Queensland Documents

#### Table 5 – Energy Queensland Recommended Documents

Document Reference	Detail / Description
Work Category Specification WCS6.2	Public Lighting Maintenance <sup>17</sup> .
Work Category Specification WCS25	Overhead Mains Electrical Construction <sup>19</sup> .
Work Category Specification WCS31	Commissioning and Operation <sup>19</sup> .
Work Category Specification WCS34	Earthing Systems <sup>19</sup> .
Work Category Specification WCS37	Public Lighting Installations <sup>18</sup> .
Work Category Specification WCS47.3	Public Lighting Rate 2 Design.
Work Category Specification WCS47.4	Electrical Network Planning and Design.

<sup>&</sup>lt;sup>17</sup> The Service Provider is to make this Work Category Specification available (at all times) to infield Operators, when electricity network Make Ready Work is occurring on the relevant Overhead Asset(s).

<sup>&</sup>lt;sup>18</sup> The Service Provider is to make this Work Category Specification available (at all times) to infield Operators, when electricity network Make Ready Work is occurring on the relevant Overhead Asset(s).



Document Reference	Detail / Description
Work Category Specification WCS73A	Assessment – External Party Wireless Telecommunications Installations On Overhead Electricity Network Assets.
Work Category Specification WCS90	Overhead Transmission Construction and Maintenance <sup>20</sup> .
Work Category Specification WCS91.3	Overhead Transmission Tower Maintenance <sup>20</sup> .
Work Category Specification WCS125	Mobile Cranes <sup>20</sup> .
Energy Queensland Procedure 00237	Shared Network Asset Works Management <sup>19</sup> .
	Energex Manual 00294 - Queensland Electricity Connection and Metering Manual <sup>20</sup> .
Energy Queensland Group Manual 00294	Ergon Energy Network Manual NA000403R328 - Queensland Electricity Connection and Metering Manual <sup>22</sup> .
Energy Queensland Group Manual	Energex Manual 00301 - Operating Practices Manual <sup>22</sup> .
00301	Ergon Energy Network Procedure P53K05 - Manage Planned Switching And Access On The Network Procedure <sup>22</sup> .
Energy Queensland Group Manual	Energex Manual 00302 - Overhead Design Manual – Limit State <sup>22</sup> .
00302	Ergon Energy Network Manual STNW3361 - Standard for Distribution Line Design Overhead <sup>22</sup> .
Energy Queensland Standard 00310	Energy Queensland Environmental Management System: Environmental Standard <sup>21</sup> .
Energy Queensland Group Manual 00354	Energex Manual 00354 - Overhead Network Condition Assessment Manual <sup>22</sup> .
	Ergon Energy Network Manual <sup>22</sup> .
Energy Queensland Group Manual 00576	Energex Manual 00576 - Public Lighting - Standard Conditions for Public Lighting Services <sup>22</sup> .
	Ergon Energy Network Manual <sup>22</sup> .

<sup>&</sup>lt;sup>19</sup> Previously an Energex only reference document or form.

<sup>&</sup>lt;sup>20</sup> Previously an Energex only reference document or form. For Southeast Region utilise Energex equivalent reference document or form. For Northern and Southern Regions utilise Ergon Energy Network equivalent reference document or form.



Document Reference	Detail / Description
Energy Queensland Group Manual 00767	Energex Manual 00767 – JW Public Lighting Design Manual <sup>21</sup> .
	Ergon Energy Network Manual NA000403R434 – JW Public Lighting Design Manual <sup>23</sup> .
Energy Queensland Group Procedure 00891	Energex Procedure 00891 - Procedure: Plan Network Switching <sup>23</sup> .
	Ergon Energy Network Procedure P53K05B02 – Planned Work – Process Application <sup>23</sup> .
Energy Queensland Group Standard	Energex Standard 01037 - As Constructed Drawing Standard <sup>23</sup> .
01037	Ergon Energy Network Specification RSD04 - Specification For Distribution Design Drafting Standard <sup>23</sup> .
SAHV	Queensland Electricity Entity Procedures for Safe Access to High Voltage Electrical Apparatus.
Energy Queensland Group Work	Energex Work Practice WP1202 - Low Voltage Connections <sup>23</sup> .
Practice WP1202	Ergon Energy Network Work Practice BS001408R100 - Low Voltage Connections <sup>23</sup> .
Energy Queensland Group Work	Energex Work Practice WP1249 - Earth Resistance Testing Transmission Structures <sup>23</sup> .
	Ergon Energy Network Work Practice <sup>23</sup> .
Energy Queensland Group Work Practice WP1323	Energex Work Practice WP1323 - Electricity Entity Requirements, Working Near Overhead and Underground Electric Lines <sup>23</sup> .
	Ergon Energy Network Work Practice BS001405R107 - Electricity Entity Requirements, Working Near Overhead and Underground Electric Lines <sup>23</sup> .
Energy Queensland Group EWR	Electrical Work Request <sup>22</sup> .
	Energex Form 1194 - HV Access Permit <sup>23</sup> .
Energy Queensland Group Form 1194	Ergon Energy Network Form P53K05B07C01 - HV Access Permit <sup>23</sup> .
Energy Queensland Group Form 1195	Energex Form 1195 - HV Access Permit Supplementary / Attachment Page <sup>23</sup> .

 <sup>&</sup>lt;sup>21</sup> Previously an Energex only reference document or form. For Southeast Region utilise Energex equivalent reference document or form. For Northern and Southern Regions utilise Ergon Energy Network equivalent reference document or form.
 <sup>22</sup> Previously Energex Form 0002.



Document Reference	Detail / Description
	Ergon Energy Network Form P53K05B07C02 - HV Access Permit Supplementary Page <sup>23</sup> .
Energy Queensland Group Form 1206	Energex Form 1206 - Network Connection Application <sup>23</sup> .
	Ergon Energy Network Form SR000101F100 - Application Form for Network Connection of Watchman Lights and Pole Mounted Unmetered Supply Devices <sup>25</sup> .
Document reference not applicable.	Current plans detailing existing underground essential services infrastructure in the immediate area and surrounding the <i>Worksite</i> .

#### 17.2.2 Queensland Acts and Regulations

- (a) For Queensland Acts and Regulations, refer to WCS133, Section 13.2.2 Queensland Acts and Regulations.
- (b) For additional Queensland Acts and Regulations specific to this category of work, refer below:
  - (i) Work Health and Safety Act 2011 Mobile Crane Code of Practice 2006.
  - (ii) Work Health and Safety Queensland Guide for Doggers.
  - (iii) Electrical Safety Code of Practice 2020– Working Near Overhead and Underground Electric Lines ().
  - (iv) Workplace Health and Safety Queensland Managing Risks of Plant in the Workplace Code of Practice 2021.
  - (v) Queensland Heritage Act 1992
  - (vi) Aboriginal Cultural Heritage Act 2003
  - (vii) Planning Act 2016
  - (viii) Other relevant Queensland Codes of Practice.

#### 17.2.3 Australian Standards and Other Documents

- (a) For Australian Standards and other documents, refer to WCS133, section 13.2.3 Australian Standards and other documents.
- (b) For additional Australian Standards and other documents specific to this category of work, refer below:
  - Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) Radiation Protection Standard for Maximum Exposure Levels to Radio Frequency Fields – 3 kHz to 300 Ghz.
  - (ii) Telecommunications Act 1997 (Cth) as amended or replaced.
  - (iii) Telecommunications Code of Practice 1997 as amended or replaced.

<sup>&</sup>lt;sup>23</sup> Previously an Energex only reference document or form. For Southeast Region utilise Energex equivalent reference document or form. For Northern and Southern Regions utilise Ergon Energy Network equivalent reference document or form.



- (iv) Telecommunications (Low-Impact Facilities) Determination 1997 as amended or replaced.
- (v) AS/NZS 1158 Set: 2005 (R2010) Lighting for roads and public spaces Set.
- (vi) AS/NZS 1170.2:2021 Structural design actions Wind actions.
- (vii) AS 1199.1:2003 (R2016) Sampling procedures for inspection by attributes -Sampling schemes indexed by acceptance quality limit (AQL) for lot-by-lot inspection.
- (viii) AS 1319-1994 Safety signs for the occupational environment.
- (ix) AS 1418.5:2013 Cranes, hoists and winches-Elevated work platforms (EN 13000:2010, MOD).
- (x) AS/NZS 1418.10:2011 (R2017) Cranes, hoists and winches Mobile elevating work platforms.
- (xi) AS/NZS 2053.1:2001 (R2016) Conduits and fittings for electrical installations -General requirements.
- (xii) AS 2550.5:2016 Cranes, hoists and winches Safe use Mobile cranes.
- (xiii) AS 2550.10:2006 (R2009) Cranes, hoists and winches Safe use Mobile elevating work platforms.
- (xiv) AS/NZS 3000:2018 Wiring Rules (known as the Australian/New Zealand Wiring Rules).
- (xv) AS/NZS 3015 2004 Electrical Installations Extra-Low Voltage D.C. Power Supplies And Service Earthing Within Public Telecommunications Networks
- (xvi) AS 4702:2000 (R2013) Polymeric cable protection covers.
- (xvii) AS/NZS 7000:2016 Overhead line design Detailed procedures.
- (xviii) AS/NZS 61558.1:2008 Safety of Power Transformers, Power Supplies, Reactors and Similar Products - General requirements and test (IEC 61558-1 Ed 2, MOD).
- (xix) C524:2013 (Rev 2016) External Telecommunication Cable Networks (Industry Code Communications Alliance LTD).
- (xx) C564:2011 Mobile Phone Base Station Deployment.

### **18 APPENDICES**

#### Appendix A Generic Column and Pole RFR Signage Arrangements

- Appendix B Typical Footpath Foundation Arrangement
- Appendix C Typical Arrangements for External Party Wireless Installations on Columns
- Appendix D Typical Arrangements for External Party Wireless Installations on Poles



#### Appendix A – Generic Column and Pole RFR Signage Arrangements



#### Figure A-1 – Telecommunications Equipment \_ RFR Safe Access Distance Zones \_ Typical Arrangement





#### Appendix B – Typical Footpath Foundation Arrangement

Figure B-1 – Telecommunications Equipment Cabinet Foundation





Figure B-2 – Footpath Cabinet For Areas Less Likely To Have Underground Infrastructure Installed



Appendix C – Typical Arrangements for External Party Wireless Installations on Columns



Figure C-1 – Typical Layout \_ Conduit Entry Into Steel Public Lighting Column





Figure C-2 – Typical Layout \_ Small Cell Installation On Steel Public Lighting Column





Figure C-3 – Telecommunications Equipment \_ Macrocell Antenna Mounting Details \_ Special Streetlight Column





Figure C-4 – Telecommunications Equipment \_ Microcell Antenna Mounting Details \_ Special Streetlight Column



Appendix D – Typical Arrangements for External Party Wireless Installations on Poles



Figure D-1 – Typical Layout \_ Small Cell Installation On HV and LV Wood Pole





Figure D-2 – Telecommunications Equipment Wi-Fi Antenna On Wood Poles





Figure D-3 – Telecommunications Equipment \_ Macrocell Antenna Installation Details \_ Distribution Pole



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