SERVICE & INSTALLATION RULES FOR CONNECTION TO THE ELECTRICITY DISTRIBUTION NETWORK

INCLUDING

APPENDICES

Authorised when accessed at www.actewagl.com.au

(WHEN PRINTED THIS DOCUMENT IS UNCONTROLLED)

Note: User must be connected to the Internet to view linked drawings

SERVICE AND INSTALLATION RULES

CONTENTS

INDEX OF DRAWINGS

8911-307	LV Metering Cubicle for Current Transformer Metering 200/5 CT Extended Range
8911-308	Typical Metering Cubicle for Multi-Installation
8911-312	Typical Standard Meter Box (Minimum Requirements)
8911-313	Meterbox for Installation with 50mm² Underground Service Cable
8911-321	Permissible Meter Locations Domestic Installations
8911-323	Revenue Metering Cubicle used for HV pole mounted metering unit
8911-324	Typical Metering Cubicle for Multi-Installation and Looping or Paralleling of ActewAGL Cables
8911-326	Dual Tenany Switchboard Layout for 600 x 600 Meter Box
8912-02	Underground Service Conduit Requirements
8912-03	Typical Underground Service Cable Requirements for Single Domestic or Small Commercial Installation
8912-04	Typical Underground Service Cable Conduit Requirements for Installations Exceeding 100 Amps per Phase
8912-05	Typical UG Service Arrangement for Meter Box in Boundary Fence/Wall
8913-212-01	Unmetered Supplies Servicing Arrangement POE Provided by Customer
8913-212-02	Unmetered Supplies Servicing Arrangement Direct Connection of Consumer Mains
8913-213-06	Wall Mounted Service Cubicle with Modular Feeder Units
8913-22-02	P.O.E. / Fuse Box for Domestic & Small Commercial Customers (16mm² Underground Services)
8913-22-03	Domestic Meter Box/Enclosure Support Arrangement
8914-201	Temporary Installation Residential Blocks Overhead Supply
8914-202	Temporary Installation Residential Blocks Underground Supply

1 INTRODUCTORY INFORMATION

1.1 Standard Customer Contracts

These Service and Installation Rules are to be read in conjunction with the relevant customer contracts covering connection to the ActewAGL Distribution electricity network and the on-going provision of electricity through that connection. These contracts apply to all customers connected to (or intending to be connected to) the network and do not relieve customers of any obligations outlined in these Rules.

The details of the contract(s) that apply can be found on the ActewAGL website at www.actewagl.com.au.

Physical connection services and

Ongoing supply services

1.2 Area of the Distribution Network

The ActewAGL electricity distribution network covers customers within the area proclaimed as the Australian Capital Territory and small adjacent areas in New South Wales.

1.3 Application of the Service and Installation Rules

ActewAGL's Service and Installation Rules apply generally in respect of premises in urban and rural areas. Where the premises are in isolated or undeveloped areas conditions may vary. In such circumstances the customer will be informed when an application to connect to the electricity network is made.

ActewAGL's prime directives with respect to the application of this document are, in order of importance:

a) the safety of personnel who work on the electricity network and to the general public; and

b) to minimise asset loss-of-life, reduced performance, and to prevent damage to electricity network assets ; and

c) to minimise disruption to all customers (quality of supply) inclusive of the applicants site.

d) environmental compliance

1.4 Charges for Supply of Electricity

Customers whose annual electricity consumption is equal to or greater than 160 MWh are non-franchise customers and are required to enter into a contract with a licensed electricity supplier for the supply of electricity. Customers whose annual electricity consumption is less than 160 MWh may choose either to be supplied by ActewAGL Retail on a regulated franchise tariff or may enter

into a contract with a licensed electricity supplier for the supply of electricity. Franchise tariffs are regulated by the Independent Competition and Regulatory Commission and are published by ActewAGL Retail.
Related link- Electricity-network-prices

Related document reference: Section 4.3 of ActewAGL Statement of Tariff Classes and Tariff s 2012/13

1.5 Network Charges-

Charges for the use of the electricity network are regulated by the Independent Competition and Regulatory Commission and are published on the ActewAGL website at www.actewagl.com.au. These charges are included in the regulated franchise tariff. For a non-franchise customer the network charges will normally be included by the customer's electricity supplier in the electricity account.

1.6 Application for Connection to the Electricity Network

Formal written application for connection of a new installation, or for an addition or alteration, should be lodged as soon as the decision to proceed is made.

ActewAGL requires written notification for all alterations to metering, point of attachment and point of entry locations, uninterruptible power supply installations or motor generator set installations or embedded generators including PV installations.

Application shall include as a minimum but not limited to the following:

- Address of installation including blocks and sections
- Type of development/installation
- Gross floor areas where applicable
- Maximum demand including calculations to AS 3000
- Timing/staging
- Contact details – owner/developer, consultant/electrical contractor, builder

Applications may be sent to:
enworks@actewagl.com.au (for applications for commercial enquiries)
networkservicing@actewagl.com.au (for submission of RFS and RSM)

1.7 Warning Against Premature Expenditure

No expense should be incurred by the prospective customer until formal application has been made and advice received as to the conditions under which ActewAGL would agree to the connection of the load to the network and the provisions to be made by the customer for the installation of ActewAGL's equipment on the premises.

Adequate notice of the customer's requirements should be given, particularly where the load is relatively large or the supply is required in a remote location, as considerable time may be necessary for negotiations and construction.

Matters which may affect the design of a building project, such as the determination of the position of service equipment, the point of attachment for

the service line or the point of entry of the underground service cable, and the position of any substation on the premises, should be settled at an early stage.

When contemplating the connection of equipment, particular care should be taken to ascertain ActewAGL's requirements relating to the prevention of interference with the supply to other customers.

1.8 Necessity for Employing a Licensed Person

Legislation requires that all electrical wiring work be carried out by a person licensed as prescribed and, in addition, places restrictions on persons other than licensed electrical contractors from undertaking such work. Therefore, where the customer is responsible for electrical wiring work required under these Service and Installation Rules, a licensed electrical contractor shall act as the agent of the customer. The holder of an appropriate grade of electrician's licence may carry out the installation of wiring in a premise of which the holder is the owner or bona fide occupier.

1.9 Compliance with the Wiring Rules

Legislation requires work carried out on a customer's installation to comply with *AS/NZS 3000 Electrical installations (known as the Australian/New Zealand Wiring Rules).* The Wiring Rules set down the essential requirements for ensuring safety from fire and shock and apply to all electrical installations on customers' premises.

Persons carrying out such work are required to be licensed with the ACT Government as electricians and to provide the ACT Government with written particulars within 14 days of the completion of this work.

1.10 Connection of Installations Following Completion of Wiring Work

ActewAGL is not an regulatory authority and will not connect a new installation to the electricity network until that work has been approved for connection by the ACT Government or the licensed electrical contractor that has undertaken the works where this work is carried out outside the ACT Governments jurisdiction. In the ACT, evidence of this approval is normally provided by the issue of a Certificate of Electrical Safety to the ACT Government for the new works. (See Clause 1.13 for further information)

For installations in areas outside ACT Government jurisdiction ActewAGL Distribution require a certificate of electrical safety or equivalent prior to any connection. See section 1.13 below.

Connection of an installation shall not be regarded as implying compliance with any specification or legislation, nor in any way as giving an assurance of quality.

1.11 Connection of Alterations and Additions

Legislation requires that, except with the permission of the ACT Government, a person shall not connect to the electricity network any consumer's installation or any addition or alteration thereto, prior to its inspection by ACT Government .

1.12 Interference and Damage to ActewAGL's Equipment

Legislation prescribes penalties for interfering with, or obstructing access to, ActewAGL's equipment. A customer may be held liable for damage to ActewAGL's equipment installed on the premises.

1.13 Alternative Connection Arrangements

These Service and Installation Rules establish the requirements for connection to the electricity network. Customers can propose alternative arrangements for connection to the network outside the scope of these Service and Installation Rules. Any alternative arrangements proposed must be submitted, in writing, to the Manager, Technical Regulation and Standards, at the address shown below.

The Manager, Technical Regulation and Standards will determine the acceptability of the proposed alternative connection arrangement within 15 business days of receipt of the written proposal.

Any customer dissatisfied with a decision made by the Manager, Technical Regulation and Standards concerning an alternative connection arrangement should, in the first instance, refer the matter to the General Manager Asset Management. If the matter remains unresolved, the customer may have the right to request the ACT Civil and Administrative Tribunal (ACAT) to deal with it.

1.14 Correspondence

Any correspondence with ActewAGL in connection with these Service and Installation Rules should be addressed to:

Manager, Technical Regulation and Standards
ActewAGL Distribution
Electricity Networks Division
GPO Box 366
Canberra ACT 2601

2 GENERAL REQUIREMENTS

2.1 Scope and Disclaimer

These Service and Installation Rules apply generally in respect of connection of premises in urban and rural areas to the ActewAGL electricity network. Where the premises are in isolated or undeveloped areas conditions may vary. In such circumstances the customer will be informed when an application to connect to the electricity network is made.

Despite the care taken in preparation of this document, ActewAGL does not warrant that it is free of inaccuracy. Users must exercise their professional judgment to ensure safety and should obtain advice from ActewAGL about any entry in the Service and Installation Rules that they believe may be in error**.** Advice can be obtained by telephoning 13 10 93 or by emailing faultscallcentre@actewagl.com.au

2.2 Definitions

Unless otherwise stated, the terms used in these Service and Installation Rules are as defined in the *AS/NZS 3000 Wiring Rules*.
The following definitions shall apply.

"ActewAGL" shall mean ActewAGL Distribution ABN 76 670 568 688,

"ActewAGL Office" shall mean:

(a) For all enquiries and counter transactions:

ActewAGL Electricity Networks Division
Corner Oakden and Anketell Streets
Greenway ACT 2900
Physical-Connection-Services

(b) For counter transactions only:

Actew Water Division
12 Hoskins Street
Mitchell ACT 2911

"AS" shall mean Australian Standard

"AS/NZS" shall mean Australian/New Zealand Standard

"MEN System" shall mean a "Multiple Earthed Neutral System

"Customer" shall mean the applicant for connection to the network.

"ACT Government" means the Environment and Sustainable Development Directorate.

"Easement in Gross" means, in relation to a business providing a public utility service, an easement registered in the name of a person or body for the purposes of that business.

“PCC” shall mean the point of common coupling with the electricity supply network.

"RFS” shall mean Request for Service.

“RSM” shall mean Request for Service Markings

“Secondary Residence” means a dwelling in addition to the main residence. It can be attached or detached from the primary building.

"Service Equipment" shall mean all ActewAGL owned equipment, including all such equipment installed within the premises of the customer.

2.3 Agreement to Pay Charges

Where the customer is required to pay any charge in accordance with these Rules, the customer shall, if requested, sign an agreement written in a form acceptable to ActewAGL before the work is commenced.

Network charges

2.4 Failure to Comply With The Service and Installation Rules

In the event of the customer failing to comply with the requirements of these Service and Installation Rules, ActewAGL may refuse to connect the customer’s installation to the network, or may disconnect the customer’s installation. A charge may be made for the reconnection of the installation to the network.

3 SUPPLY ARRANGEMENTS

3.1 System of Supply

The electricity supplied by ActewAGL at the point of supply is in the form of alternating current of approximately sinusoidal waveform at a frequency of 50 Hertz. The nominal supply voltage is 415/240 volts from a 3 phase 4 wire systems. In some outlying areas the supply may be a single phase 240 volts 2 wire or 480/240 3 wire system. Supply is also available at high voltage, which is normally 11,000 volts.

ActewAGL may superimpose control voltages on the normal supply voltage.

Note:

AS 60038 Standard voltages, requires the nominal voltage of existing 240/415 V +6%, -6% systems to evolve toward recommended values of 230/400 V, +10%, -6%. There is no transition period stated for the change to the new nominal voltage levels. In common with the rest of the electricity industry in Australia, and consistent with the expectations of manufacturers and importers of electrical goods, ActewAGL is still operating its system at 240/415 V +6%, -6% under normal operating conditions and will continue to do so until the industry and manufacturers jointly move towards the new voltage levels.

3.2 System Earthing

The neutral conductors of the supply system are solidly earthed. For the purposes of the *AS/NZS 3000 - Wiring Rules*, it shall be regarded as the Multiple Earthed Neutral (MEN) System.

3.3 Prospective Fault Current

The installation must be designed to withstand, without damage, the maximum currents, which may occur under fault conditions such as a short circuit.

Unless otherwise advised in writing by ActewAGL, the maximum (3 phase symmetrical) prospective short circuit current for 1 second, at the customers terminals where supply is at 415/240 volts from street mains, may be taken as: -

(i) Suburban residential areas - 10,000 Amperes
(ii) multi- residential(four or more units), commercial and industrial areas - 30,000 Amperes

Lower values of prospective short circuit current will apply in installations, which are remote from a substation or supplied from a substation of small capacity.

Higher values of prospective short circuit current (40,000 amperes or greater) may apply where supply is direct from a substation of large capacity. Customers shall confirm prospective fault current values with ActewAGL on case by case basis including two and three transformer chamber substations.

In the case of supply at high voltage, customers will be advised of the values following receipt of an application. It is the customers responsibility to ensure that there is low voltage switchgear with sufficient protection to ensure that a fault within the customers facility or installation does not interfere with other

customers connected to the network. This may require the installation with an Service Protection Device (SPD) with appropriate protection settings.

Note:

Consumer's mains in directly metered installations are protected by a service fuse of up to 100A rating. The ACT Government requires that consumer's mains be a minimum size of 6mm^2 to avoid damage to the insulation under fault conditions.

3.4 Number of Services

Only one service will normally be provided to any one block. However, in some instances ActewAGL will require more than one service to physically separated premises on the one block.

3.5 Special or Additional Services

ActewAGL may agree to a customer's documented request either in writing or by submission of plans, for the provision of a special or additional service. If granted, the customer shall pay the full cost involved. These costs may include off site costs.

Normally for low voltage supplies, ActewAGL will install service cables for loads up to 630A with its standard range of cables. Customers requiring ActewAGL to service installations with a load in excess of 630A will require approval in writing from ActewAGL.

3.6 Segregation of Supplies

Where more than one service is provided, each shall supply a separate and clearly defined portion of the premises without intermixture or electrical interconnection of the portions, (either directly or by changeover facilities) unless otherwise agreed to by ActewAGL. Unless the additional service is provided to supply specific equipment, the whole of the installation in any defined portion of the premises shall be supplied from the same service. The customer shall affix labels at each main switchboard to define the area or equipment it supplies and to indicate the presence and location of other supplies. A label shall further be affixed to each distribution board to indicate the main switchboard from which it is supplied.

Where more than one service is supplied to a customer's main switchboard no bus-section switches shall be installed between sections of the board supplied from the separate services without approval of ActewAGL.

3.7 Temporary Installation

Where permanent network supply is available and subject to the payment of relevant charges, ActewAGL will provide a service to a temporary connection point in situations where supply is required for a limited period.

Appendix A7 contains further details on temporary supplies.

3.8 Sources of Alternative Supply

Where the customer proposes to install an alternative source of electrical supply i.e. break before make connection such as a standby generator, portable generator set, uninterruptible power supply (UPS) or photovoltaic inverter systems for connection to the electrical installation normally supplied from ActewAGL's system, such equipment shall not be installed or connected until notification has been submitted to ActewAGL by way of an RFS form and a drawing showing clearly the connections to be made and methods of operation of the alternative supply. The RFS form can be obtained by clicking on the link below:

Request for service

The approval of ActewAGL shall be obtained before any connections are made.

Reference needs to be made to Clause 5.5 regarding minimum requirements applicable to the customer's installation.

3.9 ActewAGL's Substations on Customer's Premises

3.9.1 Method

The method of supply to large or isolated installations shall be determined by negotiation between ActewAGL and the customer.

It is sometimes necessary for ActewAGL to install a transformer substation within a customer's premises. Where the maximum demand of the installation may exceed 100KVA or the installation is at an isolated location, inquiries shall be made to ActewAGL to determine whether a substation will be required on the premises.

It is the customer's responsibility to obtain all relevant design and siting approvals. The substation location showing clear vehicular access facility must be included in applicable development application information.

3.9.2 Accommodation

Sometimes it is necessary for ActewAGL to increase the capacity of its works in order to connect a building or premises to the network. If in the opinion of ActewAGL the connection can best be given by installing transformers, switchgear, and other apparatus on the premises which are to be supplied, ActewAGL shall not be required or compelled to connect that building or premises to the network unless the customer provides, free of cost to ActewAGL, a suitable space and enclosure, approved by ActewAGL, within the building or premises to accommodate the mains, transformers, switchgear, and other equipment which, in the opinion of ActewAGL, are necessary to connect the building or premises to the network.

The space or enclosure provided by the customer shall be for the exclusive use of ActewAGL and no other non associated services or customer owned equipment shall pass through, or be installed in, the space or enclosure. The customer is responsible for the maintenance of the space and or enclosure and the provision of appropriate continuous access to that space or enclosure.

3.9.3 Installation/Extension of High Voltage Mains

ActewAGL will supply, install and maintain the high voltage mains determined by ActewAGL to supply ActewAGL's substations on customer's premises. Charges may be made for any such extension or maintenance of such mains. The customer shall provide satisfactory access to the high voltage mains and provide, install and maintain a conduit or set of conduits, cable pits and any associated facilities required by ActewAGL.

Depending on the location of high voltage cable and/or low voltage cable mains relative to buildings and structures, ActewAGL may require provision of an "*Easement in Gross*" to ensure access is available to the cable routes for installations and maintenance purposes. ActewAGL will advise customer when this requirement is necessary.

3.9.4 Location of Main Switchboard

The main switchboard should be installed as close as possible to the substation. In any case the maximum size consumers' mains shall be 2 by 300mm² Cu cables per phase without ActewAGL approval and 2 by 500mm² Cu cables per phase with ActewAGL approval.

3.9.5 Use of Equipment

ActewAGL may use its equipment installed on the premises to connect to the network any other premises or customer, subject to the requirements of the customer on whose property the substation is located first being met.

3.10 Determination of Number of Phases of Low Voltage Supply

Except where otherwise advised by ActewAGL the number of phases of low voltage supply which will be provided to an installation or separately metered portion of an installation, without incurring a charge in accordance with Clause 4.2.5, shall be as set out in Table 1.

ActewAGL may refuse to provide additional phases merely to supply instantaneous water heaters, 415 volt single phase equipment such as welders, X-ray machines, 3 phase motors rated at 2.0kW or less, or other polyphase equipment if, in the opinion of ActewAGL, 240 volt single phase equipment can satisfactorily perform the required function.

TABLE 1
NUMBER OF PHASES OF LOW VOLTAGE SUPPLY

Load Category	Number of Phases
Nominal load not exceeding 100A	1 phase and neutral (2 wire)
Nominal load exceeding 100A	3 phases and neutral (4 wire)
Rating of largest motor exceeds 2.0 kW	

The "nominal load" for the purpose of Table 1 shall be calculated on the assumption that all load will be connected line-to-neutral at 240 volts and shall exclude polyphase instantaneous water heaters. The calculation shall otherwise be in accordance with the method set down in the *AS/NZS 3000 Wiring Rules* for the calculation of maximum demand in mains and sub-mains, except in the case of multiple domestic installations. In this case, the nominal load of the whole installation shall be taken as the sum of the nominal loads for each domestic unit calculated separately.

3.11 Balancing of the Installation

3.11.1 General

The loading of an installation, or separately metered portion of an installation supplied from more than one phase, shall be so arranged that, at the time of maximum demand of the installation, the current in any active supply conductor shall not exceed the current in any other active supply conductor by more than 30 amperes.

Note:

To facilitate balancing, appliances incorporating 240 volt loading should generally be provided with the number of active terminals as set out in Table 2. Where three active terminals are provided, the components of loading should be arranged so that the loading on any terminal does not exceed that on any other terminal by more than 25 amperes.

TABLE 2
BALANCING OF APPLIANCES

Appliance Rating	Number of Active Terminals
Not exceeding 25 A *	1
Exceeding 25 A but not exceeding 50 A	2 **
Exceeding 50 A	3 **

* Single element in-slab floor heaters up to a nominal 9 kW rating are excluded from these requirements.

** Suitable for connection to different phases.

3.11.2 Water Heaters (Instantaneous Type)

The loading of instantaneous type water heaters shall not exceed 25 amperes in the case of 240 volt single phase units, or 25 but not exceeding 50 amperes per phase in the case of three phase units. The equipment shall also meet requirements for voltage disturbance limits as described in Clause 5.2.1.

3.11.3 Cooking Ranges

Domestic cooking ranges having a total rating not exceeding 13.5kW may be connected between one phase and neutral. Ranges having a total rating exceeding 13.5kW shall be arranged for connection between three phases and neutral.

3.12 Clearances From ActewAGL's Electricity Assets

Clearances from ActewAGL's electricity assets in accordance with the Utility Networks (Public Safety) Regulations 2001 and ActewAGL drawings 3811-004 and 3832-018 shall be maintained at all times.

No unauthorised equipment shall be placed on or near (within minimum clearances) ActewAGL's assets.

Care shall be exercised by customers including obtaining clearances when excavating in the vicinity of buried cables. Cable clearances must be obtained by contacting "Dial Before You Dig" by telephoning 1100. A minimum of two full working days notice is required.

4 PROVISIONS FOR SERVICE EQUIPMENT

4.1 General Requirements

The customer shall provide mounting and installation facilities for ActewAGL's service equipment in the positions selected by ActewAGL. The service equipment is supplied and installed by ActewAGL and shall remain its property.

4.2 Connection to the Premises

ActewAGL installs and maintains the connection between its system and the customer's installation. ActewAGL will determine whether the connection will be in the form of aerial service lines or underground service cables. (See also Clause 3.9).

ActewAGL will not allow aerial service lines in bushfire prone areas (all rural and Bushfire Abatement Zone nominated by the Emergency Services Agency) or where underground mains are available.

In low bushfire risk areas (Urban) or where overhead mains are available, ActewAGL's preference is to provide underground service cables.

Underground services will also be required where;

- an intermediate service pole would otherwise be required
- the service would be greater than 30 metres in length
- the service connection is to a double storey building
- adequate ground clearance cannot be obtained by installing an overhead service with the use of a standard riser
- regulatory clearances to structures cannot be met or maintained
- existing vegetation prevents the installation of an overhead service or where such vegetation has the potential to encroach minimum clearances from the overhead line
- Where the change of service would further encumber a neighbouring property
- the overhead line would traverse any part of a swimming pool
- the site has been redeveloped
- a standard ActewAGL bracket or riser is unable to be installed at the point of attachment to accommodate an overhead service (ie: flat roof residences)

4.2.1 Aerial Service Lines

If aerial service line is to be provided ActewAGL will determine the route of the service line and the position of the point of attachment to any building or structure. The customer shall provide, install and maintain any support on private land for the service line and shall carry out any work and provide and install any equipment required by ActewAGL on such support, point of attachment or point of connection.

Details of constructional requirements are available on request.

The size of any service post or pole and the design of any bracket, or similar device used to raise the point of attachment, shall be as determined by ActewAGL at the time of marking the service.

ActewAGL will not accept responsibility for damage to the customer's premises resulting from normal tension in the service line or causes beyond ActewAGL's control.

4.2.2 Clearance of Service Lines

The clearance of service lines above ground, to structures, and to trees and other vegetation is required to conform with the Utility Networks (Public Safety) Regulations, drawings 3811-004 and 3832-018 and with AS/NZS 7000 ActewAGL will nominate the point of attachment and any other requirements to ensure that these clearances are achieved.

Such clearances shall not be reduced by any subsequent works on the premises.

4.2.3 Underground Service Cables

ActewAGL will determine the position of entry and depth of the service cable at the property boundary and its route on the property. The customer shall provide, install and maintain a conduit or set of conduits and any associated facilities required by ActewAGL for the installation of the service cable. Details of constructional requirements are available on request. See drawings 8912-02, 8912-03 for residential and 8912-04 for commercial installations.

4.2.4 Connections to Service Equipment

The customer shall install a sufficient length of cable suitable for connection of the consumer's mains to service lines, service fuses and neutral link and shall also install the interconnecting wiring for ActewAGL's metering and control equipment. All conductors shall be stranded soft drawn copper unless provided with terminating devices approved by ActewAGL.

A person, other than an employee of ActewAGL or an ActewAGL authorised person, shall not make any connection to, or disconnection from, conductors directly connected to ActewAGL's network, or insert a conductor into any item of ActewAGL's service equipment, except as authorised by ActewAGL.

4.2.5 Charges Applicable

The customer shall pay charges as determined by ActewAGL in respect of the installation as per the ACT Electricity Networks Capital Contributions Code 2012 and shall generally be applicable where: -

(i) An aerial service line is in excess of one span or 22 metres in length, provided that in the case of single domestic premises the first span will be installed without charge.

(ii) An underground service cable exceeds 8 metres in length from property boundary line most convenient to the ActewAGL network.

(iii) The service line is terminated at some point other than that selected by ActewAGL involving ActewAGL in greater cost.

(iv) The number of phases installed is in excess of the number determined in accordance with Clause 3.10 Table 1.

(v) Any relocation of existing ActewAGL electrical assets

(vi) The service is temporary or additional.

4.3 Facilities for Installation of Meters and other Service Equipment

4.3.1 Installations Suitable for Use of the Standard Meter Box Panel

For single domestic and other nominated installations having a nominal load of up to 100 amperes per phase, the customer shall provide and install a standard hinged pre-drilled panel complying with ActewAGL's standard meter panel layout as shown in Drawing 8911-2211-101. The nominal size of the panel shall be not less than 575mm high x 355mm wide for boxes housing meters only and 575mm high x 565mm wide for boxes housing meters and switchboards. Where a contactor or other associated equipment is necessary the larger panel shall be used.

Other meter boxes which contain meters or meters and switchboard will be accepted if approved by ActewAGL and meet the requirements of the relevant Standards.

The panel shall be mounted either: -

(i) In a standard meter box complying with Drawing 8911-312; or

(ii) On a suitable surround of steel not less than 1.2mm thick providing a clear space not less than 75mm deep between the rear face of the panel and the surface on which the surround is mounted.

Except where otherwise nominated by ActewAGL's officer, the panel shall be so located that the height of its top edge above the floor or ground beneath the panel: -

(a) In domestic installations is not more than 2000mm and not less than 1500mm;

(b) In non domestic installations is not more than 2000mm and not less than 760mm.

When fully extended on its hinge to the 90° open position, a clearance of 200mm shall be maintained between the front face of the panel and any fixed object.

If the panel is enclosed, other than in a standard meter box, a clearance of 175mm shall be provided from the front face of the panel to the door.

4.3.2 Connection to Private Overhead Electric Lines (POEL)

If connection is made to a private pole of a private overhead electric line the customer shall ensure the installation is designed in accordance with AS/NZS 3000.

4.3.3 Installations Not Suitable for Use of the Standard Meter Box Panel

Where the installation is considered by ActewAGL to be unsuitable for use of the standard meter box panel as described in Clause 4.3.1, the customer shall provide facilities for mounting and connecting ActewAGL's service equipment in accordance with a notification given by ActewAGL. Clause 5.1 details the associated facilities to be incorporated in the customer's installation.

4.3.4 Communications Equipment

Adequate space shall be provided for any communications equipment required by the customer in connection with the National Electricity Market and the communications equipment shall be installed such that it does not interfere with ActewAGL service equipment.

Communication equipment installations must also observe the requirements of *AS HB100 Coordination of power and telecommunications*

4.3.5 Alterations and Additions

If an alteration or addition to an existing installation makes it necessary to install additional service equipment, the customer shall make provision for its mounting and connection in accordance with ActewAGL's requirements.

Where the additional meters and control devices can be accommodated on an existing meter board, which has been approved by ActewAGL, ActewAGL's officer will fix such equipment to the board and connect it to suitable wiring installed by the customer.

4.3.6 Unmetered Supplies

To service unmetered installations, the customer shall provide the consumers terminals and suitable facilities as per drawings 8913-212-01 and 8913-212-02

4.4 Location of Service Equipment

In addition to complying with the requirements for accessibility and protection of ActewAGL's equipment as set out in Clauses 4.5 and 4.8, the service fuses and links shall be located at a position selected by ActewAGL.

In the case of a public building or any premises where a number of occupiers are supplied through the same service, the service fuses must be located in a suitable position in a common use area near a public entrance which is accessible to ActewAGL's officers at all hours without having to obtain a key to the premises.

An exclusion zone of 1000mm shall be maintained between the metering installation and any structure or block boundary.

All meters shall be located at the one metering position which may be the location of the service fuses and links, but consideration will be given to any request for a metering position on each floor of a multi-storey building occupied by separate customers.

Meters shall not be installed in the room where the main switchboard is located but shall be adjacent to the room in an accessible area.

The following locations are considered unsuitable for mounting metering and control equipment: -

(i) Over stairways, ramps, in narrow passageways or in other confined spaces.

(ii) Vehicle docks, driveways and factory passageways where the equipment or the person working on it would not be effectively protected.

(iii) Positions in close proximity to or over machinery or open-type switchgear.

(iv) Locations which are liable to be affected by fumes, dampness, dust, noise or vibration of such nature as may cause deterioration of equipment or unsatisfactory working conditions.

(v) Hazardous locations as defined in *AS/NZS 60079.10 Classification of hazardous areas*.

(vi) Where the normal ambient temperature exceeds 30°C.

(vii) Where there is insufficient light.

(viii) Where the use of a stepladder would be hazardous.

4.5 Accessibility of Service Equipment

4.5.1 Metering Equipment and Service Fuses

Adequate space, generally not less than 1000mm, shall be provided and maintained in front of the metering panel and service fuse panel or cabinet for ActewAGL's officer to read meters and work safely and without difficulty.

Immediate access shall be provided for ActewAGL's officers during normal business hours to all meters and control equipment on customer's premises. This requirement is considered to be complied with where: -

(a) In a single domestic premises it is not necessary to pass through a door or gate;

(b) In multiple domestic premises the equipment is accessible only by means of direct external access, unless otherwise approved by ActewAGL;

(c) In business premises the equipment is located in a lockable portion of such premises which are always open or attended during normal business hours.

(d) Meters capable of being read remotely are installed to ActewAGL's requirements.

Any elevated floor or platform used to provide access shall be substantial and permanent and, where necessary, shall be fitted with a railing. Access to such elevated positions shall be provided by an approved fixed stairway equipped with a handrail. The design of the platform, railings and handrails shall comply with *AS 1657 Fixed platforms, walkways, stairways and ladders - Design, construction and installation*.

Locking of a meter box is acceptable only if it is done by means of a standard lock, which may be purchased from ActewAGL.

In non-domestic installations standard ActewAGL locks may be used only on doors or gates which give access to a room or enclosure which is used solely for the purpose of housing ActewAGL's and customer's electrical equipment.

The customer shall ensure that access is not subsequently restricted or the location otherwise rendered unsuitable. If this occurs, the customer shall restore satisfactory access or arrange for the relocation or replacement of the meter position at the customer's cost.

4.5.2 Point of Attachment

Unrestricted access must be provided to the point of attachment for aerial service cables and associated equipment and fuses. Structures such as carports or pergolas shall not be erected immediately below the pole end or the point of attachment. See Drawing “Minimum clearances bare and covered overhead conductors 3811-004.

4.6 Spacing Between Meters and Current Carrying Conductors

In order to avoid the adverse effect on meters of external magnetic fields, the customer shall, except as otherwise determined by ActewAGL provide and maintain the following minimum spacing between meters and certain current carrying conductors. Generally electronic meters are considered to be less susceptible to external magnetic fields.

4.6.1 Multi-Core Cables and Bunched Single-Core Cables

Where the separation between all conductors of a circuit is due solely to the solid insulation and sheathing on the conductors, as in multi-core cables or a group of single core cables in flat or bunched formation, there is no special requirements as to spacing. This is acceptable provided the insulation integrity is not compromised in any manner.

4.6.2 Spaced Single-Core Cables, Busways or Busbars

Where the separation between conductors of the same circuit exceeds that in Clause 4.6.1 but does not exceed 160mm, the minimum spacing between any point on the meter and any point on the nearest conductor of the circuit shall be in accordance with Table 3. Intermediate points may be obtained by interpolation.

TABLE 3
SPACED SINGLE-CORE CABLES, BUSWAYS OR BUSBARS

Current in Conductor Nearest to Meter up to (Amperes)	Minimum Spacing Between Conductor and Meter (Millimetres)
150	Nil
400	500
600	700
1000	900
1500	1200
2000	1400
3000	1700
4000	2000

4.6.3 Shielding

The spacing determined under Clause 4.6.2 may be reduced by multiplying them by the following factors if the meters or conductors are enclosed in a container made of mild steel of the thickness indicated in Table 4. Where other thicknesses or materials are proposed the factor shall be as determined by ActewAGL.

TABLE 4
SHIELDING

Thickness of Mild Steel Plate (Millimetres)	Multiplying Factor
5.0	0.25
2.5	0.50
1.2	0.75

4.6.4 Special Cases

Where the separation between the conductors referred to in Clause 4.6.2 exceeds 160 millimetres, the spacing shall be as determined by ActewAGL.

4.7 Fixing to Wall Structure

Facilities for the mounting of ActewAGL's service equipment and associated surrounds and boxes enclosing them shall be securely fixed to a wall or rigid supporting structure in accordance with the requirements of ActewAGL.

The fastening method used shall be of a type acceptable to ActewAGL, which, with the exception of boxes built into walls, permits easy removal of the service equipment.

4.8 Protection of ActewAGL's Equipment

The customer shall take whatever action is considered by ActewAGL to be necessary to prevent ActewAGL's equipment being affected by weather, mechanical damage, dusty, corrosive atmospheres or exposed to vandalism. The enclosure shall be to a minimum rating of IP23

A durable weatherproof box with hinged door and catch may be used for this purpose provided it is not inferior to the standard meter box shown in Drawing 8911-312. If the door is hinged on the top edge, a stay fastened to the box is required for holding it in a fully open position. Doors shall not be glazed. Any clearance notified by ActewAGL shall be maintained around ActewAGL's equipment.

For commercial and industrial meter installations please refer to table 4 A

Table 4 A
Standard ActewAGL Meter boxes

ActewAGL Drawing Number	Drawing Title
8913-22-03	Domestic Meter box Enclosure support arrangement
8912-05	Typical UG service Arrangement for Meter box in Boundary/wall
8911-312	Typical Standard Meter Box (minimum Requirements)
8911-307	LV Metering Cubicle for Current Transformer metering 200/5 CT Extended Range
8911-308	Typical Metering Cubicle for Multi Tenanted Installations Suitable for Single Radial cables only
8911-324	Typical Metering Cubicle for Multi-Installation and Looping or Paralleling of ActewAGL Cables
8911-323	Revenue Metering Cubicle used for HV pole mounted metering unit

4.9 Load Control Equipment

Where, in accordance with the provisions of any charge published by ActewAGL, electricity is to be supplied only during certain hours, ActewAGL will provide, and install a single pole control device, in accordance with such charge requirements.

Where the controlled load exceeds the capacity of the control device (typically 30A) the customer shall be required to supply and install an approved sealable contactor in a position determined by ActewAGL. The contactor will be operated by ActewAGL's control device. The customer shall install the necessary wiring as required by ActewAGL

5 CUSTOMER'S INSTALLATIONS

5.1 Facilities Associated with Metering

5.1.1 General

In addition to providing and installing a panel or panels equipped and wired in accordance with Clause 4.3, the customer shall arrange the electrical installation in the premises to meet the requirements of Clauses 5.1.2 to 5.1.5 inclusive.

5.1.2 Protection of Meters Against Short Circuit

Where required by ActewAGL for a service rated at more than 100 amperes, the customer shall arrange the installation so that all direct connected meters and associated control devices and the wiring connected to them are on the load side of ActewAGL's service fuses.

Please note that the rating of such protective device installed by ActewAGL will not exceed 100 amperes.

5.1.3 Connections and Links

Not more than one cable shall be connected to any one terminal of a meter or control device. Where it is necessary to connect more than one meter to one phase with an unmetered supply main or submain, the customer shall, where required, supply and install links for the purpose. Any such links supplied by the customer shall be mounted on the front of the meter panel, back wireable, fit for purpose and suitable for sealing.

5.1.4 Sealing

The customer shall make provision in an approved manner for ActewAGL to affix seals to portions of the customer's installation in circumstances where, in the opinion of ActewAGL such seals are necessary to prevent obstruction or diversion of the supply of electricity or to avoid interference with the supply to other customers or for purposes associated with the control and metering of the electricity supply or for any other purposes relating to the agreement with the customer.
In general, provision for sealing is required for all connections on the line side of the meters and certain other connections associated with metering.

5.1.5 Labelling

An unique and durable identification number must be assigned and securely fixed to the service fuse, meter, distribution board and at the main entrance to the premises.
The owner of the premises shall ensure that all labelling must be maintained to reflect current layout arrangements of the complex. Failure to maintain this arrangement may result in the disconnection of supply.

All alternative sources of supply must be clearly labelled at the main switchboard. Where large commercial or industrial buildings are supplied from more than one service, labels shall be provided at each service position and at the main switchboard associated therewith, indicating the portion of the installation supplied.

5.2 Limitations on Connection and Operation of Equipment

5.2.1 Interference with Supply to Other Customers

The customer's equipment shall be arranged and operated to prevent undue interference with the supply to other customers.

The two basic types of interference caused by customer's loads are: -

1. Voltage fluctuations (dips and rises), which are caused by the switching of loads such as heater banks, motors, single phase air conditioning units or power factor correction equipment.

2. Voltage waveform distortion (harmonics), which are usually caused by loads with electronic power supplies.

The customer must ensure that harmonic distortion caused by the electrical installation or by any appliances is not in excess of the limits prescribed in AS/NZS 61000 part 3.2, 3.4 & 3.12 for low voltage.

If, in the opinion of ActewAGL, the customer should use or deal with the electricity supplied in such a way as to cause undue interference to the supply to other customers, the customer causing the interference shall take corrective action. The fact that ActewAGL has connected a premise that has equipment causing the interference shall not exempt the customer from the operation of this clause.

The customer's low voltage equipment or groupings of equipment will generally be considered acceptable for connection if

- manufacturer declaration stating that these equipment comply with AS/NZS 61000.3.2 or AS/NZS 61000.3.12 (for harmonic currents) is available and either
- manufacturer declaration stating that these equipment comply with AS/NZS 61000.3.3 (for voltage changes, fluctuation and flicker) is available or
- the network impedance at the connection point is less than the maximum permissible system impedance declared by the manufacturer in accordance with AS/NZS 61000.3.5 or AS/NZS 61000.3.11 (for voltage changes, fluctuation and flicker).

Connections at high voltage will be assessed for compliance using the recommendations of the applicable standard – AS/NZS 61000.3.6 for harmonic emission limits and AS/NZS61000.3.7 for voltage fluctuation limits.

5.2.1.1 General Equipment

Equipment, other than motors, having load changes not more than those specified in Table 6 for the frequency of load change indicated is acceptable for connection.

Where a piece of equipment includes a motor which is switched simultaneously with another load component, then the equipment is acceptable if the steady state load changes are within those specified in Table 6 and the motor starting current complies with Clause 5.2.1.2.

TABLE 6
LIMITATIONS ON CONNECTION AND OPERATION OF EQUIPMENT

Voltage of Load Units (Vac)	Connection of Load	Switching Arrangement	Number of Phases of Supply	Acceptable Changes of Line Current for Indicated Frequency of Change (Amperes)			
				More than 1 / Min	From 12 / hour up to 1 / Min	From 4 / hour up to 12 / hour	Up to 4 / hour
240	Line to Neutral	-	1	Refer to *AS/NZS 61000.3.3 and AS/NZS 61000.3.5*	13	18	25
		Phases not switched simultaneously	2 or 3		13	18	25
		Phases switched simultaneously	2		13	18	25
			3		21	30	43
415	Line to Line (no neutral connected)	Phases switched simultaneously	2		21	30	43
			3		21	30	43

5.2.1.2 Motors

Motors having starting currents not more than those specified in Table 7 for the starting frequency indicated are acceptable for connection.

TABLE 7
LIMITATIONS ON CONNECTION AND OPERATION OF MOTORS

Motor Voltage	No of Phases of Supply	Acceptable Starting Current for Starting Frequency (Amperes)			
		More than 1 / Min	From 12 / hour up to 1 / Min	From 4 / hour up to 12 / hour	Up to 4 / hour
240	1	Refer to *AS/NZS 61000.3.3 and AS/NZS 61000.3.5*	19	29	38
415	3		32	48	64

5.2.1.3 Equipment Requiring Special Consideration

ActewAGL may refuse to permit the connection of equipment in the following categories if they consider that by such connection, the supply to other customers would be adversely affected:

(a) Equipment which would cause excessive fluctuation of voltage on ActewAGL's system as a result of its large or fluctuating demand, e.g., arc furnaces, welding machines, X-ray units and frequently started large motors. In such cases the customer shall provide any information requested by ActewAGL to determine whether the equipment complies with *AS/NZS 61000.3.3 or AS 61000.3.5*.

(b) Equipment which would cause excessive distortion of the wave shape of ActewAGL's system voltage, e.g., rectifiers, frequency converters, load control devices using thyristors or saturable reactors. In such cases the customer shall provide any information requested by ActewAGL to determine whether the equipment complies with *AS/NZS 61000.3.2*.

5.2.1.4 Conditional Approval

ActewAGL may approve the connection of equipment having a fluctuating load characteristic and/or which causes waveform distortion subject to specified conditions of operation of the equipment. Such conditions may include restrictions on frequency or cycle of operation, time-of-day restrictions, provision of harmonic filters or other auxiliary equipment, or a specified method of connection to the power supply. Costs incurred shall be the responsibility of the customer.

Where such approval is granted the customer shall not cause any change to the specified conditions without obtaining the approval of ActewAGL. Any approval previously given shall be void if any of these conditions are changed.

5.3 Customers Installations

5.3.1 Consumer's Mains

A consumer mains is defined as the cable or overhead wire between the Electricity Network Boundary (as defined in the ACT Electricity Network Boundary Code 2000) and the customer's installation.

(a) Joints in unmetered consumer's mains are not permitted unless approved by ActewAGL.

(b) The conductors of consumer's mains shall be insulated in different colours for identification purposes. Where necessary, core identification may be achieved by sleeving in accordance with *AS/NZS 3000 Wiring Rules*. The use of electrical tape for this purpose is not acceptable.

(c) The size of the consumer's mains shall be selected to the requirements of AS/NZS 3000 and these rules. The minimum size of the consumer mains shall be 6 mm^2.

(d) The consumer's mains shall be installed in such a manner that in the event of a fault in the consumer's mains the impedance of the fault current path i.e. fault loop impedance path shall be low enough to allow sufficient current to flow to ensure proper operation of the protective devices.

(e) The insulation resistance between conductors and between conductors and earth of an unmetered consumer's mains shall not be less than the values as listed below when tested by a 500V d.c. insulation resistance tester that complies with the requirement of Clause 8.3.6.1 of the AZ/NZS 3000: 2007 Wiring Rules as published and amended from time to time.
- For cables up to 50m route length – 50 megohms
- For cables in excess of 50m route length, a reduction of 5 meg ohms for each additional 25m route length is acceptable subject to an absolute minimum of 5 megohms

(f) The consumer's mains must be in a condition that is fit for purpose and not physically damaged in any way.

5.3.2 Main Switchboards and Meter Panels

Arrangements shall be made to ensure that live parts on a switchboard or meter panel cannot be touched by unauthorised or unqualified persons. Where the protecting case can be opened or removed without the use of tools, locks, which lock automatically upon closure and require a key to open them, shall be used. Suitable labels warning of the presence of live parts shall be fixed to the front of such doors.

5.4 Earthing

All new installations required to be earthed shall conform to the requirements for the MEN System of Earthing as set down in the *AS/NZS 3000 Wiring Rules*.

5.5 Connection to Alternative Supply Sources

Where, in accordance with Clause 3.8, ActewAGL agrees to the installation of facilities to enable an installation to be disconnected from ActewAGL's system and connected to a private alternative source of supply, such facilities shall be arranged either directly or by suitable interlocking procedures, so that ActewAGL's system, service equipment and metering equipment cannot be energised from such alternative source. The switching of the generator neutral may be required to avoid multiple MEN connections. The normal supply neutral must not be switched. A notice shall be fixed on the main switchboard to show that such facilities exist, which sections of the installation they can supply, their point of control and the conditions under which they may be operated. Refer also to AS 3010 “Electrical Installations – Generating Sets”.

5.5.1 Embedded Generators

Embedded generators must be installed according to the requirements in ActewAGL’s Guidelines for embedded generator connections which are detailed in the following documents:

ActewAGL’s requirements for LV Embedded generator connections

Guidelines for embedded generator connection to ActewAGL’s low voltage (LV) network

ActewAGL’s requirements for HV Embedded generator connections

Large scale embedded generator connection

Upon request, ActewAGL can provide a grid code to proponents of embedded generators who are seeking guidance to addressing the requirements of the NER.

A general outline of ActewAGL’s requirements is below:

(1) **Technical requirements**:

- Network boundary, connection arrangements and capacity;
- Synchronisation;
- Frequency control and limits;
- Voltage and reactive power control and limits;
- Load control and limits;
- Power quality and limits;
- Metering requirements;
- Wiring requirements;
- Connection capacity limits;
- Connection, disconnection and re-connection operations;

- Isolation of an embedded generator from the utility network;
- Protection systems requirements;
- Fault levels;
- Earthing;
- Monitoring, control and communications requirements;
- Emergency requirements;
- Network operations;
- Commissioning;
- Testing;
- Maintenance; and
- For sub transmission network connection generating units, requirements as set out in the schedules to Chapter 5 of the National Electricity Rules.

(2) Testing:

Protection measures applying to an embedded generating unit are to be tested by qualified persons:

- when the embedded generating unit is installed and commissioned, before connecting to a utility's network; and
- at a minimum of every 5 years after connecting to the utility's network.

(3) Disconnection:

ActewAGL will disconnect an embedded generating unit from its network, where it is satisfied, on reasonable grounds that the embedded generating unit:

- presents a safety hazard to the utility's network, persons accessing or working upon the utility's network, the public or any emergency services;
- is affecting the quality or reliability of supply to other customers supplied by the utility;
- may or is affecting the safety, quality or reliability of any other distribution or transmission networks; or
- is not in compliance with its ES&I Rules.

(4) ActewAGL requires generator owner/operator to ensure the generator has adequate:

- Safety plan
- Safety Rules
- Safe operating procedures
- Maintenance requirements and procedures to ensure the installation is in sound operating condition
- Trained staff or trained contractor for operation and maintenance

5.6 Power Factor

5.6.1 General

If the power factor, as determined by ActewAGL, of the supply taken by a customer's installation is such that, in the opinion of ActewAGL, the electricity network is not or would not be efficiently utilised or the supply to another customer is or would be adversely affected, the customer shall maintain such power factor at a value not less than 0.9.

No condition of operation of power factor correction equipment or variation of inductive load shall at any time cause the power factor of the installation to become leading.

The requirements for the installation of power factor correction capacitors at customers' installations are described in Appendix A11.

5.6.2 Luminous Discharge Tubes and Fluorescent Lighting Units (Other than Single Dwelling Domestic Installations)

The power factor of luminous discharge tube lighting installations, signs, fluorescent lamps, etc. shall not be less than 0.9. Power factor correction is not required in installations with a total uncorrected connected load not exceeding 10 amperes (e.g. twenty 38 watt tubes).

5.7 High Voltage Installations

Customers intending to build, own, operate and maintain their high voltage installation connected to ActewAGL's network shall submit a proposal to ActewAGL. ActewAGL will then advise customers of its requirements such as:

1. Contractual and application requirements
2. Applicable charges
3. Responsibilities
4. Installation and equipment compliance
5. Protection and metering requirements
6. Quality of supply
7. Inspection and testing
8. Operation and maintenance procedures.

APPENDIX A1 CUSTOMER SUPPLY PROCEDURES

1. SCOPE

This document outlines procedures relating to the connection of new installations and alterations/additions to existing installations. These procedures will assist in meeting the reasonable needs of customers, contractors and ActewAGL, and to avoid misunderstandings and delays.

2. ENQUIRIES

Enquiries concerning the various procedures set out in this document should be directed to the staff at ActewAGL's Office, Greenway. This office deals with general enquiries between the hours of 8.30am and 4.00pm Monday to Friday.

Over the counter transactions such as payments, submission of Request for Service or Request for Service Marking forms may also be carried out at the Actew Water Division Office, Mitchell. The counter is open between the hours of 8.00am to 4.45pm Monday to Friday. DA/BA applications are not accepted at this location

3. APPLICATION TO CONNECT TO THE NETWORK AND NOTIFICATION OF WIRING

New installations which require an underground service will be marked for service location by ActewAGL when Development Application plans are submitted to ActewAGL.

On receipt of the Development Application plans, ActewAGL officers will check whether any special conditions to connect to the network are applicable and initiate work for the reinforcement of the system where necessary. The customer will then be informed of any charges, special conditions and any work which may be necessary for the customer to perform before a connection can be provided.

An application to connect to the network must be made to ActewAGL together with payment of any charges before the connection will be made.

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A Request for Service Marking (RSM) form should be lodged with ActewAGL where additional load requires an existing service to be upgraded from single phase to three phase or where premises requires a new Point of Attachment or relocation of an existing service.

An application for connection (RFS) form must be submitted 15 working days prior to completion of building work to give ActewAGL time to install the underground service cable and/or metering equipment. RFS form can be obtained by clicking on the link below:

This Appendix forms part of the Service and Installation Rules and is to be read in conjunction with those rules

Request for service

On new premises where the service cable is already installed, but metering equipment is yet to be installed, an additional (RFS) form shall be submitted to initiate the metering equipment installation process. These forms must not be submitted until the site is ready for ActewAGL to undertake works.

4. PROVISION TO BE MADE FOR SERVICE EQUIPMENT

Reference should be made to Appendix A3 Provisions for Service Equipment in Single Domestic and Small Installations or Appendix A4 Provisions for Service Equipment in Multiple Installations, or Appendix A5 Off-peak Supply as appropriate, for details of the facilities which must be provided by the customer.

These facilities, in the case of new installations, will include provision by the customer of a panel, with all wiring for the connection of meters and all associated equipment and control equipment.

The provision of the service equipment and the installation of the consumer's mains should be carried out as soon as the building work is sufficiently advanced. ActewAGL must be notified by the submission of a Request for Service form (RFS) to enable the scheduling of the installation of the service equipment.

5. CONNECTION TO THE NETWORK

When the installation is complete and ready for connection, a Certificate of Electrical Safety must be lodged at the office of ACT Government to facilitate an electrical inspection.

ActewAGL will not connect any new installation to the network until ACT Government have authorised connection.

Energisation of the customers' electrical installation to the electricity distribution network via ActewAGL's metering shall not occur until evidence that there is a relevant retail supply agreement and a completed and approved ACT Government inspection is confirmed. Confirmation must be sought by evidence of the Authority's self-adhesive "*Authorisation for metering and connection by ActewAGL personnel*" signed off and dated label at the customer's meter box, or at the combined meter apparatus and installation equipment main switchboard. **If no such label is present the installation must remain disconnected from the electricity distribution network.**

6. SERVICING APPOINTMENTS

In certain circumstances it may be necessary for the contractor to arrange in advance for servicing and metering work to be conducted at an appointed time. Work requiring appointments include re-positioning or replacement of meter boxes, consumer's mains, service mains and conversion to Off-Peak metering.

In such cases, an appointment must be made in advance at either of ActewAGL's offices at Greenway or Mitchell.

It is essential that any such appointment be made only when it is known that all the necessary preliminary matters have been arranged: that is, the service equipment is satisfactory, any charge has been paid and the installation will be completed before the time of the inspection. An application (RFS) form shall be submitted at the time of making the appointment, and a Certificate of Electrical Safety must also be submitted to ACT Government.

7. WORK OUTSIDE NORMAL WORKING HOURS

In some circumstances, ActewAGL may agree to a customer's and/or electrical contractor's request to carry out certain work outside normal working hours. Written confirmation by the customer and/or the electrical contractor to pay the cost involved is required in addition to a letter stating that all customers affected are aware of and have agreed to outage times if required. This confirmation must be received by ActewAGL at least three working days prior to the commencement of works.

8. SEPARATION OF SUPPLY

When a contractor divides an existing installation into separate installations, serving two or more occupancies, the contractor must make an appointment for this work to be carried out. Any such change must also label the new occupancy in accordance with Section 5 of this document.

9. INSTALLATION DEFECT FEE

An Installation Defect fee applies when ActewAGL has to revisit a site, necessitated by obstructed access or non-compliance with the Service and Installation Rules. This fee is approved by the Australian Energy Regulator (AER) and is published on the ActewAGL website at www.actewagl.com.au

The payment of the Installation Defect fee will be taken as notice that the defect has been rectified.

APPENDIX A2 DOMESTIC ELECTRICAL INSTALLATIONS

1 SCOPE

This publication briefly explains the terms used in describing a typical domestic electrical installation and provides general background information.

2 COMPONENT PARTS OF A DOMESTIC INSTALLATION

2.1 Overhead Service

These are the overhead conductors installed by ActewAGL between its mains and a point of attachment on the customer's premises.

2.2 Underground Service

These are the underground service cables installed by ActewAGL between its mains and a point of entry on the customer's premises.

Care should be exercised by customers including obtaining clearances when excavating in the vicinity of buried cables. Cable clearances must be obtained by contacting "Dial Before You Dig" by telephoning 1100. A minimum of two full working days notice is required.

2.3 Point of Attachment

This is the point at which the aerial conductors of the service line are attached to a customer's building, post, pole, or structure. The location is determined by an officer of ActewAGL who also indicates the provisions, which must be, made by the customer to enable ActewAGL to securely anchor the insulators, which it installs to terminate the service line.

The position selected for the point of attachment will depend on such factors as the profile of the terrain, the presence of obstructions and the relative positions of the building and street mains. Typical locations selected by ActewAGL's officer for the point of attachment are the house fascia or gable.

In some cases, it may be necessary to install a service riser bracket at the point of attachment to raise the line sufficiently to maintain minimum safe clearances above the ground or driveway and other structures. Service riser brackets (when required) are to be supplied by the customer and must be one of a number of approved types available from trade suppliers. Standard cable bracket and fascia bracket are provided by ActewAGL.

It is important for the customer's electrical contractor to ensure when installing the service bracket that the structure supporting the anchor bolts or service riser bracket is adequate in strength to withstand the tension of the service line.

2.4 Consumers Terminals

These are the junction between the conductors of the service line or underground service cable and those of the consumer's mains. The making of

this connection and the carrying out of any work at the consumer's terminals must be carried out by ActewAGL staff.

2.5 Consumers Mains

These are cables, which are installed by a licensed electrical contractor engaged by the customer. They commence at the consumer's terminals, and terminate at the customer's main switchboard.

Refer to Clause 5.3.1 of the Service and Installation Rules for details of the requirements for joints in unmetered consumer's mains and for core identification of consumer's mains.

2.6 Main Switchboard and Meter Panel

ActewAGL generally requires the use of a standard hinged pre-drilled panel, to cater for ActewAGL's service and metering equipment.

Customers are advised to use a panel that complies with ActewAGL's published standard. These panels and associated meter boxes and surrounds are available from trade suppliers.

However, if the residence has a very large electrical installation, typically above 100amps per phase the standard panel may not be adequate and a larger panel and separate facilities for the mounting of the service equipment may be required.

The panel is required to be protected from the weather and is generally enclosed in a weatherproof meter box rated at IP23. It is preferred that this be made of a standard meter box which complies with Drawing 8911-312. However, other forms of construction are acceptable if they are equivalent to the standard box in all relevant respects.

ActewAGL installs its service equipment and associated equipment on this panel. Adequate space is generally also available for the customer's switchboard equipment necessary to control and protect the sub mains and final sub circuits.

3 WORK ON CUSTOMER INSTALLATIONS

Legislation requires work carried out on a customer's installation to comply with *AS/NZS 3000 Electrical installations (known as the Australian/New Zealand Wiring Rules).* The Wiring Rules set down the essential requirements for ensuring safety from fire and shock and apply to all electrical installations on customers' premises.

Persons carrying out such work are required to be licensed with ACT Government as electrical contractors and to provide ACT Government with written particulars within 14 days of the completion of this work.

APPENDIX A3 PROVISION FOR SERVICE EQUIPMENT IN SINGLE DOMESTIC AND SMALL INSTALLATIONS

1 SCOPE

This publication sets out provisions for the installation of service equipment in premises, which are suitable for the use of a standard meter panel, in accordance with Clause 4.3.1 of the Service and Installation Rules.

2 GENERAL REQUIREMENTS

The customer shall provide mounting and installation facilities for ActewAGL's service equipment in the positions selected by ActewAGL officer. "Service equipment" as referred to in this publication includes service lines and cables, service fuses, meters, and off-peak load control equipment, but excludes an off-peak contactor required for load switching. This equipment is supplied and installed by ActewAGL and shall remain its property.

3 CONNECTION TO THE PREMISES

3.1 Aerial Service Lines

ActewAGL will not allow aerial service lines in bushfire prone areas (all rural areas and also areas within the bushfire abatement zone as determined by the Emergency Service Agency) or where underground mains are available.

In low bushfire risk areas (Urban) or where overhead mains are available ActewAGL's preference for new services is to be underground.

ActewAGL has developed new guidelines to assist builders and other contractors in the building industry understand how ActewAGL will electrically service extended or redeveloped residential properties. Specifically, the guidelines are an indication of where ActewAGL will nominate an underground service to be installed in areas that are reticulated with overhead mains. In some circumstances there may be exceptions. Therefore, in accordance with ActewAGL's Service & Installation Rules before any building activity commences any change to existing electrical servicing due to extensions, or any new electrical servicing required due to a redevelopment must be specified by ActewAGL. This process is initiated by ActewAGL when the Development or Building Application is received. You will receive a copy of the completed Request for Service Marking Form specifying such a change when your approved plans are returned. Alternatively, if you have not received this form with your plans any change required to an electrical service can be requested by the builder, contractor or home owner by submitting a completed Request for Service Marking Form. Once again this should be initiated before any building activity commences.

Guidelines

The following outlines when an underground service is required:

- Where an Intermediate Service pole would otherwise be required
- Where the service would be greater than 30 metres in length
- Where the service connection is to a double storey building
- Where adequate ground clearance cannot be obtained by installing an overhead service with the use of a standard riser
- Where regulatory clearances to structures cannot be met or maintained
- Where existing vegetation prevents the installation of an overhead service or where such vegetation has the potential to encroach minimum clearances from the overhead line
- Where the change of service would further encumber a neighbouring property
- Where the line would traverse any part of a swimming pool
- Where the site has been redeveloped
- Where a standard ActewAGL bracket or riser is unable to be installed at the point of attachment to accommodate an overhead service (i.e. flat roof residences)

For any clarification or further advice regarding these guidelines please contact ActewAGL on 6293 5770.
Where an existing aerial service is required to be altered then ActewAGL will determine the route of the service line and the position of the point of attachment to any building or structure after receiving a Request for Service Marking. The customer shall provide, install and maintain the point of attachment. Services in excess of 30 metres should be underground.

3.2 Underground Service Cables

Services shall normally be installed underground. ActewAGL will determine the position of entry for the service cable at the property boundary and its route on the property.

The customer shall provide, install and maintain a conduit or set of conduits and any associated facilities required by ActewAGL for the installation of the service cable. Detailed requirements are set out in Appendix A8 Underground Supply to Single Domestic and Small Installations.

3.3 Connections at Service Equipment

The customer shall install a sufficient length of PVC or elastomer-insulated stranded copper cable (flexible cables not permitted) of a suitable size or current rating for connection of the consumer's mains to service lines, service fuse(s) and neutral bar. (Refer Appendix A4; clause 5.6)

The customer shall also arrange for the installation of the wiring on the load side of ActewAGL's service equipment and for the ends to be prepared for insertion and connection by ActewAGL. Separate full sized PVC or elastomer-insulated stranded copper metering neutral cables are required for each meter or control device. Cables insulated with XLPE is not permitted.

Where service fuses are located on the switchboard, one additional cable connection is permitted to be terminated on the load side at each service fuse to enable supply to be provided to a separately metered portion of the installation such as an off-peak water heater. In other cases an active link shall be provided on the switchboard to enable such connection.

A person, other than an employee of ActewAGL shall not make any connection to, or disconnection from, conductors directly connected to ActewAGL's network, or insert a conductor into any item of ActewAGL's service equipment, except as authorised by ActewAGL.

4 FACILITIES FOR INSTALLATION OF METERS AND OTHER EQUIPMENT

4.1 Standard Panel and Meter Box

The customer shall provide and install a standard hinged pre-drilled panel complying with Drawing 8911-2211-101. The panel shall be complete with wiring for the mounting and connection of ActewAGL's meters and control equipment.

The panel shall be mounted either:

(i) In a standard meter box complying with Drawing 8911-312; or

(ii) On a suitable surround of steel not less than 1.2mm thick providing at least 75mm of space behind the panel, erected in a location which is suitably protected.

Except where otherwise nominated by ActewAGL, the panel shall be so located that its top edge is not more than 2000mm or less than 1500mm above the floor or ground beneath it. A clearance of 200mm shall be maintained from the front face of the hinged panel to any fixed object with the panel open 90^{o} on its hinges. If the panel is enclosed, other than in the standard meter box, a clearance of 175mm shall be provided from the front face of the panel to the door.

Details of requirements including drilling of the panel for fixing of ActewAGL's equipment and space for the customer's equipment are available from ActewAGL.

This Appendix forms part of the Service and Installation Rules and is to be read in conjunction with those rules

Notes:

1. Customers are advised to use panels complying with Drawing 8911-2211-101. These panels and associated meter boxes and surrounds are available from trade suppliers. No objection will be raised to the presence of redundant holes resulting from the use of a standard pre-drilled panel.
2: Other meter boxes which contain meters or meters and switchboard may be used, subject to approval by ActewAGL.

4.2 Wiring

The wiring and the arrangement of the equipment on the standard panel is required to be in accordance with these rules, and with *AS/NZS 3000 Wiring Rules*.

Where hinged or removable meter panels are used, conductors connected to equipment on the panel shall be provided with sufficient free length to enable the panel to be readily opened up to 90 degrees for work to be carried out.

4.3 Fixings

Boxes, surrounds and enclosures shall be securely fixed to a solid wall or rigid supporting structure that is mechanically sound and of a permanent nature that does not permit the box to be vibrated.

4.4 Protection from Weather etc.

Specific requirements for the protection of meters and service equipment are detailed at clause 4.8 of the Service and Installation Rules.

4.5 Accessibility

Specific requirements for the location and accessibility of meters and service equipment are detailed at clauses 4.4 and 4.5 of the Service and Installation Rules.

5 SEALING OF CUSTOMER'S EQUIPMENT

The customer shall enclose connections and make provision in an approved manner for ActewAGL's officer to affix seals to facilitate the detection of unauthorised access to connections such as links on the line side of meters and certain other connections associated with metering. In a domestic or small installation this will generally involve the use of an approved sealable link, and, if applicable, a sealable off-peak load contactor and control switch.

6 SMALL INSTALLATIONS OTHER THAN SINGLE DOMESTIC

ActewAGL's Standard Meter Box and panel may be used for any non-domestic installation where agreed to by ActewAGL's officer.

This Appendix forms part of the Service and Installation Rules and is to be read in conjunction with those rules

Notwithstanding the requirements of Clause 4.1 the top edge of the panel in a non-domestic installation shall be so located as to be not more than 2300mm or less than 760mm above the floor or ground.

7 DRAWINGS

The following drawings form part of this Appendix: -

8911-2211-101	Standard Switchboard Arrangement Domestic and Off Peak-Tariff
8911-312	Typical Standard Meter Box
8911-321	Permissible Meter Locations - Domestic Installations

This Appendix forms part of the Service and Installation Rules and is to be read in conjunction with those rules

APPENDIX A4 PROVISION FOR SERVICE EQUIPMENT IN MULTIPLE OCCUPANCY INSTALLATIONS

1 SCOPE

This Publication sets out the provisions required for the installation of service equipment in premises where direct connected meters are nominated for metering the whole or any portion of an installation where ActewAGL's standard meter box panel is not adequate. It is applicable to multiple domestic installations and flats, (excluding dual occupancies) groups of small shops, factory units and the like, where metering is grouped.

For loads in excess of approximately 100A per phase it is necessary to use meters which operate in conjunction with current transformers and reference should be made to Appendix A6 Current Transformer Metering for the additional provisions which the customer is required to make.

2 GENERAL REQUIREMENTS

The customer is required to provide mounting and installation facilities for ActewAGL's service equipment in the positions selected by ActewAGL. "Service Equipment" shall mean all equipment installed in a premises by ActewAGL, including service lines, cables and busbars, service fuses, links, meters, current transformers and auxiliary control equipment.

Requirements for the location and mounting of the service equipment will be notified by ActewAGL following the receipt of approved plans prepared by a switchboard manufacturer. If ActewAGL decides the proposed work is not of a relatively simple nature it may be necessary for an onsite appointment with an ActewAGL officer who will set out provisions to be made for the mounting and connecting of metering equipment.

3 CONNECTION TO THE PREMISES

3.1 Aerial Service Lines

ActewAGL will not allow aerial service lines in bushfire prone areas (all rural areas and also areas within the bushfire abatement zone as determined by the Emergency Service Agency) or where underground mains are available.

In low bushfire risk areas (Urban) or where overhead mains are available ActewAGL’s preference for new services is to be underground.

ActewAGL has developed new guidelines to assist builders and other contractors in the building industry understand how ActewAGL will electrically service extended or redeveloped residential properties. Specifically, the guidelines are an indication of where ActewAGL will nominate an underground service to be installed in areas that are reticulated with overhead mains. In some circumstances there may be exceptions. Therefore, in accordance with ActewAGL's Service & Installation Rules before any building activity

commences any change to existing electrical servicing due to extensions, or any new electrical servicing required due to a redevelopment must be specified by ActewAGL. This process is initiated by ActewAGL when the Development or Building Application is received. You will receive a copy of the completed Request for Service Marking Form specifying such a change when your approved plans are returned. Alternatively, if you have not received this form with your plans any change required to an electrical service can be requested by the builder, contractor or home owner by submitting a completed Request for Service Marking Form. Once again this should be initiated before any building activity commences.

Guidelines

The following outlines when an underground service is required:

- Where an Intermediate Service pole would otherwise be required
- Where the service would be greater than 30 metres in length
- Where the service connection is to a double storey building
- Where adequate ground clearance cannot be obtained by installing an overhead service with the use of a standard riser
- Where regulatory clearances to structures cannot be met or maintained
- Where existing vegetation prevents the installation of an overhead service or where such vegetation has the potential to encroach minimum clearances from the overhead line
- Where the change of service would further encumber a neighbouring property
- Where the line would traverse any part of a swimming pool
- Where the site has been redeveloped
- Where a standard ActewAGL bracket or riser is unable to be installed at the point of attachment to accommodate an overhead service (i.e. flat roof residences)

For any clarification or further advice regarding these guidelines please contact ActewAGL on 6293 5770.
Where an existing aerial service is required to be altered then ActewAGL will determine the route of the service line and the position of the point of attachment to any building or structure after receiving a Request for Service Marking. The customer shall provide, install and maintain the point of attachment. Services in excess of 30 metres should be underground.

This Appendix forms part of the Service and Installation Rules and is to be read in conjunction with those rules

3.2 Underground Service Cables

Services shall normally be installed underground. ActewAGL will determine the position of entry for the service cable at the property boundary and its route on the property. Detailed requirements are set out in Appendix A9 Underground Supply to Installations with Demands Exceeding 100 Amperes per Phase.

4 SERVICE FUSES AND NEUTRAL BAR

4.1 Installation

The neutral bar is to be provided and installed by the Contractor.

Where ActewAGL assesses the maximum load of the installation at 100A per phase or less ActewAGL installs HRC service fuses.

Where ActewAGL assesses the maximum load of the installation at more than 100A per phase ActewAGL may install the service fuses in a cubicle at a location separate to the meter panel. The customer shall provide and install the cubicle containing mounting facilities for the fuses in an accessible position nominated by ActewAGL. Refer to Drawing 8913-213-06 .

4.2 Accessibility and Protection

In addition to complying with the requirements for accessibility and protection of ActewAGL's equipment from weather, etc., as set out in Sections 5.3 and 5.4 of this Appendix the service fuses and neutral bar must be located externally at the street access level of the building, which is accessible to ActewAGL's officer, in order to ensure continuity of supply to individual customers. Consideration will be given to other locations only in exceptional circumstances.

4.3 Connections at Service Fuses and Neutral Bars

4.3.1 General

The Customer shall arrange for the installation of a sufficient length of cable for connection of the consumers mains at the consumers terminals and at the line terminal of the service fuses and neutral bar, to permit connection by ActewAGL in a manner which complies with ActewAGL's requirements and *AS/NZS 3000 Wiring Rules*.

The customer shall also arrange for the installation of similar wiring on the load side of ActewAGL's service fuses and neutral bar and for the ends to be prepared ready for connection by ActewAGL's officer.

The customer shall install a sufficient length of PVC or elastomer-insulated stranded copper cable (flexible cables not permitted) of a suitable size or current rating for connection of the consumer’s mains to service lines, service fuse(s) and neutral bar.

Cables of other types, if used, must be jointed or otherwise connected in an approved manner to cable of the required type and size for connection to this equipment.

A person, other than an employee of ActewAGL or an authorised person, shall not make any connection to, or disconnection from, conductors directly connected to ActewAGL's network, or insert a conductor into any item of ActewAGL's service equipment, except as authorised by ActewAGL.

4.3.2 Services not exceeding 100A Rating

Where the assessed maximum load of the installation is 100A per phase or less, ActewAGL installs HRC service fuses. The maximum conductor size, which can be terminated, directly into service fuses when they are mounted on a panel, which is, surface wired, is 35 mm^2.
One additional cable may be connected on the load side of each double terminal service fuse to supply a separately metered portion of the installation.

4.3.3 Services exceeding 100A Rating

Where the assessed maximum load of an installation exceeds 100A per phase, it may be supplied from the low voltage reticulation or direct from a substation.

When approved by ActewAGL, ActewAGL's service fuses, or other approved *service protective devices* (SPD's), may be incorporated in a service fuse cabinet or in the customer's main switchboard. Where the SPD does not have a removable fuse or link, the SPD shall have provision for locking in the open position using a 45mm wide padlock (8.7mm shackle diameter, 22mm horizontal shackle clearance and 19mm vertical shackle opening). In large installations the service fuses may be located in a substation.

5 METERS

5.1 Installation

ActewAGL provides and installs the meters appropriate for the number of separately metered occupancies in the premises and for the tariffs required (including allowances for PV and off-peak). Single phase meters will be installed in new installations for separate occupancies with single phase equipment only and assessed maximum loads not exceeding 100A. For occupancies having three phase equipment and a maximum load not exceeding 100A per phase direct connected multiphase meters will be utilised. For occupancies exceeding 100A per phase refer to Appendix A6 Current Transformer Metering.

5.2 Grouping

It is preferred, in general, that all meters together with the service fuses and links be located at the one metering position. Consideration will be given to any request for a metering position on each floor of a multi-storey building occupied by separate customers.

Where it is necessary to connect more than one set of meters in multiple occupancy buildings where changes in tenancy may require alterations to the portions of the installation connected to a meter, connecting or paralleling links shall be supplied by the customer. Such links are required to be readily accessible, suitable for sealing by ActewAGL and must comply with ActewAGL's requirements. Links shall not be located on the back of a hinged meter panel.

5.3 Accessibility

Adequate space is required in front of the meter panel and service fuse panel or cabinet for ActewAGL to read meters and work safely and without difficulty. In this regard the space between any wall on which service equipment is mounted and any other wall or obstruction in front of the panel is generally required to be not less than 1000mm.

ActewAGL requires immediate access during normal business hours to all meters and control equipment on customer's premises. This requirement is not considered to be complied with where it is necessary for an ActewAGL officer to pass through a lockable door or gate in a domestic premises but no objection will be raised to such equipment being located in a lockable portion of business premises which are always attended during normal business hours.

Specific requirements for the location and accessibility of meters and service equipment are detailed at clauses 4.4 and 4.5 of the Service and Installation Rules.

5.4 Protection from Weather, Mechanical Damage and Corrosive Atmospheres

Specific requirements for the protection of meters and service equipment are detailed at clause 4.8 of the Service and Installation Rules.

5.5 Mounting Provisions

ActewAGL will include, in the notification to the applicant for connection to the network, the mounting requirements for grouped meters.

5.6 Wiring

The wiring of meters is required to be in accordance with *AS/NZS 3000 Wiring Rules*. Stranded copper conductor cable of not less than 6mm^2 or not more than 35mm^2 shall be used for the wiring of individual meters.

Factory assembled combinations, will also be accepted, subject to the manufacturer having previously submitted full details and received ActewAGL approval of the system.

5.7 Protection Against Short Circuit

Direct connected meters and control devices must be so located within the customer's installation that they, together with the wiring associated with them, are adequately protected against short circuit.

5.7.1 Services not exceeding 100A

Where conductors of not less than 6 mm^2 are used and ActewAGL service fuse does not exceed 100A rating, and then the requirement of Clause 5.7 is met.

5.7.2 Services exceeding 100A

ActewAGL will provide a HRC fuse on the line side of the metering, capable of interrupting the prospective short circuit current.

5.7.3 Sub-mains to separate occupancies

ActewAGL providing HRC fuses for connections of the meters will meet the requirement.

The customer must provide over current protection in the form of a circuit breaker located after the meter or control device.

6 SEALING OF UNMETERED EQUIPMENT

In general, the customer is required to suitably enclose and arrange for sealing by ActewAGL of all the equipment installed on the line side of the meters, together with all metering connections.

Adequate segregation is required between portions of a switchboard, which are sealed, and those, which are not.

7 SPACING BETWEEN METERS & CURRENT CARRYING CONDUCTORS

Specific requirements for the spacing between meters and current carrying conductors are detailed at clause 4.6 of the Service and Installation Rules.

8 LABELLING

A unique and durable identification number must be assigned and securely fixed to the service fuse, meter, distribution board and at the main entrance to the premises.
The owner of the premises shall ensure that all labelling must be maintained to reflect current layout arrangements of the complex. Failure to maintain this arrangement may result in the disconnection of supply.

All alternative sources of supply must be clearly labelled at the main switchboard. Where large commercial or industrial buildings are supplied from more than one service, labels shall be provided at each service position and at

the main switchboard associated therewith, indicating the portion of the installation supplied.

9 DRAWINGS

The following drawings form part of this Appendix: -

8911-308	Typical Metering Cubicle for Multi-Installations.
8911-324	Typical Metering Cubicle for Multi-Installation and Looping or Paralleling of ActewAGL Cables
8913-213-06	Wall Mounted Service Cubicle with Modular Feeder Units

APPENDIX A5 OFF PEAK SUPPLY

1 SCOPE

This publication sets out the provisions, which an applicant for Off-Peak tariff is required to provide for the connection of ActewAGL's service equipment and metering.

2 CONDITIONS FOR CONNECTION TO THE ELECTRICTY NETWORK

The conditions for connection to the electricity network shall be as set out in the Electricity Network Schedule of Charges and the relevant customer connection contract(s). These charges and contracts are published on the ActewAGL website at www.actewagl.com.au.

3 SUPPLEMENTARY INFORMATION

3.1 Definitions

3.1.1 Storage Water Heater

"Storage Water Heater" shall mean a device in which water is heated and stored in a container and drawn off for use. (The term shall include a water heater incorporating a heat exchanger for transferring heat from the stored water to the water that is drawn off. The water within the exchanger cannot be used). Storage Water Heaters are eligible for connection to Off-Peak.

3.1.2 Thermal Storage Space Heater

"Thermal Storage Space Heater" is a device by means of which energy in the form of heat may be stored in concrete, masonry, metal, liquid or other suitable material for a lengthy period and subsequently liberated to surrounding air. The device may be in the form of an independent unit or it may be incorporated in the building structure, e.g. heating units embedded in a concrete floor. Thermal storage space heaters are eligible for connection to Off-Peak.

4 CONTROL OF OFF PEAK INSTALLATIONS

Any installations that vary from the standard diagram shall be discussed with ActewAGL prior to installation.

5 OTHER HEATING SOURCES

Off-Peak is not available to electrically boosted water heaters where gas, kerosene or other types of fuel are used as the primary source of heating. However, electrically boosted solar storage water heaters will be supplied at Off-Peak under similar conditions to other types of electric storage water heaters. The rated hot water delivery will include the electrically heated and solar sections of the unit.

This Appendix forms part of the Service and Installation Rules and is to be read in conjunction with those rules

6 SWIMMING POOLS AND SPA POOLS

An electrically heated swimming pool or spa pool is classified as a storage water heater and is eligible for connection to Off-Peak subject to minimum volume limitations as defined in AS3000.

The nominal capacity of the pool shall be taken as the rated hot water delivery in determining eligibility for supply at Off-Peak.

Note:

Spa and turbo tubs that do not have self contained heating elements are not storage water heaters and therefore do not qualify for off peak tariffs.

7 REPLACEMENT OF WATER HEATERS

Water heaters supplied by Off-Peak shall be replaced by heaters of similar or increased volume.

8 CHANGE-OVER SWITCHING

The Electricity Network Schedule of Charges require that single element water heaters and thermal storage heaters supplied at Off-Peak may be given supply only within prescribed hours. A change-over switch which would enable the water heater load, normally supplied at the Off-Peak Charge, be transferred by the customer to the Principal Charge is permissible. The change over switch is to have an **"off"** position.

9 REQUIREMENTS FOR INSTALLATION OF A CONTACTOR AND MINIMUM SIZE OF CONDUCTORS

Where, in accordance with the provisions of any Charge published by ActewAGL, electricity is to be supplied only during certain hours, ActewAGL will provide and install a single pole control device capable of directly controlling loads supplied under that Charge, up to a rating of 30 amperes.

Where the controlled load exceeds 50 amperes or involves the switching of more than one phase of supply, the customer shall provide and install a contactor arranged so that it is operated by ActewAGL's control device. The contactor shall be of an approved type, be capable of carrying the full connected load, suitable for sealing and shall be installed at the meter position. The customer shall also install the necessary wiring and ensure that the contactor is satisfactorily maintained. All conductors associated with the Off-Peak supplies shall be a minimum 6mm^2.

10 CALCULATION OF MAXIMUM DEMAND FOR OFF-PEAK CHARGES IN A DOMESTIC INSTALLATION

When calculating the maximum demand for consumer’s mains the demand of the off-peak elements shall be taken to be the full load current.

1. When the calculated maximum load is less than 100 amps including the off-peak elements, the consumer's mains shall consist of a one phase two wire system.

2. When the calculated maximum load including the off- peak elements exceeds 100 amps the consumer's mains may consist of a two phase three wire system.

11 DRAWINGS

The following drawings form part of this Appendix: -

8911-1211-107	Typical Wiring Diagram for 1 Phase Electronic Meter with Off Peak load up to 30 amps
8911-1211-111	Typical Wiring Diagram for 1 Phase or 3 Phase Meters with Off Peak load greater than 30 amps
8911-1211-113	Three Phase Off-Peak with Booster Switch
8911-2211-101	Standard Switchboard Arrangement Domestic and Off-Peak Tariffs

APPENDIX A6 CURRENT TRANSFORMER METERING

1 SCOPE

This publication sets out the facilities the customer is required to provide to accommodate current transformer metering for supply at 415/240 volts.

2 GENERAL

Current transformer metering will generally be used when it is anticipated that the maximum load of an installation or portion of an installation, which is to be separately metered, will exceed 100A per phase. In addition to providing facilities in accordance with Appendix A4 for ActewAGL's service fuses and for any direct connected meters necessary, the customer shall provide facilities for mounting and connecting the current transformers, meters and associated equipment, in accordance with this publication.

3 FACILITIES REQUIRED FOR INSTALLATION OF METERS

3.1 CT Metering Panel

In respect of each separately metered portion of an installation for which CT metering is necessary the customer shall provide and install a metering enclosure which shall be suitably screened from current carrying conductors as stipulated under Clause 4.6 of the Service and Installation Rules and in general shall not form part of the main switchboard. Details of the enclosures are contained in the drawings referenced in this appendix.

Specific details of all installations are available from the ActewAGL Office, Greenway.

3.2 Location and Access Requirements

The CT metering panel shall be installed by the customer and pre-drilled to accommodate the fixing and connection of ActewAGL's meters and equipment.

ActewAGL will indicate the position required. In general, the panel must be located so that no portion of it is lower than 760mm or higher than 2000mm from the ground or floor level where it is installed.

Protection required for meters and metering equipment is to be in accordance with Clause 4.8 of the Service and Installation Rules.

4 FACILITIES REQUIRED FOR INSTALLATION OF CURRENT TRANSFORMERS

4.1 General

For installations and separately metered portions of installations requiring the use of current transformers, it is required that these current transformers and

associated equipment be fixed within the customer's main switchboard unless otherwise approved by ActewAGL.

The customer shall submit drawings for the proposed facilities for metering equipment and, subject to ActewAGL's approval, the CTs and potential circuit fuses will be provided for installation by the customer. The care of this equipment is the responsibility of the customer.

4.2 Circuit Location

The metering equipment will be fixed in a position approved in each instance by ActewAGL, and usually will be connected between the service fuses and the customer’s switchboard.

4.3 Location and Access Requirements

The location of current transformers, removable busbars, potential circuit fuses and neutral connecting link incorporated in or on a switchboard, shall be such that no part of any of these items is less than 760mm or more than 2000mm from the floor or platform from which access is obtained. They shall be conveniently accessible from outside the switchboard structure. Connections to the CT secondary terminals, potential fuses and metering neutral link shall be not more than 300mm from the plane of the access panel or doorway for cubicle switchboards.

The cubicle or section of the switchboard allocated for the installation of ActewAGL's metering CTs, potential fuses, etc. shall be completely segregated from the customer's portion of the switchboard by means of suitable rigid barriers.

4.4 Safety Screen

In order to reduce the possibility of inadvertent contact of persons or foreign objects with the live busbars, a removable insulated screen is required within the CT enclosure to provide a complete "dead front". In this regard the screen shall extend the full width of the chamber and extend at least 100 mm beyond the consumer’s mains termination lugs. The CT secondary terminal covers, potential fuses and where applicable service fuses shall protrude through the screen to enable CT ratio changes and fuse cartridge replacements to be effected without its removal. All CT secondary wiring and the wiring to and from the fuses shall be located behind this screen. The screen shall be equipped with two (2)-insulated handles to permit its safe removal.

4.5 Doors

Doors shall be provided with facilities for easy and safe opening or removal. Doors shall be hinged and capable of opening to a minimum of 90 degrees.

4.6 Identification

The door shall be labelled "ActewAGL CT Metering" and clearly identify the associated customers. Furthermore, all unmetered parts of the switchboard shall be clearly labelled “unmetered”.

4.7 Locking

Locking of the door shall be provided with an approved lock, provided by the customer. (Lockwood type 201.)

4.8 Mountings

The mountings which are to be provided by the customer for the current transformers shall consist of 6mm dia. studs, secured by brazing or equivalent means to a mounting plate or bar, together with nuts. Alternatively, tapped holes at two diagonally opposite corners of a mounting plate and slotted or hexagon-head 6 mm dia. set screws are acceptable, subject to dowels being provided at the other corners to support the current transformers during removal of the set screws.

A pre-drilled baseboard of insulating material shall be provided for the mounting of the potential fuses in an accessible position near the current transformers with which they are associated. The mounting baseboard shall be in approximately the same plane as the safety screen. A clearance of 100mm (min.) to 300mm (max.) shall be provided between it and the enclosure door. The fuses shall be stud connected to its associated busbar on the line side of the current transformers.

Dimensions of current transformers are given in Drawing 8911-2213-101, "Specifications of Current Transformers".

4.9 Primary Conductors

The conductors passing through each current transformer shall be in the form of a removable section of copper busbar enclosed within the switchboard to enable alterations or removal of the current transformer.

The surfaces to which these conductors are to be connected shall be either copper or suitably plated copper or copper alloy.

Connection and disconnection shall be by the use of adjustable or socket type spanners.

The size and shape of the busbar shall be selected to suit the openings in the current transformers of the type nominated by ActewAGL.

The removable section of busbar shall be 300mm (min) to 450mm (max) in length. No wiring is permitted to be connected to the removable section of the busbar or the bolts or fixings which secure it.

5 FACILITIES REQUIRED FOR THE CONNECTION OF METERING EQUIPMENT

5.1 General

Drawing 8911-1213-101 shows a typical wiring diagram for CT metering. The customer shall provide and install all wiring necessary between the current transformer position and the meter position for each separately metered portion of the installation. The wiring shall be 0.6/1kV, plastic insulated, stranded copper conductor of cross-sectional area indicated in Clauses 5.3 and 5.4. Each of the insulated conductors shall be visually distinguishable by colour and size.

The conductors shall comprise of single insulated conductors enclosed in conduit. No wiring for purposes other than that described in Clauses 5.2 to 5.6 inclusive shall be contained in the conduit.

Sufficient length to enable connections to be made by ActewAGL's Officer, (1500mm minimum) shall be provided at the meter. Connections in the CT enclosure shall be made by the electrical contractor.

Except where otherwise approved by ActewAGL's Officer, the conduit shall be open to view.

5.2 Identification of conductors

Each of the insulated conductors shall be visually distinguishable by colour and size in accordance with Drawing 8911-1213-101.

5.3 Secondary Circuit Wiring

The cross-sectional area required for the CT current circuit conductors is dependent upon the route length of the wiring between the meter panel and the current transformers and on the transformer characteristics. It shall be not less than 7/0.67 mm^2 as shown in Drawing 8911-1213-101.

Where the route length is likely to exceed 10 metres, ActewAGL's approval must be obtained.

5.4 Potential Circuit Wiring

The potential circuit wiring shall be 7/0.50 mm^2. The potential fuses shall be stud connected to the busbar on the line side and close to each current transformer.

A connection facility is to be provided for the metering neutral conductor in an accessible location in close proximity to the current transformer position.

The connection to a busbar shall be by means of a suitable lug secured by a 6 mm dia. set screw into a tapped hole and be clearly visible from the position of the current transformers. Any alternative proposal for the means of connection of potential circuit wiring and metering neutral conductors as above shall be submitted in writing for ActewAGL approval.

5.5 Protective Enclosure

The form of protective enclosure for the potential and current circuit wiring shall, where practicable, be a surface run rigid PVC conduit without inspection fittings. The conduit shall be adequately supported and in the case of switchboard mounted current transformers, shall continue into the switchboard enclosure to a position adjacent to the base of each current transformer and to the potential fuses.

Where surface run wiring is not practicable, the wiring shall be in heavy duty UPVC conduit laid at a depth of 500mm except where the conduit is encased in concrete.

5.6 Earthing Connection

The customer shall also install a 2.5mm^2 stranded copper earthing conductor, in accordance with the provisions of *AS/NZS 3000 Wiring Rules*, and connect it to an earthing terminal inside the metal surround of the meter panel and also provide an additional length of 1500mm.

6 FURTHER INFORMATION

Where it is proposed to incorporate ActewAGL's metering current transformers within a customer's switchboard, contact should be made by the switchboard manufacturer with ActewAGL so that the proposed arrangements may be discussed.

7 DRAWINGS

The following drawings form part of this publication: -

8911-1213-101	Diagram of Connections to Current Transformers Kilowatt-hour Polyphase Meter, Test Links and Potential Fuses.
8911-2213-101	Specifications for Current Transformers.
8911-307	LV Metering Cubicle for Current Transformer Metering 200/5 CT Extended Range

This Appendix forms part of the Service and Installation Rules and is to be read in conjunction with those rules

APPENDIX A7 TEMPORARY INSTALLATIONS

1 SCOPE

This document outlines procedures relating to the connection of temporary installations. The following procedures will assist in meeting the reasonable needs of customers, contractors and ActewAGL, and avoid misunderstandings and delays.

2 GENERAL

2.1 Warning Against Premature Expenditure

ActewAGL advise that no expense should be incurred by the prospective customer towards the erection of a temporary installation until ActewAGL has indicated, that connection to the network can be made available, and the conditions under which connection to the network is to be given.

Where it is not necessary to extend or augment the electricity network in an area, ActewAGL may install a temporary connection for a limited duration to supply electricity for specific purposes, such as a builder's power switchboard.

Where it is necessary to extend or augment the electricity network to provide connection services, the terms and conditions for connection will be subject to negotiation, upon receipt of a written request for connection to the network. Provision of a temporary connection in these circumstances is conditional upon availability of adequate construction resources.

Where a temporary connection is provided for construction purposes it will normally be disconnected at the time of installation of the permanent service equipment unless prior arrangements have been made by the customer.

Cost of temporary supply installation will be imposed upon the applicant.

2.2 Connection of Temporary Installations less than 100Amps per phase

ActewAGL will connect the installation if it complies with the following conditions.

a) A Request for Service Marking(RSM) form has been completed and submitted

b) Payment has been made for such charges, for any works required of ActewAGL, as may be determined by ActewAGL

c) An electrical contractor has submitted a Request for Service form and/or that a Certificate of Electrical Safety has been lodged with the ACT Government

d) An ACT Government electrical inspector has attached a sticker to the meter board that reads: “Authorisation for temporary supply for construction and

demolition purposes" or "Authorisation for connection of permanent electrical installation to an electricity network"

e) An electricity account has been established with an electricity retailer.

ActewAGL will check the installation and, if found to comply with the conditions set out herein, will connect the installation.

The connection of the temporary installation by ActewAGL will constitute ActewAGL's initial permission for the temporary installation to remain connected for a period not normally exceeding twelve months.

2.3 Connection of Temporary Installations greater than 100Amps per phase

ActewAGL will connect the installation if it complies with the conditions set out hereunder.

Upon the receipt of: -

a) A Request for preliminary electricity network advice (PNA) form to enworks@actewagl.com.au PNA form can be found at Request for Preliminary Network Advice ; and

b) payment of such charges, for any works required of ActewAGL, as may be determined by ActewAGL and

c) an electrical contractor submits a Request for Service form and/or that a Certificate of Electrical Safety has been approved by ACT Government ;and

d) An electricity account established with choice of retailer.

ActewAGL will check the installation and, if found to comply with the conditions set out herein, will connect the installation.

The connection of the temporary installation by ActewAGL will constitute ActewAGL's initial permission for the temporary installation to remain connected for a period not normally exceeding twelve months.

3 TEMPORARY INSTALLATION ARRANGEMENTS

3.1 Customers Installations

The customer is responsible for the erection of an approved meter box and meter panel and, where required, an approved pole and or electrical conduits within the block.

The electrical installation shall be installed in accordance with this Appendix, *AS/NZS 3000 Wiring Rules* and *AS/NZS 3012 Electrical installations - Construction and demolition sites*.

3.2 Earthing

The Multiple Earthed Neutral (M.E.N.) system of earthing shall be used.

3.3 Mounting of Switchboards

Switchboards and meter boxes shall not be mounted on ActewAGL's poles or on poles located outside the block

A domestic meter box temporary supported in its permanent position by commercially available support arrangement may also be used. These support arrangement must be structurally certified to perform the functions for which they were designed and approved by both ActewAGL and ACT Government.

Drawing 8913-22-03 shows the minimum requirements for the support arrangement.

4 METHOD OF CONNECTION

4.1 Overhead Connection

ActewAGL will provide an aerial service cable to a point not further than 15 metres (15m) from its pole, see Drawing 8914-201.

4.2 Underground Connection for Domestic Installations

ActewAGL will provide an underground service cable to the permanent metering position in a domestic installation. The customer shall provide an underground conduit from the boundary to the meter box. See Drawings 8912-02 and 8912-03.

The electrical contractor shall install consumer's mains to supply the temporary installation (see Drawing 8914-202) and no additional charge will be made by ActewAGL to reconnect these mains to the permanent metering equipment during normal working hours.

4.3 Underground Connection for Commercial Installations

ActewAGL will provide an underground service cable to an agreed temporary metering position on a commercial installation. The electrical contractor shall make provision for the installation and termination of the service cable, and the installation of all metering equipment.

Any person carrying out work or other activities under, over or adjacent to any ActewAGL asset which could in any way affect access to, clearances from or the safety of persons near such asset is required to notify ActewAGL and to obtain the necessary approvals.

5 SHOWS, CARNIVALS AND TENTS

Temporary installations for shows, carnivals and tents shall comply with *AS/NZS 3001 Electrical installations - Relocatable premises (including caravans and tents) and their site installations, AS/NZS 3002 Electrical installations - Shows and carnivals* and *AS/NZS 3000 Wiring Rules*.

Any person proposing to carry out a temporary electrical installation is required to provide notification to ACT Government and ActewAGL, to obtain the necessary approvals and to pay the applicable fees and charges.

6 DRAWINGS

The following drawings form part of this publication: -

8912-02	Underground Service Conduit Requirements
8912-03	Typical Underground Service Cable Conduit Requirements for a Single Domestic or Small Commercial Installation
8914-201	Temporary Installation Residential Blocks -Overhead Supply
8914-202	Temporary Installation Residential Blocks -Underground Supply
8913-22-03	Domestic Meter Box/Enclosure Support Arrangement
8911-2212-101	Temporary Connection to Residential Blocks Prior to Permanent Connection

APPENDIX A8 UNDERGROUND SUPPLY TO SINGLE DOMESTIC AND SMALL INSTALLATIONS

1 SCOPE

This publication sets out ActewAGL's requirements for the provision of underground service cables, consumer's mains and conduit, in single domestic or small installations where the rating of the service does not exceed 100A per phase.

2 GENERAL

Where ActewAGL determines that connection to the network will be made available by means of underground cable or where the customer's request is granted by ActewAGL for provision of underground supply, the customer is required to provide, install and maintain the conduit/s and associated facilities and the consumers mains where required.

ActewAGL installs and maintains the service cable. A charge is made in certain circumstances in accordance with Clause 4.2.5 of the Service and Installation Rules.

Upon receipt by ActewAGL of the proposed plan/s of the premises, an officer will indicate ActewAGL's requirements, so that conduit can be laid before concrete foundations and the like are installed.

A Completed Request for Service (RFS) form must be submitted 15 working days prior to completion of necessary building work to give ActewAGL time to install the underground service.

3 INSTALLATION OF CONDUITS FOR SERVICE CABLE

3.1 Type and Size

The conduit shall be heavy duty rigid UPVC to *AS/NZS 2053 Conduits and fittings for electrical installations*.

The diameter shall be 50mm minimum, except in special circumstances where a conduit of larger diameter is required by ActewAGL's officer.

3.2 Laying of Conduit

The conduit shall be laid in accordance with the approved plan, in a generally straight line from a position on the boundary alignment to the meter box. The conduit shall be laid at a depth which provides 600mm of cover to finished ground level for 50mm conduits and 850mm of cover for larger conduits. The conduit is not to pass under the building.

Installation of conduit in rock shall be in accordance with *AS/NZS 3000 Wiring Rules*.

Notes:

1. Generally the meter box is housed in a recess in the wall, as shown in Drawing 8912-02. With this arrangement, the conduit may have to pass through a structural footing of the building and rise within the cavity of an external wall.

2. ActewAGL's cables in the nature strip should be treated as "live" and care must be exercised during excavation. (Clearances must be obtained from “Dial Before You Dig” by telephoning 1100 or online via www.1100.com.au a minimum of two full working days before excavations begin)

3.3 Bend Limitations

Only one bend of 90 degrees or less, having a radius of not less than 450mm, is permitted where the conduit rises to the meter box or other terminating position. No additional bends shall be installed but a minor deviation of the straight line run of the conduit is permissible, i.e. within the flexibility of the conduit without distortion of the walls. If it is found to be impracticable to install the conduit in accordance with these requirements, ActewAGL's advice should be sought.

3.4 Joints

Joining of the conduit shall be by means of sockets or fittings which are installed so that the internal bore of the system is continuous and smooth and presents no obstruction to pulling in the cable. Joints shall be watertight and bonded using an appropriate jointing method.

3.5 Draw Wire

A continuous 2.5mm (minimum) diameter steel draw wire, protruding at least 600mm from each end of the conduit shall be provided. Refer to ActewAGL Conduit Technical Standards Procedure EN4.04 P04 for details.

3.6 Drainage of Conduit

Where the ground level at the street end of the conduit is above the floor level of the building in which the conduit terminates, a drain shall be provided from the conduit to ensure the conduit is drained and water does not enter the switchboard by one of the following methods: -

(a) Where the conduit rises on the outside of the building, the drain shall be in the form of a 10mm diameter hole in the conduit, arranged to point towards the wall approximately 300mm above ground level so that the entry of water and debris is minimised.

(b) Where the conduit is not on the outside of the building, a 15mm diameter PVC pipe shall be solvent-welded into the conduit without protruding into the bore. It shall be arranged to discharge to the exterior of the building approximately 300mm above ground level.

3.7 Sealing

Care shall be taken to prevent material from entering the conduit. The conduit shall be sealed at the street end with a plug or cap and soft mastic compound, which can be removed easily.

The conduit end shall be identified by the installation of an appropriate marker peg.

3.8 Trench Inspections

The trench may be backfilled before the installation is inspected.

4 PROVISION FOR OTHER SERVICES

Other services may be located in the same trench as ActewAGL's service cable provided that, with the exception of necessary crossings, they are separated as far as practicable in the trench as per ActewAGL drawing 3832-018 and not laid over the service cable.

5 DRAWINGS

The following drawings form part of this publication: -

8911-313	Meter Box for Installation with 50 mm^2 Underground Service Cable.
8912-02	Underground Service Conduit Requirements.
8912-03	Typical Underground UG & OH Service Cable Conduit Requirements for a Single Domestic or Commercial Installation.
8912-04	Typical Underground Service Cable Conduit Requirements for Installation exceeding 100amps per phase.
8913-22-02	P.O.E. / Fuse Box for Domestic & Small Commercial Customers ($16mm^2$ Underground Services)

APPENDIX A9 UNDERGROUND SUPPLY TO INSTALLATIONS WITH DEMANDS EXCEEDING 100 AMPS PER PHASE

1 SCOPE

This publication sets out ActewAGL's requirements for the provision of underground service cables, consumer's mains and conduit where the rating of the service exceeds 100A per phase.

2 GENERAL

Where ActewAGL determines that supply will be made available by means of underground cable or where the customer's request is granted by ActewAGL for provision of underground supply, the customer is required to provide, install and maintain the conduits and associated facilities located within the property boundary and the consumers mains cables where required.

ActewAGL installs and maintains the service cable. A charge is made in certain circumstances in accordance with Clause 4.2.5 of the Service and Installation Rules.

The customer is required to submit a Request for Preliminary Electricity Network Advice (PNA) to enworks@actewagl.com.au prior to commencement of any development activity to confirm ActewAGL servicing requirement.

3 INSTALLATION OF CONDUIT FOR SERVICE CABLE

3.1 Type and Size

The conduit shall be heavy duty rigid UPVC to *AS/NZS 2053 Conduits and fittings for electrical installations*.

The nominal size of conduits and minimum radius of bends shall be generally in accordance with Table 1. A larger size or a second conduit may be specified by ActewAGL's Officer.

TABLE 1
MINIMUM RADII FOR CONDUIT BENDS

Nominal Conduit Size (mm)	Minimum Radius of Bend UPVC (mm)
50	450
100 - 150	1200

This Appendix forms part of the Service and Installation Rules and is to be read in conjunction with those rules

3.2 Laying of Conduit

The conduit shall be laid in accordance with the approved plan and ActewAGL Conduit Technical Standards Procedure EN4.04 P04, in a generally straight line from a position on the boundary alignment to the meter box or point of entry cubicle. The conduit shall be laid at the recommended burial depth as per drawing 3832-018.Conduits shall not pass under building or any structures unless approved by ActewAGL.

Installation of conduit in rock shall be in accordance with *AS/NZS 3000 Wiring Rules Underground wiring system*.

Notes:

1. Generally the meter box is housed in a recess in the wall, as shown in Drawings 8912-02 and 8912-04. With this arrangement, the conduit may have to pass through a structural footing of the building and rise within the cavity of an external wall.

2. ActewAGL's supply cables in the nature strip should be treated as "live" and care must be exercised during excavation. (Clearances should be obtained from "Dial Before You Dig" by telephoning 1100 or online via www.1100.com.au a minimum of two full working days before excavations begin)

3.3 Bend Limitations

Only one bend of 90 degrees or less, having a radius as shown in Table 1 is permitted where the conduit rises to the meter box or other terminating position. No additional bends shall be installed but a minor deviation of the straight line run of the conduit is permissible, i.e. within the flexibility of the conduit without distortion of the walls or heating of the conduit. If it is found to be impracticable to install the conduit in accordance with these requirements, ActewAGL's advice should be sought.

3.4 Joints

Joining of the conduit shall be by means of sockets or fittings which are installed so that the internal bore of the system is continuous and smooth and presents no obstruction to pulling in the cable. Joints shall be watertight and bonded using an appropriate jointing method.

3.5 Draw Wire

A continuous 2.5mm (minimum) diameter galvanized steel draw wire, protruding at least 600mm from each end of the conduit shall be provided. Refer to ActewAGL Conduit Technical Standards Procedure EN4.04 P04 for details.

3.6 Drainage of Conduit

Where the ground level at the street end of the conduit is above the floor level of the building in which the conduit terminates, a drain shall be provided from

the conduit to ensure the conduit is drained and water does not enter the switchboard by one of the following methods: -

(a) Where the conduit rises on the outside of the building, the drain shall be in the form of a 10mm diameter hole in the conduit, arranged to point towards the wall approximately 300mm above ground level so that the entry of water and debris is minimised.

(b) Where the conduit is not on the outside of the building, a 15mm diameter PVC pipe shall be solvent-welded into the conduit without protruding into the bore. It shall be arranged to discharge to the exterior of the building approximately 300mm above ground level.

3.7 Sealing

Care shall be taken to prevent material from entering the conduit. The conduit shall be sealed at the street end with a plug or cap and soft mastic compound, which can be removed easily.

The conduit end shall be identified by the installation of an appropriate marker peg.

3.8 Termination of Conduit

Conduit shall terminate flush with the top of the base of a point of entry cubicle.

4 INSTALLATION OF A SERVICE CABLE TO A POINT OF ENTRY CUBICLE

4.1 General

Where, in accordance with Clause 2, ActewAGL identifies that it is necessary to install a point of entry cubicle. An approved enclosure (point of entry cubicle) shall be provided by the customer to terminate the service cable and connect the consumer's mains.

4.2 Point of Entry Cubicle

The enclosure shall be installed in a location which has been agreed to by ActewAGL as being suitable and to which a conduit for the installation of the service cable can be laid in accordance with Clause 3. The location must be such that unrestricted access is provided.

Consumer's mains cables shall be extended to allow termination and connection to the service equipment by ActewAGL.

A typical underground service cable termination enclosure is shown in Drawing 8913-213-06.

5 CONSUMERS MAINS

5.1 Copper /Aluminium Conductor

The customer shall provide suitable lugs for the copper/aluminium conductors. ActewAGL will fit the lugs and terminate the conductors to ActewAGL's equipment.

5.2 Mineral Insulated Metal Sheathed Cable

The customer is responsible for terminating MIMS cables in a manner satisfactory to ActewAGL.

6 PROVISION FOR OTHER SERVICES

Other services may be located in the same trench as ActewAGL's service cable provided that, with the exception of necessary crossings, they are separated as far as practicable in the trench as per ActewAGL drawing 3832-18 and not laid over the service cable.

7 DRAWINGS

The following drawings form part of this publication: -

8911-307	LV Metering Cubicle for Current Transformer Metering 200/5 CT Extended Range
8911-308	Metering Cubicle for Multi-Installations.
8911-313	Meter Box for Installation with 50mm^2 Underground Service
8911-324	Typical Metering Cubicle for Multi-Installation and Looping or Paralleling of ActewAGL Cables
8912-04	Typical Underground Service Cable Conduit Requirements for Installations Exceeding 100Amps per Phase
8911-1213-101	Diagram of connections to current transformers kilowatt-hour polyphase meter, test links and potential fuses
8913-213-06	Wall Mounted Service Cubicle with Modular Feeder Units

APPENDIX A10 DUAL OCCUPANCY/SUBDIVISION OF RESIDENTIAL LEASES AND SECONDARY RESIDENCE

1 SCOPE

This publication sets out the provisions for the installation of ActewAGL's electrical services for a dual occupancy/subdivision residential lease.

Dual Occupancy/subdivision shall mean, *"Two dwellings constructed on the one residential block or one residential block proposed for subdivision into two residential blocks".*

Dual Occupancy shall not include additional dwellings, which are attached or form part of the existing dwelling or for non-residential structures.
Consideration has been given to two different methods of servicing and metering of dual occupancy dwellings:-

(1) A single service to each lease, or
(2) Separate services to each dwelling on the one lease.

2 GENERAL

Clause 3.4 of ActewAGL's Service and Installation Rules provides for a single service to each residential lease upon which a domestic dwelling is constructed. The services shall be underground. ActewAGL will determine the appropriate point for the connection of the service to each dwelling.

3 SINGLE SERVICE

Where a single service is provided to a residential lease with more than one dwelling it shall generally be connected to the front or original dwelling.

4 SEPARATE SERVICES

Separate services for dual occupancy/subdivision will be provided.

Where a separate service is installed to an additional dwelling, the cost of the second service is to be borne by the customer including any other network modification required.

5 CONNECTION TO THE PREMISES

ActewAGL will install an underground service as determined by request for service marking (RSM). This service may terminate in a POE box which may be located on the back wall of the dwelling or at a meter box in an approved location. See Drawing 8911-321 and 8913-22-02.

This Appendix forms part of the Service and Installation Rules and is to be read in conjunction with those rules

For underground services a conduit is to be installed in accordance with Appendix A8 Underground Supply to Single Domestic and Small Installations, from a point determined by ActewAGL. See drawings 8912-02, 8912-03 and 8912-04.

6 METERING

Metering for domestic dwellings is required to be installed in an approved meter box in a suitable position as determined in Appendix A3 Provision for Service Equipment in Single Domestic and Small Installations and Drawing 8911-321.

Where only one service has been supplied for more than one dwelling or structure, e.g. a house and flat, or two separate dwellings on the one lease block, the meters shall be grouped at a single meter box, which would normally be installed, on the front or original residence. Both dwellings would be considered to form a single installation in accordance with *AS/NZS 3000 Wiring Rules*, and shall be controlled from a single main switchboard. Drawing 8911-326 provides details for dual tenancy switchboard layout.

Where a separate service has been provided for each dwelling and separate meter boxes are installed, the access provisions for both meter boxes shall be in accordance with the Service and Installation Rules.

7 SECONDARY RESIDENCE

A secondary residence is a new form of residential development replacing the current ‘relocatable unit’ and ‘habitable suite’. This is a dwelling in addition to the main residence. It can be attached or detached from the primary building and it can be permanent or temporary.

A single service will be provided to the primary residence only. The customer is responsible for arranging electricity supply from their electrical installation to the secondary residence. Meter for secondary residence must be located at meter box of primary residence.

8 DRAWINGS

The following drawings form part of this publication: -

8911-321	Permissible Meter Locations Domestic Installations
8911-326	Dual Tenancy Switchboard Layout for 600 x 600 Meter Box

APPENDIX A11 INSTALLATION OF POWER FACTOR CORRECTION CAPACITORS AT CUSTOMERS INSTALLATIONS

1 SCOPE

This appendix sets out the requirements for the installation of power factor correction capacitors at customers' installations.

2 BACKGROUND

Customers can gain significant benefits by improving the power factor of their electrical installations. These benefits include reduced electricity costs, increased plant load capacity and utilisation, and better voltage regulation.

Improvement of power factor is usually achieved by the installation of capacitors but unless these are correctly installed, serious problems can arise such as overcompensation, generation of excessive harmonics, and creation of over voltage transients. These problems can affect the quality of the electricity supply, both in the customer's installation and also in the installations of other customers.

3 ActewAGL REQUIREMENTS

The requirements set out below must be observed in order to minimise these and other associated problems. These requirements are intended for application at switchboards or significant individual loads, although some aspects are also relevant to small individual loads.

3.1 Power Factor

Customer power factor at the point of common coupling (PCC) with the ActewAGL network shall be between 0.9 lagging and unity. Leading power factor is not acceptable.

3.2 Compliance with Relevant standards

Compliance is required with the relevant parts of *AS/NZS 61000 Electromagnetic compatibility (EMC)* and the Voltage Tolerance Envelope published by Technical Committee No. 3 of the Information Technology Industry Council of America and shown at Figure 1, with respect to harmonic limits and voltage fluctuation limits during steady state operation and switching conditions. *AS 61000* shall have precedence over the Voltage Tolerance Envelope curve where there is any conflict. Notwithstanding the above, compliance is also required with the ActewAGL Service and Installation Rules; especially with respect to a customer not causing undue interference to another customer, and ActewAGL reserving the right not to assign the complete fluctuating load capability, or voltage distortion capacity, of the system to any one customer, in order to reserve capacity for future customers or other existing customers.

3.3 Switching Steps

On LV circuits, automatic control of capacitors shall not exceed 50 kVAr steps. On HV circuits the allowable step size will depend on compliance with the above Standards.

3.4 Resonance Mitigation

Appropriate measures shall be employed to avoid resonance with the network and to limit in-rush currents. These measures could include, for example, de-tuning reactors and resistors. On HV circuits the impedance values of this equipment shall be provided with sufficient adjustment capability (for example, ± 20%) to cater for future ActewAGL network impedance changes that may arise from transformer tap changes, network feeder changes, etc.

3.5 Fault Isolation

Protection schemes that rapidly detect and isolate faults in the power factor correction installation so as not to adversely impact on the network shall be included. Phase voltage imbalance protection across the capacitors shall also be provided on HV circuits.

3.6 Switchgear

Switchgear used for capacitor bank fault breaking/making, switching and isolation has a more onerous duty cycle than that used on general circuits, and must be suitably rated for capacitive currents, fault levels, and possible associated over voltages. All power factor correction equipment shall comply with relevant Australian Standards with an appropriate allowance for over voltages and over currents due to harmonics, resonance and power factor.

Switching and fault isolation equipment shall operate on all phases simultaneously.

The switching device shall comply with the requirements of IEC 947-5-1 and VDE 0660-200 which defines the duty of the device as suitable for “switching of capacitors”.

3.7 Isolation

Isolation of the capacitor bank via fuse links or the power factor controller that operates capacitor contactors is not acceptable.

3.8 Discharge of Capacitors

All capacitors shall be self discharging (not via fuses), and shall be provided with independent means of direct capacitor discharge and with earthing facilities. Prominent labels advising workers of the correct application method and discharge time duration to avoid electrical hazard shall be provided.

3.9 Disposal of Capacitors

Capacitor units shall not contain any material that is classified as hazardous or which will require special disposal provisions.

3.10 Avoidance of Back Generation

Power factor correction installations shall be designed to prevent motor self excitation to ensure that back generation into ActewAGL's network does not occur.

3.11 Star Point Earthing

Capacitor banks that are Wye connected shall have the star point unearthed to avoid triple harmonic current flow, and to avoid de-sensitisation of earth fault protection schemes. ActewAGL may consider alternative connection arrangements the customer may propose.

4 DOCUMENTS REQUIRED FOR PROPOSAL

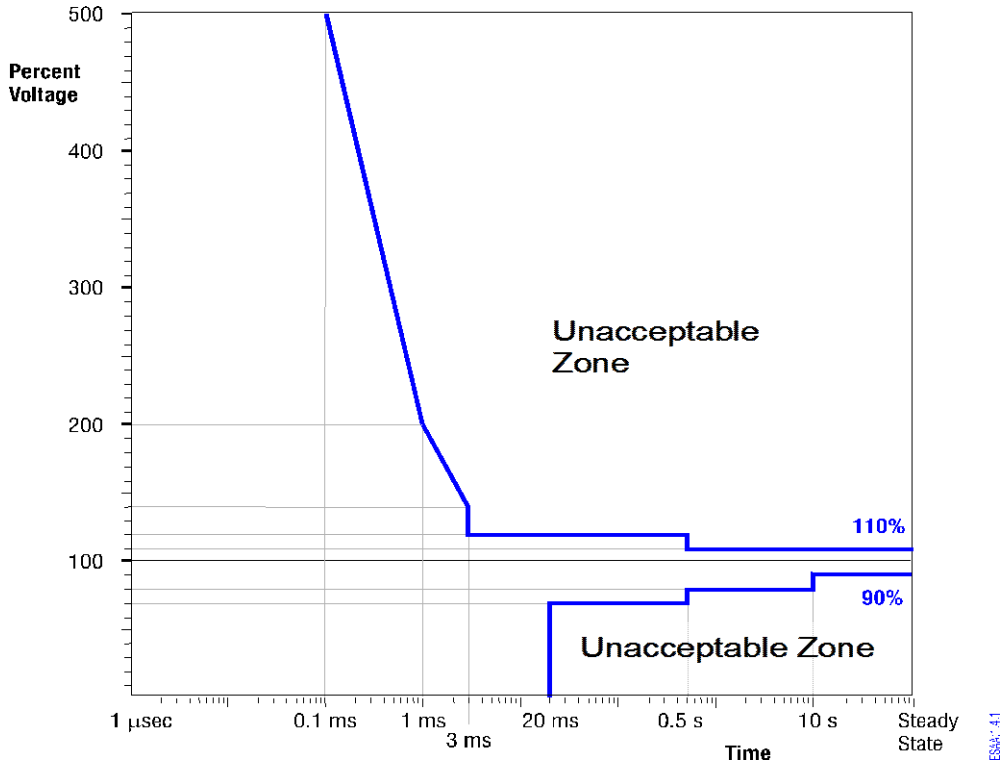
Power factor correction proposals submitted to ActewAGL shall include a Single Line Diagram, calculations and other documentation to demonstrate compliance with these requirements. The information submitted shall include:

- equipment ratings
- capacitor switching step sizes
- data for calculation of harmonic current and voltage content at the PCC
- data for calculation of the natural resonant frequency of the installation
- magnitude and duration of inrush currents and transient voltages during switching
- details of protective devices
- manufacturer's type and routine test certificates.

Acceptance by ActewAGL of an installation proposal is only in relation to connection to the ActewAGL network. Any installation approvals required by ACT Government shall be the responsibility of the person submitting the proposal.

Upon request, ActewAGL will advise network fault levels at the customer's PCC to facilitate installation calculations.

FIGURE 1
THE VOLTAGE TOLERANCE ENVELOPE



The **Voltage Tolerance Envelope** (supersedes CBEMA curve) published by Technical Committee No. 3 of the Information Technology Industry Council of America

This Appendix forms part of the Service and Installation Rules and is to be read in conjunction with those rules