

Network Connection Standards

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1 General

1.1 Introduction

MainPower owns and operates the distribution network ('the network') in North Canterbury and Kaikōura. To help our customers connect to the network, and to ensure MainPower can operate the network in a safe and compliant way, we set out these Network Connection Standards.

Everyone connecting to our network must comply with these requirements, as well as overarching legislative requirements from our government.

These standards do not cover outages, property access, costs, liability, assignment, and a range of other aspects. Please refer to our [Connection Agreement](#) on the MainPower website for these terms. You can also find further reading on our website, including [frequently asked questions](#) and our regulatory [disclosures](#).

2 Connecting to the network

2.1 Introduction

Before connecting to the electricity network, MainPower must ensure the connection will be safe and will not adversely impact supply to other customers. All new connections, both temporary and permanent, must be approved by MainPower. Refer to our website for [more information on the process for applying for a connection](#).

2.2 Network capacity

Capacity letters are issued by MainPower to the local territorial authority to confirm supply is available, prior to subdivision consents being issued. Capacity will be determined by MainPower at its sole discretion, subject to current network standards and operational limits. Capacity is provided in accordance with our Capital Contributions Methodology. [Request a 'capacity letter' by applying on our website](#).

If capacity is not available, the next step will usually be applying for a new power supply. This may be subject to engineering and design, and costs will normally be borne by the customer, subject to MainPower's Capital Contributions Methodology, which explains how much funding MainPower may be prepared to contribute towards the cost of the new power supply.

Existing connections are limited to their current fused capacity, which may be non-standard for older connections. Fuses may not be upgraded to a larger size without MainPower's written approval. MainPower keeps a record of the installed fuse size.

2.3 Connecting an existing power supply

An existing power supply is a 'point of supply' specifically designed for a customer to receive electricity from the network. Where an existing power supply is available, the customer may connect to the network by applying online. [Refer to our website for more information](#). In short, the steps are as follows:

1. The customer's electrician (or the customer) initiates a new connection application.
2. MainPower will process the application, working with the customer's chosen energy retailer, and issue a 'Connection Advice Notice' once the application is approved.
3. The connection advice is issued to the customer's electrician (or customer), enabling them to make their side of the connection ready to connect and live in accordance with this standard. The connection advice is also issued to the customer's preferred livening agent (who may also be the energy retailer's chosen metering agent). They will inspect and test the connection, install network fuses to liven the connection, install a meter if able and provide MainPower with livening information.
4. At this point the energy retailer can begin supplying the customer with electricity.

2.4 Building or modifying a power supply

If a designated point of supply does not exist, the customer may need to engage MainPower or an approved contractor to construct a new power supply. This process begins with an application online; [see MainPower's website for more information](#).

Customers usually need to meet costs associated with building new power supplies. [Please refer to our Capital Contributions Methodology in the Disclosures section of our website](#).

Note that the existence of powerlines, electrical cables, other network infrastructure, or other power supplies nearby or on the customer's property does not indicate a power supply exists for any new connection to the network.

2.5 Standard connections

Standard low voltage connections to the MainPower network are supplied at 63 amps single phase or 32 amps three phase, unless otherwise agreed in writing prior to connecting. MainPower will issue a Connection Advice Notice to the person applying for the connection, to confirm the required connection. Note that single-phase connections are normally limited to 63 amps capacity at most. Some connections have a lower capacity.

There are some non-standard connections on the MainPower network. Non-standard connections cannot upgrade to a standard connection without MainPower's written approval. Upgrades will always be subject to the available capacity in the network, in accordance with MainPower's Capital Contributions Methodology.

MainPower may specify the number of phases required per connection, and the customer must comply with these instructions. Two-phase systems require special approval. MainPower accepts no liability for customers or their contractors who fail to confirm the location and size of their connection prior to installing cabling or wiring.

2.6 Network boundaries

In general, MainPower owns all high voltage and medium voltage electrical distribution infrastructure in North Canterbury. Electrical transmission infrastructure may be owned by MainPower or Transpower (the national electricity transmission grid). High voltage networks on commercial or industrial sites are usually not part of MainPower's network unless a specific agreement exists.

Most low voltage distribution lines and cables, located in road reserve, are owned by MainPower and form part of the network. This typically includes streetlight lines and cables, but not the lights themselves. Electrical infrastructure owned by other organisations in the road reserve can only be installed with approval from the relevant territorial authority or NZ Transport Agency.

Once low voltage lines or cables cross into private property, determining ownership requires some understanding of the Electricity Act. MainPower may assume responsibility for poles supporting conductors that cross directly over formed public roads in the interest of public safety; however, MainPower does not contract with customers to assume ownership of those poles. Refer to the images in Appendix D showing network ownership limits.

Secondary networks are generally small local networks embedded within a distribution network, which do not form part of MainPower's network. Refer to Appendix C for further reading on secondary networks.

Developers of secondary networks need to ensure that any property owners connected to that network are aware of the procedure for fault calls and who is responsible for payment. MainPower will advise the local council of any privately owned networks so the information can be included on land information memoranda.

3 Network Connection Standards

3.1 Introduction

The Network Connection Standards apply to new connections to the network, and to changes to existing connections. The purpose of the standards is to:

1. ensure the network can be planned, designed, and constructed to be efficient, reliable, resilient, and safe
2. set technical conditions that govern connecting to the MainPower network
3. allow customers to make informed decisions about connecting to the network and to ensure customers can connect safely and effectively.

3.2 Supply standards

3.2.1 Network security

The network, and any secondary network connected to the network, shall be designed in accordance with the security requirements and practices of MainPower and all applicable statutes, regulations, standards and codes of practice. MainPower's security requirements and practices are available on request.

Substandard security arrangements may present a risk to the public. MainPower may refuse to live with such networks if they are deemed unsafe.

3.2.2 Voltage

The network is designed and operated to maintain the voltage within the limits prescribed by the Electricity (Safety) Regulations 2010, which are 230 volts \pm 6% for single-phase supplies or 400 volts \pm 6% for three-phase supplies when measured at the point of supply.

3.2.3 Network disturbances and harmonics

Customers must not take any action or use any equipment that adversely affects the supply of electricity to another customer. Examples of adverse effects include voltage changes, voltage fluctuations, flicker, and harmonic distortion.

Any network changes required to mitigate disturbances caused by a customer will be at that customer's cost. Examples of customer equipment that can cause disturbances include electric motors, welders, motor starters, variable speed drives, and inverters (such as those used for connecting generation equipment to the network).

Any three-phase motor greater than 4 kW or any single-phase motor greater than 1.5 kW must not have direct on-line starting unless approved by MainPower.

Customer equipment shall comply with Regulation 31 of the Electricity (Safety) Regulations 2010 and, specifically, shall not inject any harmonic distortions into MainPower's network that exceed the levels specified in NZECP 36:1993 *New Zealand Electrical Code of Practice for Harmonic Levels* (freely available from WorkSafe). [MainPower's Rural Network Harmonics Standard contains further details.](#)

Customers with two- or three-phase supplies are required to take all reasonable efforts to design and maintain their installations to balance loads over all the phases.

3.2.4 Load management signalling

MainPower operates a load management system to transfer storage heating loads (such as water heating) from peak to off-peak periods, to reduce the need for capital investment in the network. The load management system is also used for tariff signalling, street light control, and for operational management of certain network assets.

The signals operate at 283 Hz. Customers shall design and operate equipment connected to the network in a way that does not interfere with or diminish the operation of the load management system.

3.2.5 Power factor

The true power factor of a customer installation, measured at the metering point, shall not be less than 0.95 lagging. In the case of irrigation pump motors, power factor correction is typically only required where the nameplate rating of the pump motor exceeds 20 kW.

Power factor correction capacitors may interfere with load management signalling or cause harmonic resonance problems. Customers shall design and operate such equipment connected to their installations so that it does not interfere with the power quality of the network or the operation of MainPower's load management system.

3.3 Design standards

MainPower may refuse to connect or take ownership of any equipment or installations that do not comply with MainPower's Design and Construction Standards or any other technical standards that MainPower may reasonably set.

The following clauses summarise several of the Design and Construction Standards.

Copies of MainPower's Design and Construction Standards are available on request. Approved contractors also have access to these standards and technical specifications.

3.3.1 Earthing

The arrangements for connecting the network or secondary network with earth shall be designed to comply with the requirements of the regulations and applicable electrical Codes of Practice.

3.3.2 Electrical protection

Electrical protection is required to protect people and equipment on both the MainPower network and the customer's installation and/or secondary network. The customer's arrangements for electrical protection, including types of equipment and protection settings, must be compatible with the equipment, settings, and standard practices on the network, as specified by MainPower. In particular:

1. Maximum clearance times must be within the limits established by MainPower in accordance with protection settings and equipment short circuit ratings.
2. The electricity supply to a customer's installation or secondary network may be subject to multiple short interruptions caused by automated switching systems that may be in use on our network. MainPower will, on request, provide details of auto-reclosing or automatic switching systems, including protection arrangements, so the customer can take this into account during the design of their installation or secondary network.
3. For certain types of faults, protection arrangements on the network may cause disconnection of one phase only of a three-phase supply.

To ensure satisfactory operation of the network, customers' protection systems (including operating times, discrimination, and sensitivity at the point of supply) shall, before connection, be subject to approval by MainPower.

MainPower will not accept customers limiting the fault current infeed to the network by use of protection and associated equipment in circumstances where the failure of that protection or associated equipment in a fault scenario could adversely affect the network.

Discrimination between any customer's equipment and MainPower's equipment shall be maintained at all times, and evidence of satisfactory discrimination may be requested by MainPower.

Further protection requirements for electrical installations are covered by AS/NZS 3000 Electrical Installations - known as the Australian/New Zealand Wiring Rules. The current standard is AS/ NZS 3000:2007, customers should ensure that any work is undertaken in accordance with the version gazetted at the time.

3.3.3 Prospective short circuit current

Customers must ensure that their installation and circuit protection can withstand the maximum prospective short circuit currents that may be encountered. MainPower will, on request, advise a maximum prospective short circuit current for a customer's point of supply.

For residential installations supplied from the low voltage network, the prospective short circuit current at the customer's main switchboard will be less than 6 kA due to MainPower's use of fault-limiting high rupturing capacity (HRC) fuses.

For commercial or industrial customers supplied from the low voltage network, the fault level may be higher depending on the size of the transformer supplying the installation, and the applied protection.

For customers supplied from a dedicated transformer, the maximum prospective short circuit current at the low voltage terminals of the transformer may exceed 6 kA for three-phase transformers larger than 100 kVA.

For customers connecting directly to MainPower's high voltage network, maximum prospective short circuit currents are site-specific and should be requested from MainPower.

3.3.4 Interconnection

Where a customer has more than one point of supply, no interconnection between those points may be made without MainPower's prior written agreement, which may be withheld or withdrawn by MainPower at its absolute discretion.

3.4 Planning information

The following sections outline the information that MainPower may require to assess the impact that a new connection (or a change to an existing connection) may have on the network, and to undertake the administration associated with processing the request. MainPower may request additional information to satisfy these requirements, which the customer shall provide.

MainPower may refuse to connect, or may disconnect, any customer who does not comply with these requirements. MainPower will make all reasonable efforts to provide network parameters and information requested by the customer for the purpose of planning and designing the customer's installation or network.

3.4.1 Customer notification of changes

Customers must give MainPower reasonable notice of any change to their installation, fittings, protection, secondary network, or operating regime that might impact the customer's compliance with any part of this standard, or with any other agreement that may be in place between the customer and MainPower.

MainPower must be provided with sufficient lead time to assess and, if necessary, accommodate these changes and to implement any modifications to the network.

3.4.2 Reactive compensation plant

Customers shall provide MainPower with information on any reactive compensation plant connected to the network, including the MVAr capacitive or inductive rating of the equipment, and operating range if variable, as well as details of any automatic control logic.

3.4.3 Demand transfer capability

Customers shall provide MainPower with details of demand transfer capability where the same demand may be supplied from alternative customer points of supply. This shall include the proportion of demand normally fed from each point of supply and the arrangements for transfer under outage conditions.

3.4.4 Load characteristics

Low voltage supply

For supplies at low voltage, it is usually possible to assess whether a proposed connection to the network is acceptable, and to determine the necessary supply arrangements, from analysis of the following limited data:

1. maximum power requirements (kVA)
2. type and electrical loading of equipment to be connected (e.g. number and size of motors, including maximum starting currents, frequency of starts and electrical heating arrangements)
3. the date when the connection is required.

This information should be provided to MainPower when a connection is requested. Should a preliminary examination of this data indicate that more detailed information is required, this shall be provided to MainPower upon request.

Where a connection is required that is greater than the standard connection, the customer is required to apply to MainPower in writing for increased capacity.

High voltage supply

For supplies at high voltage, it is necessary for the following additional information to be provided.

1. All types of demand:
 - i. maximum active power requirement
 - ii. maximum and minimum reactive power requirements
 - iii. type of load and control arrangements (e.g. controlled rectifier or larger motor drives with maximum starting currents)
 - iv. maximum load on each phase at the time of maximum demand
 - v. maximum levels of harmonic voltage and current to be imposed on the network.
2. Fluctuating loads:

Details of the cyclic variation, and where applicable, the duty cycle of active power (and reactive power, if appropriate); in particular:

 - i. the rates of change of active power and reactive power, both increasing and decreasing
 - ii. the shortest repetitive time interval between fluctuations in active power and reactive power
 - iii. the magnitude of the largest step changes in active power and reactive power, both increasing and decreasing.

In some cases, more detailed information such as an indication of the pattern of build-up of load and a proposed commissioning programme may be required.

3.4.5 Connection arrangements

MainPower and the customer will agree the voltage at the point of supply once the customer has submitted a connection application. MainPower may specify the connection voltage in order to avoid potential disturbance caused by the customer's apparatus to other customers, or for other technical reasons. We may also agree alternative methods for minimising the effects of disturbing loads.

1. **Subdivisions**

Special provisions apply to subdivisions to ensure provision is made for future development in accordance with the relevant territorial authority's district plan. These provisions will ensure cabling is adequately rated to supply ongoing development. Further details are included in Appendix B.
2. **Supply at high voltage**

In certain circumstances supply will be provided at high voltage. In such cases MainPower will supply high voltage cables and switchgear, and may supply high voltage metering equipment, up to the customer point of supply. The customer will be responsible, unless MainPower agrees otherwise, for all fittings beyond the customer point of supply. Customers proposing a connection at high voltage should contact MainPower at an early stage. Additional requirements for such connections can be found in Appendix C.

3.4.6 Demand management

Where MainPower or the customer needs coordinated demand management, the means of implementing this shall be agreed between the two parties.

Arrangements for emergency demand management may also form part of the overall demand management agreement. Information on the available emergency load shedding on the secondary network shall be made available to MainPower on request.

3.5 Distributed generation standards

Applications to connect generators either directly (such as wind turbines or utility scale solar) or through a customer's installation (such as rooftop solar) **must be made through MainPower's website**.

Generation that could export energy to the network cannot be connected without first applying to MainPower through our website. These generators include but are not limited to wind turbines, solar panels, batteries, and diesel generators. In addition to the connection application, the customer must notify their electricity retailer to arrange for appropriate revenue metering to be installed. The customer may also want to make arrangements with the electricity retailer to purchase any exported energy.

Certification of the installation must occur within 10 days of commissioning. This demonstrates the generation is safe to operate. MainPower reserves the right to isolate any point of supply containing generation that does not provide this documentation on time.

Large generators above 1 MW may be subject to the [Electricity Industry Participation Code \(EIPC\)](#). In this case the system operator (Transpower) must be included in the process and will have their own set of requirements that must be followed. MainPower may be able to facilitate discussions with Transpower depending on the connection configuration. This will be assessed on a case-by-case basis. The generation owner is responsible for providing any information requested as part of this process.

For distributed generation connections at standard low voltage, the generation must be unable to create an electrical 'island' beyond the point of connection, unless an interlocked changeover switchgear is installed. The generation must be unable to back feed or inject into the network without mains supply being live.

MainPower's generation connection processes align with Part 6 of the EIPC. For more information on this process, and each parties' obligations, please refer to MainPower's [Distributed generation application summary and our guide to connecting distributed generation to the MainPower network information](#) documents available on our website, or Part 6 of the EIPC.

Generation that is unable to connect to the MainPower network (such as a local diesel backup generator or portable battery bank) does not require connection approval from MainPower.

4 Operational requirements

Most customers have few ongoing obligations once they have connected to the network, according to this standard. Some customers have extra responsibilities post-connection to actively ensure their operations are coordinated with MainPower. This section covers those operational requirements.

4.1 Demand forecasts

4.1.1 Introduction

MainPower needs to forecast network load accurately to enable it to efficiently plan network reinforcement.

4.1.2 Scope of forecasts

This section applies to the following customers:

1. embedded generators that are not subject to central dispatch and with generating plant over 300 kW
2. customers with demand over 300 kVA.

4.1.3 Information required

All or some of the following information must be provided upon request by MainPower:

1. winter maximum demand
2. summer maximum demand
3. power factor at maximum demand
4. total annual energy
5. other information as reasonably requested by MainPower from time to time.

All information needs to be in writing in a format agreed with MainPower and needs to be provided within 10 working days of receiving the request.

4.2 Outage planning

To plan and coordinate our activities, MainPower requests customers affected by Section 4.1 to provide us with information about their planned outages. This allows us to coordinate our maintenance and avoid repeat outages affecting customers.

Customers with their own generation may choose to advise MainPower when their generator will be offline, to reduce the chances of a planned network outage overlapping with their generation outage.

4.2.1 Outage planning procedures

MainPower needs at least 20 working days' notice of upcoming outages for our outage planning process to consider combining work with the same outage. This must be provided to MainPower in writing.

4.2.2 Testing and monitoring

MainPower monitors the network continuously to ensure we are providing the correct quality of supply. Normally this relates to voltage, reactive power, or harmonic content. Customers with certain apparatus can have an impact of the quality of supply, particularly power electronics or large machinery. From time to time, MainPower performs tests to find quality of supply issues to improve quality on the network.

Where a customer is found operating outside the technical parameters specified in any part of these Network Connection Standards, or of any other statutory regulation or electrical code of practice, MainPower will let the customer know.

Customers found operating outside the limits must immediately, or within an agreed timeframe with MainPower, remedy the situation. This may include disconnecting the fittings causing the problem. If the customer is unable to remedy the situation, the customer may be disconnected from the network.

4.2.3 Load control and emergency load shedding

In times of peak load or under emergency conditions, MainPower may be required to reduce load to protect the security of the greater power system. Customers need to be aware of these activities and are encouraged to assist MainPower when circumstances arise. This may include:

1. load control using hot water cylinders or irrigation load controllers
2. demand management (asking customers to reduce their power consumption)
3. disconnecting load (turning off customers)
4. automatic under-frequency load shedding (automatically turning off customers when the grid's electrical frequency drops below a set threshold)
5. requesting increased generation.

5 Safety

5.1 Coordination across ownership boundaries

From time to time, customers (or their contractors) may need to work around or upon electrical fittings or the network. MainPower and the customer must always ensure work can proceed safely on either side of the ownership boundary.

A system of documentation, which may be electronic, shall be maintained by MainPower and the customer to record the agreed safety measures put in place when:

1. work (or testing) will be carried out on high voltage plant and/or apparatus across the operational boundary
2. electrical supply to the customer must be isolated by either party for safety reasons.

For high voltage apparatus, this must include an 'Assurance' or 'Transfer of Operational Control' between MainPower and the customer (or their contractor).

5.2 Vegetation

Trees that could fall upon powerlines are the responsibility of the landowner who owns the tree. MainPower may hold landowners liable for any network damage caused by trees and vegetation on their property.

If MainPower has reason to believe that vegetation on private property presents a hazard to our network, we may issue a notice notifying the landowner about the vegetation hazard.

Landowners must ensure that trees and vegetation on their premises are trimmed in accordance with the Electricity (Hazards from Trees) Regulations 2003 to prevent interference with their electricity connection, or other electricity network infrastructure on their property.

Under the regulations, MainPower is entitled to issue a notice requiring the landowner to cut or trim vegetation if the vegetation is approaching the approach distances defined in the regulations. If the work is not completed within the specified time on the notice, MainPower may independently initiate and undertake the required work at the landowner's cost as allowed for by the Electricity (Hazards from Trees) Regulations 2003. MainPower may recover these costs from the tree owner.

For information about trees near power lines and your responsibilities, [please see the MainPower website](#).

5.3 Protecting the network on your property

The network can exist upon or near private property provided it has a legal right to be there, such as an easement, historical right, agreement, or other legal protection. Landowners are not responsible for maintaining the network on their property, but landowners are obliged to take reasonable steps to prevent activities on their property from causing damage to the network.

Landowners may undertake a wide range of different activities on their property. Those activities may pose a range of different risks to the network on or near the property. The best steps to protect the network are therefore related to the activities taking place on the land.

This may include, but is not limited to:

1. ensuring assets have suitable exclusion zones surrounding them
2. providing suitable physical protection (e.g. traffic barriers or stock fences if necessary)
3. keeping vegetation clear.

Always consult with MainPower before building or planting near the network. Accessways and easement frontages must remain clear so MainPower can access the network quickly in an emergency. Never attach any structure, fence, or other object to network equipment, including power poles.

Landowners need to be aware of the Electrical Code of Practice 34 (ECP34), [which is available online](#), before working near the network.

6 Customer categories

6.1 Introduction

This section details the availability and the criteria, including the customer category in respect of the provision of line function services, to be adopted by MainPower when approving a customer category relating to a new connection to the network, or where the customer has requested that MainPower consider approving a change in category.

The electricity retailer, as agent for the customer, must provide any information requested by MainPower to assist in the determination of the appropriate customer category and to allow MainPower to maintain an adequate customer database for communication, charging, reporting and statistical purposes. Failure to supply this information on request may result in MainPower refusing to connect the customer to the network or the disconnection of the customer from the network. Where a customer has any installation supplied by more than one retailer, then the customer must provide separate disconnection points for each retailer.

If premises are occupied by someone who is not the network customer and MainPower becomes aware that the occupant has not met the obligations under MainPower's Connection Agreement or the agreement that the occupant has entered into with the network customer for the supply of electricity to those premises, then MainPower may, at its absolute discretion, disconnect the network customer from MainPower's network. MainPower will advise the network customer and the occupant.

6.2 Fixed charges

The fixed charge component of a contract for the supply of line function services is for a minimum 12-month period in all cases.

Fixed charges apply to all customer categories.

Where a property has multiple metering points, each one will attract lines charges that best align with the predominant use of the connected installation.

Water pumps sized greater than 5 kW motor rating will be classified as either irrigation or non-residential depending on the predominant use.

MainPower reserves the right to decide the customer category for every installation and to reassess any concessions made on these properties.

6.3 Residential

Installations are categorised as 'residential' when they are a primary residence and take supply at up to 63 amps on single phase or 32 amps on two or three phases, or other current ratings that MainPower may approve. All installations that require greater supply ratings and that are requested to be residential in nature will be assessed by MainPower on a case-by-case basis. The following options are available under the 'residential' customer category.

6.3.1 Controlled

1. Installation must have an electric controlled storage type hot water system with a minimum capacity of 180 litres (40 gallons).
2. Under-sink type cylinders of 40 litres or less are approved for connection to the uncontrolled supply subject to the requirements of (a) above being met.

3. Quick recovery electric systems utilising a separate top element may have that element connected to the uncontrolled supply, subject to the conditions in clause (1) being met. The size of the top element must be 2 kW or less and be controlled by the customer in such a manner as to prevent continuous operation (fitting of a time limit switch with 1 hour maximum on time, or a single shot recharge switch is required).
4. Spa pools may be connected to the 'uncontrolled' customer category provided that the conditions of clause (a) are met.
5. For controlled loads with a demand greater than 30 amps, the customer shall supply a suitable contactor device for switching the load.
6. Existing installations charged in accordance with previous controlled customer categories, where the requirements of cylinder capacity are not met, may continue to qualify for this customer category.
7. Fixed wired electric vehicle chargers with a capacity of 2 kW or greater must have a load control device fitted to enable interruption in the event of an emergency.

6.3.2 Night special

Only approved fixed wired storage water heating or storage space heating load can be connected to the 'night special' customer category.

1. Elements or appliances connected to this customer category will not be made switchable to any other customer category.
2. Supply of 'night special' is limited to a maximum of 8 hours availability between the hours of 9:30 pm and 7:30 am.
3. For controlled loads with a demand greater than 30 amps, the customer shall supply a suitable contactor device for switching the load.
4. Other storage systems will be subject to approval.
5. Quick recovery systems utilising a separate top element may have that element connected to the uncontrolled supply.
6. This customer category is not a standalone customer category. It is available in conjunction with 'residential controlled' or 'uncontrolled'.

6.3.3 Uncontrolled

All installations that do not have electric storage water heating under MainPower's direct control will qualify for this customer category. This customer category has no controlled load. Potable water pumps supplying residential connections can, at MainPower's discretion, be classified as 'residential uncontrolled' if they are under 3.5 kW.

6.4 Other supply

This customer category applies to all installations other than 'residential'.

6.4.1 Non-residential

This applies to non-residential installations not covered by other customer categories. All storage water heating shall be controlled. MainPower reserves the right to charge a higher fixed charge where the customer requests an uncontrolled supply in this instance.

6.4.2 Night special

Availability of 'night special' to installations where the predominant use is non-residential is limited to special circumstances and is subject to negotiation between MainPower and the customer.

6.4.3 Irrigation

This is applicable to installations where the predominant use is irrigation. All irrigation installations will attract a motor capacity charge, based on the installed capacity of any motor(s) in that installation that may run at the same time. No other fixed charges apply.

1. Where a domestic water pump is installed in the same installation, it will qualify for inclusion in the 'irrigation' customer category provided that the motor capacity is 5 kW or less and the motor capacity is included in the irrigation motor capacity charge.
2. Motor capacity charges are based on annual charges and cannot be avoided by disconnection and reconnection within any 12-month period, except where disconnection of the supply and removal of the service line and or transformer occurs.
3. A standard 3-pin outlet and lighting circuit are permissible within the installation on this customer category.
4. All irrigation connections must have a load control device fitted to enable interruption in the event of emergency.

6.4.4 Pumping

Water pumping schemes with reservoir systems will be controlled. MainPower reserves the right to charge a higher fixed charge where the customer requests an uncontrolled supply in this instance.

6.4.5 Large customer

Customers consuming over 500,000 kWh of energy per annum are classified as Large Users, their pricing takes into account the customers' load characteristics and other relevant information.

MainPower reserves the right at any time to review volume discounts where large movements occur in the customer's energy consumption.

6.4.6 Streetlighting

The 'streetlighting' category is applicable to installations, either customer-owned or owned by the territorial authority, where the use of the installation is primarily for lighting.

1. Meters will not normally be required for this customer category. Specific approval for streetlighting load to be unmetered is not required. The normal process for recording streetlighting load must be followed (managed by the relevant territorial authority).
2. Charges will be determined by type of lamp and billed monthly.
3. Maintenance agreements are not part of this standard.

6.4.7 Temporary supply

The 'temporary supply' customer category is only available with installations where power is required for a temporary nature for construction or other short-term purpose. This is applicable to installations where the predominant use is for builders' temporary supply and temporary lighting.

1. The charges for a temporary supply are based on the activity being a commercial undertaking.
2. Temporary supply customers are not deemed to be 'qualifying customers' in the matter of issue of rebate shares.
3. Electricity must not be used for any purpose other than that directly related to the building and lighting activity.

6.5 Optional additions

Optional pricing additions are provided for under veranda lighting, right of way lighting, distributed generation, and electric vehicle charging. The additions may be used in conjunction with any other pricing category (either residential or non-residential). [Please see the MainPower Pricing Disclosures for more information.](#)

7 Metering

7.1 Introduction

The EIPC details the requirements for all metering equipment installed for the purpose of measuring and recording of line function services and recording the consumption of electricity conveyed to customers connected to MainPower's network. Refer to Part 10 of the EIPC.

7.2 Investigations

If any party to the electricity supply arrangements relating to a metering installation suggests that the meter readings may be inaccurate, the meter owner shall make available the most recent calibration results for the metering equipment and shall discuss the situation with the party.

After such discussion and consideration of the costs involved, any party may request that further testing be carried out. The meter owner may carry out such on-site tests as may be appropriate to determine whether the meter would be likely to be found defective in a formal laboratory test.

Results and conclusions from these tests shall be discussed with the complainant.

If there is still disagreement, the meter owner shall carry out such tests as are appropriate, using their professional judgement, to attempt to ascertain the cause of any problem.

At any stage during the above process, any party may request that the meter is removed and subjected to formal laboratory tests.

7.3 Security

All metering assets shall be completely and securely sealed by the meter owner to prevent unauthorised alterations that may affect the metering equipment integrity or performance.

7.4 Responsibility for metering equipment and enclosure

The customer's electricity retailer will be responsible for all meters and low voltage current transformers. The customer must provide a suitable weatherproof enclosure capable of housing all metering equipment required for any installation connected to the network. Metering enclosures should be a minimum of 120mm deep, to enable metering equipment, including load control devices, to be installed.

All connections to the MainPower network must be metered, unless expressly approved by MainPower in writing, or covered explicitly by this standard (e.g. streetlighting), or the Electricity Authority Guidelines for Unmetered Load.

MainPower does not install check meters.

7.5 Ripple relay

MainPower's load management system works by signalling ripple relays at customer installations. All ripple relays shall be configured to MainPower's written specifications. These can be provided to MainPower's service providers, metering equipment providers (MEPs), and electricity retailers on request.

MainPower owns some standalone ripple relays on meter boards, excluding ripple relays integrated into other devices. MainPower's objective is to reduce mixed ownership of devices on the metering board. For this reason, MainPower-owned external ripple relays must be displaced by newer devices wherever possible.

When new metering is installed, MainPower no longer supplies standalone ripple relays. We require our standalone ripple relays to be displaced by a new meter with an integrated ripple relay or, where that is not possible, a new external relay should be fitted and owned by the MEP.

For new installation control point (ICP) connections, MainPower requires ripple relay functionality to be installed wherever possible. MainPower will issue written instructions to this effect, contained within each new connection instruction. Where such written instructions are issued, relay functionality must be installed in accordance with those instructions. Please revert to MainPower if this instruction cannot be followed for any reason.

Ripple relays shall not be removed without advising MainPower in writing. New ripple relays (of any kind) must not be introduced to an uncontrolled customer installation unless instructed by MainPower in writing, except when displacing an

existing ripple relay. If a legacy MainPower owned ripple relay is displaced MainPower must be notified of the ICP and ripple relay serial number.

Appendix A: Definitions and interpretations

Active power	means the product of voltage and current and the cosine of the phase angle between them (measured in kilowatts (kW) or mega-watts (MW)).
Apparatus	means all machines, fittings, and appliances in which conductors are used or supported, or of which they form a part.
Central dispatch	means the dispatch of generating units by Transpower.
Connection Agreement	means any contractual agreement or arrangement between MainPower and a customer that provides the customer with the right to connect to and/or use the network in accordance with the purpose and terms specified in the agreement.
Controlled	means the ability for MainPower to interrupt the supply of electricity for the purposes of network load management in accordance with any load management agreement.
Customer	means any person who is party to a Connection Agreement with MainPower, the terms of which require MainPower to provide line function services. Such a person owns or has the use of fittings connected to the network or, where the context of this agreement otherwise requires, proposes to own, or wishes to have the use of, fittings connected to the network.
Customer's installation	means any fittings of a customer used for the purpose of conveying electricity from the point of supply to where the electricity may be consumed, including any fittings owned or used by a customer jointly with any other person, but does not include fittings forming part of MainPower's network.
Demand	means the electricity demand expressed in kVA/MVA, kW/MW or kVAr/MVAr of apparent power, active power, and reactive power, respectively.
Distributed generation	means any equipment used to generate electricity that is connected to the distribution network. This includes dedicated generation installations and generators connected through existing installations, such as homes or businesses.
EIPC	means Electricity Industry Participation Code 2010 and its amendments.
Electricity retailer	means any person who is party to a 'Conveyance Use of System Agreement' with MainPower, for the purpose of using the network to convey electricity to customers.
Electrical code of practice	means an electrical code of practice issued pursuant to the Act.
Fittings	means equipment used, or designed or intended for use, in connection with the generation, conversion, transformation, conveyance, or use of electricity.
Generator	means a person who generates electricity.
Line function services	means the provision and maintenance of fittings for the conveyance of electricity and the operation of such fittings, including the control of voltage and load control.
Low voltage	means low voltage as defined by the Electricity (Safety) Regulations 2010.

MainPower’s Design and Construction Standards	means the Design and Construction Standards published by MainPower from time to time, a current copy of which may be obtained from MainPower’s Rangiora office during office hours.
Metering equipment	<p>means metering equipment and other apparatus for the purpose of measuring and recording the quantity of the supply of electricity conveyed through the network to a customer’s point of supply for consumption by the customer, including but not limited to:</p> <ol style="list-style-type: none"> 1. active and reactive energy meters with pulsing output 2. current transformers 3. voltage transformers 4. interval data recorders 5. relays 6. associated equipment (including wire and enclosure) 7. modems.
Point of supply	has the meaning defined in the Electricity Act 1992 (Part 1, section 2, subsection 3).
Protection	means the arrangements designed to detect abnormal conditions in the network and initiating fault clearance, or actuating signals or indications.
Secondary network	has the meaning defined in Appendix C.
Uncontrolled	means that the supply of electricity is not interrupted for the purposes of network load management in accordance with any load management agreement.

Appendix B: Technical requirements for reticulation of new subdivisions

B.1 General

MainPower requires that subdivision electrical reticulation that will become part of the network be constructed in accordance with the Network Connection Standards and MainPower's Design and Construction Standards.

B.2 Planning period

Reticulation for subdivisions shall be designed to supply all customers likely to be connected to the network within a 10-year period of the commencement of the development.

B.2.1 Further development

Where it is likely that further developments will occur within the 10-year planning period, which are likely to be supplied using the network installed for the original development, then the original development shall be designed to allow for those future developments inside the 10-year period.

B.2.2 Territorial authority endorsement

Design assumptions relating to further developments shall be discussed with the appropriate territorial authority and shall be endorsed by an officer of that territorial authority before being submitted to MainPower for approval.

B.3 Preferred design

All work involving extensions to the network must comply with MainPower's Design and Construction Standards.

B.3.1 Design approval

Designs for extensions that will form part of the network must be approved by MainPower prior to construction.

Appendix C: Secondary networks and high voltage customers

C.1 Background on secondary networks

Secondary networks are electricity networks that are indirectly connected to New Zealand’s national electricity transmission grid or Electricity Distribution Business (EDB) network. They are either embedded or connected to a local distribution network. Secondary networks may be supplied at high voltage or low voltage.

There are generally considered to be three types of secondary network:

1. **Customer networks** provide both retail and network services (examples include some office buildings, residential apartment complexes, campgrounds, marinas, hotels, and motels).
2. **Embedded networks** provide network services (examples include some shopping malls, retirement villages, residential apartment complexes and office buildings).
3. **Network extensions** provide (own) the network infrastructure (examples include some office buildings, residential apartment complexes and some subdivisions).

Each type of secondary network results in a different responsibility for supplying electricity retail and distribution services to consumers, and for undertaking electricity market functions (e.g. metering, reconciliation, and consumer switching).

Table C.1 summarises this.

Table C.1: The supply of electricity services to end-consumers under secondary network types

	Customer network	Embedded network	Network extension
Retail service provided by:	Customer network	Traders with use-of-system agreement (UoSA) with embedded network	Traders with UoSA with local distributor
Distribution service provided by:	Customer network	Embedded network	Local distributor
Market functions undertaken by:	Not applicable	Embedded network and traders	Local distributor and traders

Note: The customer network owner and embedded network owner can contract with another party to provide retail and network services or perform market functions.

Source: Electricity Authority

The owner of a secondary network is responsible for the maintenance and safe operation of the secondary network, along with compliance with the Electricity Act 1992, Electricity (Safety) Regulations 2010, and where applicable, the Electricity Industry Participation Code.

For a new secondary network connection, the owner will be required, as a condition of connection, to provide details of how they intend to manage their compliance obligations.

The Electricity Authority’s *Guidelines for Metering, Reconciliation and Registry Arrangements for Secondary Networks* (available on the Electricity Authority’s website: www.ea.govt.nz) explain the various characteristics of secondary networks, along with the obligations imposed on secondary network owners.

C.2 High voltage secondary networks

Typical configurations for high voltage secondary network connections are indicated in Figures C.1 to C.4.

Supply will be via an incoming isolation device such as a circuit breaker, isolator, or fuse-switch supplied and maintained by MainPower, but the customer shall provide suitable accommodation for this equipment if required by MainPower.

Where required by MainPower, provisions shall be allowed for control of the customer's circuit breakers from MainPower's equipment. This may be from protection and/or remote-control signals as determined by MainPower to maintain network integrity.

High voltage metering units incorporating instrument transformers will generally be required for all high voltage secondary network connections. In all cases, MainPower shall approve instrument transformer units required for metering of the customer's high voltage supplies. The metering unit shall be installed no further than 5 metres from the point of supply. All costs associated with metering the connection will be the responsibility of the high voltage secondary network owner.

When supply is required from paralleled high voltage feeders to meet loading or security requirements, special protection facilities will be required.

Owners of works (who may be a high voltage customer) with a distribution capacity of 10 MVA or greater must implement a safety management system, in compliance with Regulations 47 to 56 of the Electricity (Safety) Regulations 2010, and have the safety management system audited.

Owners of works (who may be high voltage customers) with an installed distribution capacity of less than 10 MVA must ensure they have inspection, maintenance and record-keeping practices in place that comply with Regulations 40 to 46 of the Electricity Safety Regulations 2010; however, they may voluntarily implement an audited safety management system as an alternative.

Customers wishing to connect to the MainPower network and take supply at high voltage will be required to furnish:

1. a copy of the certified design for the high voltage installation
2. a copy of the Certificate of Compliance covering the high voltage installation
3. a copy of the record of testing in accordance with Regulations 38 and 64 of the Electricity (Safety) Regulations 2010
4. a copy of the Record of Inspection in accordance with Regulation 72 of the Electricity (Safety) Regulations 2010
5. evidence that the owner of the high voltage installation has either an audited safety management system in accordance with Regulations 47 to 56 of the Electricity (Safety) Regulations 2010 or has a management system in place that satisfies the requirements of Regulations 40 to 46 of the Electricity (Safety) Regulations 2010.

High voltage secondary network connections may be metered at low voltage where the following conditions are met:

1. The high voltage secondary network is a customer network as defined by the Electricity Authority's *Guidelines for Metering, Reconciliation and Registry Arrangements for Secondary Networks*.
2. No more than one transformer is connected to the customer network.
3. The low voltage metering point is immediately adjacent to the transformer and has a meter that measures in half-hourly intervals.

In the above situation, MainPower may at our sole discretion require ownership of the low voltage fusing, and the connection capacity would then be based on the low voltage fuse size (or transformer capacity, whichever is lower).

Where any of the above conditions can no longer be met, for a low voltage metered high voltage secondary network connection, the secondary network owner will be required, at their cost, to establish high voltage metering as close as practicable to the Point of Supply.

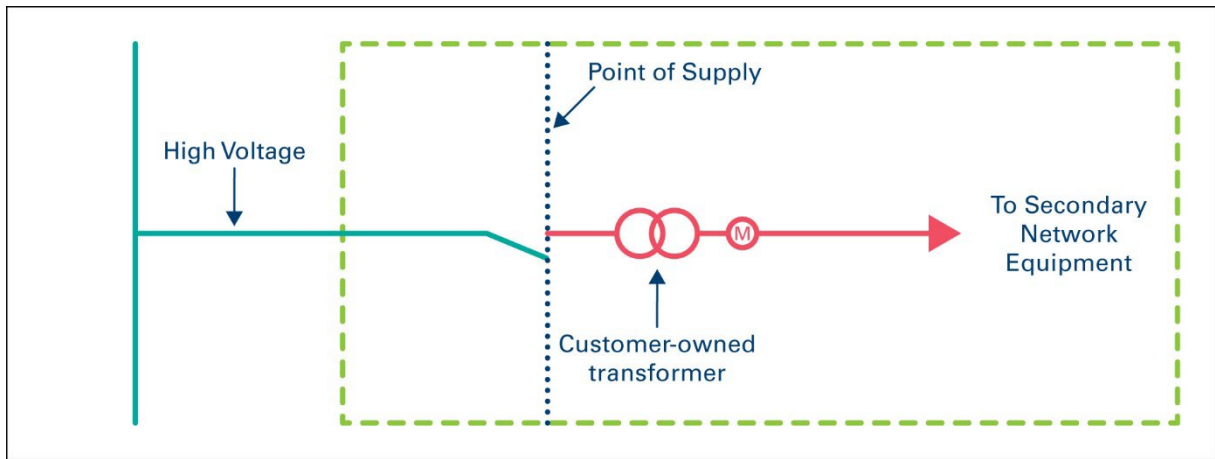
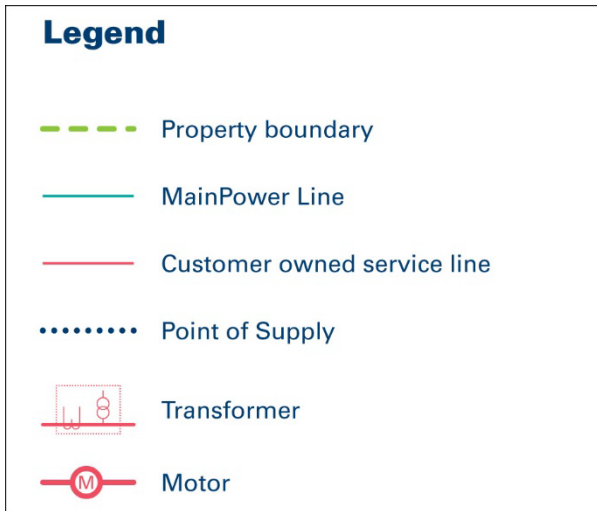


Figure C.1: High voltage secondary network tee connection – low voltage metering.

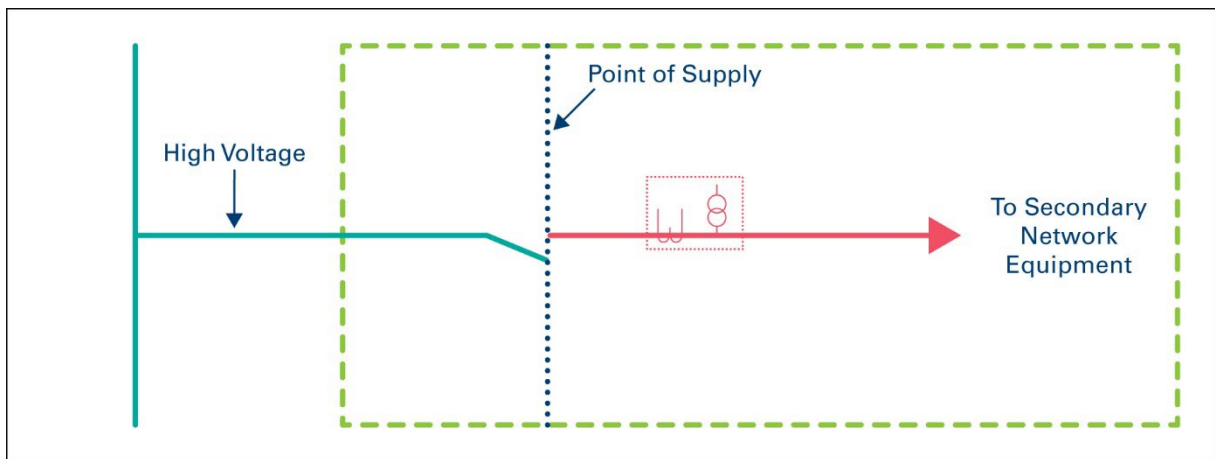


Figure C.2: High voltage secondary network tee connection – high voltage metering.

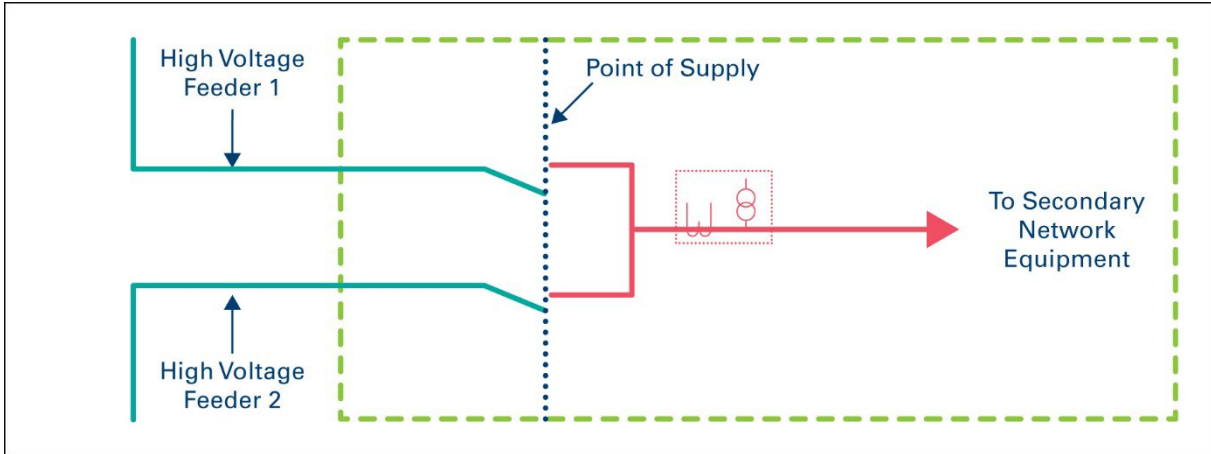


Figure C.3: High voltage secondary network feed-through connection – high voltage metering.

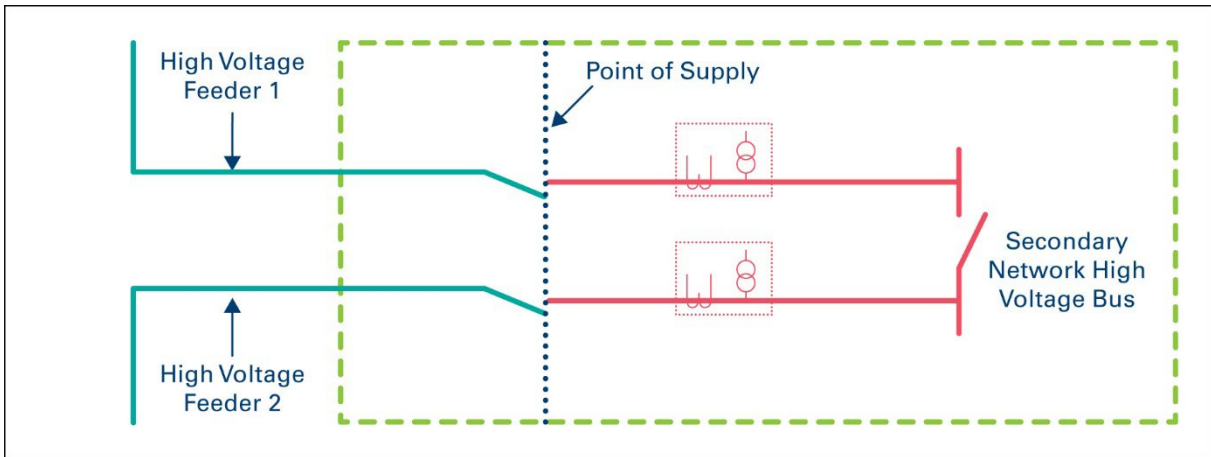
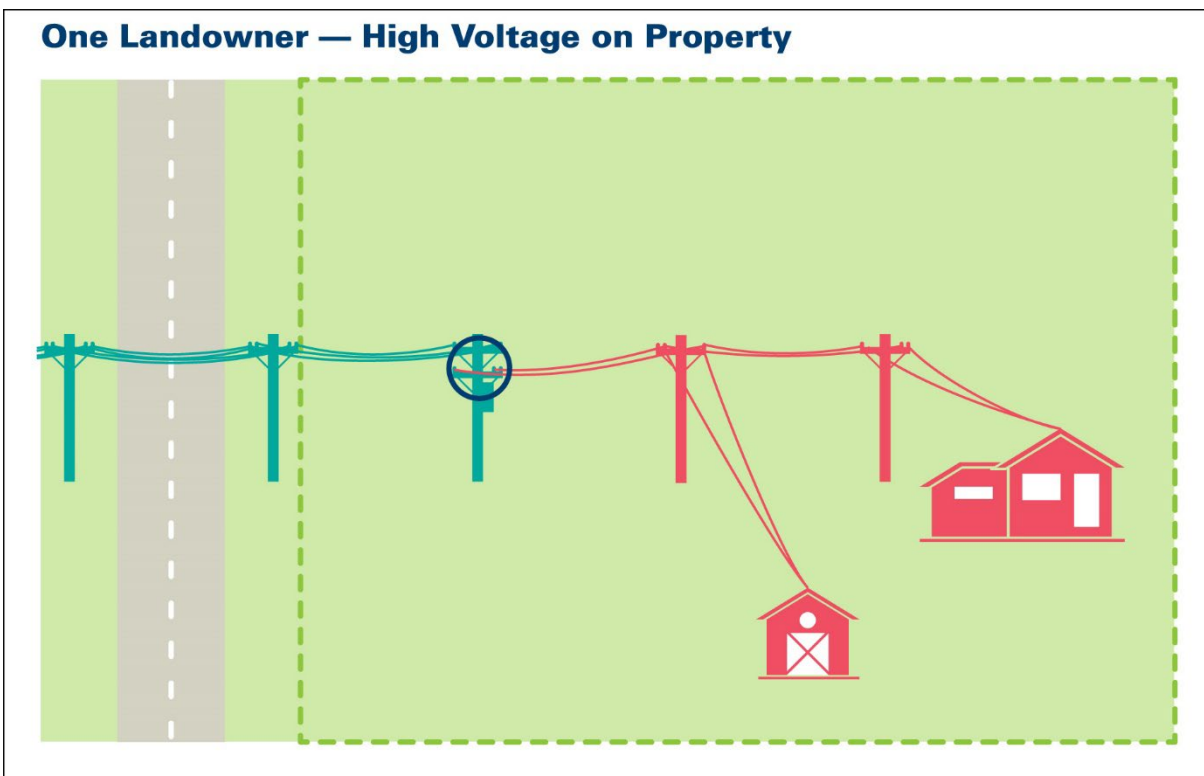
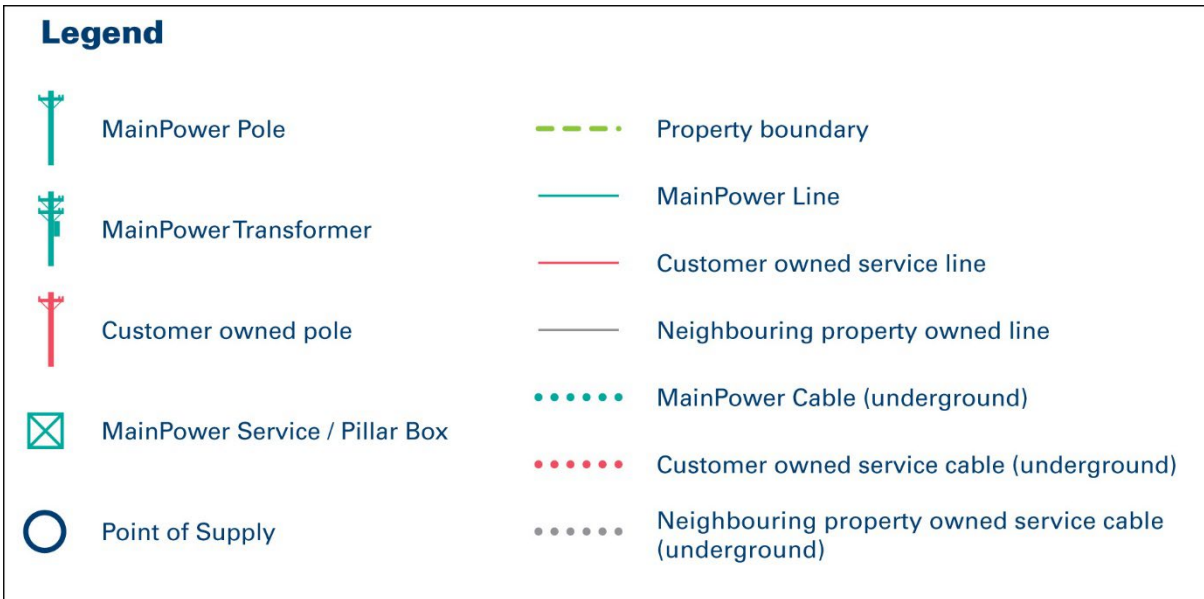
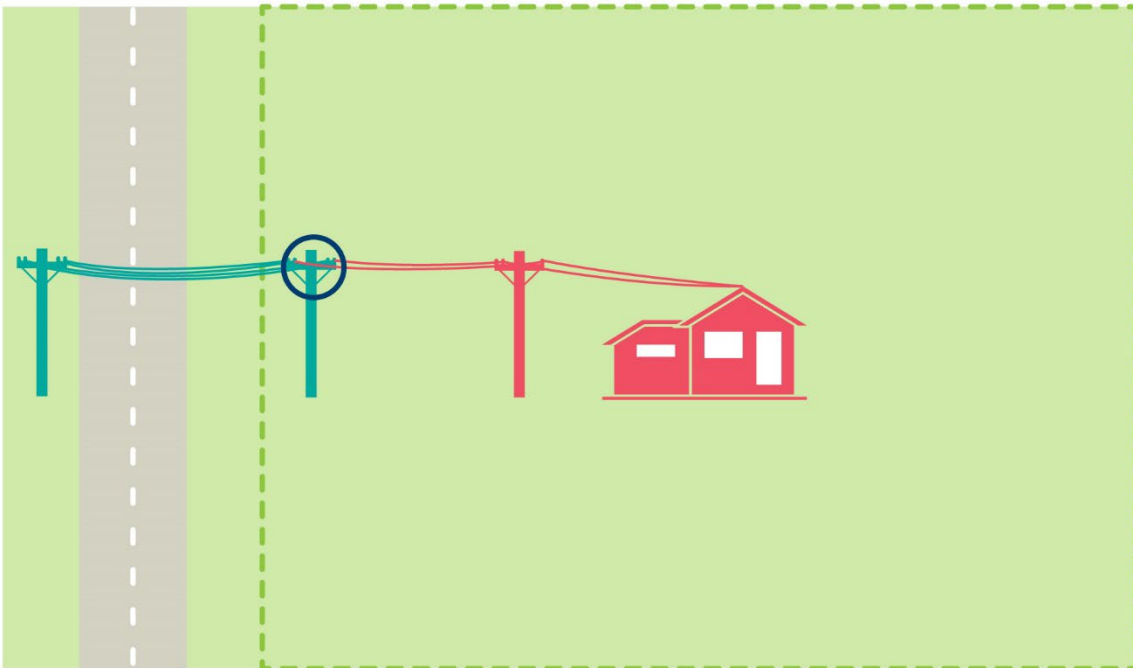
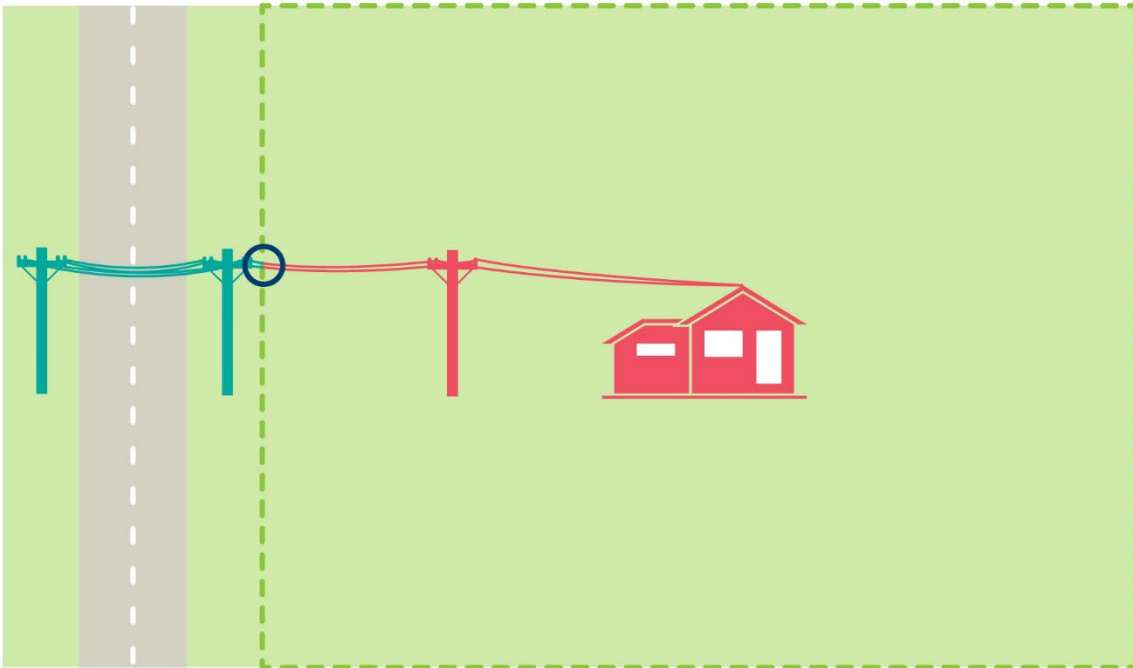


Figure C.4: High voltage secondary network dual-feed connection – high voltage metering.

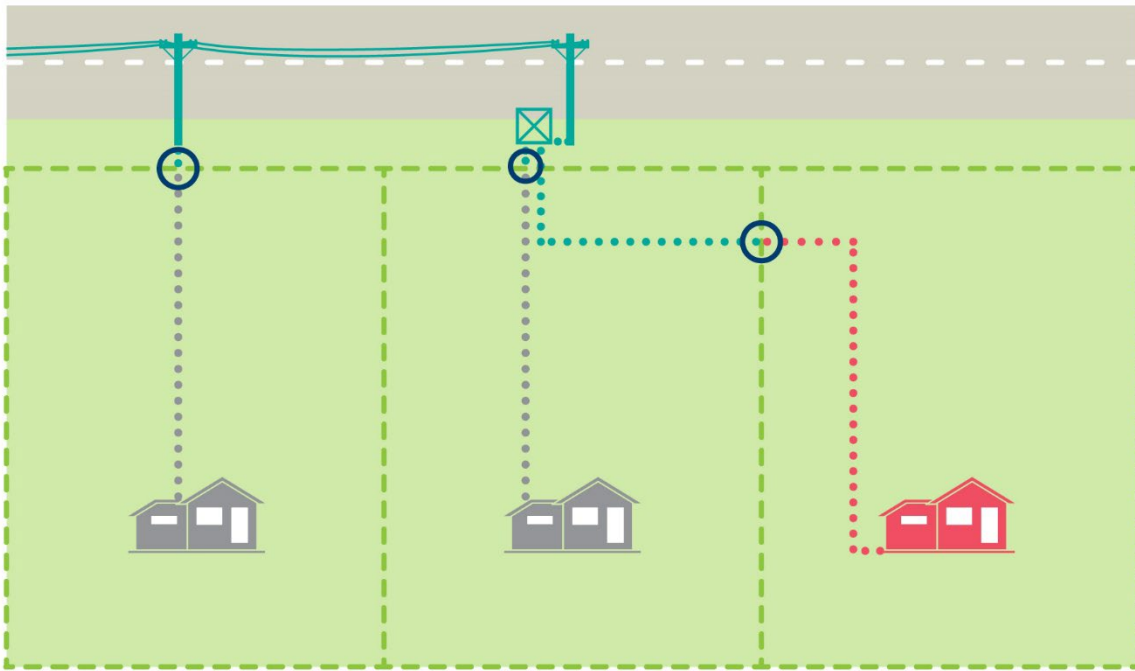
Appendix D: Network ownership limits



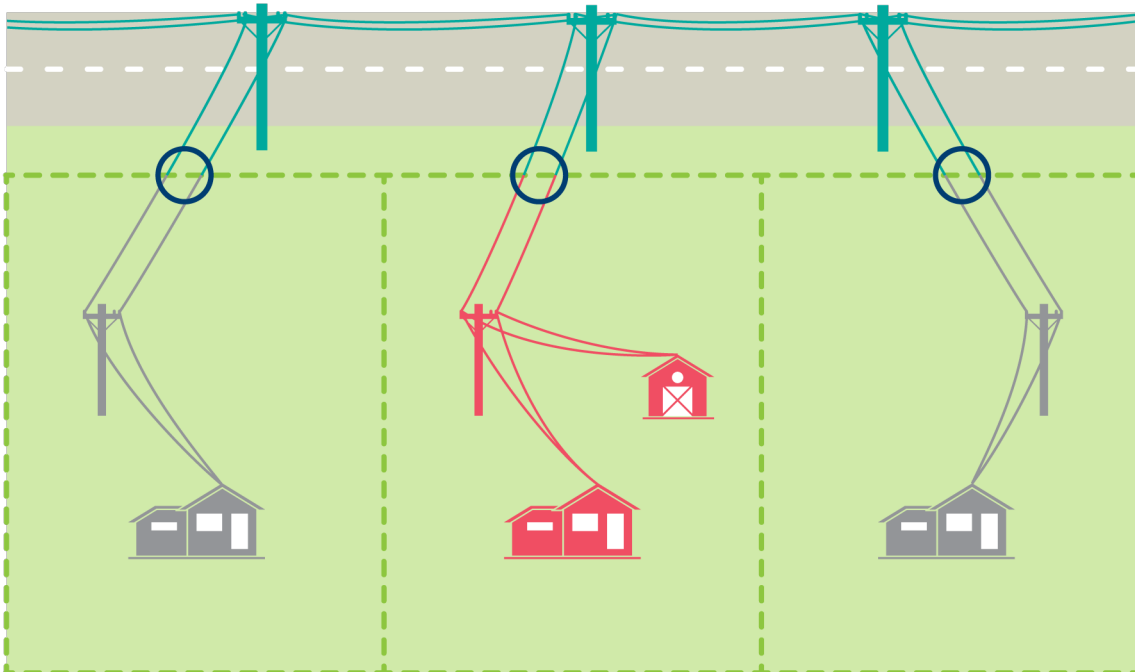
Road Crossings



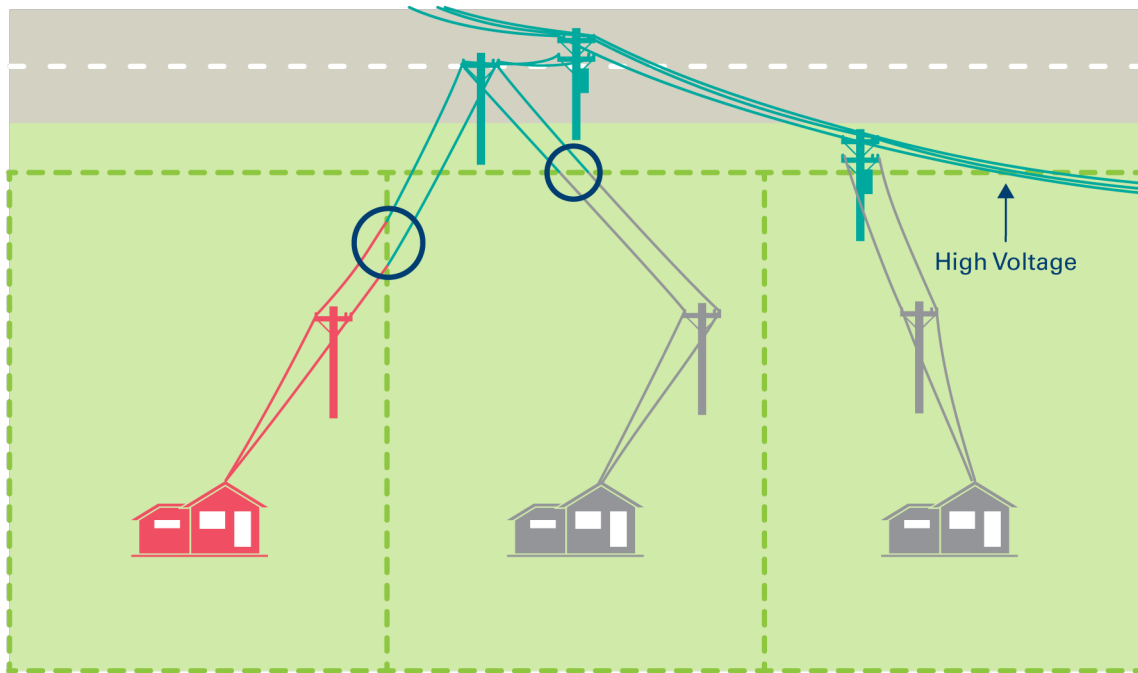
Multiple Landowners — Underground Supply



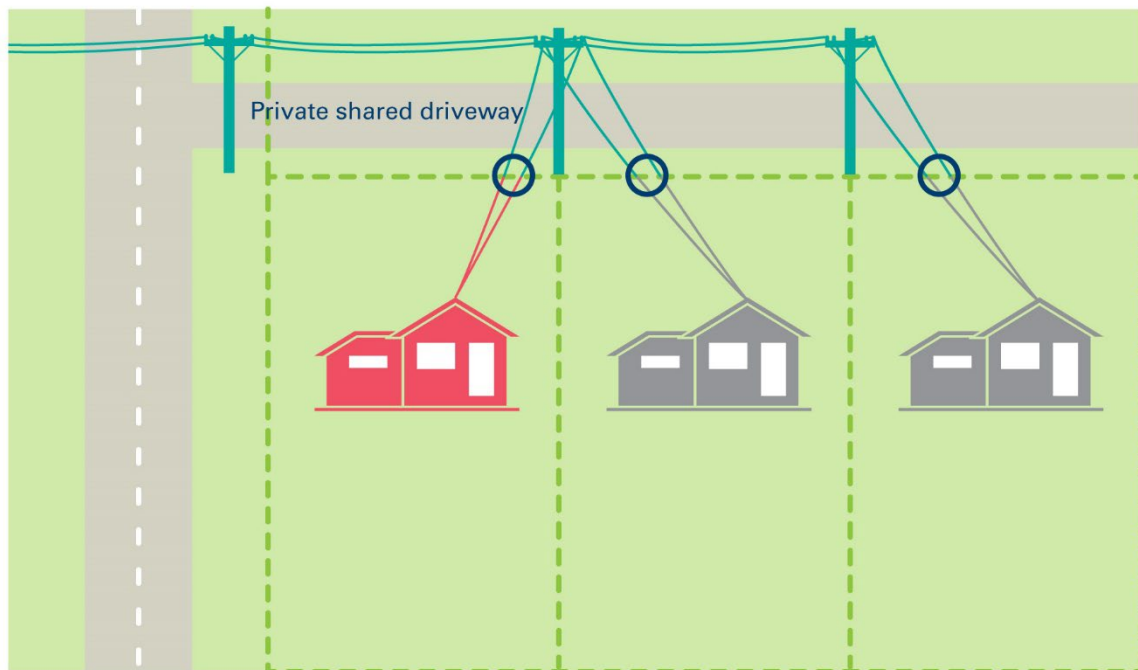
Multiple Landowners — Overhead Supply



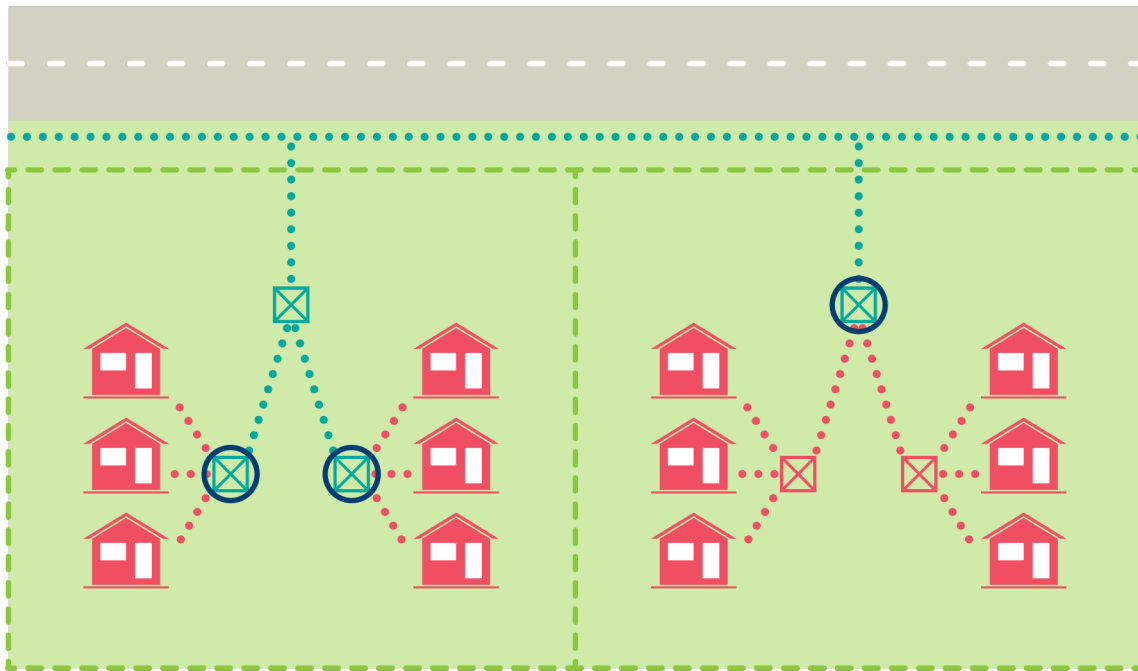
Multiple Landowners — Overhead Supply



Multiple Landowners — Right of Way



Multiple Customers — Unit Titled Development



*Please refer to property landowner or MainPower for more information.

Appendix E: Document history and version control

Version #	Date Approved	7.5.1.2 Document Owner/ Approved By	7.5.1.3 Brief Description
8.0	01.05.05	7.5.1.4 Network Manager Development	7.5.1.5 Brought into the IMS format without change to content
8.1	01.07.15	7.5.1.6 Network Manager Development	7.5.1.7 Update to 2.2.3 and 2.2.5
9.0	26.03.20	7.5.1.8 Network Manager Development	7.5.1.9 Updated to better define how MainPower's Point of Supply is built behind property boundary lines
9.1	01.09.23	7.5.1.10 Head of Assets and Operations	7.5.1.11 Full redevelopment of document to improve relevance to current standards
9.2	19.12.2023	7.5.1.12 Communications Manager	7.5.1.13 Edited, formatted and proofed.
9.3	02.05.2024	7.5.1.14 GM Commercial	7.5.1.15 Final changes reviewed and approved
9.4	07.08.2024	7.5.1.16 GM Commercial	7.5.1.17 Update to 7.4 to include minimum metering depth.