

New LV Service Connections

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1. Introduction

This document outlines Northpower's policy, core processes and technical requirements for low voltage service connections to Northpower's network. This includes:

- the creation of new connections and installation control points (ICPs),
- changes to existing connections, and
- the connection of small scale distributed generation (DG).

This document is supported by specific technical standards, requirements and process guides as relevant.

This audience of this document is both external and internal users – some content relates to process guidance/commentary for internal users (Northpower).

2. Northpower References

Reference	Details
Process / Guides	
Customer Guide: New LV Service Connections	Customer guide for the new service connections process
Customer Guide: Connection Requirements	Customer guide for the technical requirements for new service connections
Policies / Standards	
ENS 02.01.080	Asset Ownership Policy
ENS 02.01.085	Asset Ownership Identification and Demarcation (and drawings)
Drawings 2Y119s1 to 2Y119s7	Asset Ownership / boundary related drawings
ENS 21.01.001	Network Approved Contractor Standard
ENS 05.02.010	Conditions for Network Construction by Contractors
ENS 05.02.016	Conditions for Contractors Constructing Services
ENS 02.01.064	Congestion Management Policy – Distributed Generation
Technical Standards & Drawings	
ENS 02.01.030	Design and As Built Plans with Service Connections
ENS 02.01.065	Technical Requirements for Small Scale Generation.
ENS 02.01.120	Disconnected Installation Management
ENS 02.01.150	Electrical Tests for connection of LV Installations – Planned Work
ENS 02.01.165	Working Near Reticulation
ENS 03.01.015	Overhead and Underground Distribution – Fusing policies
ENS 03.03.100	Pillars and Cabinets
ENS 05.01.005	Subdivision Resource Consent Requirements
ENS 03.01.035	Subdivision Design Guide
ENS 05.02.010	Conditions for Network Construction by Contractors
ENS 05.02.016	Conditions for Contractors Constructing Services
ENS 05.02.020	Unmetered Electricity Supplies and Streetlighting
ENS 05.02.035	Supply Options for Collective Residential Developments
ENS 05.02.036	Supply Options for Low Voltage Customers
ENS 05.02.037	Builders Temporary Supplies
Overhead Connections - Supporting Details	Typical LV Riser Cable Arrangement: Drawings 2F359S1 Michaud's Electrical Distribution Protection manual TransNet TUDS Training Manual
Underground Connection - Supporting Details	EP3 Ecopillar: Drawings 2F358S1, 2F358S, 2F358S12 Promax S2 Pillar: Drawing 2F143S2 Promax S3 Pillar: Drawing 2F143S4 Pillar Trenching Details: Drawing 2F284S1

3. Other References

Reference	Details
AS/NZS 3000	Electrical Installations (Australian/New Zealand wiring rules)
AS/NZS 4777	Grid Connection of Energy Systems via Inverters
NZ Government / ESR	Electricity (Safety) Regulations
Australian Clean Energy Council	http://www.solaraccreditation.com.au/products/inverters.html
EIPC Code	Electricity Industry Participation Code 2010 (The Code). <i>Note - Part 6 (related to Distributed Generation), Part 10 (Metering), Part 11</i>
Use of Systems Agreements (UoSA)	Use of System Agreements with electricity retailers
EA DG Connection Guidelines	The Electricity Authority "Connection of small scale distributed generation (equal to or less than 10 kW) to a local network", 2014

4. Definitions

Reference	Details
Customer Initiated Works (CIW)	Northpower's process for managing customer requests that require upgrades or alterations to the network, and the associated cost allocation / contributions to the relevant customer(s).
Customer	The party (or their agent) who will be supplied by, or is requesting the Connection to the Northpower network
Customer Management System	The system(s) used by the Customer Service Team to manage and coordinate customer services, including where relevant: connections requests, contractor works orders, customer correspondence and complaints.
Customer Services Team	The Customer Services Team within Northpower (Network)
Customer Services Coordinator	The role(s) responsible within Northpower for the coordination of connections and approvals.
ICP	Installation Control Point. A point of connection at which the electrical installation for a retailer's customer is connected to the Northpower network.
ICP Identifier	The unique identifier for an ICP created in accordance with the Code.
Long Term Disconnected Connection	'Long Term Disconnected' means the meters have been removed and the service line has been completely disconnected at the Network point of connection, generally the service line span connected to the network is removed. However, permission has not been obtained from the installation owner to permanently dismantle the supply in accordance with the Electricity Industry Act 2010 Subpart 3 Continuance of supply. <i>Refer to ENS 02.01.120 Disconnected Installation Management.</i>
Network Approval	Approval from Northpower for a customer to connect or change an existing connection.
Northpower (Network)	The network distribution business that owns, operates and maintains the electricity distribution network assets.
Northpower Contracting	The contracting division of Northpower Ltd, who are the primary provider to Northpower (Network) for electricity network maintenance and reactive services.
Northpower Contractors	Contractors directly engaged by Northpower.
Network Approved Contractor	Contractors that have been pre-approved by Northpower to undertake specified works on, or in close proximity to, the Northpower network. These are generally engaged directly by non-Northpower parties (i.e. Retailer, Customer etc.)
Livening Agent	A Network Approved Contractor, who is specifically authorised to liven connections to the network.
Metering Installer	The Contractor engaged by the Retailer to install metering equipment on a customer premise.
Retailer	The electricity Retailer who the Customer purchases electricity from, and who has a contractual relationship with Northpower under a Use of System Agreement.

Reference	Details
(The) Registry	<p>The Electricity Authority (EA) 'Electricity Registry', which contains key details of Installation Control Points (ICP's). The Registry facilitates exchange of information between retailer, metering equipment providers (MEP) and distributors to manage reconciliation and switching processes.</p> <ul style="list-style-type: none"> • Distributors create the ICP and enter information about the ICP such as the connection to the grid, address, pricing, etc.) • MEPs enter information about the metering located at the ICP and the meter configuration. • Retailers enter information that affects the reconciliation process at the ICP (such as the retailers participant ID, reconciliation type, profile etc.)
Service Connection	The point of connection at which electricity may flow into or out of the Northpower low voltage (LV) network to/from an ICP.

5. Policy

Northpower's policy is for all service connections to meet safety, technical and commercial requirements before connection to the distribution network is allowed.

Key policy aspects include:

- Connection Applications must be made for all new (or amended) service connections and distributed generation connections.
- Network Approval must be provided by Northpower, prior to connection of new (or amended) connections.
- All connections (including Distributed Generation) must meet the technical requirements specified by Northpower.
- Where connections require works to amend or upgrade the distribution network to enable the connection to proceed, Northpower's Customer Initiated Works (CIW) process applies. As part of this, the Customer may be required to pay for some (or all) of the associated works, and Northpower may contribute to the cost of the works.
- Where existing service connections now need to be amended or altered, the current government legislation and Northpower requirements need to be applied (i.e. treat as a new connection).
- Electrical connections to the Northpower network are only allowed to be undertaken by Northpower Contractors or Network Approved Contractors (where they have been specifically authorised to undertake these works).

Further detail on these aspects is provided in the relevant sections in this standard.

Long Term Disconnected Service Connections

Where a 'long term disconnected service' is intended to be reconnected to the Northpower network, and the span previously connecting the service to the network has been removed, Northpower is obligated to arrange replacement of the removed span and allow the reconnection i.e. as it was before it was disconnected. For further details, refer to Northpower's Policy *ENS 02.01.120 Disconnected Installation Management*.

6. Applications for Connections

Customers must submit an Application for Connection and have received network approval, for all new connections and changes to existing connections made to the Northpower network.

Applications are to be made by the customer (or their contractor/agent), and need to provide all information required by Northpower to ensure a smooth application approval process.

6.1. Submitting Applications

Applications for new or amended connections are to be submitted by completing the online form at Northpower's website: <https://northpower.com/forms/application-for-work>

6.2. Queries

Any questions or queries should be directed to the Customer Services Team to coordinate and manage in Northpower's customer management system.

Contact can be made via:

- email to: Customercare@northpower.com
- or by calling: 0800 NORTHPOWER (0800 667 847)

6.3. Connection Process, Requirements & Guides

Northpower provides additional guidance for customers about the connection process and technical requirements on Northpower's website.

The high-level process for a new Connection is outlined in [Appendix 2 - New Service Connections Process](#).

7. Network Approval Requirements

7.1. Network Approval

Network Approval is required for all new connections and changes to connections made to the Northpower network.

Network Approval is required for the following situations:

- Connection of a new Installation Control Point (ICP)
- Connection that has been previously decommissioned (treated as a new ICP) or long term disconnected
- Connection of an unmetered supply (excluding public streetlighting owned by NZTA or the District Councils)
- Increase in load from that originally approved or designed
- Change in phasing from that originally approved or designed
- Separation of an existing supply for an additional supply or tenancy
- Connection of a distributed generation system

Network Approval is intended to ensure the following:

- Electricity supply connection (fusing) is available
- The correct connection point is utilised
- The correct phasing is utilised
- Network capacity is sufficient
- Network voltage range is maintained within defined limits (i.e. volt drop/rise)
- Legal access to the network
- Reticulation is legally installed

Any issues or discrepancies between the Connection application submitted to Northpower and the allocated supply, concerning the connection point, phasing, capacity and legalities are to be followed up by Northpower with the customer or their electrician. If the issue cannot be resolved, then Network Approval for the connection cannot be provided.

7.2. Network Approval Not Required

Network Approval is not required for the following situations:

- Disconnection or decommissioning of ICP's.
- Reconnection of ICP's have been disconnected or de-energised other than long-term disconnected ICPs.
- Relocation of an existing Meter station within same property.
- Combining / centralisation of existing ICP's within same property.
- Changing a Builders Temporary Supply (BTS) to a caravan supply.
- Addition of a submain or other changes beyond the meter station, provided the loading remains within original designed capacity.
- Streetlights and traffic lights installed by Network Approved Contractors for authorised third parties (e.g. District Councils or NZTA)

7.3. Northpower delegation of 'Network Approval' to approved Contractors

Northpower may delegate 'Network Approval' ability to pre-defined Northpower Contractors (primarily Northpower Contracting as the network maintenance contractor) where they are approved as capable of reviewing designs considerations and connections on behalf of Northpower.

7.4. Network Approval - Validity period

The Network Approval is valid for up to 6 months after issue. If the installation has not been permanently connected within this time, a new application should to be submitted.

8. Technical Requirements – New LV Service Connections

8.1. Intro

Northpower's technical requirements for service connections are overviewed within this Standard. Specific technical requirements are detailed further in the referenced Northpower Technical Requirement documents, standards or policies. This includes (but is not limited to):

- ENS 05.02.036 Supply Options for Low Voltage Customers
- ENS 05.02.035 Supply Options for Customer Connections – Collective Residential Developments
- ENS 05.02.037 Builders Temporary Supplies
- ENS 03.03.100 Pillars and Cabinets (*Note - includes TUDS*)
- ENS 03.01.015 Fusing Policy
- ENS 02.01.085 Asset Ownership Identification & Demarcation Policy (and drawings 2Y119s1 to 2Y119s7)
- ENS 03.01.080 Voltage Drop Determination
- Various technical Drawings and manufacturer manuals or instructions
- Wiring of the meter station and the metering installation must comply with the technical diagrams published on the Northpower website

8.2. Existing LV Service Connections

Existing service connections should have been commissioned to the standard required at the time of connection. Where existing service connections now need to be amended or altered, the current government legislation and Northpower network requirements need to be applied.

8.3. New LV Service Connections – Standard Requirements/Options

Northpower's core technical requirements for low voltage service connections are outlined below, with further detail provided primarily in *ENS 05.02.036 Supply Options for Low Voltage Customers* or specific standards as referenced.

8.3.1. Supply from Overhead Service (Pole fuse)

If the new connection is to be supplied from an overhead connection, i.e. a pole mounted fuse holder, refer to the following documents for details around the layout and fuse operation:

- *Typical LV Riser Cable Arrangement: Drawings 2F359S1*
- *Michaud's Electrical Distribution Protection manual*

8.3.2. Supply from Pillars or Pits / TUDS

Refer to ENS 03.03.100 Pillars and Cabinets.

The current standard pillars in use are the Transnet Ecopillar system – primarily the EP3 but also the EP2, EP4 and EP6.

If the new connection is to be supplied from a Transnet Total Underground Distribution System (TUDS) the service cable is required to be a double insulated, non-screen cable, between 6mm² and 50mm², manufactured in accordance with AS4026.

Also, refer to drawings and details in:

- *TransNet TUDS Training Manual*
- *EP3 Ecopillar: Drawings 2F358S1, 2F358S, 2F358S12*
- *Promax S2 Pillar: Drawings 2F143S2*
- *Promax S3 Pillar: Drawings 2F143S4*
- *Pillar Trenching Details: Drawing 2F284S1*

8.3.3. Supply from breach joint

Where an existing connection is supplied by a breach joint (i.e. hard tapped to the low voltage network), Northpower owns up to the connection point or service fuse (i.e. originally designed to have fuses on the side of the house).

To align with new standard/policy, a new/amended connection with an existing breach joint will require a new pillar or TUD (with appropriate fusing) to be installed at the property boundary. Installation of the new pillar/TUD will be undertaken by Northpower, generally at no cost to the customer.

8.3.4. Supply from single neutral stud pillar

Refer to ENS 03.03.100 Pillars and Cabinets.

If the new connection is to be supplied from a pillar with a single neutral stud supplying multiple customers, then the pillar will need to be replaced with a new pillar (or TUDS). Installation of the new pillar/TUDS will be undertaken by Northpower generally at no cost to the customer.

8.3.5. Fusing sizes

Northpower's standard service connection fuse sizes are outlined in *ENS 03.01.015 Fusing Policies*:

- Northpower's standard service connection fuse size for a domestic supply is 60/63A.
- Installations connected to transformers of 30kVA or less, will generally require to be fused at less than 60/63A.

If requested by the customer or electrician, lower rated fuses may be installed provided that standard fuses stocked by Northpower are utilised and the rating is marked on the fuse holder.

The use of whole current metering is limited to a maximum of 100 amp supply per phase; supply requirements of greater than 100 amps per phase will require CT metering.

8.3.6. Load Control Requirements

All new installations with suitable interruptible loads shall be capable of being controlled by Northpower's load control system through an approved Northpower owned and supplied ripple receiver or relay.

8.4. Builders Temporary Supplies (BTS)

Refer to ENS 05.02.037 Builders Temporary Supplies

A Builder's Temporary Supplies ("BTS") shall:

- only be utilised for providing an electricity supply for building or construction work.
- not be utilised for providing an electricity supply for residential, leisure or commercial use.

Builder's temporary supplies may only be used for up to a 1-year period. A short extension may be granted only if the completion of building work is imminent. Otherwise, the builders temporary supply shall be changed to an appropriate permanent supply, disconnected or decommissioned.

All Builders Temporary Supplies shall be metered and can be either:

- 1 phase (30/32A) for housing or small commercial construction
- 3 phase (60/63A) for large commercial or industrial construction

A customer requiring a Builder's Temporary Supply will need to complete and submit to Northpower, a standard "Application for Network Connection or Alteration to Supply" form either online or a paper form.

A Northpower Installation Control Point (ICP) number is to be allocated to each BTS. This number should be retained when it is changed to a permanent supply.

8.5. Unmetered Supplies

Refer ENS 05.02.020 Unmetered Electricity Supplies and Streetlighting

Unmetered electricity supplies can be utilised where the load is low, the load can be defined and provision of a metered supply is not practical. If the load profile is uncertain then it must be metered.

Unmetered supplies must not use more than 3,000kWh per annum and the unmetered connection is subject to acceptance by the nominated electricity retailer.

A standard Application for Network Connection form is to be completed for each new unmetered connection. The details of the unmetered load (type of load, size of the load, and expected usage) must be entered on the Application form.

8.6. Streetlights & Traffic Lights

Refer ENS 05.02.020 Unmetered Electricity Supplies and Streetlighting

Street lighting includes public and private streetlights, security lighting and public toilet lights which are controlled from dawn to dusk.

Details of streetlights are held within a "Streetlight Database", including details of the location and lighting specifications (lamp type and wattage) provided to Northpower Network.

Public street lighting is distributed unmetered load and the total load represented by an ICP may exceed 3,000 kWh per annum. Connection of private streetlighting requires an Application for Connection and Network Approval.

Installation and connection of Streetlights to Northpower's Network must only be undertaken by Network Approved Contractors, engaged by the streetlight owner (i.e. Council, Roading Authority). *Refer to ENS 21.01.001 Network Approved Contractor Standard*

8.7. Asset Ownership & Demarcation

Refer to ENS 02.01.085 Asset Ownership Identification and Demarcation, and the associated Drawings 2Y119s1 to 2Y119s7.

Northpower's standard policy is to own the following (low voltage network):

- All parts of the low voltage distribution network that provides service to multiple properties and including the connection point to individual properties.
- All parts of the low voltage distribution network that provides service to multiple units, leased or licensed areas with separate supplies (e.g. retirement village or community).
- All distribution and service reticulation (excluding submains) that is attached to Northpower poles, within Northpower pillars or transformers.
- Exclusive low voltage service lines/cables/ducts passing through the road corridor up to the property boundary.
- Exclusive low voltage service lines/cables passing through a neighbouring property that are not within an electricity easement but are protected by the electricity act 1992.
- Exclusive low voltage service lines/cables that are hard tapped (e.g. breach joint) to the network, up to the connection point or service fuse.
- Poles in private property supporting reticulation crossing the road that has safety clearance issues.
- Any anchor poles for stays supporting Northpower lines.
- Telecommunications poles supporting Northpower's (or Northpower interest) reticulation
- Reticulation that is covered by a vesting agreement or agreement to construct a Northpower asset.

9. Overview: Scenarios for LV Connections and Network Approvals

There are a wide range of connection scenarios requiring consideration for Network Approval – the following scenarios and review considerations are common, with other scenarios to be reviewed and approved on a case-by-case basis ensuring that they meet relevant network requirements.

9.1. Individual connection point available

Network Approval can be provided if:

- there is fusing allocated/available for the requested connection
- an existing supply has been decommissioned and is to be replaced by a similar new supply from the same connection point. Note that a new ICP Identifier will be required.

Network review/checks may be required for:

- The transformer capacity – to determine capacity is sufficient or if an upgrade may be required
- The network voltage drop - to determine if a network upgrade may be required. Specifically, when all or several of the following conditions exist:
 - The connection point has been designed before 2000
 - The reticulation has been extended or additional connection points provided after the original design
 - The connection point is a long way from the transformer (>200m)
 - The distribution conductors are small (<35mm² Cu or < 70mm² Al)

9.2. Installation of a single supply (ICP)

9.2.1. General

This includes a single supply (ICP) to a property or building with multiple meter stations; a single meter station with multiple ICP identifier's and supplies that are to be separated.

This includes the following:

- Additional tenancy in multi tenanted building
- Separation within an existing meter station
- Separation with provision of an additional meter station on a separate building

The electricity supply connection must have sufficient capacity for all the proposed ICP's connected.

Each ICP is to be able to be separately disconnected without disconnecting any other ICP with either lockable switches, sealable fuses or separate fuses (Clause 3 of Schedule 11.1 Part 11 of the Code).

The disconnection point and meters are to be accessible during normal working hours.

A meter station in or on a building within one property should not be used to supply another property.

Note that the multiple ICP's within the same property may also be combined and centralised into one ICP, which will have a single electricity retailer. Those ICPs combined into a single ICP will be decommissioned in the Electricity Registry.

9.2.2. Additional tenancy in a multi-tenanted building

A separate supply is created for an additional tenant in a multi-tenanted building.

Generally, the supply has been provided as part of the original construction of the building or is arranged by the building owner's electrician.

If the electricity supply is satisfactory i.e. compliant with conditions in *section 9.2.1 General*, then a network approval for the new connection may be issued.

Refer to ENS 05.02.035 Supply Options for Collective Residential Developments

9.2.3. Separation within an existing meter station

A separate supply is created when an existing individual supply is split into two ICP's with the provision of a master meter station e.g. a building is split into two flats.

Generally, arrangements are made for provision of additional metering in the existing meter station and rearrangement of the building wiring by the building owner's electrician.

If the electricity supply is satisfactory i.e. compliant with conditions in *section 9.2.1 General*, then a network approval for the new connection may be issued.

9.2.4. Separation with an additional meter station on another building

A separate supply is created when an existing individual supply is split into two ICP's with a building provided with a separate ICP in a new meter station.

Generally, a pillar, with fuses for each ICP, is cut into the existing service cable near the existing meter station.

The pillar, cabling rearrangements and new meter station may be completed by the owner's electrician or by Northpower.

If the electricity supply is satisfactory, that is compliant with conditions in *section 9.2.1 General*, then a network approval for the new connection may be issued.

Note: if a separate supply is to be created by the provision of a new service main to the network connection point then this is to be treated as a new supply. If there is no provision for an additional supply, then the application is to be returned to the Customer Services Coordinator who is to inform the customer and arrange a designer to investigate and provide additional fusing if required.

9.3. Electricity reticulation or connection point not certain

If there is uncertainty of the details for the existing reticulation or connection point, Northpower will undertake a site visit (typically by a Northpower fault person):

- to verify or update the details held
- if possible, rectify any minor issues identified while on site
- if more significant differences found, organise to rectify these.

Network Approval can be provided if:

- The electricity supply is verified as satisfactory for the new connection
- The issues are organised to be remedied, however this will need to indicate the issue and that it is under action.

If the location of the new connection or the customer's requirements is not clear on the application, details will need to be confirmed by Northpower before approval is granted.

9.4. Electricity reticulation or connection point not available

In the following situations, Network Approval cannot be provided:

- Electricity supply or connection point is not available or allocated
- Incorrect connection point or phasing
- Insufficient capacity available
- Legal access or rights unsatisfactory
- Construction documentation is unsatisfactory
- Location of the proposed connection or requirements are not clear

9.5. Increase in demand for existing ICP

When there is a proposed increase in demand for an existing ICP, from the demand originally approved or designed, the following checks are to be completed:

- Network capacity is available
- Existing service fusing or fuse holder is satisfactory

If both are satisfactory, a Network Approval for the increase in demand and increased fuse rating (if required) may be issued.

9.6. Change in phasing for existing ICP

When there is a proposed change in the number of phases, at the network point of connection, from that originally provided, designed or approved, the following checks are to be completed:

- For an increase in the phases connected, check that the distribution reticulation has sufficient phases and fuses available. If there is also an increase in load, the relevant checks detailed above will also need to be completed.
- For a decrease in the phases connected, check that the network voltage drop and transformer balancing is not compromised. Any effect on future development should also be considered.

Refer to ENS 05.02.036 Supply Options for Low Voltage Customers.

10. Connection and livening to Northpower's Network

10.1. Connection Process

The high-level process for a new LV Service Connection is outlined in [Appendix 2 - New Service Connections Process](#).

10.2. Metering

The customer must make a request to their electricity Retailer who will organise for metering to be installed. The electricity Retailer determines who the metering equipment provider (MEP) is, who will then determine who provides the metering equipment and who installs it.

Wiring of the meter station and the metering installation must comply with the metering technical diagrams published on the Northpower website before the connection is livened.

For a supply to an ICP of greater than 100 amps per phase CT metering must be installed prior to livening as whole current metering is limited to 100 amps per phase.

Note - that the metering installer is required to complete a "Metering Installation Certification Report".

10.2.1. Unmetered Streetlights

Any additional unmetered connections to the streetlight network under the area streetlight ICP will not require a service request from the Retailer as no metering is required.

Northpower's Commercial Team will determine the tariff and add the estimated consumption to the streetlight database for billing.

10.3. Laying Service Cables

Where the underground service cable is installed by a non-Northpower Contractor, the service cable must only be installed to the base of the pillar or the web of the pole, with the following restrictions:

- A "Restriction for Excavating near Poles" provided by Northpower, would be required when digging within 2.2 m of a pole unless supervised by an electrician with a current electrical practicing licence.
- The trench will need to be hand dug within 450 mm of any underground cables.

10.4. Connecting Services to the Network Fuse holder

Only Contractors specifically approved by Northpower can connect the service cable (or line) to any Northpower asset – including installing the cable into the existing pit/pillar or up the pole to the cross-arm.

These Contractors can then connect the service main to the fuse holder, but they must not liven the connection (insert fuse) unless they are approved as Livening Agents (below).

Prior to connection of the service main to the fuse holder, the Contractor must confirm with Northpower Network that the retailer has requested connection and accepts responsibility for the ICP (Clause 31(2) Part 10 of the Code).

Refer to ENS 21.01.001 Network Approved Contractor Standard.

10.5. Streetlights & Traffic Lights (Local Authority/Council owned)

Councils can engage Network Approved Contractors to install fuses and connect streetlights and traffic lights to the Northpower network. These Network Approved Contractors (where authorised to act on behalf of Council) are required to inform Northpower and provide as built plans, including power rating and intended consumption, for all new connections and changes to existing connections.

Refer to the following:

ENS 21.01.001 Network Approved Contractor Standard

ENS 05.02.020 Unmetered Electricity Supplies and Streetlights

10.6. Livening of connections only by approved Livening Agent

Livening of a connection is only allowed to be undertaken by a Livening Agent (who has Network Approved Contractor status for livening connections), who is to ensure that the new connection complies with the following before it is livened:

- Current NZ electrical safety regulations, standards and codes of practice
- Northpower's Electricity Network Standards, Policies and requirements
- Northpower's Network Approval document
- A Certificate of Compliance (CoC) has been provided for all parts of the service and installation to be connected and includes details of works completed
- The meter station and meters have been clearly labelled by the metering installer, including the following:
 - .1. Northpower's premise no
 - .2. Certification with full ICP no
 - .3. 24 hour and Controlled meters
 - .4. Import and Export meters
 - .5. Property details where there are multiple ICP's in the meter station e.g. Flat 1
- The meter installation and installed metering complies with the appropriate metering technical specifications available on the Northpower web site.

If Distributed Generation has been installed as part of this connection, there are strict requirements that must be met before the Distributed Generation can be connected and livened. Refer to the section on Distributed Generation later in this Standard, and refer to *ENS 02.01.065 Technical Requirements for Small Scale Distributed Generation*

10.7. Information Livening Agent must submit to Northpower

Upon livening a new connection to the Northpower network, the Livening Agent must submit the following information (as updated from time to time) to Northpower to meet requirements of the Code. The information required is to be provided in a format specified by Northpower.

Note – This is separate to the requirements of the Retailer or Metering Equipment Provider, which also have information requirements in accordance with the Code.

Site Details

- ICP Identifier
- Street Address
- Rapid Number (if available)
- Connection Livening Date
- GPS Coordinates
- Retailer
- Northpower Reference (*if relevant, i.e. service request/work order*)

Connection Details

- Number of phases connected (1, 2 or 3)
- Phase colours utilised (Blue, Red, White)
- Network Fuse ratings (Amps)
- Overhead or Underground Connection
- Connection Point (*i.e. Network Fuse Location at: Pole, Pillar, Pit, Distribution Board*)
- Network Connection Fuse Location (if different to Network Fuse location)
- Customer Service Cable Size
- Tariff Types (*Controlled/Uncontrolled/Unmetered*)

Controlled Load Details (if applicable)

- Type of Controlled Load
- Control Channels - available
- Control Channels – in use

Unmetered Load (if applicable)

- Type and size (Watts)
- Time(s) that the unmetered load is operational

Inspector & Certification Details:

- Company Name
- Inspector Name
- Inspector License Number / ID
- Test Results (*e.g. earth loop impedance test reading*)
- CoC Certificate Number
- ESC Number
- Rol Number
- ICP Status on leaving site (i.e., connected, disconnected)

11. Connection of Small Scale Distributed Generation

11.1. Introduction

Northpower's process and technical requirements for the connection of Distributed Generation ("DG") are overviewed within this Standard, with specific detail and technical requirements defined in the relevant Northpower Technical Requirement documents, standards or policies.

This includes: *ENS 02.01.065 Technical Requirements for Small Scale Distributed Generation*.

11.2. Application's for the connection of Distributed Generation

Customers are required to apply to Northpower for the pre-approval of connecting distributed generation prior to connecting to the Network.

Applications for Distributed Generation connections are to be submitted online at Northpower's website: <https://northpower.com/forms/distributed-generation-application>

Queries can be made via:

- email to: Customercare@northpower.com
- or by calling: 0800 NORTHPOWER (0800 667 847)

Applications are to be made by the customer (or their installer/electrician), and need to provide all information required by Northpower to ensure a smooth application process.

11.2.1. Application & Connection Process – Overview

A high-level outline of Northpower's process for managing DG Applications and Connections is as follows, and is also illustrated in *Appendix 2 - Distributed Generation Connections Process*:

- Customer develops a design to determine the electrical generating capacity and electrical system specification.
- Customer submits a Distributed Generation Application to Northpower.
- Northpower will check that the network is capable of handling the proposed generation and for any potential "quality of supply" issues. Northpower will advise if any enhancements (including additional work) to the network are required.
- Northpower can provide an approval for the installation of distributed generation once any technical issues are resolved. Note the approval will contain any relevant technical conditions including: maximum generated power, phasing and if Northpower requires a site visit and verification prior to livening.
- The owner of the distributed generation equipment will need to organise with their electricity Retailer to arrange purchase of any excess power generated.
- The Retailer will organise for the installation of the import/export metering once an ICP has been issued. The retailer will require a copy of Northpower's approval to confirm that the proposed generation system is able to be connected.
- Customer to install the generation system and make ready to connect. Note that the installer or Electrical Inspector may make a brief temporary connection to run the generation system for testing (only) purposes.
- Northpower will coordinate with the customer (or their installer) to connect the distributed generation to the network – this may require an inspection and verification of compliance by Northpower.

Note that the approval for the distributed generation installation is valid for 6 months. If the generation equipment has not been connected within this timeframe, a new application will be required.

11.3. Distributed Generation – Technical Requirements

For full technical details refer to *ENS 02.01.065 Technical Requirements for Small Scale distributed Generation*.

11.3.1. Distributed Generation Connection – Technical Requirements

11.3.1.1. Inverter Compliance

The inverter connecting a DC generation system is to comply with the version of AS/NZS 4777, Grid Connection of energy Systems via Inverters that is specified in the current Electricity (Safety) Regulations.

A list of inverters compliant with AS/NZS 4777.2:2015 is available on the Australian Clean Energy Council website. <http://www.solaraccreditation.com.au/products/inverters.html>.

11.3.2. Network Impact / Capability to Connect DG:

11.3.2.1. Phasing

The phasing of the distributed generation is to be compatible with the supply transformer and with *ENS 02.01.065 Technical Requirements for Small Scale distributed Generation*.

11.3.2.2. Transformer Capacity

The generation capacity of all the systems connected to each phase of the transformer is not to exceed the rated capacity.

11.3.2.3. Voltage Drop

The network voltage drop should be checked when the generation to be connected is either a long way from the transformer (>200m) or the distribution conductors are small (<35mm² Cu or < 70mm² Al).

If the voltage drop of the existing distribution reticulation exceeds the required voltage limits at the point of supply, then this will require Northpower to amend the network.

The voltage drop should also be checked if there is a request to change the network connection from a multi-phase supply to a single phase supply. Refer to section *9.6 Change in phasing for an existing ICP*.

11.3.2.4. Voltage Rise

The voltage rise is to be checked when the generation capacity connected to an individual low voltage distribution feeder exceeds 5 kVA per phase.

If the voltage rise limits are exceeded at the point of supply, the application will be declined unless this is remedied at the customers cost. Approval may be provided for either a reduced generation capacity or a restriction on exported power.

The voltage rise should also be checked if there appear to be network voltage drop issues.

11.4. Approval of connection of distributed generation

The Network Approval of Distributed Generation Connection Applications is to be completed by the Customer Services Coordinator.

Network Approvals are undertaken to confirm that the generating system complies with Northpower requirements and will not adversely impact on the electricity network's performance.

Northpower's specific technical requirements and process are outlined in Northpower's network standards including:

- *Appendix 2 - Distributed Generation Connections Process*
- *ENS 02.01.065 Technical Requirements for Small Scale Generation*.

11.4.1. Approval of Distributed Generation

The approval is to include the following:

- Customers name and installation address
- Full ICP number
- Generation type and approved capacity
- Battery or storage capacity if applicable
- Supply phases connected and generation phases to be connected
- If Northpower requires an inspection and verification prior to liveing

If there is an approved change in the supply phases connected in conjunction with the distributed generation installation this is to be included in the Northpower approval. Refer to section 9.6 *Change in phasing for an existing ICP*.

If the approval is subject to a required network upgrade by Northpower, then details are to be included.

The approval is to be forwarded to the following:

- The applicant (i.e. the Customer or their provider/installer)
- The customers chosen Retailer (if provided)
- Northpower's relevant teams

11.4.2. Approval Validity

The approval is valid for up to **6 months** after issue. If the distributed generation has not been connected within this time, a new application shall be required to be submitted.

11.4.3. Approval before ICP number created

If the customer does not yet have an electricity supply connection and an ICP number is not available, then an approval may still be issued. However, the approval should initially only be sent to the provider/installer/customer. Note - that an electricity supply connection should be available and subject to a new Connection Application approval process.

The new connection Network Approval should refer to the distributed generation approval and vice versa and both should confirm if the Distributed Generation connection is to be completed in conjunction with the new connection or separately.

Note that the ICP for the Connection will need to be created and issued in the customer's name before the Retailer can organise for installation of import/export metering.

11.4.4. Phase change approval

Smaller distributed generation systems and also systems with battery storage are generally single phase and will operate more efficiently when the installation has a single phase connection to the network. Because of this, there will be requests to change existing multi phase installations to single phase in conjunction with the distributed generation installation.

For checks required to approve a change in phasing refer to section 9.6 *Change in Phasing for existing ICP*.

Phase changes requested to be implemented with the distributed generation connection.

- If satisfactory, the approval of the phase change can be included with the Northpower approval for the connection of distributed generation.
- If the approval has already been issued it may be updated to include approval of the phase change and reissued.

Phase changes requested to be implemented separately from the connection of the distributed generation.

- A separate application to Northpower will be required and if satisfactory, a Network approval (for services) can be provided. Additional costs to the customer may apply.

Details will be recorded in Northpower's connection application system and the distributed generation database.

11.4.5. Expanding export capacity of existing generation

Where a customer wishes to increase the capacity of their existing distributed generation system, the same application and network review process is required (as detailed in section 11.2).

This review process will confirm that the total proposed capacity of the generating system complies with network capacity constraints, phasing requirements and Northpower's network standards.

As this is for an existing connection, no further physical works should be necessary.

The DG Approval should show the original generating capacity, the capacity of the expansion and the total capacity of the system.

Northpower's existing records for the system, along with the generation information held in the Registry, are to be amended to show the total capacity.

11.4.6. Reducing capacity of existing generation

Where a customer wishes to reduced (downgrade) the capacity of their existing distributed generation system, Northpower must be notified, so that systems and records, including the generation information held in the Registry, can be updated.

This information is also important as it can impact the ability for other customer generation to be connected in adjacent areas of the network.

Notifications are to be made via email to Customercare@northpower.com.

11.4.7. Decommissioning of existing generation

Where a customer has decommissioned their existing distribution generation system, the customer must notify Northpower. Northpower needs accurate information to maintain systems and meet industry reporting requirements including removal of generation information held in the Registry for the ICP.

Notifications are to be made via email to Customercare@northpower.com.

11.5. Liveness & Inspection requirements

Northpower requires the generating system installation to be inspected by a registered electrical inspector. Where the distributed generation is being installed on an existing ICP, the electrical inspector is not required to be a Network Approved Contractor (ie is required for new ICPs only).

Liveness information is to be submitted to Northpower in the required format - refer to [Appendix 3 - Distributed Generation Liveness Form](#). This includes key liveness information and the Record of Inspection (RoI) details relating the Inspection.

Northpower may also require the distributed generation system be inspected and verified by Northpower or a Network Approved Contractor to ensure compliance with network standards (i.e. to ensure grid protection or anti islanding device operates and generator disconnects during fault or outage).

All distributed generation connections are required to meet the requirements of:

- Northpower's Network Approval for the distributed generation, including phasing and capacity
- Northpower's technical standards including *ENS 02.01.065 Technical Requirements for Small Scale Distributed Generation*
- Certificate of Compliance
- Electrical Inspection (with a Record of Inspection)
- Operation of the grid protection or anti islanding device
- Safety labelling is in place

Refer to:

- [Appendix 2 - Distributed Generation Connection Process](#)
- [Appendix 3 - Distributed Generation Liveness Form](#).

11.6. Recording Distributed Generation Connections

11.6.1. Capturing Distributed Generation Connections in Northpower Systems

Once the distributed generation connection has been made, Northpower systems must be updated to ensure the key details are known and available to the relevant people. This includes notifying the relevant teams (GIS, Control Operators, Retailer Billing Analyst, and Network Information Analyst) of ICP and distribution substation number to update:

- GIS - showing the DG Connection by the transformer and by the ICP on the map
- Schematic / SLD - showing the DG connection by the transformer on the schematic,
- Billing System – ICP details
- Generation type and capacity at the ICP to be loaded (via Gentrack) into the Registry

11.6.2. ICP Details

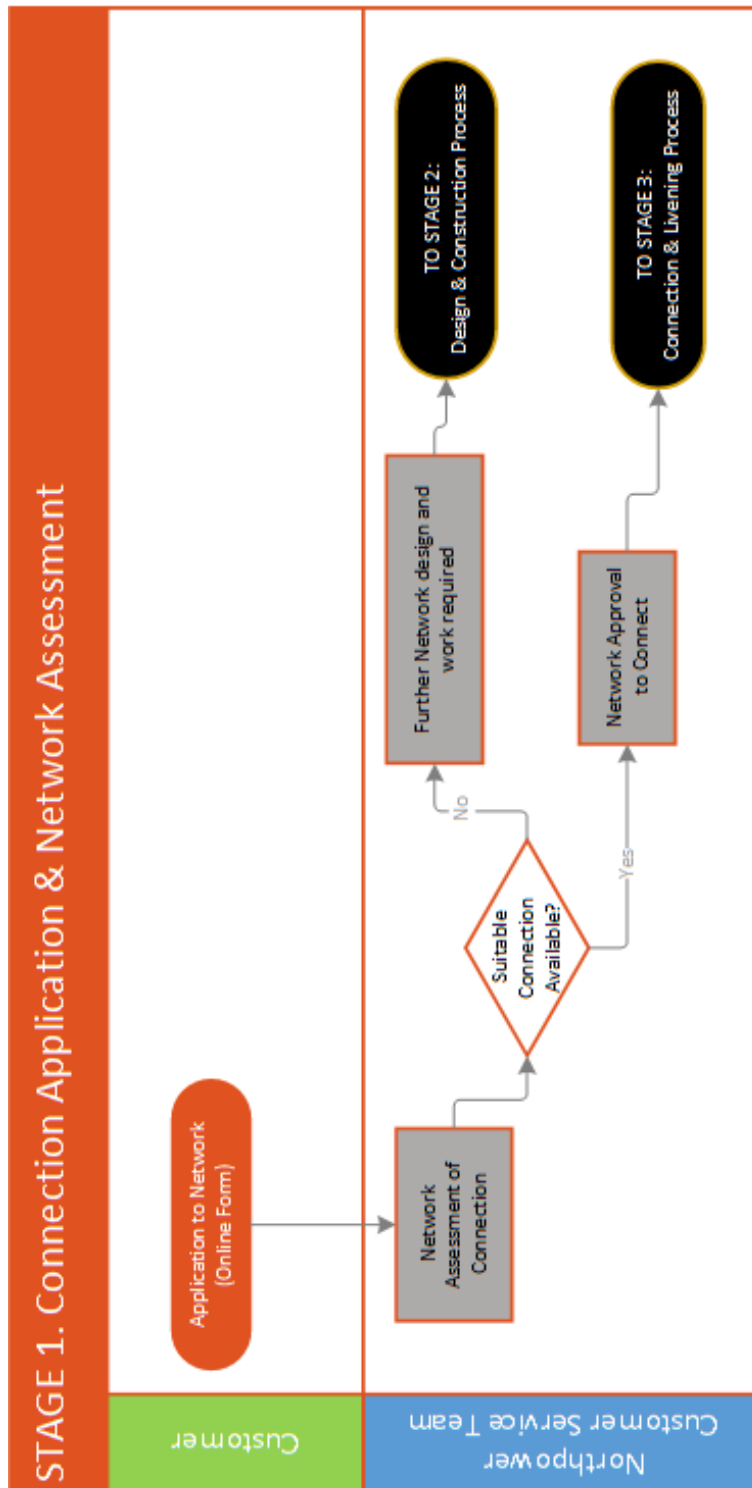
Details of the distributed generation system are to be recorded with the ICP information in the Customer Management System, Billing System and Electricity Registry (as relevant)

- Generation type (Photo Voltaic, Wind, Hydro etc.)
- Generation capacity (kVA or MVA)
- Battery or storage capacity (kWh)
- Generating phases and phase colour
- Connection date
- Disconnection date

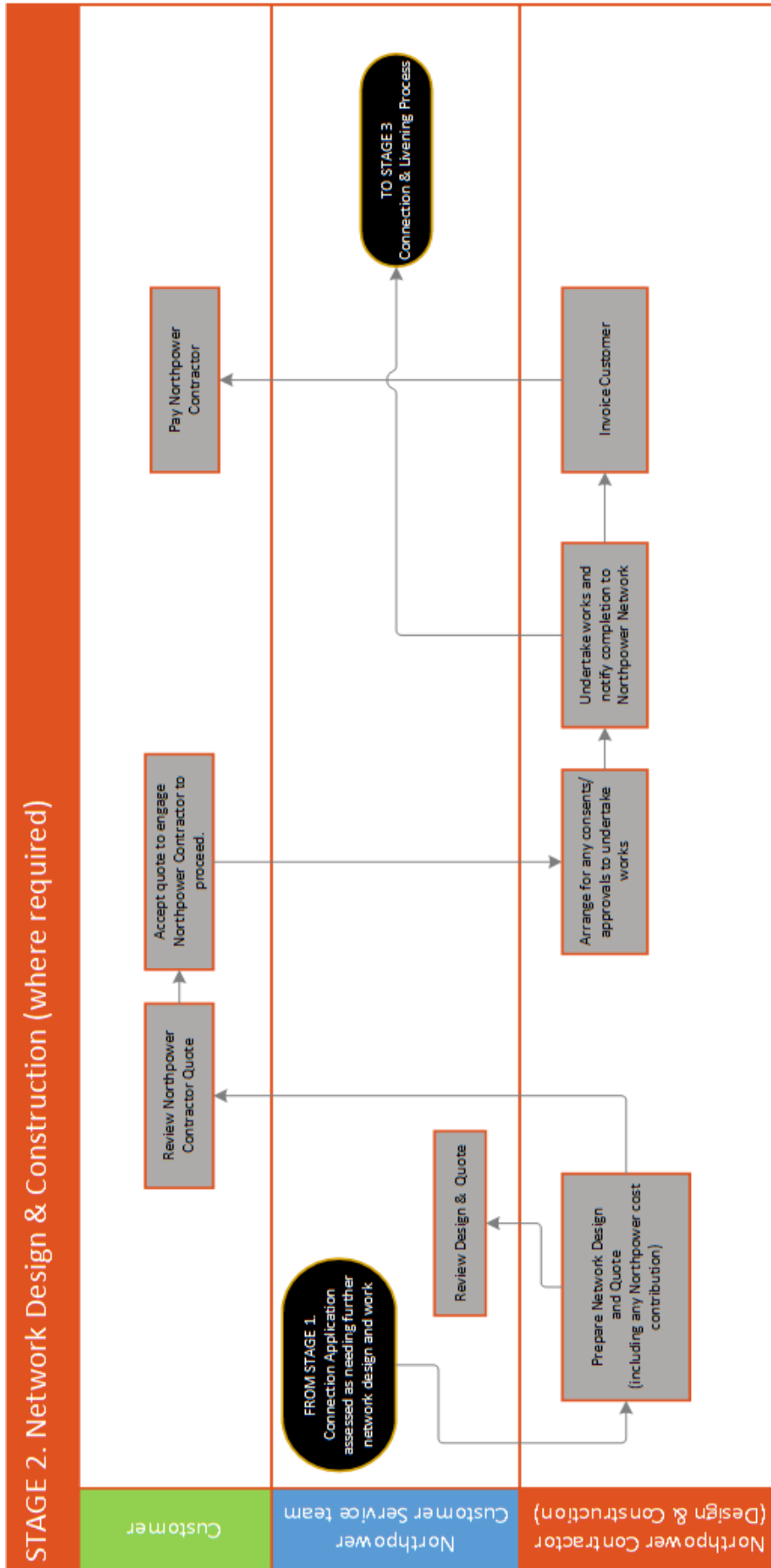
APPENDIX 1: New Service Connections Process

The three stages of the new service Connections process are illustrated in the following diagrams:

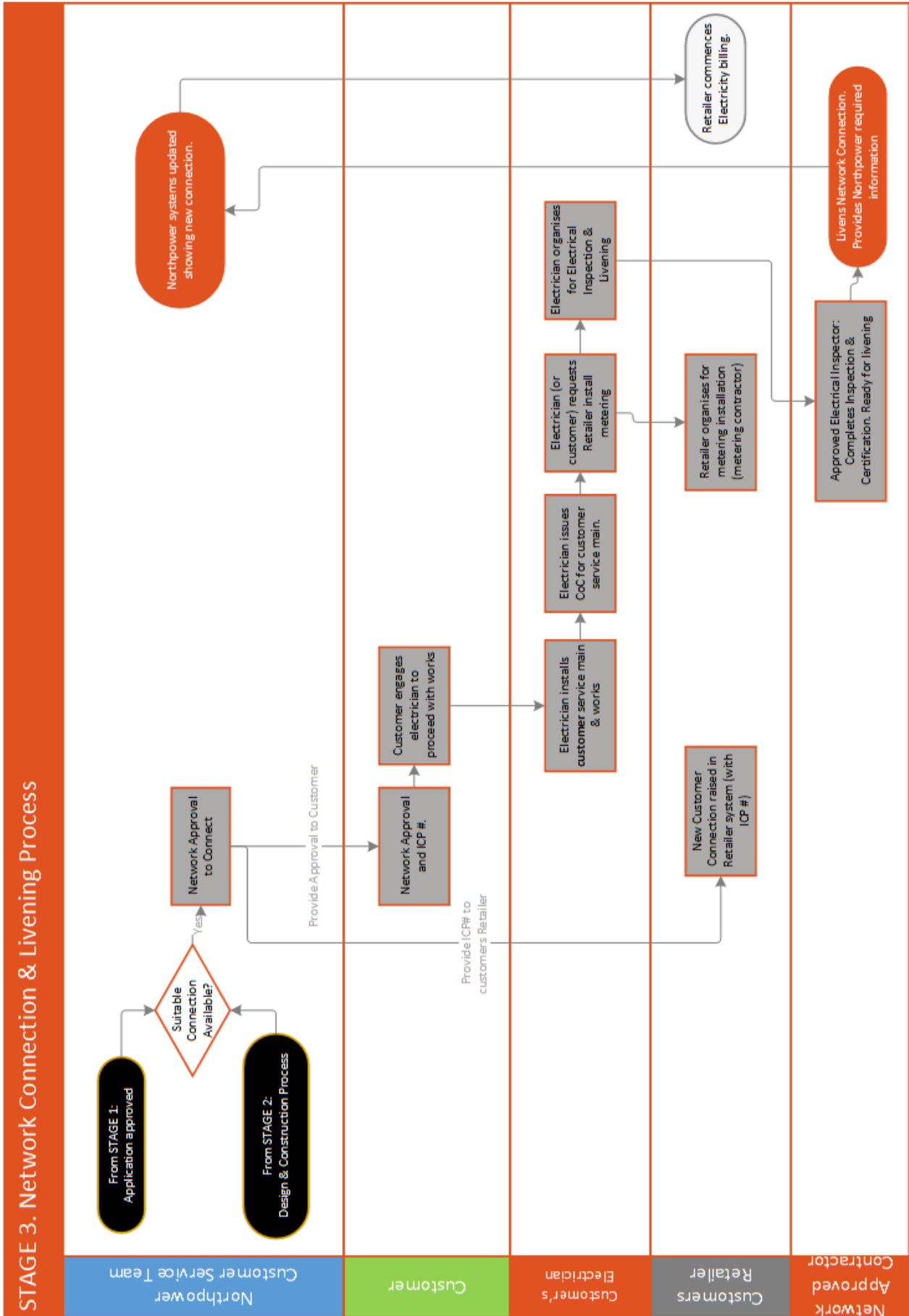
Stage 1: Connection Application & Network Assessment



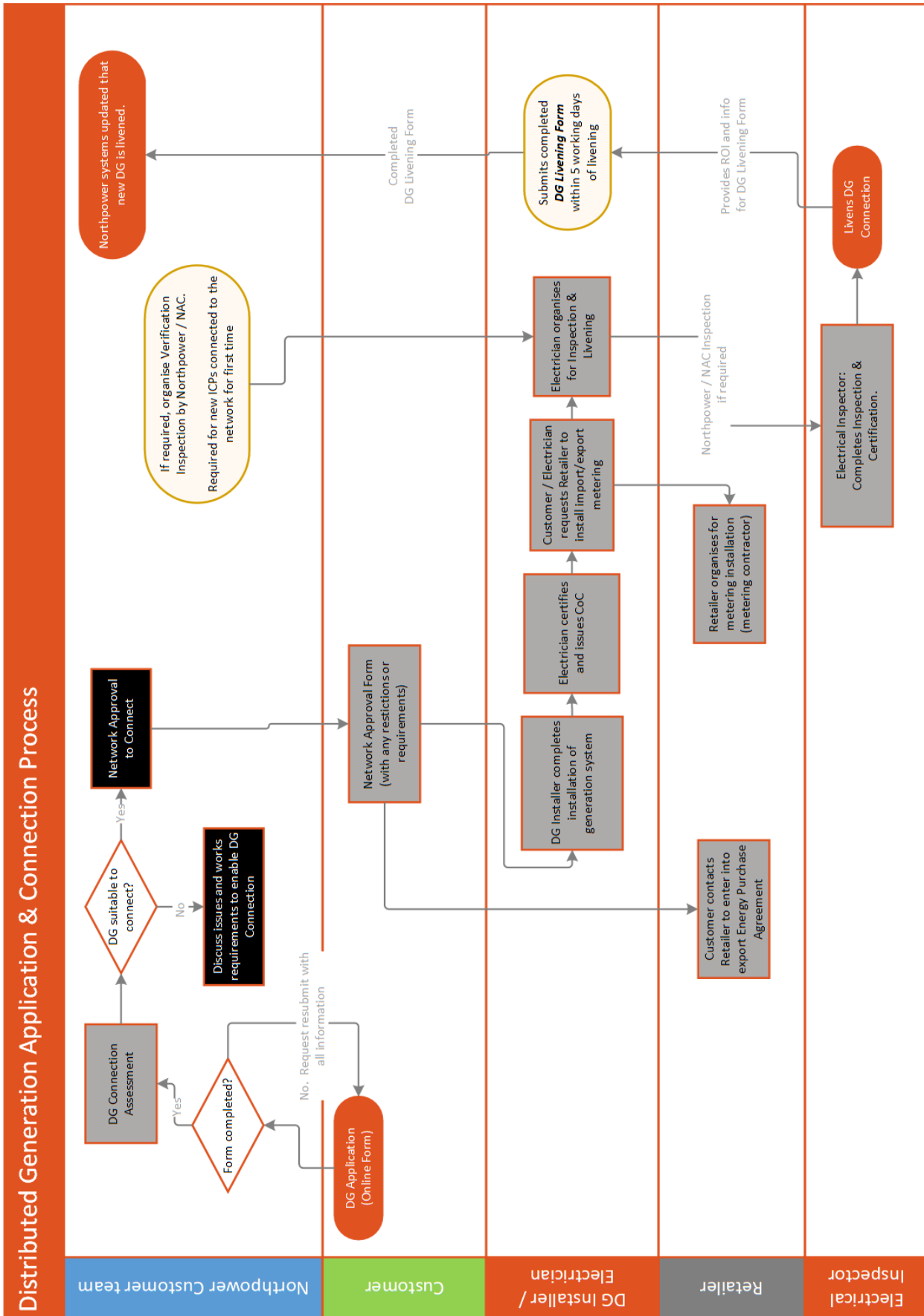
Stage 2: Network Design & Construction (where required)



Stage 3: Network Connection & Livening Process



APPENDIX 2: Distributed Generation Connections Process



APPENDIX 3: Distributed Generation Livening Form [TEMPLATE]

DISTRIBUTED GENERATION: LIVENING FORM			
This form MUST:			
<ul style="list-style-type: none"> • Be submitted to Northpower via distributedgeneration@northpower.com within 5 working days of the connection of the distributed generation to Northpower's network. • Include a copy of the Certificate of Compliance (CoC) from a registered Electrician/Licensed Electrical Inspector that certifies that the Distributed Generation complies with the Electricity (Safety) Regulations 2010. • Note: Where the Distributed Generation system is being installed on an existing ICP, the Electrical Inspector is not required to be a Network Approved Contractor. For ICP's that are being connected to the Northpower network for the first time, a Livening Agent who is a Network Approved Contractor must be used. 			
PREMISE & CUSTOMER DETAILS			
ICP Number			
Customer Name			
Physical Address			
DISTRIBUTED CONNECTION DETAILS (AS PER NETWORK APPROVAL)			
Generation Type		Generation Make / Model	
Generation Capacity (kVA)		Approved Net Export Capacity (kVA)	
Inverter Make / Model		Inverter Complies with AS/NZS 4777	Yes / No
Generation Phase	Red / Blue / White	Battery Storage & Capacity	Battery Storage: Yes / No Capacity (kWh):
Supply Phase(s)	Red / Blue / White	Provider / Installer (Company)	
DISTRIBUTED GENERATION SYSTEM COMISSIONING			
Installation tested by	Name:	License No:	
	Company:	Phone #:	
Date tests completed		Auto Isolation disconnection speed (seconds)	
Loss of network supply auto-isolation test proven	Yes / No	MEN Earth test results (Ohms)	
Auto-restoration (if existing), after specified delay proven	Yes / No	Electrical inspection to AS/NZS3000:2007 and Electricity (Safety) Regulations 2010 completed	Yes / No
Protection setting details. Please attach additional details where necessary		CoC Attached	CoC Number: Attached: Yes / No
ELECTRICAL INSPECTION (LIVENING)			
RoI Number:		Date Livened	
Electrical Inspector Details	Name:	License No:	
	Company:	Phone #:	