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Wellington Electricity Distribution Code and Network Connection Standard

Document Register

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Revision Register

Revision	Issued	Reason for revision	Change reference	Supersedes
0	31/08/2018	New Document		
1	25/11/2020	Connection Requirement Revised		
End of Revision Register				

Contents

1. Purpose

To define the requirements and responsibilities of parties with equipment connected or to be connected to the Wellington Electricity network (excluding Transpower).

2. Policy

It is important that the security and reliability of the supply of electricity from the Wellington Electricity network is managed in order to continuously operate the network in a safe and efficient manner.

All Parties connected, or to be connected to the Wellington Electricity Network (excluding Transpower) must comply with the requirements set out in this Distribution Code.

WELL may disconnect, or refuse to connect, any Party, or other person that does not comply with this Distribution Code.

With Government's approach to Climate Change and reduction in CO_2 emissions, WELL envisions a substantial increase in Distributed Energy Resources (DER) connecting onto the LV networks. To adapt to this fundamental network change, WELL will require the smart management of Connections, which may include the real time visibility and management of connected DER. Connections must be managed in a manner which ensures capacity constraints do not occur to affect supply quality, which is critical for maintaining security of supply for all connected Parties on WELL's network.

The network is transitioning from a 'set and forget' approach to managing assets to a more dynamic real time system approach. The change in the way the network operates, due to emerging technologies, requires forward thinking from the initial design as well as ongoing active monitoring.

WELL may require a bidirectional communication link to be established with the DER installation. By having visibility and operational management over DER, WELL can avoid network congestion and maintain security of supply. These measures are important for avoiding a system emergency event arising from a high penetration of DER

In addition to complying with the Distribution Code, both WELL and Parties of the Distribution Network must comply with their obligations under the Electricity Act 1992, the Regulations, the Electricity Industry Act, the Resource Management Act 1991, HSWA and other relevant legislation.

3. Scope

This Distribution Code applies to all Parties associated with the Wellington Electricity distribution network and defines the following:

- Standard and technical requirements for Connections to the Distribution Network
- Requirements for operational communications
- Requirements for long-term planning
- Health and Safety management on the WELL Network
- Requirements for contingency planning and network restoration
- Requirements for coordinating energy flows and demand
- Requirements for communication of network specific operating and quality parameters

4. Definitions

Act	Electricity Act 1992.
Active Power	The product of voltage and the in-phase component of alternating current (measured in kilo-watts (kW) or mega-watts (MW)).
Apparent Power	The product of voltage and alternating current (measured in kilo-volt-amperes (kVA) or mega-volt-amperes (MVA)).
Black Start	The procedure by which a Generating Plant commences generating electricity without requiring an external power supply
Commerce Commission	A Crown Entity responsible for promoting competitive outcomes in markets where competition is not possible, including the electricity market.
Connection Agreement	Any contractual agreement or arrangement between WELL and a Party setting out the terms and conditions for connection of the Party's Equipment to the WELL Network (but excludes any arrangement with Transpower for connection to Transpower's Network).
Connections	Applies to all existing and new connections on Wellington Electricity's Network
Control Person	A person who has been nominated by WELL, Transpower or a Party (as appropriate) to be responsible for controlling and co-ordinating network operations, and all health and safety requirements, and network emergencies.
Demand	The electricity demand of apparent power, Active Power and Reactive Power expressed in kVA/MVA, kW/MW or kVAr/MVAr respectively.
DER	Distributed Energy Resources including, but not limited to, distributed generation, battery storage and electric vehicles.
Design Rating	The maximum current or voltage, or combination of both, which an item of equipment is intended to have applied to it, taking into account cyclic variations of that voltage and current, together with other parameters as appropriate to specific items of equipment.
Distributed Generator	A person who owns or operates Generating Plant and/or injects or is able to inject electricity into the WELL Network. This includes owners of Solar PV and battery storage.
Dynamic Connection Agreement (DCA)	An agreement that allow DER products to be connected to the Network and to participate in providing services.
Electrical Code of Practice	An Electrical Code of Practice issued pursuant to the Act.
Electricity Authority	The Electricity Authority mission is to promote competition in, reliable supply by, and the efficient operation of, the New Zealand electricity industry for the long-term benefit of consumers
Electricity Governance Rules	The Electricity Governance Rules 2003 as amended from time to time.
Electricity Retailer	A person who supplies, or proposes to supply, electricity to another person for consumption by that other person, via the WELL Network
Embedded Network	An electricity network (including all Fittings) connecting, or to be connected, to the WELL Network which conveys electricity to a third party, or injects, or is able to inject, electricity directly into the WELL Network.
End-Consumer	Any person who consumes, or may consume, electricity distributed through the WELL Network at one or more Points of Connection.
End-Consumer Installation	Any Fittings owned or used by an End-Consumer that form part of a network for conveying electricity from the Point of Connection to where the electricity may be consumed.
End-Consumer Premises	Any premises all or part of which are occupied by the End-Consumer or on which an End-Consumer Installation is situated.
Event	An unscheduled or unplanned occurrence on or relating to an Embedded Network, or the WELL Network including, faults, outages, incidents and breakdowns.
Fittings	Everything used or designed or intended for use, in or in connection with the conversion, transformation, conveyance, measurement or use of electricity
Generating Plant	One or more electricity generating units and all associated Fittings used to generate and convey the electricity generated to the WELL Network
Good Industry Practice	The exercise of that degree of skill, diligence, prudence and foresight which would reasonably and ordinarily be expected from a skilled and experienced operator engaged in New Zealand in the same or similar circumstances having regard to common industry practice in New Zealand at the time.

High Voltage	Any voltage exceeding 1000V AC or 1500V DC
Low Voltage	Any voltage exceeding 50V AC or 120V DC but not exceeding 1000V AC or 1500V DC
Metering Equipment	Equipment used to measure the quantity of Active Power and Reactive Power entering and/or exiting a Point of Connection.
Point of Connection	A point at which a Party's Fittings interconnect with WELL's Network
Power Factor	The ratio of Active Power to apparent power calculated in accordance with the following formula: PF = Q/P
Protection System	The primary arrangements designed to detect abnormal conditions in the WELL Network, any Generating Plant, Embedded Network and/or End-Consumer Installation and initiate fault clearance, or actuate signals or indications.
Reactive Power	The product of voltage and current and the sine of the phase angle between them, which is normally measured in Kilo-vars (kVAr) or Mega-vars (MVAr).
Regulations	Regulations made pursuant to the Act and any other relevant regulations in force from time to time.
System Operator (Distribution)	The service provider responsible for scheduling connections and management of passive and active devices on Distribution Network in a manner to maintain supply quality by avoid fluctuations in frequency or disruption of supply on the distribution network to maintain a secure and reliable low voltage energy delivery system. The DSO also coordinates with Transpower
System Operator (Transmission)	The service provider responsible for scheduling and dispatching electricity on Transpower's Network in a manner to avoid fluctuations in frequency or disruption of supply on the transmission network (currently carried out by Transpower).
Transpower	Transpower New Zealand Limited, and its successors and assigns in its capacity as owner/operator of Transpower's Network [and not in its capacity as an End-Consumer].
Default Distributor Agreement (DDA)	An agreement between WELL and an Electricity Retailer / Trader relating to the use of the WELL Network by the Electricity Retailer to supply electricity to its customers.
Use of System Agreement	An alternative agreement between WELL and an Electricity Retailer / Trader relating to the use of the WELL Network by the Electricity Retailer to supply electricity to its customers.
Party (or Parties)	An End-Consumer, Embedded Generator, Embedded Network operator, Electricity Retailer / Trader or any other person that is associated (through Connections or other means) to the WELL network.
Party Equipment	Appliances, Fittings, Generating Plant and any other equipment owned or operated by a Party.
WELL	Wellington Electricity Lines Limited and its successors and assigns.
WELL Network	The electricity networks (including all Fittings) for the conveyance and distribution of electricity owned or operated by WELL.
WELL Congestion Std	WELL Policy for managing equitable allocation of network capacity when congestion may occur

5. References

Reference Standards	**Title**	**Page**
AS/NZS 61000.3.2:2010	Electromagnetic compatibility (EMC) Part 3.2 Limits	8
AS/NZS 61000.3.3:2012	Electromagnetic compatibility (EMC) Part 3.3 Limits	9
AS/NZS 61000.3.4:2007	Electromagnetic compatibility (EMC) Part 3.4 Limits	9
AS/NZS 61000.3.5:2013	Electromagnetic compatibility (EMC) Part 3.5 Limits	9
AS/NZS 61000.3.6:2012	Electromagnetic compatibility (EMC) Part 3.6 Limits	9
AS/NZS 61000.3.7:2012	Electromagnetic compatibility (EMC) Part 3.7 Limits	9
BS EN 50160:2010	Voltage characteristics of electricity supplied by public distribution systems	11
AS/NZS 4777.2:2015	Grid connection of energy systems via inverters Part 2: Inverter requirements	9
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ENP-108	Electricity network standard: Network Security and Planning Policy	9
ENS-308	Distribution Earthing Design	10, 11, 17
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ENG-100	Technical Requirements for Connection of Distribution Generation (DG)	18
	Congestion, Curtailment and Interruption Management Policy	19
ENS-001	Approved Network Fittings	15
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Other		
NZ legislation	Civil Defence Emergency Management Act 2016	29
	Electrical Codes of practice	7, 9, 11, 17, 18 , 23
	Electricity Act 1992	4, 5, 7
	Electricity Industry Act 2010	
	Electricity (Hazards from Trees) Regulations 2003	26
	Health and Safety at Work Act 2015	27
	Resource Management Act 1991	4, 8
	Safety Rules & General Safety Handbooks for the Electricity Industry	26
Transpower	Transpower Network emergency recovery procedures	19
	Transpower's Connection Code	23
End Of References		

6. Cost of Compliance

Where a person (supplier) is required to supply information to another person (requestor) under this Distribution Code and Network Connection Standard, the supplier will bear the reasonable costs of supplying that information. Where information in addition to that required under this Distribution Code and Network Connection Standard is requested, the requestor may be required to bear the reasonable costs of supplying the information incurred by the supplier.

7. Distribution Planning Code

7.1 Introduction

This section specifies WELL's technical, design and connection criteria and procedures for planning and developing the WELL Network.

The objectives of this section are:

(a) To enable the information to be available for WELL to allow the Network to be planned, designed and constructed to operate safely, securely and economically;
(b) To facilitate the use of the WELL Network by Parties;
(c) To establish technical conditions to facilitate the interface between Embedded Networks and the WELL Network;
(d) To formalise the exchange of planning and monitoring information; and
(e) To provide sufficient information for a Party to assess opportunities for Connections and, where appropriate, to plan and develop it's Embedded Network so as to be compatible with the WELL Network.

The cost responsibility for any alteration or addition to the Distribution Network driven by a Connection may require a commercial arrangement between WELL and the relevant Party. This commercial arrangement is not detailed in this document.

Information exchanged between WELL and a Party for planning purposes may be commercially sensitive and must be kept confidential to the Parties.

7.2 Standards and Design Principles

This section sets out the principles and standards for the design of the WELL Network and any embedded network or End-Consumer Installation. This distribution code is not intended to inhibit design innovation or restrict the introduction of new technologies or electricity networks which are consistent with the overall requirements of this distribution code.

WELL recognises that some Parties may not presently comply with all requirements in this section, and has made or is in the process of making arrangements with those Parties to rectify the situation. Subject to these arrangements, nothing limits the obligation of the Parties to comply with this Distribution Code within a time frame reasonably acceptable to WELL.

7.2.1 Standard of Supply

7.2.1.1 Security

The WELL Network, any Embedded Network and any fittings which are to be transferred to WELL (including Fittings for subdivisions and other developments), must be designed to meet:

- The Electricity Network Security Criteria as defined in the annual Asset Management Plan section 8.1.1[1].
- All relevant legislation, Regulations, the Electricity Governance Rules and Electrical Codes of practice.
- Where DER is being connected by a Party, application or further engagement may be required to ensure security of supply of the LV network is maintained. DER Connections may be required to supply power quality metrics and operational control via a data link to WELL.

7.2.1.2 Frequency and Voltage

The WELL Network, any Embedded Network and any Fittings which are to be transferred to WELL (including any Fittings for subdivisions and other development) must be designed to:

- Enable the WELL Network to operate at 50 Hertz;
- Enable a range of voltages to be supplied to Parties; and
- Comply with all relevant legislation, Regulations, the Electricity Governance Rules and Electrical Codes of Practice.

7.2.1.3 Network Disturbances and Waveform Distortion

To limit the potential effects of voltage waveform distortion and other disturbances on the WELL Network caused by certain types of Party Equipment, a Party's load must comply with the following:

(a) Voltage fluctuations must comply with the limits set out in all relevant Regulations and Electrical Codes of Practice and 61000 series joint Australian/New Zealand EMC standards;

(b) The voltage and current waveform distortion by any load or End-Consumer Installation must comply with;

1. AS/NZS 61000.3.2:2013 Electromagnetic compatibility (EMC) Part 3.2 Limits – Limits for harmonic current emissions (equipment input current less than or equal to 16 A per phase);

[1] Further details of Asset Management Plan can be found on the WELL website at: https://www.welectricity.co.nz/getting-connected/generating-your-own-electricity/

2. AS/NZS 61000.3.4:2007 Electromagnetic compatibility (EMC) Part 3.4 Limits – Limitation of emission of harmonic currents in low voltage power supply systems for equipment with rated current greater than 75 A; and
3. AS/NZS 61000.3.6:2012 Electromagnetic compatibility (EMC) Part 3.6 Limits – Assessment of emission limits for distorting loads in MV ,HV and EHV power systems; and
4. AS/NZS 4777.2:2015 - Grid connection of energy systems via inverters Part 2: Inverter requirements.

(c) Voltage fluctuations and flicker due to any load or equipment (e.g., motor start, motor operation, sudden switching of large loads or equipment, operation of electrical arcing equipment such as welding machines or arc furnaces, etc.) must comply with:

1. AS/NZS 61000.3.3:2012 Electromagnetic compatibility (EMC) Part 3.3 Limits – Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current less than or equal to 16 A per phase and not subject to conditional connection.
2. AS/NZS 61000.3.5:2013 Electromagnetic compatibility (EMC) Part 3.5 Limits – Limitation of voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current greater than 75A.
3. AS/NZS 61000.3.7:2012 Electromagnetic compatibility (EMC) Part 3.7 Limits – Assessment of emission limits for distorting loads in MV ,HV and EHV power systems; and
4. AS/NZS 4777.2:2015 - Grid connection of energy systems via inverters Part 2: Inverter requirements.

WELL may require a Party to implement corrective measures to limit the level of distortion, at its own expense, if the Party's equipment does not comply with the requirements above. Under special circumstances WELL may consider other limits or levels.

Under fault and circuit switching conditions the rated frequency or voltage may fall or rise transiently. The fall or rise in voltage will be affected by the method of earthing of the neutral point of the WELL Network, and this variation in voltage will be taken into account by Parties in selecting Party Equipment. WELL's distribution earthing design and construction practice is contained in ENS-308 Distribution Earthing Design.

7.2.1.4 Signalling Systems

WELL operates signalling systems for load control and other control purposes at the frequencies detailed in Appendix 1. To ensure the correct operation of the signalling systems, Party Equipment must be designed and operated to not interfere with the operation of the signalling systems or the WELL Network. WELL may require a Party to provide any necessary corrective measures or removal of the Party's Equipment at the Party's expense if the Party's Equipment interferes with WELL's signalling systems or the WELL Network.

Where DER is being connected by a Party, application or further engagement may be required to ensure security of supply of the LV network. Bi-directional data links may be established between the DER and WELL, to enable real time power quality visibility and operational control.

7.2.1.5 Power Factor

The Power Factor of a Party's load measured at the metering point must not be less than 0.95 lagging or leading at all times. Larger connections are incentivised to correct power factors via tariffs. WELL may also require a Party to provide any necessary corrective measures at the Party's expense if the Party's power factor falls below 0.95 at any time. Any corrective measures must not cause disturbance or distortion in excess of those specified in sections 7.2.1.3 or 7.2.1.4. If the Party fails to implement corrective measures, WELL may implement corrective measures, and the Party will pay WELL's reasonable costs of doing so.

7.2.1.6 Voltage Imbalance

Under normal operating conditions, during each period of one week, 95% of the 10 minute mean rms values of the negative phase sequence component of the supply voltage must comply with the requirements of BS EN 50160:2010 "Voltage characteristics of electricity supplied by public electricity networks" and be within range 0 to 2% of the positive phase sequence component.

Connections that cause voltage disturbance outside of network limits may be disconnected to return supply quality to prescribed values. The requirement to provide information is discussed in section 7.2.2.5.

7.2.2 Design Principles

7.2.2.1 Materials and Construction Standard

The materials used in the construction of the WELL Network and any Embedded Network and any Fittings which are to be transferred to WELL (including Fittings for subdivisions and other developments), must comply with WELL's Design and Construction Standards.

WELL may not accept ownership of and/or refuse to connect any Party Equipment that does not conform to WELL's Design and Construction Standards or any other technical standards which WELL may reasonably set.

7.2.2.2 Earthing

The method of earthing the WELL Network is contained in ENS-308 Distribution Earthing Design which is designed to comply with regulations, relevant Electrical Codes of Practice and industry guidelines. All Fittings must meet the voltages and fault levels which will be imposed on the Fittings as a result of the method of earthing.

Multiple earth neutral networks must be designed by Parties to comply with Good Industry Practice.

Where there is more than one source of energy, Parties must take precautions to limit the occurrence and effects of circulating currents in respect of the neutral points connected with earth.

7.2.2.3 Protection

The WELL Network and each Embedded Network must incorporate Protection Systems in accordance with any relevant Regulations and Electrical Codes of Practice.

To ensure satisfactory operation of the WELL Network, Parties must obtain WELL's approval to operating times, discrimination and sensitivity of Protection Systems at the Point of Connection before commissioning, or making any change to the Point of Connection.

Unless otherwise agreed by WELL in writing, Parties must not limit the fault current infeed to the WELL Network by the use of Protection Systems as the failure of that Protection System to operate as intended, in the event of a fault, could cause the fault rating of Fittings owned by WELL to be exceeded.

7.2.2.4 Superimposed and Other Signals

Any Party Equipment including mains borne signalling equipment installed by a Party for the purpose of information transfer, load management, or any other purpose must:

- Comply with the appropriate industry standards; and
- Not be used to superimpose, inject or convey signals on the WELL Network without WELL's prior written approval (usually in conjunction with a commercial agreement setting out other terms and conditions).

WELL may disconnect a Party's mains borne signalling equipment which has been installed without WELL's approval.

If a Party's signals leak into the WELL Network, the Party will indemnify WELL from any loss or damage whatsoever caused by the Party using the WELL Network for conveyance of signals.

Where there is a communications link established between WELL and Party equipment, which can be used to manage load or generation, this will need to be agreed and tested / maintained to the required standards.

7.2.2.5 Mains Signalling Channels

WELL will from time to time designate which channels Electricity Retailers may use for signalling at Points of Connection. Each Electricity Retailer must ensure that the load management equipment at Points of Connection supplied by it will reliably respond to the designated channel signal.

WELL may reserve or allocate certain channels for use by a certain Electricity Retailer or for WELL's own use. Other Electricity Retailers must not use a reserved channel without providing WELL with evidence satisfactory to WELL that the designated Electricity Retailer has given written approval to the use of that channel by the other Electricity Retailer. Any Electricity Retailer who wishes to carry out load management on a reserved channel must enter into a separate agreement with WELL.

DER Connections may require a data communication link to give WELL visibility of power quality metrics and operational management over load or generation. This is especially required where the network is being pushed outside network limits. The data communication link will need to be assigned and tested to ensure management of the DER can support network quality and security standards.

7.2.2.6 Capacitors

Any capacitors installed by a Party must:

- Be designed so that they do not adversely affect the WELL Network and any signals conveyed by WELL over the WELL Network (refer to section 7.2.1.4 above)
- Not generate or cause to generate waveform (or harmonic) distortions or transient overvoltages or transient overcurrents in excess of the limits given in clause 7.2.1.3.

Before installing capacitors, the Party should discuss the technical details with WELL and WELL will provide technical information to assist the Party to design the capacitors. WELL may require the Party to implement appropriate corrective measures if the Party's capacitors interfere with WELL's signals or other Embedded Networks, End-Consumer Installations or their use of the WELL Network.

7.2.2.7 Interconnection

A Party may not interconnect between Points of Connection without WELL's prior written approval.

7.3 Connections to the WELL Network

This section specifies the information required by WELL from a Party (including Distributed Generators[2]) in order to ensure that adequate technical provision is made for new supplies, increases in existing load, or changes in load characteristics. With Government's approach to Climate Change and reduction in CO_2 emissions, WELL envisions a substantial increase in EV and DG connecting and onto its LV networks. To adapt to this fundamental network change, WELL will require the smart management of Connections, which may include the real time visibility and control of connected DER. Connections must be managed in a manner which ensures capacity constraints do not occur, which is critical for maintaining security of supply for all connected Parties.

7.3.1 Load Characteristics

7.3.1.1 Low Voltage Supplies

For Low Voltage supplies the Party must provide the following data to WELL when a connection is requested:

(a) Maximum Apparent Power requirements (kVA);
(b) Type and electrical loading of equipment to be connected e.g., number and size of motors, including maximum starting currents and electrical heating arrangements;
(c) Capacity of generators installed (if any) and their mode of operation (standby or base load);
(d) The date when the connection is required); and
(e) Data communication capabilities (e.g. available protocols) from DER Connections

If WELL requires more detailed information, the Party will provide the information to WELL on request at the Party's cost.

[2] Further details of connecting distributed generators can be found on the WELL website at: https://www.welectricity.co.nz/getting-connected/generating-your-own-electricity/

7.3.1.2 High Voltage Supplies

For High Voltage supplies the Party must provide the following information in addition to the information required under 7.3.1.1:

(a) All types of demand:

(i) Maximum Active Power requirements;
(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; and
(v) The maximum levels of harmonic voltage and current to be imposed on the WELL Network.

(b) 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; and
(iii) The magnitude of the largest step changes in Active Power and Reactive Power, both increasing and decreasing.

(c) Generation[3] (if applicable):
Details of generation schedule:

(i) Rates of change of Active Power and Reactive Power;
(ii) The schedule of intended generation; and
(iii) Whether the generation is running in parallel with WELL's Network and if so, the fault current contribution to WELL's Network.

(d) Energy storage (if applicable)
Use of a Party's energy storage which has the ability to change load in a manner that affects peak demand, then communication on operating limits or management may need to be considered ahead of connection.

Where required by WELL, the Party will also provide more detailed information such as an indication of the pattern of build-up of load and a proposed commissioning programme.

7.3.2 Connection Arrangements

The design of Connections between the WELL Network and an Embedded Network or End-Consumer Installation must be in accordance with the standards and regulations, especially WELL's standards, set out in section 5, subject to any modification approved by WELL.

[3] Further details of connecting distributed generators can be found on the WELL website at: https://www.welectricity.co.nz/getting-connected/generating-your-own-electricity/

When an application for connection is made, WELL will agree with the relevant Party the voltage and capacity at which the Party will be connected in accordance with WELL's normal practice for the type of load to be supplied. WELL may specify a different connection voltage to avoid potential disturbance caused by the Party's Equipment, or for other technical reasons, or may agree alternative methods for minimising the effects of disturbing loads. The Party must take any reasonable steps to keep its Demand within the agreed supply capacity. Should the Party anticipate its Demand will exceed the agreed supply capacity, it must notify WELL to agree on necessary (if any) remedial actions. Failure to notify WELL that may result in failure/ damage of WELL equipment may result in WELL seeking compensation from the Party.

Before entering into a Connection Agreement the Party must reasonably satisfy WELL in writing that the Embedded Network or End-Consumer Installation will comply with all appropriate requirements of the Distribution Code.

For existing Connections where new load is added which can be varied, then the Party may be offered a preferential tariff in recognition of dynamically managing the load. This will require the consideration of a Dynamic Connection Agreement and communications with the variable load, storage or generation source.

7.3.2.1 Standard LV Connections

Connections to residential and small business End-Consumers are normally made at 60A single phase. Where appropriate and possible, WELL can provide the following standard connections:

(i) Residential connections: 230 V single phase 60 A, 400 V three phase 60 A
(ii) Commercial / industrial connections: 230 V single phase 60 A, 400 V three phase 60 A, 100 A or 160 A

7.3.2.2 Sub-divisions

For subdivision reticulation where ownership may be transferred to WELL, provision must be made for future development in accordance with the relevant District Plan to ensure cabling has adequate capacity to supply on-going development stages without the need for upgrade. Full details and requirements are included in ENS-309 Underground Subdivision Design

7.3.2.3 Enhanced Low Voltage Connections

For larger loads at Low Voltage, WELL may need to reinforce the WELL Network, and will advise the Party of such requirements. If the supply or supply increase is greater than 200 A, the Party must apply in writing.

Where a new transformer is required for a proposed connection, the Party must first enter into an agreement with WELL in relation to the location and provision of accommodation for the transformer.

Unless otherwise agreed, WELL will provide all Fittings to a suitable Low Voltage frame or termination, which will be the Point of Connection.

7.3.2.4 Supply at High Voltage

If a Party requires supply at High Voltage, the Party must contact WELL to agree on the voltage. Once the supply voltage is agreed, WELL will supply High Voltage cables and switchgear up to the End-Consumer's Point of Connection. The Party will be responsible for all equipment beyond the Point of Connection.

7.3.2.5 Supply to Embedded Networks at High Voltage

In addition to the requirements specified in 7.3.2.4, Embedded Networks must comply with the Electricity Governance Rules requirements for Metering Equipment.

7.3.3 Communications

Routine and emergency communication between WELL and the Party will be provided and maintained as agreed in writing between WELL and the relevant Party in each particular case.

7.3.4 Demand Management

Where WELL or a Party needs to co-ordinate demand management, the parties will agree a procedure for implementing demand management.

WELL is required by the Electricity Industry Act 2010 (EIA) to interrupt supply to Parties under emergency situations or to avoid a grid emergency. Parties will, on request, provide to WELL information on available emergency load shedding. WELL will at its discretion arrange sufficient load to be disconnected to meet its obligations under the Electricity Governance Rules.

DER Connections may be subjected to demand management response programs, through Dynamic Connection Agreements (DCA) and off-peak use tariffs.

7.4 Technical Requirements for Connections

This section specifies the technical arrangements for the Point of Connection between the WELL Network and an Embedded Network, Generating Plant or End-Consumer Installation and applies to all voltage levels.

7.4.1 Fittings at Point of Connection

All Fittings at the Point of Connection must meet the design principles contained in this Code and WELL Standards, especially ENS-001 Approved Network Fittings and ENS-099 General Technical Requirements. Any connection to the WELL Network will include a means of disconnection of the Embedded Network or End- Consumer Installation readily accessible by WELL.

7.4.2 Protection Requirements

The Party's Protection System must be compatible with standard practices on the WELL Network, as specified by WELL. In particular:

(a) Maximum clearance times must be within the limits established by WELL;
(b) Equipment short circuit ratings must not be exceeded;
(c) Protection Systems for Generating Plant and capacitors must prevent unintended back-feeding of electricity into the WELL Network;
(d) In connecting to the WELL Network, the Party should be aware that auto-reclosing or sequential switching features may be in use by WELL on the WELL Network. WELL will, on request, provide details of auto-reclosing or sequential switching features in order that the Party may take this into account in the design of the Protection System;
(e) The Party should be aware that the Protection Systems on the WELL Network may cause disconnection of one phase only of a three phase supply for certain types of fault and take the necessary steps to safeguard their Party Equipment from the effect of the Event.

WELL standards give some details of commonly used Fittings. Protection Systems discrimination between a Party's Fittings and WELL's Fittings must be maintained at all times and evidence of satisfactory discrimination may be requested by WELL.

7.4.3 Earthing

Embedded Networks must be earthed in accordance with all relevant Regulations and Electrical Codes of Practice. WELL's earthing requirements are contained in ENS-308 Distribution Earthing Design

7.4.4 Fault Level Consideration

The short circuit rating of a Party's Fittings at the Point of Connection must not be less than the design fault level of the WELL Network (available from WELL on request).

7.4.5 Motor Starting

Except where WELL agrees otherwise in writing, voltage fluctuation due to motor starting must comply with clause 7.2.1.3 of this Distribution Code / Network Connection Standard.

7.4.6 Capacitive and Inductive Effects

Parties must provide design details of capacitor banks, reactors and reactive loads connected at any voltage which could adversely affect the WELL Network to:

- Verify that controlling equipment of the WELL Network is suitably rated; and
- Show that the supply quality of the WELL Network will not be impaired.

7.4.7 Intermittent Load

Unless otherwise agreed by WELL in writing, any voltage fluctuation, flickers and harmonic contents due to intermittent load or installations, such as arc furnaces, welders and cranes etc., must comply with the limits set out in clause 7.2.1.3 of this Distribution Code / Network Connection Standard.

7.4.8 Telemetry and Measurement Equipment

WELL will specify any telemetry and measurement equipment required for monitoring an Embedded Network.

Distributed Generators must provide signals to WELL's and Transpower's Control Centres for the efficient management of Transpower's Network including response to grid emergencies in accordance with the Electricity Governance Rules.

7.5 Requirements for Distributed Generation

This section applies to all existing or prospective Distributed Generators. WELL recognises that some existing Distributed Generators may not presently comply with all requirements in this section, where appropriate WELL has made or will make arrangements with those Distributed generators subject to those arrangements, nothing limits the obligation of the Distributed Generator to comply with this Distribution Code / Network Connection Standard within a time frame acceptable to WELL.

7.5.1 General Requirements

Distributed Generators with Generating Plant connected to the WELL Network must comply with all the relevant Regulations and Electrical Codes of Practice, the requirements specified in the Electricity Governance Rules and any WELL requirements as specified in WELL's Technical requirements for Connection of Distributed Generation (available from WELL's website).

The presence of Distributed Generators shall not restrict WELL's switching operations on the WELL Network.

Metering Equipment installed at Embedded Networks and Generating Plants must comply with the requirements of the Electricity Governance Rules.

At the discretion of WELL, DG Connections are subjected to:

- A reduction in permissible maximum export power in accordance with WELL's Congestion, Curtailment and Interruption Management Policy.
- Revised protection and control requirements.

7.5.2 Information Required

Before entering into an agreement to connect a Generating Plant to the WELL Network (directly or via an Embedded Network), Distributed Generators must provide sufficient information to ensure successful interfacing with the WELL Network without affecting other Parties. The information requirements are listed in the following two procedures as published on WELL's website:

- Distributed Generation (≤10kW) Connecting to WELL's electricity network
- Distributed Generation (>10kW) Connecting to WELL's electricity network

WELL will, where applicable, use the information provided to model the WELL Network to decide what the method and voltage level of the connection. WELL may require the Distributed Generator to meet the reasonable costs in doing so. The procedure for agreeing on the connection requirements and the cost of doing so are published on WELL's website.

The information will remain confidential between the Parties until agreed otherwise. WELL reserves the right to release sufficient information relating to existing Distributed Generators and those for which a Connection Agreement has been approved for the purpose of meeting its obligations under the Electricity Governance Rules.

The System Operator may also require Distributed Generators to provide information in accordance with the Electricity Governance Rules.

7.5.3 Technical And Performance Requirements

Protection and control equipment for all Generating Plant connected to the WELL Network must:

- Comply with WELL's Technical Requirements for Connection of Distributed Generation; and
- Not interfere with the quality of supply to other Parties of the WELL Network.

Generating Plant with a Design Rating 30 MW or more are subject to asset owner performance obligations and technical standards contained in Part C of the Electricity Governance Rules.

7.5.3.1 Metering Equipment

Any Metering Equipment must comply with the reconciliation requirements under the Electricity Governance Rules.

7.5.3.2 Contribution to Frequency Support

Generating Plant, when connected to the WELL Network (directly or via an Embedded Network), must remain connected and synchronised under the frequency range and for the duration prescribed in the asset owner performance obligations of the Electricity Governance Rules.

7.5.3.3 Voltage Support

Generating Plant, when connected to the WELL Network (directly or via an Embedded Network), must remain connected and synchronised, and continue operate in a manner that supports voltage and voltage stability on the grid in accordance with the asset owner performance obligations of the Electricity Governance Rules.

7.5.3.4 Protection

Each Embedded Generator must ensure the protection system on their Generating Plant is designed and constructed to the requirements as specified in the "ENG-100 Technical Requirements for Connection of Distributed Generators".

7.5.3.5 Data Acquisition

Communication between WELL and the invertor based device that is greater than 10kW rating must be established as specified in WELL's Technical requirements for Connection of Distributed Generation (available from WELL's website). To ensure all inverter based connection requirements are being adhered to, key metrics such as active power, reactive power and voltage may be requested by WELL.

7.5.3.6 Islanding

An Embedded Generator with generating Plant operating in islanded mode must not supply any part of the WELL Network beyond the Point of Connection, except when directed by WELL to do so under Transpower Network emergency recovery procedures (refer to section 5.2). If there are no facilities to resynchronise the islanded Generating Plant with the rest of the WELL Network at the Point of Connection, the Embedded Generator will, under WELL's instruction, ensure that the Generating Plant is disconnected for resynchronisation. An Embedded Generator must not, under any circumstances, re-energise parts of the WELL Network that have been disconnected from the rest of the WELL Network.

7.5.3.7 Synchronisation

Each Embedded Generator must install automatic synchronising facilities as specified in the "ENG-100 Technical Requirements for Connection of Distributed Generators".

7.5.3.8 Black Start Capability

Each Embedded Generator must:

- notify WELL in writing if its Generating Plant is capable of Black Starts and provide WELL with the details of such facilities; and
- Install synchronising facilities to allow the Generating Plant to be resynchronised and reconnected to the WELL Network after a Black Start.

7.5.4 Commissioning Tests

Each Distributed Generator must provide WELL with copies of the test records for the Generating Plant, including protection and control equipment, prior to connection of the Generating Plant to the WELL Network. WELL may not connect a Generating Plant to the WELL Network unless it is satisfied the relevant equipment meets the specified technical requirements.

7.6 Planning Information

This section sets out the planning information to be exchanged between WELL and each relevant Party.

7.6.1 Requirements For WELL

WELL will on request provide all relevant WELL Network parameters reasonably required for planning to a Party.

7.6.2 Requirements For Electricity Retailers And Other Parties

Parties must provide to WELL sufficient planning data/information and safety management requirements as requested by WELL from time to time, to enable WELL to comply with technical and legislative requirements.

A Party must give adequate notice of any significant changes to its Party Equipment or operating regime to enable WELL to design and implement any required modifications to the WELL Network.

7.6.3 Reactive Compensation Plant

A Party must provide WELL with information on any reactive compensation plant connected to the WELL Network, other than at Low Voltage, including:

(a) The MVAr capacitive or inductive rating of the equipment and operating range if variable;
(b) Details of any automatic control logic;
(c) Impedance of the compensation plant with respect to harmonic frequencies from fundamental to 50th harmonic and any other frequencies as requested by WELL; and
(d) The Point of Connection.

Where attenuation of load control or any other superimposed signals has occurred, or may occur, as a result of reactive compensation plant connected at Low Voltage, WELL may request, and the Party will provide, the information in clauses (a) to (d) above.

7.6.4 Lumped Network Susceptance

Each Party must, on request, provide WELL with details of the equivalent lumped network susceptance of its Party Equipment provided the details are reasonably accessible.

7.6.5 Fault Infeeds

WELL and each Party will exchange information on potential fault infeed levels at the Point of Connection in the form of:

(a) The maximum and minimum three phase symmetrical and phase-earth short circuit infeed; and
(b) In the case of interconnected networks, adequate equivalent network information.

7.6.6 Demand Transfer Capability

WELL and each Party will exchange information on demand transfer capability where the same demand may be supplied from alternative Points of Connection, including the proportion of demand normally fed from each Point of Connection and the arrangements for transfer under outage conditions.

8. Distribution Operating Code

This section specifies:

- The requirements, criteria and procedures used by WELL in operating the WELL Network;
- Operational matters affecting Parties, including the provision of forecasts of likely demand, the planning of outages, testing/monitoring, demand control, and the reporting of operational changes and Events.

Unless otherwise stated, this section applies to all Parties of the WELL Network.

8.1 Demand Forecasts

8.1.1 Introduction

To operate the WELL Network efficiently, and to ensure maximum security and network stability, WELL needs to forecast:

- Loadings on the WELL Network with sufficient accuracy and for a sufficiently long forward period to enable it to plan the development of the WELL Network; and
- Demand for each busbar from which it takes supply, or proposes to take supply, from Transpower.

This section applies to:

(a) Distributed Generators with Generating Plant over 1 MW; and
(b) Any Party with demand over 1.5 MVA.

8.1.2 Information Required

Parties described in 8.1.1 must, on request, provide the following information to WELL:

- Winter maximum demand
- Summer maximum demand
- Power factor at maximum demand
- Total annual energy
- Projected demand / energy usage over any period specified by WELL
- Forecasts of additional load that will require additional transformer or cable capacity.

In addition, Distributed Generators must furnish such information as WELL may reasonably consider would affect its demand forecasts.

8.2 Outage Planning

8.2.1 Introduction

To plan and co-ordinate its construction, maintenance and operational activities, WELL needs information from certain Parties on their planned outages of significant Party Equipment which may affect the operation of the WELL Network, or require the commitment of resources. This section applies to the following Parties:

(a) Distributed Generators with Generating Plant with a maximum Design Rating greater than 1 MW; and
(b) High Voltage Parties

8.2.2 Outage Planning Procedures

8.2.2.1 Generating Plant

Distributed Generators must on request provide information relating to their Generating Plant to WELL (including scheduling information on the intended usage of the Generating Plant).

8.2.2.2 Planned Outages

Parties must on request provide to WELL details and schedules of planned outages of their Party Equipment which may materially affect the operation of the WELL Network.

8.3 Testing and Monitoring

8.3.1 Introduction

WELL reserves the right to test and/or monitor the WELL Network and to request certification from Parties to ensure that Parties are not operating outside the technical parameters required by this Distribution Code / Network Connection Standard or the performance requirements of the Electricity Governance Rules.

8.3.2 Costs Of Tests

WELL may levy a charge on Parties for the carrying out tests on the WELL Network.

8.3.3 Testing & Monitoring Procedures

The testing and monitoring procedures relate to the quality of supply and the Power Factor parameters on the WELL Network.

8.3.3.1 Quality of Supply

WELL may from time-to-time test and/or monitor the quality of supply, particularly harmonics level, at various points on the WELL Network (which may follow receipt of a complaint).

Where the test shows that a Party is operating outside the technical parameters specified in Section 2 of this Distribution Code and Network Connection Standard, or any relevant Regulations, the Electricity Industry Act, Transpower's Connection Code or Electrical Codes of Practice, WELL will advise the Party and the Party will immediately, or within such time as may be agreed with WELL, remedy the situation or disconnect the Party Equipment causing the problem. If the Party does not remedy the situation, WELL may disconnect the Party from the WELL Network.

8.3.3.2 Power Factor

WELL may from time-to-time monitor the effect of the Party's load on the WELL Network, particularly the amount of Active Power and Reactive Power transferred across the Point of Connection. Where the Party is exporting or importing Active Power and Reactive Power in excess of the level specified in the Connection Agreement, WELL will advise the Party of, and where appropriate demonstrate, the results of the monitoring.

Parties must:

- Apply to WELL in writing to increase the Active Power and/or Reactive Power at the Point of Connection above the connection capacity used to calculate the connection charge, or that technically allowed by the capacity of the Fittings;
- Restrict power transfers to the connection capacity used to calculate the connection charge until WELL has agreed to amend the Connection Agreement and any physical changes have been completed.

8.4 Demand Control

8.4.1 Introduction

This section sets out procedures to enable WELL to achieve a reduction in demand following a request from the System Operator, or when WELL otherwise is aware that a Transpower Network or WELL Network emergency is occurring or likely to occur, to avoid a collapse, breakdown or overload of any part of the Transpower Network or the WELL Network. The following methods of reducing demand are dealt with:

(a) Voltage reduction;
(b) Party demand management;
(c) Party disconnection;
(d) Automatic under-frequency disconnection;
(e) Automatic under-voltage disconnection; and
(f) Emergency manual disconnection.

8.4.2 Demand Control Procedures

WELL's implementation of demand control, which may result in disconnection of load may affect End-Consumers, and where applicable, contractual arrangements between Electricity Retailers and End-Consumers should reflect this.

8.4.2.1 Operational Network Load Reduction (Voltage reduction, Party Demand Management, Party Disconnection)

WELL has developed procedures (which may be amended or replaced from time to time) to reduce load within the WELL Network in a controlled manner by reducing voltage and/or disconnecting End-Consumers or portions of End-Consumer loads.

The load reduction procedures may include a system to give notice to a Party's Control Person (where practicable) that load reduction measures will be implemented beyond normal operational or economically based demand control measures.

This may require Parties to enter Dynamic Connection Agreements to consent to automated load deferral or load shifting to manage peak demand periods.

Dynamic voltage control of inverters, through the variation of active and reactive power, is to be enabled at WELL's discretion. WELL will provide voltage control requirements to the Party responsible for the inverter.

8.4.2.2 Automatic Under Frequency or Under Voltage Disconnection

The Electricity Governance Rules require WELL to allocate parts of the WELL Network to be disconnected from Transpower's Network during emergencies and contingencies. WELL will not be liable for any voltage related or low frequency disconnection operations initiated or required by the System Operator, even if such operations were made in consultation with WELL.

8.4.2.3 Emergency Manual Disconnections

WELL may (at the request of the System Operator or otherwise) arrange to have an emergency manual disconnection procedure available, based on Transpower points of supply or any other groupings WELL considers reasonable. The procedure will be designed to operate irrespective of network frequency or voltage contingencies. WELL will not be liable for any emergency manual disconnection operations initiated or required by the System Operator, even if such operations were made in consultation with WELL.

8.5 Operational Liaison

This section sets out the requirements for the exchange of information in relation to operations on the WELL Network, or any Embedded Network or Generating Plant or Storage Plant connected directly to the WELL Network. It does not seek to deal with any actions arising from the exchange of information, but merely with that exchange.

8.5.1 Nomination of Personnel

WELL and any Party to whom this section of the Distribution Code / Network Connection Standard applies will nominate personnel having the knowledge and experience required to operate the WELL Network and the Embedded Network/Generating Plant respectively and will agree communication channels to ensure the effectiveness of the exchange of information specified herein.

8.5.2 Notification of Operations and Events

8.5.2.1 Requirement to Notify

In the case of an Operation or Event on the Embedded Network/Generating/ Storage Plant which has an operational effect on the WELL Network, the Party will notify WELL in writing in accordance with this Distribution Code / Network Connection Standard.

8.5.2.2 Form of Notification

Any notification under this section of the Distribution Code / Network Connection Standard must be of sufficient detail to describe the Operation or Event and must include the name of the individual reporting the operation or Event.

8.5.2.3 Dynamic Connection Agreement

Where an Operation or Event is likely to occur which affects the security or quality the network can supply, the Party may be required to enter an agreement for active management of the Party equipment by WELL in order to maintain supply quality at congestion periods. The DCA will be between the Party and WELL.

8.5.2.4 Timing of Notification

Notification of a planned or anticipated operation will be given as far in advance as possible, and in any case must be given in sufficient time to reasonably allow the recipient to consider and assess the implications and risks arising. In all other cases, notification must be given as soon as practical following the operation or Event occurring.

8.6 Fittings Numbering and Nomenclature

8.6.1 New Fittings

When WELL or a Party intends installing Fittings at a Point of Connection, the proposed numbering and/or nomenclature to be adopted for the Fittings must be notified to the other party. The notification will be made in writing to the relevant party and will consist of an operation diagram incorporating the proposed new Fittings to be installed, and its proposed numbering and/or nomenclature.

The notification will be made to the relevant party prior to the proposed installation of the Fittings with a view to obtaining such parties agreement to the proposed numbering and nomenclature. If the parties cannot agree, WELL, will have the right (acting reasonably) to determine the numbering and nomenclature to be applied at that site.

8.6.2 Existing Fittings

WELL and the Party at each Point of Connection must:

- Provide and erect clear and unambiguous labels showing the numbering and nomenclature of their respective Fittings;
- Supply each other, on request, with details of the numbering and nomenclature of their respective Fittings.

8.6.3 Changes to Existing Fittings

Where WELL or a Party needs or wishes to change the existing numbering or nomenclature of any of its Fittings at the Point of Connection, clause 8.6.1 applies amended to reflect that only a change is being made.

WELL and the Party must provide and erect clear unambiguous labels showing the numbering and nomenclature of its changed Fittings.

8.7 Access to Equipment

The Party will allow WELL access to its site to operate, inspect, repair, install, replace or test WELL Fittings. Failure to provide access may result in disconnection of supply.

8.8 Maintenance of Substation Accommodations

WELL is responsible for maintaining the substation accommodation on public road reserve and End-Consumer Premises if such accommodation forms an integral part of the Fittings.

Each Party is responsible for maintaining any substation accommodation on its premises if the substation accommodation is a standalone structure or a structure that forms an integral part of the Party's buildings in a reasonable condition and carrying out any necessary repairs.

8.9 Vegetation Control

Subject to the Electricity (Hazards from Trees) Regulations 2003, Parties must maintain any trees on their sites clear of WELL's Fittings.

8.10 Asset Management Plan

Each year WELL will prepare an Asset Management Plan setting out how WELL will manage and maintain the WELL Network to provide a safe and reliable supply to Parties. The Asset Management Plan will be available on WELL's website.

9. Safety Co-ordination

This section specifies the safety management criteria WELL will apply to meet the Safety Rules & General Safety Handbooks for the Electricity Industry, and other relevant Regulations and codes imposed on owners and operators of other distribution networks.

Parties must provide similar criteria and standards of safety management when carrying out work or tests at the Point of Connection with the WELL Network.

9.1 Objective

The objective is to specify the requirements with a view to ensuring safety of persons working on the WELL Network and/or any Embedded Networks or End-Consumer Installation.

9.2 Procedure

WELL and all Parties must comply with this section of the Distribution Code / Network Connection Standard.

9.2.1 Safety Management Systems

WELL will prepare an approved health and safety management system in accordance with the Health and Safety at Work Act 2015, specifying the principles and procedures and documentation to ensure the health and safety of all persons working or testing on the WELL Network, or on Party Equipment connected to it.

9.2.2 Principles

WELL and the relevant Party will:

- Adopt health and safety management procedures including provision for Control Persons who have the knowledge and experience to operate to the health and safety management procedures in use by field personnel where appropriate;
- Maintain a system of documentation which records the agreed inter-system safety precautions taken when:
    - Work or testing is to be carried out on high voltage plant and/or apparatus across the Point of Connection; and
    - Isolation and/or earthing of the other's network is needed.
- Where relevant exchange copies of the health and safety management procedures and related documentation, and if appropriate, for each working occasion.

9.2.3 Authorised Personnel

The health and safety management procedures must include a procedure for written authorisation confirming the training, knowledge and experience of personnel concerned with the control, operation, work, or testing of Party Equipment forming part of, or connected to, the WELL Network.

Each individual authorisation must indicate the class of operation and/or work permitted, and the section of the WELL Network to which the authorisation applies.

9.2.4 Environmental Safety

Arrangements must be made by WELL and the relevant Party to ensure site environmental safety and security, as required by statute. Where risks include contamination or similar, suitable decontamination facilities and procedures must be provided and used.

9.2.5 Operations Control

9.2.5.1 Control Responsibilities

WELL and each Party must:

- Jointly agree and set down in writing schedules specifying the responsibilities for operations control of equipment at the Point of Connection to ensure that only one party is responsible for any item of Fittings at any one time; and
- At all times have a nominated Control Person.

9.2.5.2 Control Documentation

WELL and each Party must maintain a suitable set of documentation which records all relevant operations or Events that have taken place on the WELL Network or any Embedded Network or End-Consumer Installation, and the co-ordination of relevant safety precautions for work.

9.2.5.3 Network Diagrams

WELL and each Party will exchange and update diagrams (together with written documentation) illustrating sufficient and up to date information for Control Persons to carry out their duties

9.2.5.4 Communications

WELL and each Party will establish:

- suitable communication links to ensure the control function is carried out in a safe and secure manner; and
- 24-hour availability of Control Persons where required by the Party.

9.2.6 Responsibility

9.2.6.1 Ownership, Operation and Maintenance Schedules

WELL's contract with each Party will specify the responsibilities for ownership, operation and maintenance of Fittings.

9.2.6.2 Maintenance of Schedules and Diagrams

All schedules and diagrams shall be maintained by WELL and Parties and exchanged as necessary to ensure they reflect the current agreements and network configuration.

10. Contingency Planning

This section of the Distribution Code / Network Connection Standard specifies the requirements:

- For assisting the re-start or operation of the Transpower Network in abnormal situations which require co-ordination between the System Operator, WELL and Parties, with a common approach to give uniformity of priorities;
- To be met during periods of declared civil emergencies.

10.1 Emergency Load Shedding

WELL is required to make provision for automated and/or manual emergency load shedding on under frequency or low voltage events, under the Electricity Industry Act for connection to Transpower's Network. Emergency load shedding is undertaken from major substations and it is not possible to isolate individual Parties from automatic or manual load shedding blocks. Therefore any Party who has a critical load should make provision for its own standby generation.

10.2 Network Recovery Procedures

Where the Transpower Network experiences complete or partial shutdown (e.g. when a major fault has a cascading effect, when there has been a significant loss of generation, or when part of the Transpower Network experiences excessive Reactive Power deficit) WELL is required to:

- Follow procedures agreed with or instructed by the System Operator;
- Liaise with the System Operator when taking any action which may have an impact on Transpower's Network.

Where generation on the WELL Network has been completely lost, WELL will co-ordinate the start-up of any Distributed Generators with Generating Plant capable of Black Start Capability and notify the System Operator. WELL may establish stable "islands of supply" around particular Generating Plant where sufficient generating capacity will be available by configuring the WELL Network appropriately.

WELL will document the strategy it applies in the above circumstances.

10.3 Civil Emergencies

WELL is required to carry out certain duties in a civil emergency in accordance with the Civil Defence Emergency Management (CDEM) Act 2002.

Wellington Electricity is classified as a lifeline utility under the CDEM Act and as such has responsibilities under this act, as follows:

- Ensuring that it is able to function to the fullest possible extent, even though this may be at a reduced level, during and after an emergency
- Having a plan for functioning during and after an emergency
- Participation in CDEM strategic planning
- Providing technical advice on CDEM where required

The CDEM Amendment Act of 2016 places additional emphasis on ensuring that lifeline utilities provide continuity of operation where their service supports essential emergency response activities.

11. Appendix 1

Main Signalling Frequencies

The following signal frequencies are used on the Distribution Network:

- 475 Hz
- 1050Hz

Other means of control also exist:

- Pilot wires

END OF DOCUMENT