



Security of Supply Unison's Participant Outage Plan

Unison Networks Limited

Approved Plan

FC9014

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ELECTRICTY NETWORK CONTINGENCY PLAN

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REVISION TABLE

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15/03/2010	v1.0	New Plan	Operations Manager	GM Networks & Operations	CEO	N/A
28/04/2010	v1.1	Addition of: <ul style="list-style-type: none"> • 25% Schedule in section 19.7 • Appendix C 	Operations Manager	GM Networks & Operations	CEO	FC9014 v1.0

Next review date: 01/07/2012

CORREGENDA

Applies to current issue of the Plan only:

Date	Applies to version	Corrections	By

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1 INTRODUCTION

- 1.1 This plan was written to comply with the Electricity Commission's Security of Supply Outage Plan (SOSOP).
- 1.2 The procedures outlined are in response to major generation shortages and/or significant transmission constraints. Typical scenarios include unusually low inflows into hydro-generation facilities, loss of multiple thermal generating stations or multiple transmission failures.
- 1.3 How an event is declared and how the Electricity Commission will communicate its requests are covered by the plan.
- 1.4 The main energy saving measure listed is rolling outages and the plan explains how these are structured and implemented.

2 PURPOSE

- 2.1 Under the Regulations, participant outage plans (POP) are required to specify the actions that would be taken to:
- Reduce electricity consumption when requested by the Electricity Commission;
 - Comply with requirements of the Electricity Commission's Security of Supply Outage Plan (SOSOP);
 - Comply with Electricity Governance (Security of Supply) Regulations 2008 and Electricity Governance (Security of Supply) Amendment Regulations 2009; and
 - Supplement the Electricity Commission's Security of Supply Outage Plan.
- 2.2 Reducing demand by disconnecting supply to customers would be a last resort after all other forms of savings, including voluntary savings, had been exhausted.
- 2.3 Unison Networks Ltd (Unison) will always endeavour to maintain supply to our customers.

3 SCOPE

- 3.1 This plan applies to all Unison employees and in particular those listed in Section 9 of this plan.

4 RESPONSIBILITIES

- | | | |
|-----|------------------------|--------------------------------------|
| 4.1 | Development & review | Operations Manager |
| 4.2 | Authorisation | General Manager Network & Operations |
| 4.3 | Approval | Chief Executive |
| 4.4 | Education and Training | Operations Manager |

5 REFERENCES

5.1 External

- Electricity Act 1992 (as at 23 December 2008)
- Electricity Commission's Security of Supply Outage Plan
- Electricity Governance (Security of Supply) Regulations 2008 and all Amendments

5.2 Unison Plans

- FC9001 Crisis Management Plan
- FC9002 Crisis Communication Plan

6 DEFINITIONS

AUFLS	Automatic Under Frequency Load Shedding
The Commission	The Electricity Commission
Feeder	A high voltage supply line typically supplying between 100 and 2000 customers.
GXP	Transpower Grid Exit Point
GEN	Grid Emergency Notice
POP	Participant Outage Plan (this plan)
Regulations	Electricity Governance (Security of Supply) Regulations 2008 and Electricity Governance (Security of Supply) Amendment Regulations 2009
Rolling Outages	Planned electricity disconnections spread over different parts of the network at differing times to avoid prolonged outages at any one location.
Security Coordinator	The person responsible for system security at the System Operator
SOSOP	Security of Supply Outage Plan
Supply Shortage Declaration	Declaration made by the Electricity Commission under Regulation 9.
System Operator	Operator of the national electricity transmission grid.

7 BACKGROUND

7.1 Electricity Commission

The Electricity Commission is a Crown entity set up under the Electricity Act to oversee New Zealand's electricity industry and markets.

A function of the Electricity Commission under the Electricity Act is to use reasonable endeavours to ensure the security of electricity supply. The Commission's activities include forecasting supply and demand, developing and publishing guideline hydro levels for security of supply, contracting for reserve energy, and improving the ability of consumers to manage price risks in the market.

7.2 Transpower

Transpower is a State Owned Enterprise, tasked with owning and operating New Zealand's National Grid - the network of high voltage transmission lines and substations that transports bulk electricity from where it is generated to distribution line companies such as Unison.

As System Operator, Transpower manages the real-time operation of New Zealand's electricity transmission system. It keeps the right amount of energy flowing to match generated supply with demand.

7.3 Unison Networks Limited

Unison Networks Limited, trading as Unison, is the power lines company that safely delivers electricity to businesses and homes across three regions – Hawke's Bay, Taupo and Rotorua.

Unison also manages the Centralines network covering the Central Hawke's Bay area, which has a separate POP plan covering their network.

8 RANGE OF EVENTS

8.1 Event Types

Events that could lead the Commission to make a supply shortage declaration can in general terms be categorised as:

- Developing Event – Events that evolve over time, for example low hydro lake or fuel levels.
- Immediate Event – Events that occur with little or no warning, usually as a result of a transmission line or major generation failure.

8.2 Major Incident

A Developing or Immediate event will be classed by Unison as a major incident and Unison's management team will activate the appropriate contingency plan and will manage the incident accordingly.

Communication with retailers, civil defence and other stakeholders will be managed as per procedures as documented in Unison's Crisis Management Plan (FC9001) and Crisis Communications Plan (FC9002).

9 UNISON STAFF RESPONSIBILITIES

Role	Unison Personnel
Receive communication from Commission	CEO or Commercial Manager
Receive communication from System Operator	Control Centre
Implement this plan	Operations Manager
Preparation of load shedding schedules	Operations Manager
Customer notification	Release Coordinators
Weekly savings reporting	Commercial Specialist

Revoking rolling outages	Commercial Manager
Reporting to Electricity Commission	Commercial Manager
Reporting to media, public agencies	Customer Relations Manager
Reporting to CDEM and Lifelines	Operations Manager ¹

10 COMMUNICATION WITH THE COMMISSION

The Commission can contact Unison using the following details:

Unison Networks Ltd
 Fax: 06 873 9300
 Ph: 06 873 9433
 P.O. Box 555, **Hastings** 4156
 1101 Omahu Road, Hastings 4120

Unison will contact the Commission's Emergency Response Project Manager for administration purposes (including reporting performance against targets) using the following details:

Electricity Commission
 Fax: 04 460 8879
 Ph: 04 460 8860
 PO Box 10041, **Wellington**
 Level 7, ASB Bank Building, 2 Hunter Street, Wellington

11 ACTIONS FOR IMMEDIATE EVENTS

11.1 System Stability

Transpower, as the System Operator, is required to keep enough reserve generation to cover the risk of the largest connected generator tripping. They are also required to keep the system frequency at 50Hz. If a large generator trips, it may cause a reduction in frequency which if not rectified can result in other generators tripping and could lead to cascade failure of the transmission system.

As reserve generation cannot immediately pick up the load of a disconnected generator, an immediate load reduction is required until additional generation can pick up load. Automatic load shedding groups reduce load in stages until the frequency stabilises.

To recover from Immediate Events electricity consumption can be reduced by:

11.2 Reserve Market

Generators and load users with interruptible load such as distribution networks may offer in reserve capacity to cover the risk of the largest generating unit or a critical transmission line tripping. The ability to do this is affected by the numbers of frequency capable relays installed and the likely revenue stream from the market less the compliance costs of participating in the reserve market. Unison participates in this market.

11.2.1 Disconnecting Customers

- Automatic Under-Frequency Load Shedding (AUFLS)

If the load shed by the Reserve Market tripping is insufficient to stabilise the network, further automatic load reduction is required.

Each distribution network company must unless exempted have available at all times two blocks of load each of 16% of its total load to be shed by automatic under frequency relays.

- AUFLS Zone 1

If system frequency fails to recover after Reserve Market load shed, AUFLS Zone 1 shedding will occur by disconnecting customers' supply. In the Unison Network the tripping relays are located at zone substations and Transpower Substations where individual feeders are tripped.

- AUFLS Zone 2

If Zone 1 tripping fails to restore frequency, the next stage, Zone 2 activates. This will disconnect a further 16% of Unison's Network.

- Manual Shedding

If AUFLS Zone 1 and Zone 2 tripping fails to stabilize frequency the System Operator will shed more load.

Once the frequency has stabilised the System Operator will advise Unison Control Centre when load can be restored.

11.3 Supply Restoration

Restoration of disconnected load must be restored in conjunction with the System Operator. This is to prevent overloading the transmission grid and/or creating further instability.

11.4 Transmission Grid Emergency

The System Operator may request Unison to reduce load under a grid emergency notice (GEN). Unison will shed water heating load. The System Operator will be advised and if more shedding is required the System Operator will instruct the Grid Owner to disconnect load as per the emergency load shedding feeders listed in *Appendix C*

If a Developing or Immediate Event is in place, the grid emergency will take precedence.

If the Commission declares a supply shortage following a Grid Emergency, then Unison will respond by implementing rolling outages as described in the following "Developing Events" section.

12 DEVELOPING EVENTS

- 12.1 If the Commission requests through the System Operator a load reduction for a Developing Event, Unison must reduce supply to meet the Commission's targets. The targets are likely to be in the form of a weekly energy savings target that is reviewed each week.

To reduce energy usage Unison would disconnect feeders or groups of feeders where they belong to a parallel or ring supply (rolling outage feeders) in a controlled manner to enable targets to be reached.

- 12.2 There maybe financial penalties for not meeting the targets specified by the Commission.
- 12.3 Water heating load shedding is generally not an option for energy savings.

13 DECLARATION OF A DEVELOPING EVENT

- 13.1 The Commission will endeavour to provide 9 days prior notice of the requirement for weekly energy savings and any increase in the weekly energy savings target.
- 13.2 If the Commission declares a supply shortage, the System Operator will specify the energy savings target to be enforced for a specific region for a specified time-frame.
- 13.3 The Commission will manage general media advertising of the need to conserve electricity and the impending rolling outages when they are requested.
- 13.4 If Unison plans to issue a public message related to rolling outages then this shall be sent to the Commission for review before being released. Any such communication will set a time for response by the Commission, so that their feedback can be included before Unison issues the message to the public.

14 CRITERIA FOR ROLLING OUTAGES

To ensure public health and safety is preserved and costs to economy are minimised the following table shows a desired criteria for selecting rolling outage feeders to be included in rolling outages.

- 14.1 Table 1 - Priority Loads

Priority	Priority Concern	Maintain Supply to:	Examples
1	Public health and safety	Hospitals, air traffic control centres, and emergency operation centres	<ul style="list-style-type: none"> - Hastings Hospital - Rotorua Hospital - Taupo Hospital - Napier Airport - Rotorua Airport - Taupo Airport - Napier, Hastings, Taupo and Rotorua Police Stations - Unison Admin - Napier CC Admin - Hastings DC Admin - Rotorua DC Admin - Taupo DC Admin - HB Regional Council Admin - Civil Defence Emergency Operations Centres

Priority	Priority Concern	Maintain Supply to:	Examples
2	Important public services	Communication networks, water and sewage pumping and Port facilities	<ul style="list-style-type: none"> - Telephone exchanges - Major CBDs - Port of Napier - RDC Water Treatment Plant - HDC Sewerage Treatment Plant - Taupo Sewerage Treatment Plant
3	Public health and safety	Minor health/medical centres, schools, and street lighting	<ul style="list-style-type: none"> - Medical Centres - Schools - Colleges - Prisons - Hotels
4	Food production	Dairy farms and food production facilities	<ul style="list-style-type: none"> - Fonterra Reporoa milk factory - Heinz-Wattie - Silver Fern Farms - Wairakei Pastoral, Taupo - McCain Foods
5	Domestic production	Commercial and industrial premises	<ul style="list-style-type: none"> - All Residential customers - Small businesses

Rolling outage feeders will all contain a variety of customers. The priority for each rolling outage feeder will be based on the priority ratings assessed for the connections within each feeder, according to the following:

Priority 1	Any feeder that has one or more priority 1 connections
Priority 2	Any feeder that has three or more priority 2 connections
Priority 3	All feeders that have an average priority ≥ 2.5 and < 3.5
Priority 4	All feeders that have an average priority ≥ 3.5 and < 4.5
Priority 5	All feeders that have an average priority ≥ 4.5 and < 5.0

Rolling outage plans will focus on higher priority feeders to the extent possible, and the lower priority feeders being selected only at the higher required savings levels.

Rolling outage feeders with the same priority and in the same area (according to our grid exit areas) are grouped together into rolling outage groups. This level of grouping simplifies the planning, management and notification of rolling outages.

The areas (GXPs for rolling outages) are:

A	Fernhill
B	Whakatu
C	Redclyffe
D	Wairakei & Ohaaki
E	Rotorua
F	Tarukenga
G	Owhata

For example, Group A5 refers to all rolling outage feeders from the Fernhill GXP area with a priority of 5.

14.2 Vulnerable Customers and Priority Sites

It is not possible for Unison to prevent rolling outages affecting vulnerable individual customers and priority sites. In addition to the prioritisation of rolling outage feeders, Unison will:

- Provide information in its public notices and website alerting vulnerable customers to the risks, and
- Request that retailers consider individually notifying their vulnerable customers.

15 AUFLS UNDER ROLLING OUTAGES

15.1 The level of AUFLS during rolling outages needs to be maintained. Unison will either:

- exclude the current AUFLS feeders from its rolling outage plans, which means that supply to lower value loads may be maintained while higher value loads are cut, or
- include AUFLS feeder shedding but limit the shedding to ensure that two AUFLS blocks of 16% are maintained. That is, if we shed 25% of our network load we would also shed up to 25% of the AUFLS load, and
- arm additional higher value load feeders to supplement the AUFLS load, and exclude these from its rolling outage plan.

16 SHUTDOWN NOTIFICATION

16.1 With the wide-scale impact of rolling outages it is not feasible to use our standard planned outage notification process (mainly because retail and postal systems could not process the thousands of outage notifications required).

16.2 When implementing a rolling outage plan, Unison will notify the outages in a number of ways:

- Public notices - Unison will place public notice advertisements in local newspapers (see draft in **Appendix B**) providing a rolling outage timetable showing the times and areas affected by rolling outages;
- Unison website – on the existing website page www.unison.co.nz Planned Outages tab will show the rolling outage timetable.

- Retailer notification - Unison will provide the rolling outage timetable to all electricity retailers together with a schedule showing the rolling outage group for all ICPs. (It is not appropriate to filter the schedule for an individual retailer's ICPs as this would place switching ICPs at risk).

16.3 Where possible, Unison will provide 7 days notice of all rolling outage plans, generally publishing and issuing notifications on a Monday to apply from the following Monday.

17 COMMUNICATION WITH SYSTEM OPERATOR

17. All communications with the System Operator will be between Unison's Control Centre and Transpower's Regional Operating Centre (Northern and Central) using Transpower's TSX telephone or normal communication systems.

17.2 Prior to notifying and implementing a rolling outage plan, Unison will consult with the System Operator Security Coordinator to establish a process for shedding and restoration, which may include a MW load cap to operate under during restoration phases. Unless agreed with the System Operator, load shedding and restoration shall be no more than 10 MW per 5 minutes.

18 GRID EMERGENCY DURING DEVELOPING EVENT

18.1 If the system operator declares a grid emergency during a Developing Event, **the grid emergency will take priority.**

18.2 As water heating load generally would not be used to reduce load in a Developing Event, Unison would have water heating load available for load reduction when required for the grid emergency. This load would be shed, the System Operator advised and if more shedding were required the System Operator would instruct the Grid Owner to disconnect load.

18.3 After the grid emergency is cancelled the rolling outages pattern would continue.

19 ROLLING OUTAGES STRATEGY AND METHODOLOGY

19.1 The Operations Manager and Commercial Manager will review weekly targets and prepare plans for weekly rolling outages based on savings required.

19.2 The methodology is:

- Each distribution feeder exiting a zone substation (or switching station, or group of feeders where they belong to a parallel or ring supply) will be named as a "Rolling outage feeder".
- Rolling outage feeders will be assigned a priority according to the criteria specified in Section 14. Rolling outage feeders in the same GXP area with the same priority will be grouped together for switching (creating 35 rolling outage groups, A1 to G5).
- Feeders that belong to AUFULS Block 1 and 2, or alternative AUFULS feeders where implemented, will be excluded from rolling outage groups unless we apply the alternative AUFLS arrangements outlined in Section 15.
- A set of switching instructions will be prepared for each rolling outage group.



- The average energy volume for a winter weekday morning (8am to 12pm) and an afternoon (1pm to 5pm) will be estimated for each group, based on the average July daytime loadings.
- Unison will provide to the Security Coordinator rolling week-ahead load forecast (beginning at a time specified by the system operator) that forecasts the distributor’s reasonable expectation of the half-hourly load at each grid exit point.
- Unison will provide to the Security Coordinator any expected change to the forecast for a grid exit point of more than 20% for any trading period, as soon as reasonably practicable following the distributor becoming aware of the expected change.

19.3 A plan will be prepared to target the required savings level, taking account of any under or over savings carried forward from earlier periods in the security of supply outage plan.

19.4 As far as possible, groups should be selected depending on the saving level required, as follows:

Savings required	Priority groups used
0 to 5%	4 and 5
5 to 10%	2, 3, 4 and 5
Greater than 10%	All groups

19.5 To the extent possible, outages should be programmed to be held during daylight hours, between 8am and 5pm, but extending into the evening where necessary to achieve the required savings level or accommodate switching logistics.

19.6 Unless advised otherwise by the System Operator, the rolling outages plan must provide sufficient time for switching of load to ensure that Unison’s load does not increase or decrease by more than 10 MW in any 5 minute period. Unison’s Operators carrying out switching are to monitor their activities in relation to this limit.

19.7 Using the methodology and excluding current AUFLS feeders, indicative plans for savings are:

5% schedule			
Group	Cuts per week	Duration (h)	Weekly savings (MWh)
1	6	4	1666
2	4	4	874
3		4	0
4		4	0
5		4	0
		Total	2540
Average winter load			50654
Estimated Savings			5.0%

10% schedule			
Group	Cuts per week	Duration (h)	Weekly savings (MWh)
1	9	4	2500
2	7	4	1529
3	6	4	1028
4		4	0
5		4	0
		Total	5056
Average winter load			50654
Estimated Savings			10.0%

15% schedule			
Group	Cuts per week	Duration (h)	Weekly savings (MWh)
1	10	4	2777
2	8	4	1747
3	7	4	1199
4	6	4	608
5	3	4	1267
		Total	7599
Average winter load			50654
Estimated Savings			15.0%

20% schedule			
Group	Cuts per week	Duration (h)	Weekly savings (MWh)
1	12	4	3333
2	10	4	2184
3	8	4	1370
4	7	4	709
5	6	4	2535
		Total	10132
Average winter load			50654
Estimated Savings			20.0%

25% schedule			
Group	Cuts per week	Duration (h)	Weekly savings (MWh)
1	14	4	3888
2	12	4	2621
3	11	4	1884
4	9	4	912
5	8	4	3380
		Total	12685
Average winter load			50654
Estimated Savings			25.0%

20 TARGET MONITORING

- 20.1 To avoid any discrepancy over the accuracy of different data sources, the Electricity Commission (in conjunction with the System Operator) will report on actual demand versus the target.
- 20.2 For load shedding to a weekly target, the *Commercial Analyst* will monitor the Electricity Commission Report of our savings results to our target and together with the Commercial or Operations Manager, review future load shedding to increase or decrease amount of rolling outages to enable the weekly target to be met.
- 20.3 In parallel (as a check) with the Electricity Commission, the Commercial Analyst will be responsible for daily and weekly reporting of consumption relative to target levels (using our data sources) to the Security Coordinator and the Electricity Commission.
- 20.4 In the case of daily or real time limits where the Electricity Commission reporting will be too slow for real time action to be taken, the Operations Manager with the assistance of the Commercial Specialist will monitor our savings and adjust the timeframe required accordingly.
- 20.5 These savings will be calculated using GXP loads measured by our metering and SCADA system and compared with the targets supplied by the System Operator.

21 LOG OF ROLLING OUTAGES

21.1 Controllers will enter in the Rolling Outage Log, times of disconnection and reconnection of all feeder interruptions, plus all actions are recorded on the SCADA log.

The log sheet to be used by Controllers is shown in **Appendix A**.

22 CONTINGENT EVENTS

22.1 If an unplanned event occurs that will alter planned rolling outages, the Operations Manager will be responsible for all decisions. Where possible, any changes to the planned timetable should be published on Unison's website and communicated to retailers.

23 CLARIFICATION

23.1 Clarification of any matter referred to in this document should be directed to the Operations Manager.

24 COMMUNICATION

24.1 The approved Plan shall be published on the Intranet and all staff notified immediately it is available.

25 IMPLEMENTATION, REVIEW AND REVISIONS

25.1 The Plan shall be subject to review every two (2) years or earlier if required.

26 APPROVALS

Prepared by: Nigel Brown


Operations Manager

Signature: 

Date: 28/4/2010.

Authorised by: Jaun Park

**Acting General Manager Networks
& Operations**

Signature: 

Date: 29/4/2010

Approved by: Ken Sutherland

Chief Executive

Signature: 

Date: 03/05/2010

28 APPENDIX B – DRAFT ROLLING OUTAGE PUBLIC NOTICE**Electricity Supply Interruptions**

Please read - Your supply may be affected

Unison is being required to reduce electricity consumption with rolling power outages across Hawke's Bay, Taupo and Rotorua regions to meet an x% savings target set by the Electricity Commission in response to the current energy crisis.

Voluntary savings have already helped us reduce the impact of rolling outages, and further savings may allow us to reduce these planned cuts further.

Outages will occur within the time periods noted in the schedule below. Wherever possible, we will delay cuts and restore power early, **so please treat all lines as live.**

Within each area we have prioritised individual circuits to minimise the cost and disruption to our community, and timed outages accordingly.

YOUR SAFETY AND PROTECTION

It is important to ensure you keep safe around electricity even when it is off.

- Power may be restored at any time.
- Please leave all appliances off during power cuts, particularly ovens and cook tops.
- To prevent damage to computers and other electrical equipment turn power off at the wall prior to outages.

Are you reliant on power?

If your health may be affected by these outages you will need to make alternative arrangements, or contact your healthcare provider for assistance. Please note that telephones that rely on a mains supply may not operate during outages, so plan in advance.

Areas	Priority Group	Monday	Tuesday	Wednesday	Thursday	Friday
A	1	8-12am	8-12am	1-5pm	1-5pm	
B	2	8-12am		1-5pm		
C	1		8-12am			1-5pm
D	2		8-12am		1-5pm	
E	1		8-12am		1-5pm	

Connections in priority groups other than those listed (and those with a "reserved" priority) are not scheduled for rolling outages in this period.

29 APPENDIX C – FEEDER PRIORITIES

AREA	SUBSTATION	FEEDER	PRIORITY	AREA	SUBSTATION	FEEDER	PRIORITY
Hastings	Arataki	Belmont	2	Hastings	Irongate	Heathcote	2
Hastings	Arataki	Brookvale	2	Hastings	Irongate	Poukawa	2
Hastings	Arataki	Palmbrook	1	Hastings	Irongate	Raureka	1
Hastings	Arataki	Simla	2	Hastings	Mahora	Apbd	5
Hastings	Arataki	Waimarama	1	Hastings	Mahora	Cornwall	4
Hastings	Camberley	Lowe	2	Hastings	Mahora	NZ Foods	5
Hastings	Camberley	Nottingley	2	Hastings	Mahora	Watties A	5
Hastings	Camberley	Omahu	5	Hastings	Mahora	Watties B	5
Hastings	Camberley	Orchard	5	Hastings	Mahora	Williams	3
Hastings	Fernhill	Rochfort	5	Hastings	Maraekakaho	Mangatahi	2
Hastings	Fernhill	Roys Hill	1	Hastings	Maraekakaho	Tikokino	2
Hastings	Fernhill	Twyford	4	Hastings	Maraekakaho	Washpool	1
Hastings	Flaxmere	Barnes	5	Hastings	Maraekakaho	Whakapirau	1
Hastings	Flaxmere	Caernarvon	3	Hastings	Rangitane	Anderson	5
Hastings	Flaxmere	Chatham	3	Hastings	Rangitane	Clive	5
Hastings	Flaxmere	Columbus	3	Hastings	Rangitane	Cool	5
Hastings	Flaxmere	Kirkwood	5	Hastings	Rangitane	Haumoana	3
Hastings	Flaxmere	Margate	1	Hastings	Rangitane	Pacific	5
Hastings	Flaxmere	McCain	5	Hastings	Rangitane	Pakowhai	3
Hastings	Flaxmere	Meihana	5	Hastings	Rangitane	Treeo	5
Hastings	Hastings	Avenue	2	Hastings	Rangitane	Works A	5
Hastings	Hastings	Civic	5	Hastings	Rangitane	Works B	5
Hastings	Hastings	Karamu	5	Hastings	Sherenden	Crownthorpe	1
Hastings	Hastings	Massey	1	Hastings	Sherenden	Flag Range	1
Hastings	Hastings	Police	5	Hastings	Sherenden	Oreka	1
Hastings	Hastings	Queen	5	Hastings	Sherenden	Otamauri	1
Hastings	Hastings	Railway	5	Hastings	Tomoana	Coventry	4
Hastings	Hastings	Riverslea	1	Hastings	Tomoana	Elwood	4
Hastings	Hastings	Southampton	5	Hastings	Tomoana	Nelson A	5
Hastings	Hastings	Stortford	5	Hastings	Tomoana	Nelson B	5
Hastings	Hastings	Warren	5	Hastings	Windsor	Ada	3
Hastings	Havelock North	Campbell	5	Hastings	Windsor	Albert	2
Hastings	Havelock North	Iona	5	Hastings	Windsor	Alexandra	5
Hastings	Havelock North	Karanema	5	Hastings	Windsor	Grove	2
Hastings	Havelock north	St Andrews	2	Hastings	Windsor	Victoria	1
Hastings	Havelock north	Te Mata	4	Hastings	Camberley	Hospital	5
Hastings	Havelock north	Te Aute	2	Hastings	Camberley	Raupare	5
Hastings	Irongate	Bridge Pa	2				

AREA	SUBSTATION	FEEDER	PRIORITY	AREA	SUBSTATION	FEEDER	PRIORITY
Napier	Awatoto	Bowen	5	Napier	Marewa	Geddis	2
Napier	Awatoto	Waitangi	5	Napier	Marewa	Herrick	1
Napier	Awatoto	Phillips	5	Napier	Marewa	Kennedy	3
Napier	Bluff Hill	Battery	5	Napier	Marewa	Nuffield	2
Napier	Bluff Hill	Colenso	1	Napier	Marewa	Westshore	3
Napier	Bluff Hill	Exchange	5	Napier	Patoka	Hendley	1
Napier	Bluff Hill	Harbour	5	Napier	Patoka	Puketitiri	1
Napier	Bluff Hill	Lighthouse	1	Napier	Patoka	Rissington	1
Napier	Bluff Hill	Parade	5	Napier	Springfield	Korokipo	1
Napier	Bluff Hill	Terrace	1	Napier	Springfield	O Dowd	1
Napier	Bluff Hill	Thompson	1	Napier	Springfield	Omaranui	1
Napier	Church Rd	Avondale	1	Napier	Springfield	Puketapu	1
Napier	Church Rd	Kent	1	Napier	Springfield	Taradale A	4
Napier	Church Rd	Mission	1	Napier	Springfield	Taradale B	4
Napier	Church Rd	Neeve	3	Napier	Tamatea	Austin	5
Napier	Church Rd	St Mary	3	Napier	Tamatea	Durham	4
Napier	Esk	Bay View	3	Napier	Tamatea	Niven	5
Napier	Esk	Tangoio	1	Napier	Tamatea	Orotu	1
Napier	Esk	Valley	2	Napier	Tamatea	Park Island	2
Napier	Faraday	Chaucer	2	Napier	Tamatea	Thames	5
Napier	Faraday	Corunna	5	Napier	Tamatea	York	2
Napier	Faraday	Dalton	5	Napier	Tannery Rd	Burness	2
Napier	Faraday	Dickens	5	Napier	Tannery Rd	Currie	4
Napier	Faraday	Guys Hill	2	Napier	Tannery Rd	Greenmeadows	2
Napier	Faraday	Jull	2	Napier	Tannery Rd	Holt	2
Napier	Faraday	Latham	1	Napier	Tannery Rd	Pirimai	2
Napier	Faraday	Spencer	1	Napier	Tannery Rd	Riverbend	3
Napier	Faraday	Tennyson	5	Napier	Tutira	Kaiwaka	1
Napier	Faraday	Vigor Brown	1	Napier	Tutira	Pohokura	1
Napier	Faraday	Wellesley	1	Napier	Tutira	Ridgemount	1
Napier	Marewa	Dunlop	5	Napier	Awatoto	Ravensdown	5

AREA	SUBSTATION	FEEDER	PRIORITY	AREA	SUBSTATION	FEEDER	PRIORITY
Rotorua	Rainbow	Tumunui	5	Rotorua	Fernleaf	Waiotapu	4
Rotorua	Arawa	City Central	5	Rotorua	Owhata	Rotoma	3
Rotorua	Arawa	City North	5	Rotorua	Atiamuri	Atiamuri Village	3
Rotorua	Arawa	City South	5	Rotorua	Atiamuri	Ongaroto	3
Rotorua	Arawa	Lake Front	5	Rotorua	Rotorua	Ngakuru	3
Rotorua	Arawa	Ngapuna	4	Rotorua	Rotorua	Ngongataha	4
Rotorua	Fernleaf	Anchor	5	Rotorua	Biak St	Fairy	4
Rotorua	Owhata	Kaharoa	5	Rotorua	Rotorua	Hamurana	4
Rotorua	Owhata	Okere	3	Rotorua	Rotorua	Malfroy	4
Rotorua	Rotorua	State Mill	5	Rotorua	Biak St	Mountain	3
Rotorua	Owhata	Te Ngae	5	Rotorua	Owhata	Owhata	3
Rotorua	Biak St	Karenga	5	Rotorua	Biak St	Aquarius	na
Rotorua	Rainbow	Waikite	4	Rotorua	Biak St	Korokai	na
Rotorua	Rainbow	Mill	1				
Rotorua	Arawa	Vaughan	5	Taupo	Runanga	Nukuhau	5
Rotorua	Arawa	Fenton Park	2	Taupo	Runanga	Roberts	5
Rotorua	Arawa	Kawaha Point	2	Taupo	Runanga	Horomatangi	5
Rotorua	Arawa	Koutu	2	Taupo	Taupo South	Richmond	3
Rotorua	Arawa	Tarawera	2	Taupo	Fletchers	Carter Holt	5
Rotorua	Biak St	Pururu	1	Taupo	Fleet St	Ashwood	1
Rotorua	Owhata	Lynmore	1	Taupo	Fleet St	Hilltop	1
Rotorua	Rotorua	Clayton	1	Taupo	Fleet St	Taharepa	1
Rotorua	Rotorua	Fordlands	1	Taupo	Runanga	Acacia Bay	2
Rotorua	Rotorua	Golf Course	1	Taupo	Runanga	Ben Lomond	1
Rotorua	Rotorua	Pukehangi	1	Taupo	Runanga	Heuheu	1
Rotorua	Rotorua	Springfield	1	Taupo	Runanga	Paorahape	1
Rotorua	Rotorua	Western Heights	1	Taupo	Taupo South	Lake Terrace	1
Rotorua	Tarukenga	Waiteti	2	Taupo	Taupo South	Rainbow	1
Rotorua	Tarukenga	Dalbeth	2	Taupo	Taupo South	Wharewaka	1
Rotorua	Tarukenga	Paradise	5	Taupo	Runanga	Taupo North	2
Rotorua	Fernleaf	Ohaaki Tie	3	Taupo	Ohaaki	Tutukau	5
Rotorua	Fernleaf	Reporoa	3	Taupo	Ohaaki	Broadlands	3
Rotorua	Rainbow	Rerewhakaaitu	3	Taupo	Runanga	Waikato	3
Rotorua	Tarukenga	Mamaku	3	Taupo	Runanga	Opepe	1
Rotorua	Tarukenga	Dansey	3	Taupo	Fleet St	Miro	4