Scanpower Limited

Asset Management Plan

April 2005 – March 2015

Period Covered: 1 April 2005 to 31 March 2015
Version: For Release
Issued: June 2005

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1.0 Executive Summary

1.1 Purpose of the Plan

The purpose of this asset management plan is to document the processes, objectives, systems and performance measures employed by Scanpower Limited in the management of the company's electricity distribution network assets. It also aims to document processes that ensure that Scanpower's asset management strategy consider customers' needs in terms of price and quality as required by the Commerce Act (Electricity Lines Thresholds) Notice 2003.

Specifically, the asset management systems and practices documented herein are designed to ensure:

- The network assets meet customers' electricity supply requirements, both in terms of quality and cost.
- Assets are maintained on a sustainable long term basis.
- Network performance targets are achieved.
- Operational and efficiency improvements are achieved over time.

Scanpower is required to produce and disclose this document annually in accordance with the Electricity Information Disclosure Requirements 2004 published by the Commerce Commission.

1.2 Date Completed and Period Covered

This plan was completed by 30 June 2005 and relates to the period 1 April 2005 to 31 March 2015.

The plan is reviewed and restated on an annual rolling basis. The next plan will be available by 30 June 2006 and will cover the period 1 April 2006 to 31 March 2016.

1.3 Asset Management Systems and Information

Scanpower undertakes asset management planning and implementation using an in-house network and line contracting division. Both engineering and line staff are employed directly by Scanpower. From time to time, Scanpower does contract out specific asset management related works to suitably qualified third party organisations.

To manage asset and network related information, Scanpower uses a number of systems. These include:

- Critchlow "Cablecad" geographic information system

- NCS (Napier Computer Systems) customer/ICP information database
- Proprietary asset databases
- SCADA system records

These are owned and operated internally by Scanpower network staff.

1.4 Network and Asset Descriptions

Scanpower owns and operates electricity distribution network assets supplying energy to the Southern Hawkes Bay region. The network area is predominantly rural in nature and covers an area of 2,000 km^2

The network comprises 861 km of lines which consists of both aerial and underground services. 6,700 ICPs are supplied across the network with maximum demands now in the 15 – 16 MW range.

The network serves two main urban areas; Dannevirke and Woodville, in addition to their surrounding rural areas. Bulk supply is taken from Transpower's 110kV Bunnythorpe / Fernhill lines via two 110 / 11kV substations at Dannevirke and Woodville. The Dannevirke and Woodville networks are not interconnected.

The Scanpower network has no 33kV subtransmission system and distribution lines operate at 11 kV / LV. For this reason the company has no zone substation assets.

A network asset revaluation exercise was undertaken as at the financial year end 31 March 2004 for financial reporting and regulatory compliance purposes. The basis for this valuation was the draft ODV Handbook issued by the Commerce Commission and current at this date. The total replacement cost of Scanpower distribution assets at this date was $40,443,825 and the depreciated replacement cost was $19,823,274.

There were no assets deemed to be surplus to requirements at the time of the valuation and therefore there was no optimisation adjustment to this value. Economic value testing of the assets by way of discounted cashflow analysis suggested there was no impairment or EV adjustment necessary, hence the optimised deprival value of the assets was calculated to be the same as the DRC at $19,823,274.

As at 31 March 2005 the ODV of the network assets is $20,344,000.

1.5 Service Level Objectives and Financial Performance

Security of Supply Objective

Scanpower has established a security of supply objective based on guidelines produced by the Electricity Engineers' Association NZ published in "Guidelines for the Security of Supply in New Zealand" dated June 2000.

Given the relatively small size of Scanpower's network and geographic / demographic characteristics, in no part of the network does load reach the size where compliance with industry standards requires security provisions to prevent interruption of supply in the event of an outage incident (known as **n-1** security level).

On this basis the Company has adopted a security level of **n**, unless where a preference for increased security of supply, and a corresponding willingness to pay for it, has been identified through the customer consultation process. Consultation with customers during the year ending 31 March 2004 which involved discussion with ten major customers and the Scanpower Customer Trust did not reveal any customer preference for provision of an increased level of security of supply. Therefore there are currently no non-standard agreements to provide a service level beyond that of **n** security.

On this basis, it is appropriate that Scanpower focus on improving the ability to restore supply in the event of an unplanned outage, rather than prevent interruption through increased security levels. The reliability measures SAIDI and SAIFI have therefore been adopted as the primary indicators of service level performance.

In order to improve the ability to restore supply in the event of an unplanned outage Scanpower has instigated an automation programme to replace manually operated air break switches with remote controlled circuit breakers, sectionalisers and air break switches. Scanpower is presently improving supply reliability by splitting and reconfiguring two main feeder circuits supplying power from the Dannevirke substation and during the next two years similar work will be carried out on four other main feeders.

Outage Duration (SAIDI) and Outage Frequency (SAIFI) Measures

Scanpower uses the standard indices SAIFI and SAIDI (class B and C) as key indicators of network reliability performance. Performance targets for 2005 / 2006 have been established on the basis of the reliability performance methodology prescribed under the Commerce Commission thresholds regime. The appropriateness of this target basis, from a customer perspective, has been confirmed through consultation with customer representatives in regard to the price / quality trade-off, undertaken in early 2004. The following table shows SAIDI and SAIFI performance results for the previous five years in comparison to target.

Figure 1 – Summary Service Level Objectives and Previous Results (2001 – 2006)

MEASURE	2006	2005	2004	2003	2002	2001
SAIFI (Class B&C)						
Target	0.93	0.93	0.93	1	1	1
Actual		0.83	1.67	0.75	1.13	0.86
Variance		🟢	🔴	🟢	🔴	🟢
SAIDI (Class B&C)						
Target	83.09	83.09	83.09	150	150	150
Actual		71.31	185.20	82.03	92.24	70.21
Variance		🟢	🔴	🟢	🟢	🟢

🟢 = *Favourable variance* 🔴 = *Adverse variance*

A more detailed analysis of reliability performance is provided in **Section 7.1** (Evaluation of Performance.

Financial Performance

In terms of financial performance, Scanpower reviews actual versus budgeted capital and maintenance expenditure on a monthly basis.

The table provided below shows the consolidated 2005 annual financial result in respect of these expenditure categories. Again more detailed performance analysis and explanation of variances is provided in Section 7.1 (Evaluation of Performance).

Also provided below is the detailed capital expenditure budget for the 2006 year, and a summary of Scanpower's ten year capital replacement programme.

Figure 2 – Financial Analysis 2004 / 05

2004 / 2005 FINANCIAL PERFORMANCE	2005 ACTUAL	2005 PLAN
CAPITAL EXPENDITURE		
11 kV Line Reconstruction	$286,072	$309,717
LT Replacement & Undergrounding	$171,430	$242,040
Transformer Replacements	$451,608	$250,000
Switchgear / Automation	$227,466	$142,500
TOTAL CAPITAL EXPENDITURE	**$1,136,576**	**$944,257**
MAINTENANCE EXPENDITURE		
Distribution Maintenance	$211,533	$440,000
Faults Maintenance	$155,532	$171,000
Non Line Asset Maintenance	$94,422	$68,000
TOTAL MAINTENANCE EXPENDITURE	**$461,487**	**$679,000**

TOTAL NETWORK EXPENDITURE	**$1,598,063**	**$1,623,257**

Budgeted capital expenditure for the coming year is as follows:

Figure 3 – Planned Capital Works / Development Initiatives 2005 / 2006 and Budgets

Scanpower Category	Description	2005/06 Budget
Reconstruction / Replacement	*Waterloo Street (McPhee St-Swinburn St)*	$3,906
	Waterloo Street (Barraud St – Gordon St)	$3,706
	North Feeder (Sub to Law Road)	$78,316
	North Feeder (Law Road to Tamaki West)	$92,056
	North Feeder (Tamaki West to Te Kakapo Valley)	$89,626
	Mangatera Feeder (Sub to Smith Road)	$77,248
	Mangatera Feeder (Smith Road)	$29,529
	Umatoroa Road (link 11kV to Top Grass Road)	$6,829
	Matamau 11kV line and switching reconfiguration	$40,000
Undergrounding LT Supplies	*Waterloo Street (McPhee St-Swinburn St)*	$66,064
	Waterloo Street (Barraud St – Gordon St)	$14,885
	Fox Street, Woodville	$77,805
	Thyra Street	$117,000
	Cadman / Carlyle / Gladstone Streets	$53,034
Transformer Replacement	*Year Two – Transformer Replacement Programme*	$250,000
Switchgear / Automation	*Remote Control Switchgear*	$115,000
	Auto Sectionalisers	$27,000
	Radio Comms Gear for Automation	$30,000
Non Line Assets	*New Ripple Injection Plant – Dannevirke Sub*	$300,000
	5,100 new ripple relay units	$612,000
		$2,084,004

Budgeted maintenance expenditures for the coming year are as follows:

Figure 4 – Budgeted Maintenance Expenditure 2005 / 2006

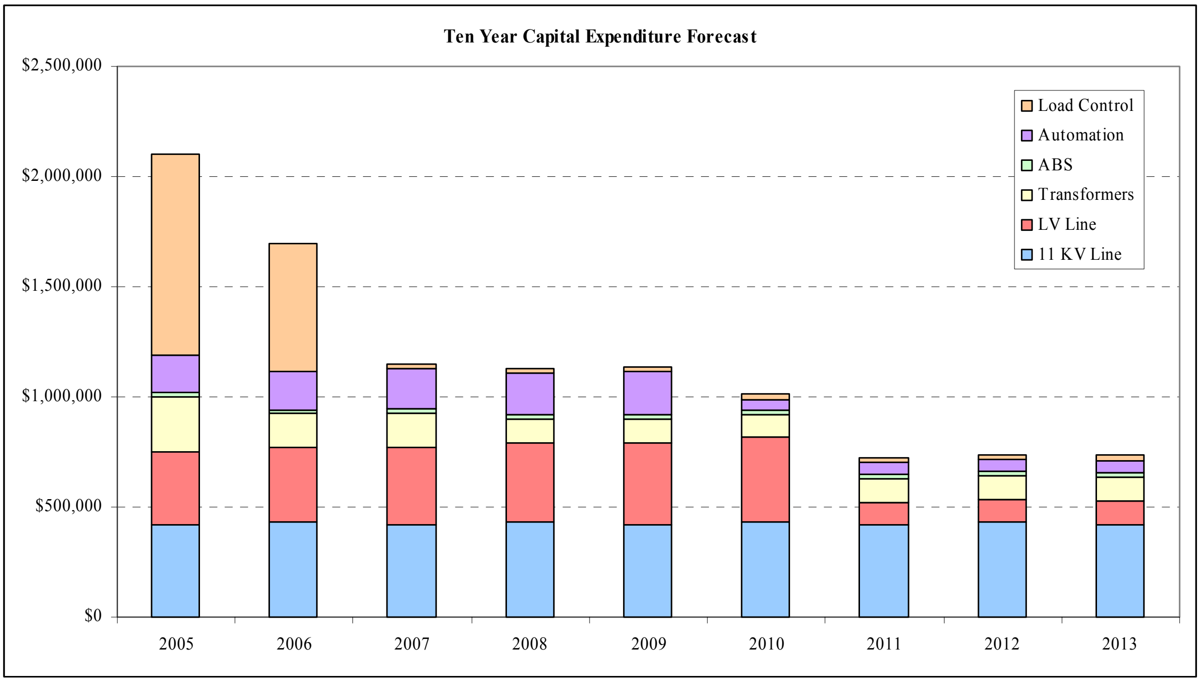
MAINTENANCE EXPENDITURE	2004 / 05 Budget
Distribution Maintenance	$350,000
Faults Maintenance	$165,000
Non Line Asset Maintenance	$326,332
	$841,332

The ten year capital replacement plan is as follows:

Figure 5 – Summary Ten Year Capital Expenditure Plan

Year	11 KV Line	LV Line	Transformers	ABS	Automation	Load Control	Total
2005	$421,216	$328,788	$250,000	$17,850	$172,000	$912,000	$2,101,854
2006	$433,852	$338,652	$150,000	$18,207	$177,160	$575,000	$1,692,871
2007	$421,217	$348,811	$154,500	$18,571	$182,475	$20,000	$1,145,574
2008	$433,854	$359,276	$105,000	$18,943	$187,949	$20,600	$1,125,621
2009	$421,218	$370,054	$108,150	$19,321	$193,588	$21,218	$1,133,548
2010	$433,855	$381,155	$105,001	$19,708	$50,000	$21,855	$1,011,573
2011	$421,219	$100,000	$108,151	$21,000	$51,500	$22,510	$724,380
2012	$433,856	$103,000	$105,002	$21,420	$53,045	$23,185	$739,508
2013	$421,220	$106,500	$108,152	$21,848	$54,636	$23,881	$736,237

Figure 6 – Graphical Representation of Ten Year Capital Expenditure Plan



1.6 Life-Cycle Asset Management and Development Plans

Life-cycle asset management focuses on the development and implementation of strategies that consider relevant economic and physical consequences, from initial planning through to disposal.

Scanpower operates a life-cycle management strategy on its network assets that aligns condition, age and service reliability with the needs of customers. To achieve this Scanpower has developed a maintenance strategy that imposes condition-based, combination, time-based or break-down strategies on assets or classes of assets depending on the relative costs and benefits of preventing in-service failure. This strategy ensures that the assets perform their required function during their lives in a cost effective manner.

As a general principle, an asset should be refurbished or replaced when:

- It ceases to be suitable for the intended purpose, or
- It becomes unsafe, or
- The present value of the cost of its replacement plus the cost of removing or de-commissioning it, less the scrap value recovered, if any, becomes less than the present value of its future maintenance, or
- Its refurbishment or replacement forms part of the least cost development of the network.

Efficiency improvements achieved through refurbishment or replacement should be taken into account, as should the consequences of supply interruption if replacement is deferred. The unforeseen failure of an asset can have large consequences that constitute a business risk or potential loss to Scanpower.

A rolling ten year network development plan has been developed and includes the following system development initiatives:

- Accommodating forecast load growth requirements.
- Enhancing reliability, capacity and cost effectiveness of supply from the National Grid.
- Replacement of aging assets which have reached the end of their useful life.
- Installation of remote controlled 11kV sectionalisers and air break switches for faster outage response.
- Upgrades to the SCADA system and replacement of the existing ripple control injection plant and relays.
- Installation of an in-house radio communications network.

1.7 Risk Management

Risk management and assessment is recognized by Scanpower as an integral part of its asset management practice. This includes establishing and improving systems and contingency plans for managing equipment failure or disaster events.

During the 2004/05 year Scanpower commissioned a detailed network risk assessment based on AS/NZS 4360:1999 Risk Management in order to identify, analyse, evaluate, treat, monitor and communicate risks associated with network assets. This analysis identified a range of risk exposures that Scanpower will remedy over time.

In all Scanpower risk management methodologies, public and environmental safety are regarded as issues of primary priority.

1.8 Performance and Plans for Improvement

Developing improvement initiatives and performance enhancement are established processes within Scanpower's asset management planning methodology. Improvement initiatives planned for the coming year are:

- Replacement of aging 11kV and 400v overhead lines.
- Split and reconfigure two 11kV main feeders from Dannevirke substation.
- Split one feeder into two feeders.
- Transformer replacement.
- Air break switch replacement.
- Installation of remote controlled 11kV air break switches.
- Installation of remote controlled sectionalisers

These improvements are considered important to improving reliability, quality of supply to Scanpower's customers, and the dynamic efficiency of the network assets.

2.0 Background and Objectives

2.1 Interaction Between Business Planning Processes and Corporate Goals

Scanpower undertakes several levels of business planning and these are as follows:

- *Strategic Plan*

  The Strategic Plan covers the medium to long term planning horizon and specifies the company vision and mission, in addition to specifying long term strategic objectives.

- *Annual Business Plan*

  The Annual Business plan is derived from the Strategic Plan, and contains implementation details and initiatives planned to deliver on strategic objectives.

- *Asset Management Plan*

  The Asset Management Plan represents the annual plan for the network division, setting out operational and financial targets. It constitutes part of the annual business plan, and is driven in the longer term by the Strategic Plan.

- *Annual Budgets*

  Annual budgets are produced as part of the annual business planning process.

- *Statement of Corporate Intent*

  The corporate goals of the company, derived from the Strategic Plan, are communicated annually to the Scanpower Customer Trust in the Statement of Corporate Intent.

2.2 Planning Periods Adopted

The following table summarises the planning periods adopted and review frequency for each of the business planning processes.

Figure 7 – Business Planning Periods and Review Frequency

Plan	Period Covered	Review Frequency
Strategic Plan	10	Annually Rolling Basis
Annual Business Plan	1	n/a
Asset Management Plan	10	Annually Rolling Basis
Annual Budgets	1	n/a
S.C.I.	1	n/a

2.3 Stakeholder Interests

Stakeholders are those groups with a direct interest in the performance of Scanpower's network assets and therefore in the company's annual Asset Management Plan, policies and working practices.

As a Customer Owned Trust, Scanpower's connected customers are also its shareholders.

The following table highlights Scanpower's key stakeholder relationships and the nature of each respective interest.

Figure 8 – Key Stakeholder Relationships

Stakeholder Group	Nature of Interest
Electricity Consumers	Network reliability Service quality Line charges New connection process Responsiveness to requests Safety
Customer Trust / Shareholders	Return on investment Annual network discount Sustainable operating practices Responsible corporate behaviours
Electricity Retailers	Line charges Minimisation of line losses Accuracy / timeliness of billing Nature of contractual relationship Response to service requests / inquiries Safety
Government / Regulatory	Disclosure requirements met Reporting vs thresholds Appropriate business practices adopted Electricity Complaints Commission
Scanpower Employees	Health and safety Appropriate training provided Personal growth opportunities

Other stakeholder relationships exist with parties such as land owners, property developers and regional emergency preparedness organisations (Lifeline).

2.4 Accountabilities and Responsibilities

Ultimate responsibility for the management of Scanpower's network assets lies with the Board of Directors, who are appointed by the Board of Trustees. The Trustees are elected on a tri-annual basis by consumers.

The Board of Directors appoints a Chief Executive who is responsible for day to day management of the company and its assets. Scanpower operates an in-house network engineering and line contracting division which undertakes asset management activity. The Network Manager is responsible for day to day running of the Network Division.

The Chief Executive and Network Manager are accountable for delivering network performance levels consistent with corporate strategic objectives specified in the Strategic and Annual Plans, and Statement of Corporate Intent, in addition to delivering and implementing the Asset Management Plan.

2.5 Asset Management Systems and Processes

Scanpower operates a number of asset management related information systems and processes. The summary details of these are as follows:

Figure 9 – Information Systems and Processes

System / Process Name	Details
Geographic Information System	Critchlow "cablecad" system Stores locational information on all network assets in graphical format
Customer Connection Database	N.C.S. customer database system Contains connection information by ICP Used to generate new connections / ICPs Source of network billing information N.C.S. financial systems
Asset Databases	Store attributes, age and condition information at component level Used as basis for programmed preventative maintenance Basis for financial / ODV exercises
Outage Database / Process	Process specified for accurate and detailed recording of network outages Database operates as repository for outage data and calculation of SAIDI, SAIFI and CAIDI
SCADA System Electronic Records	Stores information on feeder loadings, trip events etc Load control records
Proprietary / Project Databases	Linked to particular project activities such as tree trimming etc
Annual Customer Consultation	Consultation on available price and quality trade off options with customers; directly with large customers and via the Scanpower Customer Trust for residential and small commercial customers.

Scanpower network related policies are formally documented and cover areas such as Outage Reporting, Capital vs Maintenance, and Health & Safety. These are readily available to both staff and contractors.

3.0 Assets Covered

3.1 Network Configuration

Scanpower has electricity distribution network assets with a maximum demand in the range of 15 - 16MW and a total system length of 861 kilometres. Total connections number approximately 6,753 and for the year ended March 2005 97.GWh was injected into the network with an overall average loss factor of 6.76%.

The network serves two main areas – Dannevirke, Woodville and their surrounding rural areas. Bulk supply is taken from Transpower's 110 kV Bunnythorpe/Fernhill lines via two 110/11 kV substations at Dannevirke and Woodville.

The system is of relatively straightforward design. There are two Transpower points of supply, one at Dannevirke substation and one at Woodville substation, each supply separate non-interconnected parts of the Scanpower system.

There is currently no generation on the system.

The Dannevirke Transpower point of supply has parallel 110/11 kV 10 MVA transformers, giving a firm supply of 10 MVA compared with a maximum demand of some 13.5 MW.

The Transpower transformers consist of 2 banks of three single phase units, plus a spare unit totalling 7 units in all. Transformer circuit breakers are remotely switched from Transpower's Haywards substation.

Given increasing demands on the Dannevirke network, analysis has been undertaken on several options for increasing capacity at the Transpower substation. An agreement has been reached whereby Transpower will replace the existing transformers with two new 20MVA units prior to the winter of 2006

Woodville has a single 110/11 kV 4.5 MVA transformer, again in a single phase bank format with a spare unit on site.

The wide separation between the two points of supply means there is no interconnection between the two supply areas for emergency interconnection or back up purposes. Interconnection of the two systems has been investigated but at present there are no plans for this to proceed.

Seven 11 kV feeders radiate from the Dannevirke point of supply. The following table summarises the key details of each of these:

Figure 10 – Dannevirke 11 kV Feeder Configuration (at 31 March 2005)

11 kV Feeder	kWh pa	Description
Pacific	19,969,417	Rural feeder, predominantly servicing industrial load
Weber	16,200,426	Longest feeder servicing eastern extremity
Adelaide Road	12,254,649	Urban feeder into Dannevirke
Dannevirke East	11,155,009	Urban feeder into Dannevirke
Dannevirke Central	7,211,997	Urban feeder into Dannevirke
Mangatera	8,331,025	North Eastern rural area feeder
North	7,072,965	Northern rural area feeder
	82,195,488	

The Woodville point of supply supports:

Figure 11 – Woodville 11 kV Feeder Configuration (at 31 March 2005)

11 kV Feeder	kWh pa	Description
Town 1	6,425,736	Urban feeder into Woodville / Eastern rural area
Town 2	5,211,622	Urban feeder into Woodville / Western rural area
Country	4,105,247	Rural feeder to north of Woodville
	15,742,605	

The LV network system consists of 115 km of lines, 45 km of which have now been installed underground.

In regard to Scanpower's low voltage network, the company has pursued a policy of undergrounding in the urban Dannevirke and Woodville areas. This has been on the basis of aesthetic and reliability grounds, and conforms to the NZ Standard Code of Practice for Urban Subdivisions NZS 4404. This policy will continue until such time as urban LV undergrounding is complete, or if as the result of annual review the policy is amended. Network system maps are provided as an appendix to this Asset Management Plan.

3.2 Identification of Assets by Category

Network assets are categorised as follows:

- 11kV Distribution Lines and Conductor
- LT Distribution Lines and Conductor
- Circuit Breakers/Sectionalisers/ Reclosers
- Distribution Transformers
- Communications (ripple control / SCADA)

3.3 Justification for Assets

The network assets are owned and maintained to meet the reliability and electricity supply needs required by Scanpower's connected customers. No assets have been identified as superfluous to meeting these requirements and the 2004 year end ODV exercise identified no assets appropriate for optimisation.

3.4 Location, Age and Condition of Assets

3.41 11 kV Distribution Lines and Conductor

Scanpower has 745km of 11kV distribution lines, 741km of which is overhead and the remaining 4km underground. Of the 741km overhead 11kV lines, 371km of line is of concrete pole construction and 370km of hard wood pole construction.

The Company has adopted a policy of replacing wooden poles with pre-stressed concrete poles, thereby extending typical life from 45 years to 60 years.

As loads on the Scanpower network are relatively low, 11kV conductor sizes are either "Light" (standard conductor - Ferret) or "Medium" (standard conductor - Dog) per ODV Handbook definitions. There is no "Heavy" conductor used on the system.

Per ODV Handbook standard categories, 11kV line assets are as follows:

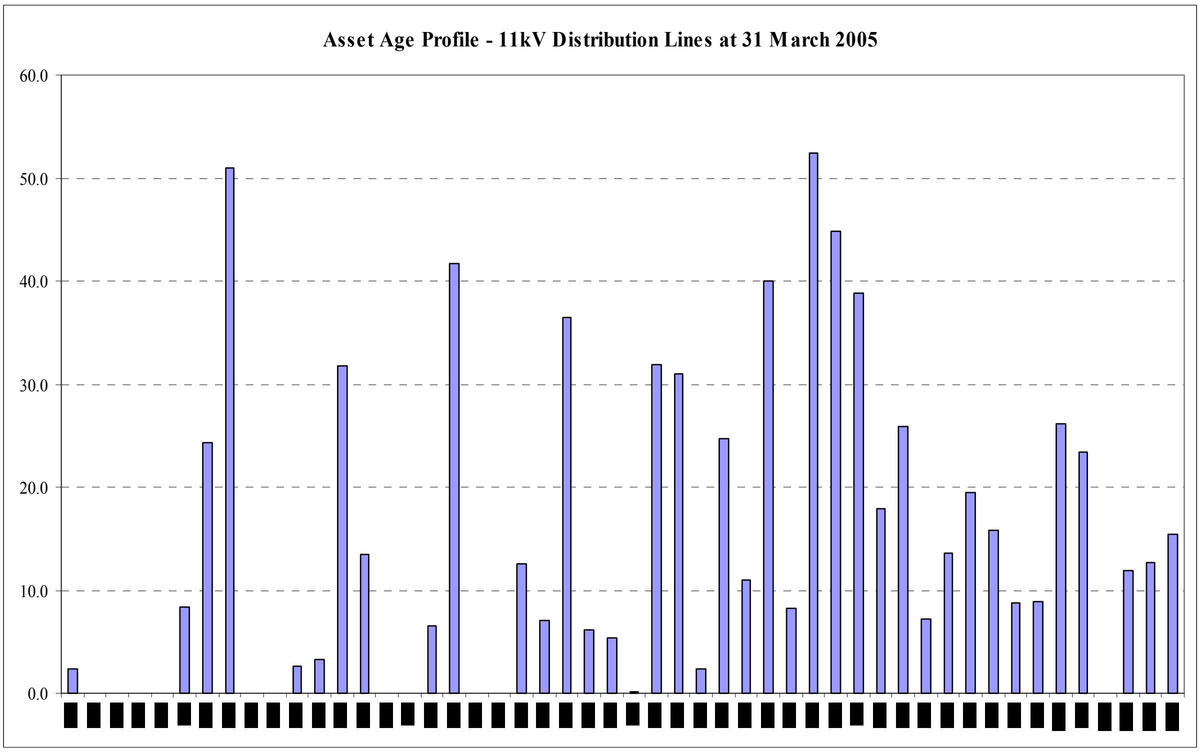
Figure 12 – Composition of 11kV Line Assets by ODV Handbook Category

11kV DISTRIBUTION LINE ASSETS	Quantity (KM)
Distribution Lines 11 kV O/H DCct Medium	12.0
Distribution Lines 11 KV O/H Light (≤ 50mm2 Al)	591.7
Distribution Lines 11 kV O/H Medium (>50mm2, <150mm2 Al)	135.4
Distribution Lines 11 kV Single Phase or SWER Lines	2.8
Distribution Lines 11 KV U/G Light (≤ 50mm2 Al)	3.5
	745.4

The following graph illustrates the age profile of 11kV distribution line assets with indicative capital replacement costs. The profile is generally healthy, with an average line age of **20 years** old.

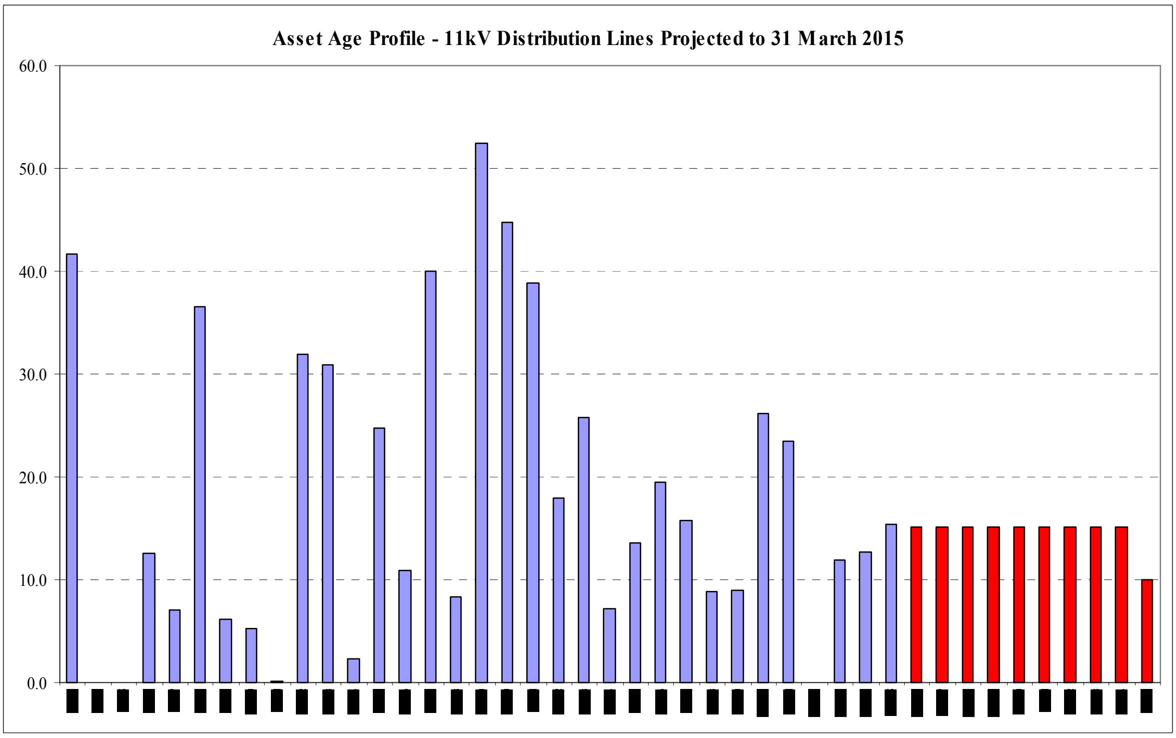
However, there is a one line section (Speedy Road to Weber Road) constructed in the 1950's (1956) which is likely to require replacement soon. Furthermore, there are a number of replacement "peaks" approaching reflecting the rapid growth of the network in the 1960's; most notably in 1961 and 1962 when 72.5km of line was installed over a two year period.

Figure 13 – Age Profile of 11 kV Distribution Lines



In establishing a ten year replacement plan, the need to smooth the investment peaks of the 1960's has been balanced against expected failure rates and known asset condition based on inspection. A rolling ten year programme is in place and the forecast age profile / replacement plan is illustrated below.

Figure 14 – Forecast Age Profile of 11 kV Distribution Lines in 2015 Based on Replacement Plan



As is evident, the work completed in the past year is consistent with the required replacement trend going forward.

3.42 LV / 400 V Distribution Lines and Conductor

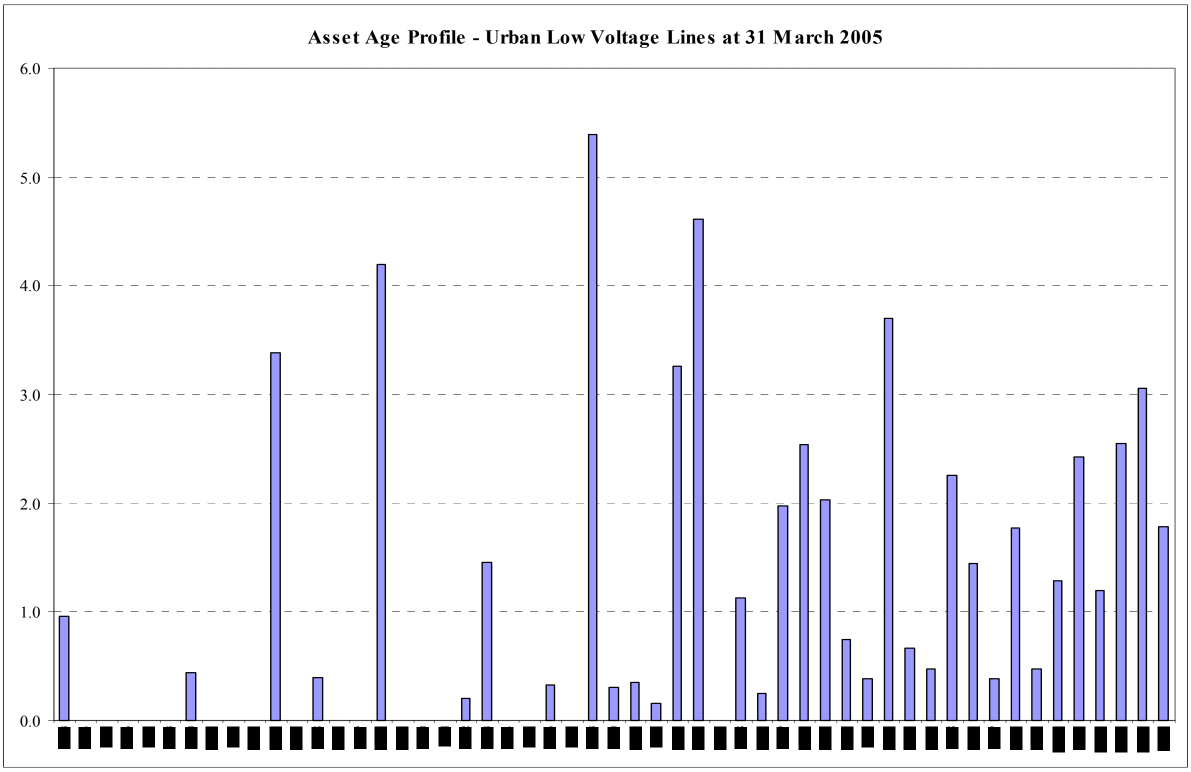
Scanpower has 115km of low voltage distribution lines. All customers on the network take supply at LV with the exception of one which takes supply at 11kV. LV line assets are categorised as at 31 March 2005:

Figure 15 – Composition of LV Line Assets by ODV Handbook Category

LV DISTRIBUTION LINE ASSETS	Quantity (KM)
LV Lines Overhead Medium LV Only (≤150mm2)	6.94
LV Lines Overhead Medium Underbuilt (≤150mm2)	63.42
LV Lines - Underground - LV Only (≤240mm2)	44.74
	115.10

The age profile of urban LV distribution lines is as follows:

Figure 16 – Age Profile of LV Urban Distribution Lines



As the age profile suggests, urban low voltage lines are in generally modern condition with an average age of **19 years** old.

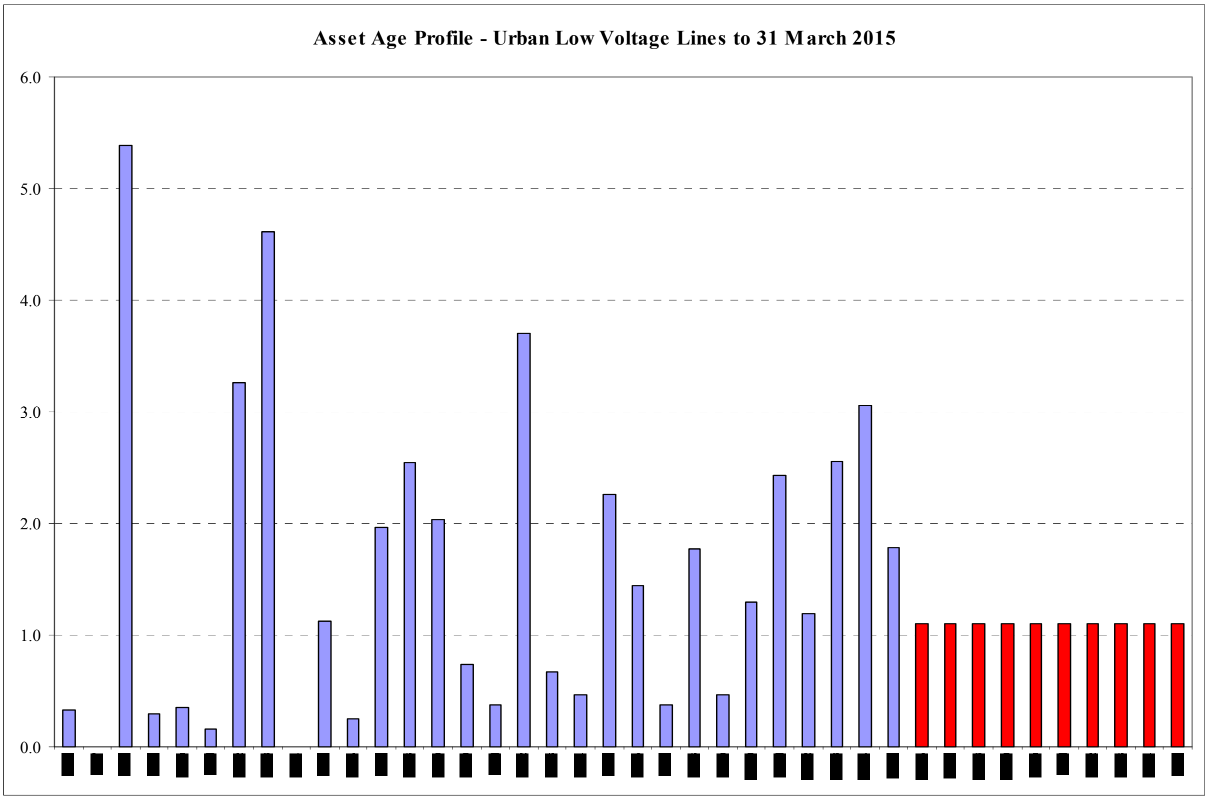
Scanpower is progressively working to complete undergrounding of all urban low voltage distribution lines. This is on the basis of environmental grounds and to conform to NZ Standard Code of Practice for Urban Subdivisions NZS 4404.

Undergrounding is undertaken in conjunction with the Council road sealing programme and is also co-coordinated with Telecom undergrounding initiatives.

Low voltage undergrounding cables are single core Beetle aluminium PVC insulated unarmoured cables. Cables are buried 600mm deep under plastic slab protection. All joints are above ground in distribution pillars.

The expected requirement to replace assets constructed in the 1950's and early 1960's over the coming ten years has produced a future annual replacement plan of ~1km overhead per year. This gives the following forecast age profile to 2015:

Figure 17 – Forecast Age Profile of LV Urban Distribution Lines to 2015



3.43 Circuit Breakers / Reclosers

Circuit Breakers / Reclosers

Scanpower has twenty-two circuit breakers installed on the network. The majority of these (15 units) were installed recently between 1999 and 2003. Of the remaining 7, 6 are installed at a major customer site having been commissioned in 1978. It is unlikely that any of these 21 units will require replacement prior to 2016.

The only other CB on the system, a Reyrolle unit installed in 1960 is planned for replacement within the coming year. There are no plans to install further circuit breakers on the system at this stage.

The following table provides a summary of the circuit breaker assets installed on the network.

Figure 18 – Circuit Breaker Asset Summary

OCB No.	Feeder Name	Sub No.	Location	Type	Installed	Age
Rich	Pacific	3060	Richmonds Oringi No 1 Incomer OCB	AEI	1978	27
Rich	Pacific	3060	Richmonds Oringi No 2 Incomer OCB	AEI	1978	27
Rich	Pacific	3060	Richmonds Oringi Killing Floor OCB	AEI	1978	27
Rich	Pacific	3060	Richmonds Oringi No 1 Plantroom OCB	AEI	1978	27
Rich	Pacific	3060	Richmonds Oringi No 2 Plantroom/Boning Room	AEI	1978	27
Rich	Pacific	3060	Richmonds Oringi Pumps OCB	AEI	1978	27
905	Country	B200	Hopelands Road – by bridge	Cooper	2003	2
908	Town 2	A040	Bushmill Road, Woodville	Cooper	1999	6
910	Weber/Te Rehunga	4040	Kiritaki Road	Cooper	1999	6
913	North	1080	Gundries road, Norsewood	Cooper	1999	6
914	Weber/Te Rehunga	4240	Weber Road, Weber	Cooper	1999	6
915	North	1060	SH2 Matamau	Cooper	1999	6
916	Mangatera	2100	Matamau/Ormondville Rd, Matamau	Cooper	1999	6
917	Mangatera	2160	Ormondville Metal Pit	Cooper	2000	5
920	Weber/Te Rehunga	4160	Millers Road	Cooper	2000	5
922	Weber/Te Rehunga	4180	Mangahei Road, Awariki	Cooper	2000	5
912	Mangatera	2060	Smith Road	Nulec	2000	5
919	Country	B140	SH2 Woodville	Nulec	2000	5
921	Weber/Te Rehunga	4160	Weber Road, Tipapakuku	Nulec	2000	5
Felt	East	6120	Feltex - OCB	Reyrolle	1960	45
903	Weber	Sub	Dannevirke Substation	Nulec	1999	6
924	Te Rehunga	Sub	Dannevirke Substation	Nulec	1999	6

Sectionalisers

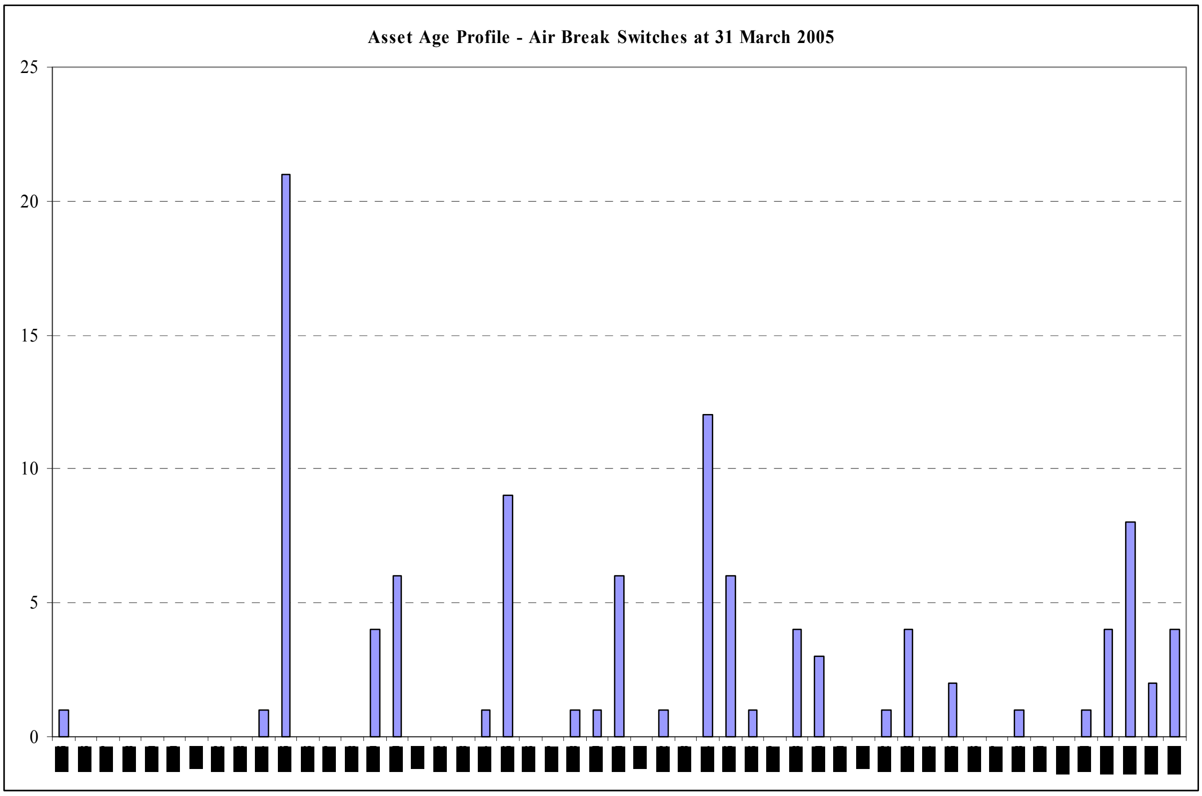
Scanpower now has six sectionalisers installed on the system which are positioned down stream from the circuit breakers thus allowing for operational discrimination. One unit was installed in 2005, the remainder in 2004.

Air Break Switches

Scanpower has an air break switch population of 105 with an average age of 24 years. This represents an improvement on last year as a result of replacement of 4 aged switches in the past year.

The following graph shows the age profile of air break switch assets.

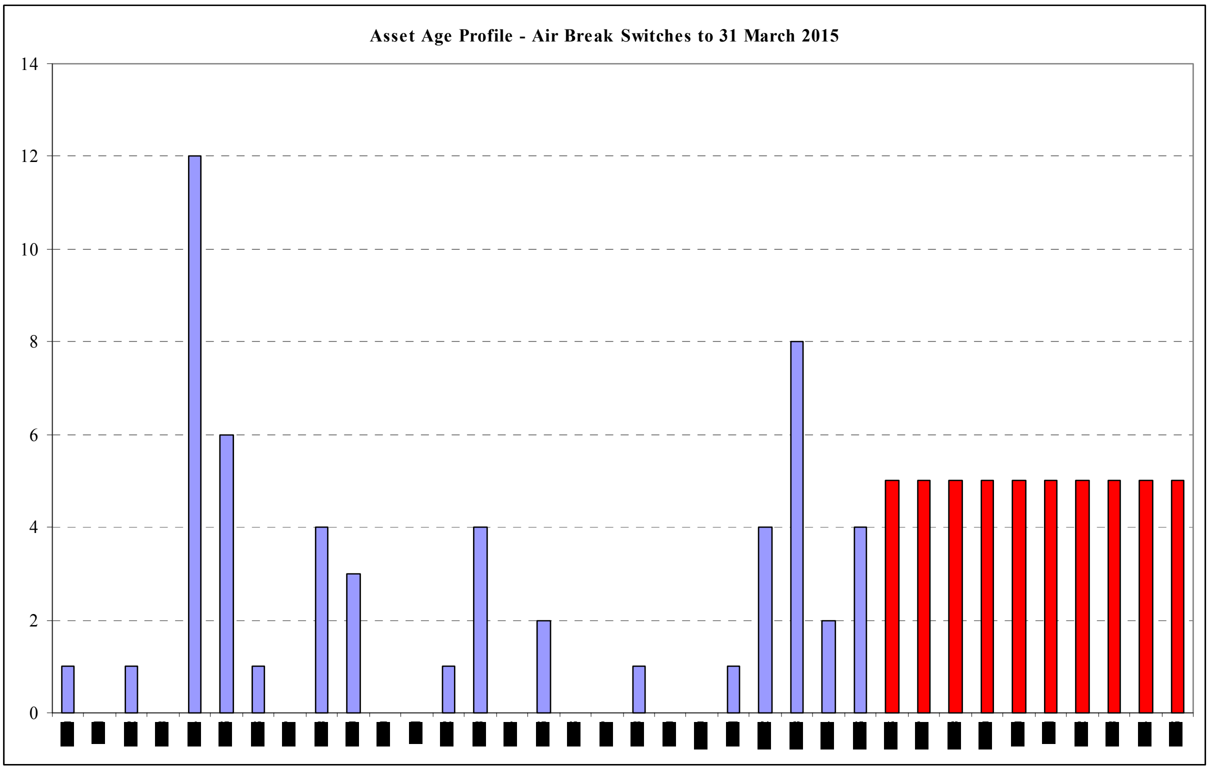
Figure19 – Air Break Switch Age Profile



As with the 11kV line asset profile, rapid expansion in the 1960's is mirrored in the ABS age profile. As with previous asset categories, a ten year replacement programme has been devised which smoothes these investment peaks, whilst minimising timing risks and taking into account anticipated failure rates.

The graph below (figure 22) shows the forecast ABS profile over the coming ten year period.

Figure 21 – Air Break Switch Age Profile to 2015



In addition to standard ABS replacement, as part of Scanpower's network development process, an ongoing programme to introduce automation to the network will continue in the coming five years with the objective of installing strategically placed remote control switches. For the coming year the budgeted capital expenditure for this is $172,000.

As at 1 April 2005, 15 Electropar remote control switches were in stores pending installation. It is planned that these will be installed during July / August 2005.

Figure 20 – Network Automation Capital Expenditure Budget

Year	2005	2006	2007	2008	2009	2010	2011	2012	2013
Capex	$172,000	$177,160	$182,475	$187,949	$193,588	$50,000	$51,500	$53,045	$54,636

3.44 Transformers

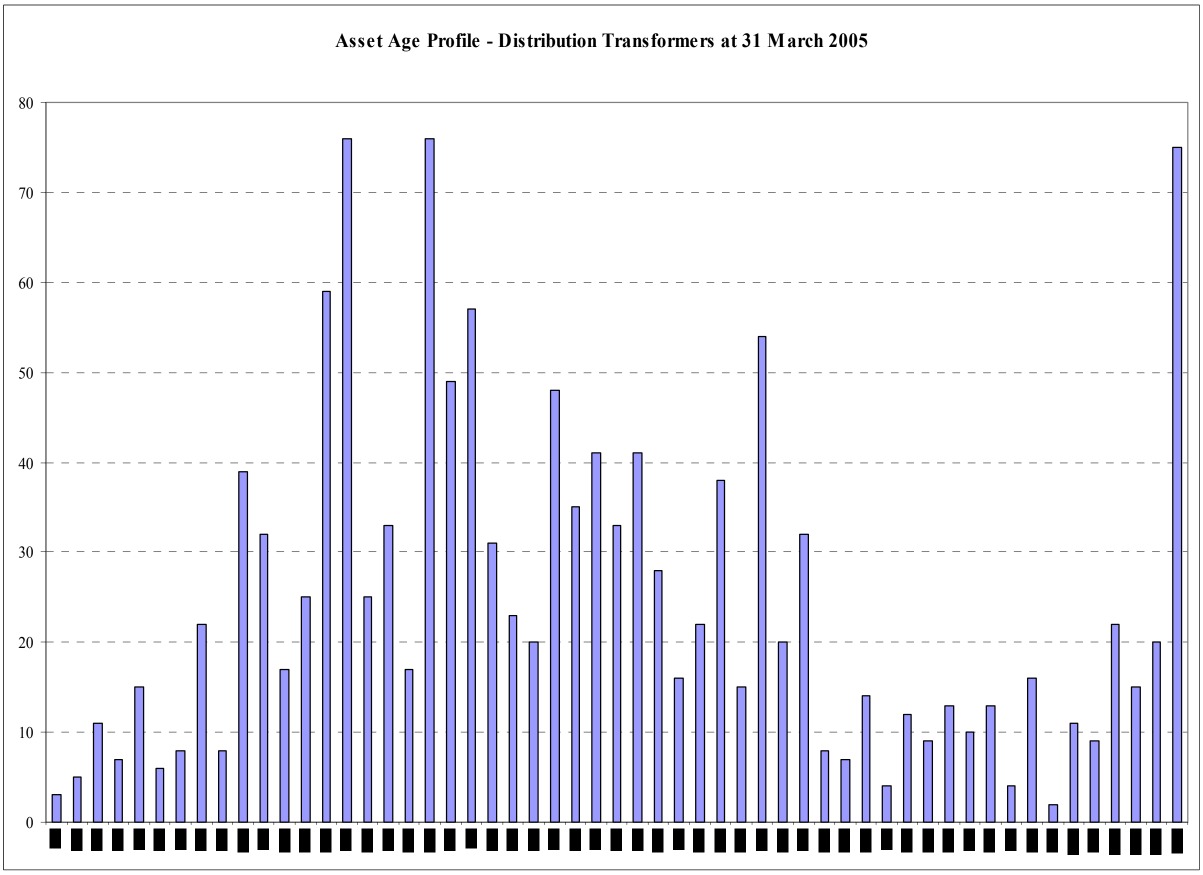
Scanpower has a distribution transformer population of 1,351 units ranging from 2kVA to 1,000kVA capacity. The total installed capacity is 58,871kVA with a capacity utilisation rating of 27.98%. The units are oil immersed 11kV / 400V fixed tap transformers.

Figure 22 – Breakdown of Distribution Transformer Assets at 31 March 2005

DISTRIBUTION TRANSFORMER ASSETS	Quantity
11 / 0.4kV Single Phase Unit 30 kVA	17
11 / 0.4kV Single Phase Unit Up To And Including 15 kVA	68
11 / 0.4kV Single Phase Unit Up To And Including 15 kVA (Pole Mounted - Bushing Terminations)	2
11 / 0.4kV Three Phase Unit 100 kVA (Pole Mounted - Bushing Terminations)	31
11 / 0.4kV Three Phase Unit 1000 kVA (Customer Premises)	6
11 / 0.4kV Three Phase Unit 200 kVA (Cable Entry)	58
11 / 0.4kV Three Phase Unit 200 kVA (Pole Mounted - Bushing Terminations)	8
11 / 0.4kV Three Phase Unit 300 kVA (Cable Entry)	18
11 / 0.4kV Three Phase Unit 300 kVA (Pole Mounted - Bushing Terminations)	11
11 / 0.4kV Three Phase Unit 50 kVA (Pole Mounted - Bushing Terminations)	71
11 / 0.4kV Three Phase Unit 500 kVA (Cable Entry)	4
11 / 0.4kV Three Phase Unit 750 kVA (Cable Entry)	5
11 / 0.4kV Three Phase Unit Up To And Including 30 kVA (Pole Mounted - Bushing Terminations)	1052
Total	**1351**

As is evident, the majority of Scanpower transformer assets fall into the three phase, pole mounted up to 30kVA category.

Figure 23 – Distribution Transformer Asset Age Profile at 31 March 2005



The current average transformer age is 28 years, reflecting an improvement from 31 years as at 31 March 2004. Based on handbook standard asset life of 45 years, this places the transformers on the older side of mid point.

As is evident from the graph above, a relatively large number of transformers were replaced during the last year. In addition to planned changes (41 units), 35 unplanned transformer installations occurred as a result of asset failures and a relatively high number of new connections on the network.

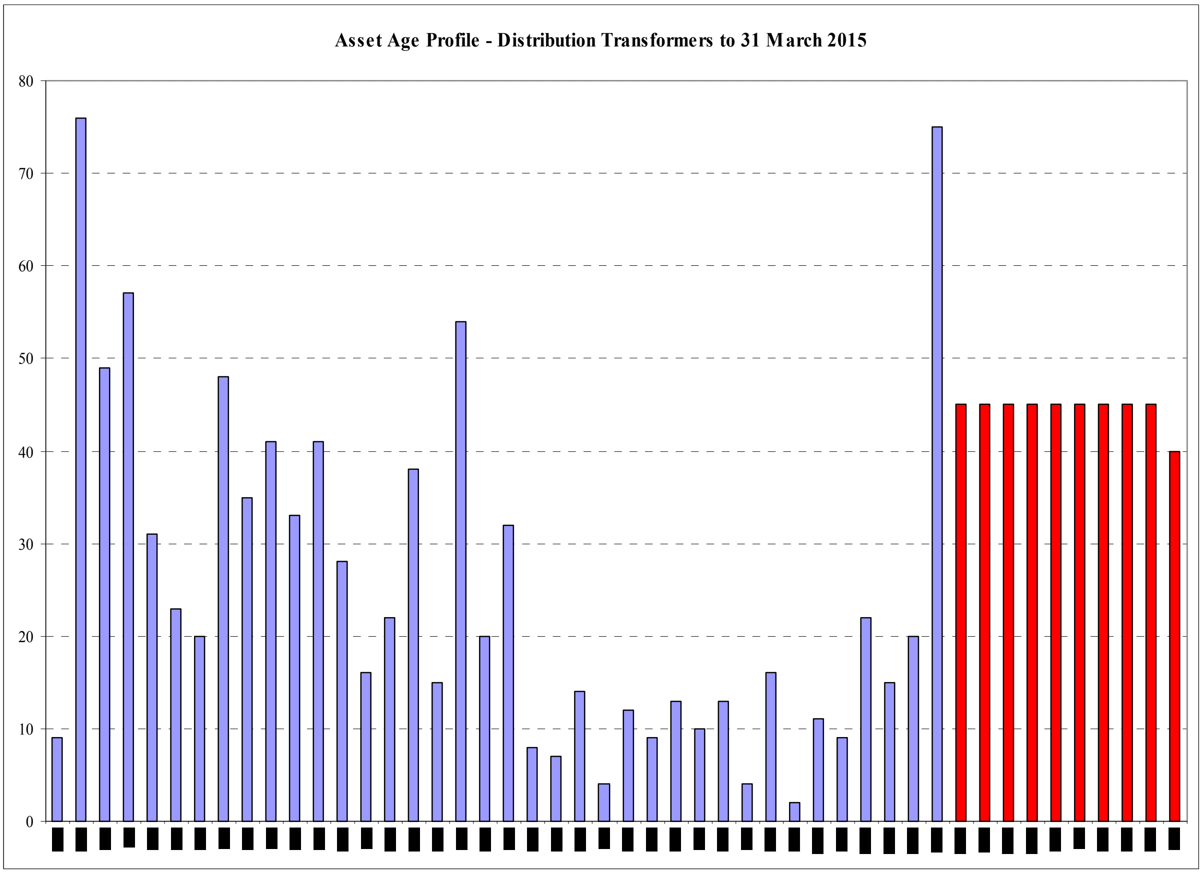
Whilst it is possible to extend the standard asset life of distribution transformers to 55 years by undertaking a structured refurbishment program, analysis suggests that based on cost this is not an economic option for lower rated transformers (<200kVA).

The transformer age profile again reflects rapid growth in the 1960's. Replacement activity in the past ten years has been relatively minimal, and for the coming ten year period, planning takes into consideration the approaching replacement spikes.

The following graph (Figure 25) illustrates the ten year forecast replacement position through to 2015.

Again, as is evident from the graph, the intention of the plan is to smooth capital expenditure levels and operational activity over the period.

Figure 24 – Forecast Distribution Transformer Asset Age Profile to 2015



3.45 Communications (Personnel / Ripple Control / SCADA)

Scanpower personnel communicate by way of VHF Tait mobiles, using trunk radio via BCL's Team Talk system and SCADA/Ripple communication is via UHF radio links.

The UHF communications equipment is now 19 years old and requires replacing. Because of this a review of the radio network was undertaken during 2004 and the decision was made to replace the existing system, including Team Talk, with our own in house system. The new system will be installed and commissioned early in 2005.

Scanpower has two static Zellweger ripple injection plants one located at the Dannevirke GXP and the other in Woodville, both are operated from the controller located in the control room in Scanpower's main office in Dannevirke. There is also an old rotary plant located at the Dannevirke GXP used as a standby.

A report prepared by Enermet in 2004 concluded that the load control gear is beyond its operational life and the equipment is no longer in production. Also many of the existing 492Hz ripple receiver relays are reaching the end of their economic life.

A new ripple injection plant will be installed at the Dannevirke substation early in 2005 and new ripple receivers, operating on the new frequency, will be installed during 2005. Once this project is complete the existing ripple injection plants will be decommissioned.

During 2006 the Woodville plant and ripple relays will also be replaced.

4.0 Service Levels

4.1 Reliability and Security of Supply Targets

SAIDI and SAIFI (Class B & C)

Scanpower uses SAIDI class B (network owner planned) and SAIDI class C (network owner unplanned) as primary indicators of network reliability.

SAIDI refers to "System Average Interruption Duration Index", and is the average total duration of interruptions of supply that a customer experiences in the period. The SAIDI for the total of interruptions is the sum obtained by adding together the interruption duration factors for all interruptions divided by the total number of connected customers.

SAIFI refers to "System Average Interruption Frequency Index" and is the average number of interruptions that a consumer experiences in the period. The SAIFI for the total number of interruptions is the sum obtained by adding together the number of electricity consumers affected by each of those interruptions divided by the total number of connected customers.

Historically, reliability performance targets have been generated internally and proposed for approval by the Board of Trustees via the annual Statement of Corporate Intent. The Board of Trustees represent, and are elected by, customers connected to the Scanpower network. As such, the preferences expressed by the Trust are regarded as an appropriate reflection of all customer preferences. Typically targets have initially been set on the basis of previously achieved performance results with an "improvement factor" applied.

With the advent of the Commerce Commission Electricity Lines Business Thresholds, minimum reliability performance standards have been prescribed. The calculation for establishing targets is the average of each measure for the base measurement five years, giving:

$$\mathbf{S}_{2006} \leq \{(\mathbf{S}_{2000}+\mathbf{S}_{2001}+\mathbf{S}_{2002}+\mathbf{S}_{2003}+\mathbf{S}_{2004}) / 5\}$$

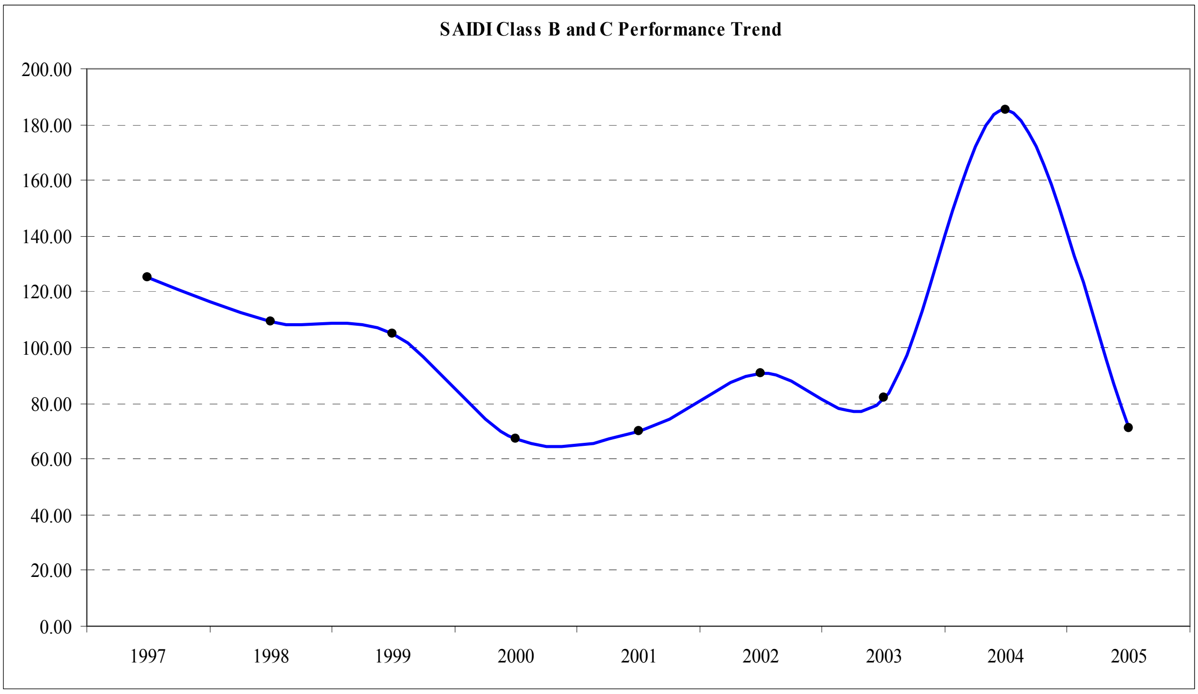
(where $\boldsymbol{S}_t$ is the SAIDI or SAIFI disclosed for year t (ended 31 March)

Scanpower has used this methodology to establish reliability performance targets for proposal to the Trust in the annual Statement of Corporate Intent. This process now also includes a formal consultation on matters of price vs quality to assess whether the proposed performance targets are in line with customer expectations and preferences.

The outcome of consultation undertaken with the Trust in early 2004 was that for the coming two years, the targets established under the threshold methodology were satisfactory in terms of quality and price. There was no expressed customer desire for the company to reduce reliability service levels (and consequently breach the threshold) or for the company to aim to significantly exceed targets established under the threshold methodology (which may have necessitated breaching the price threshold).

The following graph illustrates recent Scanpower reliability performance results.

Figure 25 – Scanpower SAIDI Class B & C Performance 1997 – 2005



As is evident, SAIDI (class B & C) performance has shown a general downward trend over the period 1997 to 2005. However, a series of exceptional events in the 2004 year lead to a very high annual SAIDI result which is anomalous to the trend seen in recent years.

Reliability performance in 2005 fell within Commerce Commission regulatory thresholds, and represented a return to more conventional levels. It is anticipated that the network automation plan will contribute to steadily improving reliability performance in the coming years.

Security of Supply

With regard to security / restoration of supply Scanpower has established a Security Standard based on the "Guidelines for Security of Supply in New Zealand" published by the Electricity Engineers' Association of NZ.

The primary purpose of this standard is to provide asset managers with a set of targets which ensure compliance with good industry practice with regard to efficient supply and an appropriate level of customer service.

The appropriateness of adopting a security standard based on EEA Guidelines has been considered, bearing in mind Scanpower's relatively small size. In no part of the network does load reach the size where compliance with industry standards requires security provisions to prevent interruption of supply (known as **n-1** security level).

Given this, and a number of other network specific considerations, a security level of **n** has been generally adopted unless consultation with customers reveals a preference for a higher level of security, and a corresponding willingness to pay for it. At this level, it is appropriate that Scanpower focus on improving the ability to restore supply in the event of unplanned outages, rather than prevent interruption through increased security level measures.

Improving the ability to restore supply as quickly as possible and improving system reliability are seen as two important factors in enhancing customer satisfaction. To achieve this Scanpower have instigated the following initiatives:

Figure 26 – Network Reliability Improvement Initiatives

Asset-based initiatives	Operational initiatives
• Installation of remote controlled sectionalisers and air break switches to reduce the number of customers lost during contingent events.	• Continuing to ensure that priority is given to restoring critical customers through proper fault dispatch processes.
• Splitting of single feeders with large numbers of customers into two separate feeders.	• Retaining all existing ABS's.
• Separating feeders configured as dual-circuits into single-circuit configurations in widely spaced corridors.	• Ensuring an appropriate AUFLS sequence is maintained.
• Replacing the existing team-talk radio network with an in-house platform.	• Using an appropriate mix of de-energised and live-line processes to maintain the network.
• Generally replacing old network components to reduce the incidence of asset failures.	• Maintaining an intensive tree trimming program.

4.2 Other Performance Targets

Safety

The safety of Scanpower's employees, contractors and the general public is regarded as of paramount importance. Scanpower operates a rigourous internal Health & Safety policy and commits providing training so that all lines staff are suitably qualified for the tasks they may undertake on the network.

Scanpower has a safety objective of zero accident frequency. All work related accidents are recorded and the number of lost time incidents is published in the Annual Report expressed as lost time incidents per 100,000 working hours.

Asset Utilisation / Load Factor

Asset utilisation, or load factor, is disclosed annually to the Ministry of Economic Development. It is an efficiency measure based on asset utilisation. Generally the higher the load factor, the more efficient the lines business is at utilising their line investment.

Review of annual Electricity Information Disclosure Statistics shows that Scanpower has consistently been above the mean and median load factor for the past seven years (1997 – 2005[1]).

Figure 27 – Scanpower Load Factor Trend vs Disclosed Industry Average

Measure	1998	1999	2000	2001	2002	2003	2004	2005
Load Factor	62.00	67.00	67.40	68.00	67.80	70.43	69.80	67.88
Median	*60.35*	*60.00*	*60.29*	*62.60*	*61.27*	*63.02*	*64.7*	*NA*
Mean	*60.43*	*61.79*	*62.28*	*63.63*	*61.02*	*64.42*	*64.1*	*NA*

NA = Not available at the time of this report

Quality of Supply

Scanpower aims to meet all statutory requirements with regard to power quality (i.e. harmonic and supply voltage levels).

The target for customer voltage complaints, where quality issues are found to be genuine, has been set at ten or less per annum.

4.3 Justification for Target Levels

In terms of reliability, SAIDI and SAIFI (Class B & C) have been adopted as primary performance measures as they conform to the industry standard and MOED / Commerce Commission disclosure and measurement bases.

The target levels restated in this asset management plan have been calculated in consultation with the Trust / customers by way of the Statement of Corporate Intent, and based on direct liaison with a sample of industrial customers.

Scanpower regards safety related measures as essential in its role as a responsible employer. A zero injury target is set from a philosophical perspective and is regarded as a worthy company objective.

Load factor is required as per MOED information disclosure regulations. It provides a useful annual benchmark for the company to refer to in assessing network utilisation and in investigating optimisation opportunities.

Quality of supply performance is required by statute.

[1] Source: MOED Electricity Information Disclosure Statistics

5.0 Network Development Planning and Life-Cycle Asset Management

5.1 Planning Criteria and Assumptions

Prior to the development of the asset management plan, a network development review is undertaken. Factors considered are:

- Point of supply capacity;
- Growth on 11kV distribution feeders, load forecasting;
- Voltage regulation;
- Analysis of network faults captured in outage logs / database;
- Network reliability performance relative to targets over the previous period;
- Network performance under emergency conditions;
- Identification of aged assets due for replacement.

The purpose of this review is to identify potential or necessary network development projects. The base criteria for assessing the need for such projects are:

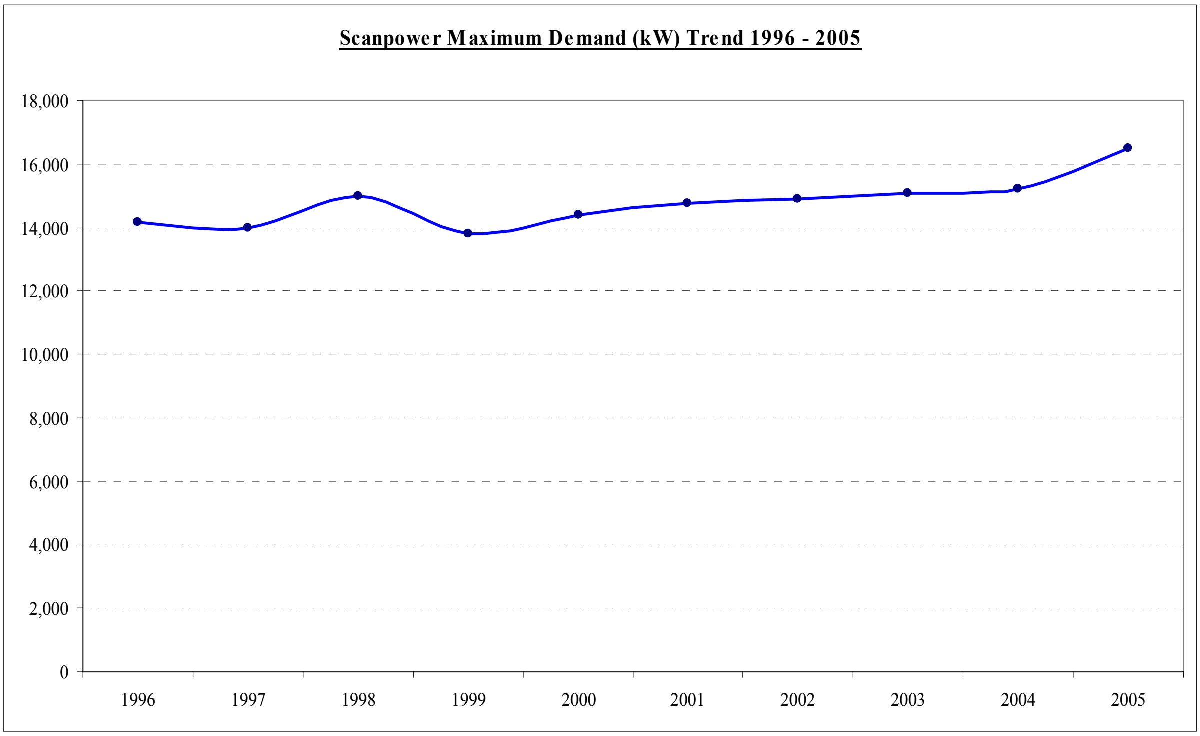
- Upgrading or expanding the network to accommodate known or anticipated load growth;
- Improving network reliability performance;
- Improving operational efficiency and fault response times;
- Delivering operating or business efficiency.

Projects identified are then assessed for viability and a business case process undertaken, prior to approval and implementation. This process includes economic analysis and NPV calculations. For example, development projects with the objective of improving reliability will be assessed on the basis of cost of project vs the NPV of cost of non-supply for the forecast reliability differential.

5.2 Demand Forecasting

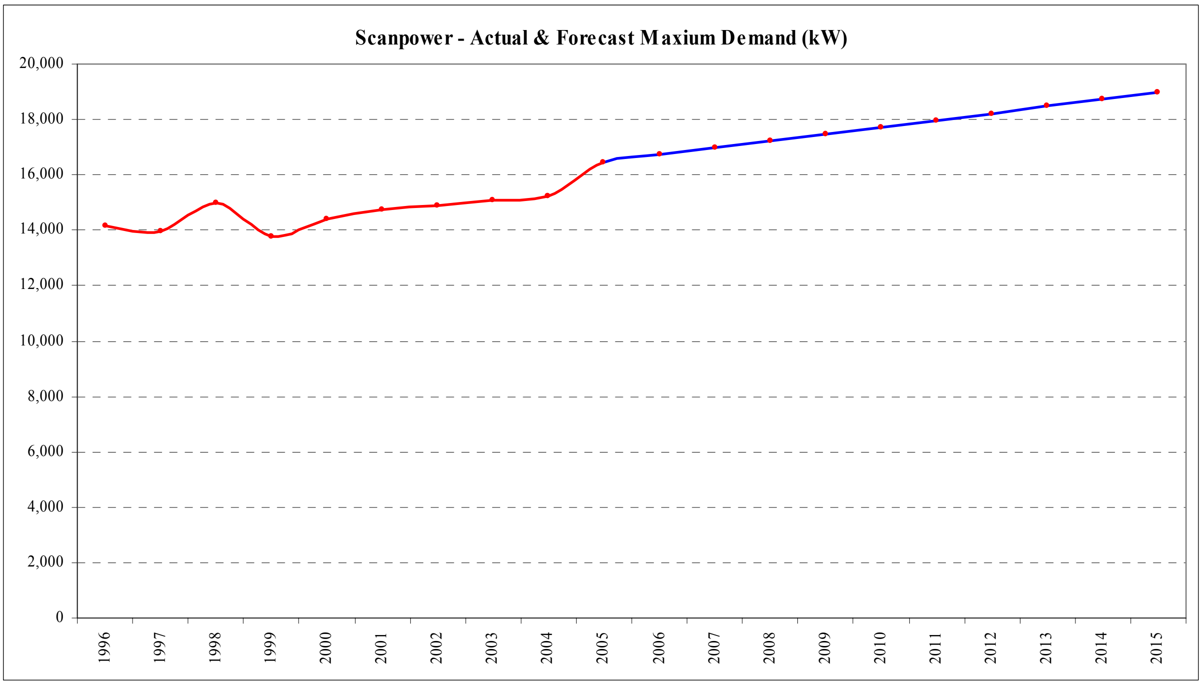
Over the last ten years, the Scanpower demand trend is as follows:

Figure 28 – Scanpower Annual Maximum Demand Trend



As is evident, there has been a general upward trend, with an anomalous result in 1998. Whilst it is confirmed that the 1998 peak was genuine, it occurred due to a fault on Scanpower load control equipment and occurred for a brief period of time. The past year has seen a notable increase in maximum demands, primarily as a result of a new freezing works becoming operational on the network.

Figure 29 – Annual Maximum Demand Trend and Forward Forecast



A forward trend line (blue line) has been added to the historic figures (in red). This is based on the following assumptions:

- Scanpower's base load is relatively static, with annual organic growth occurring at a rate of 250 kVA.

- No anticipated "step changes" anticipated (either up or down).

Therefore over the coming ten year period, load is expected to increase by:

(250 kVA x 10 years) = ***2.5 MW***

This would give a Year Ten demand of **18.97 MW**.

It is possible that the use of distributed generation, improved load control techniques and changes to network design may offset a proportion of this forecast increase.

5.3 Non-Asset Policies and Solutions

Load Growth Drivers

If the load growth in a specific area necessitates capital expenditure, an investigation into reconfiguring the 11kV network is held. If the network can be reconfigured to meet the load growth it is implemented. If this is not possible Scanpower invests in the capital expenditure.

Replacement / Redeployment

When existing assets are upgraded, based on economic life and reliability, the asset removed is assessed as to its suitability to be reused elsewhere on the network. If it cannot be reused the asset is disposed of in line with Scanpower's environmental policy.

Scanpower continuously researches new/technology and makes a decision on purchase based on suitability for the network, past reliability of the equipment and price.

Distributed Generation

Scanpower continues to research and consider distributed generation (DG) projects and initiatives, and recognises the role of DG in alleviating transmission and distribution congestion and constraints.

Other Initiatives

Load control remains an active and important practice for Scanpower in reducing peak demand on the network.

Scanpower pricing contains a demand related peak kVA charge for medium and large commercial customers (categories C4 and above). The objective of this is to send a pricing signal to larger users who have significant potential to shift load.

5.4 Service Level Options

In considering strategies to deliver on reliability service levels, Scanpower recognises that there are a number of options which may be pursued:

- Changes to working practices and outage management / planning processes; and
- Technology / asset based solutions
- Scanpower also considers preferences for service level options expressed by large customers where those customers are willing to pay for them.

For the coming year Scanpower plans to implement initiatives from the above categories for the purpose of improving SAIDI and SAIFI results. In summary these are:

Work Practice Based Options

Introduction of live-line working practices

Scanpower acquired live-line level 2 (hot-stick) capabilities in 2003/2004. Every opportunity will be taken to use live-line techniques where it is cost effective. The objective of this is to constrain planned outages to 30 SAIDI minutes per year.

Improved planned outage management & scheduling

A greater operational focus on management of outage minutes and use of techniques such as line-breaks to minimise the customer impact of planned outages has been implemented. Where planned outages are unavoidable, maximum resource will be applied to the necessary works to cut down on outage times.

Review of fault call handling processes and faultman dispatch

A review was undertaken of the radio network and a decision reached that a new in house platform would be installed which would allow communication with all mobile radios in the Scanpower area of supply.

Technology / Asset Based Solutions

Continued Installation of Remote Automatic Switches

In 2000 Scanpower introduced remote automatic circuit breakers and switches to reduce the impact on customer numbers of transient faults by isolating sections of line on which faults occur. This also improves restoration time as outages can be identified to a particular area.

The programme of replacing airbrake switches with remote control switches continues this year, allowing for centralised control of the network and improved fault response times. In a network such as Scanpower's, with rural extremities, cutting down on travel time by the use of remote control equipment will have a positive effect on reliability results.

Fault Indicators

Fault location indicators were installed at strategic locations on Scanpower's network to assist in fault location and reduce outage times particularly at night. These units are inspected annually to ensure they are fully operational.

GIS/Data Capture

Scanpower has installed a hand held data capture unit which will be used for annual asset surveys and correcting errors in the GIS. Scanpower is also considering putting its 11kV schematic diagrams on the database to replace the existing paper drawings and tracings.

5.5 Maintenance Policies

Scanpower has developed a maintenance strategy that imposes condition-based, combination, time-based or breakdown strategies on assets or classes of assets depending on the relative costs and benefits of preventing in-service failure.

Condition-based strategies

Assets	Population	Maintenance activity
• Pacific feeder • Weber / Te Rehunga feeder • Adelaide Rd feeder • Dannevirke Central feeder • Mangatera feeder	• 497.47km of 11kV • 65.51km of LV • Supplying 2,549 3phase ICP's and 1,732 1phase ICP's	• Five yearly visual inspection of all easily accessible segments including under-built LV and all cable accessories, including binocular inspection of all three and four-way connections and multi-pole structures. • Five yearly inspection of all other segments of line. • Binocular inspection of any pole-mounted CB's and ABS's as part of line visual inspections. • Five yearly – climb all three and four-way connection poles and multi-pole structures for close visual and infra-red inspection. • As required – replace insulators, tighten cross-arms and stays, replace conductors, replace poles. • Earth-testing of each transformer every 5 years.
• All transformers greater than or equal to 500kVA • Voltage Regulators	• 14 total • 6 total	• Annually – visual inspection of tank for rust, oil leaks, visually inspect silica gel breather. • As required – dielectric test of oil unless breather suggests that test should be performed earlier, infrared inspection of bushings etc. • As required – filter or replace oil as suggested by test results. • As required – repair or paint tank, replace bushings as visual inspections suggest necessary. • As required – complete overhaul of core and internal connections as oil condition and loading and fault history suggests.

Assets	Population	Maintenance activity
• All CB's on feeders rated High	• 16 CB's	• Five yearly - binocular inspection of all devices as part of line inspections. <u>Cooper KFE's</u> • Five yearly – maintain vacuum interrupting components <u>Nu-Lec N series</u> • Opportunity – check gas level alarm as part of line inspections • Five yearly – check bushings, confirm pointer free from mechanical obstructions. • As required – return Nu-Lec reclosers to manufacturer for overhaul if fault rating exceeded.
• All ABS's on feeders rated High	• 76 ABS's	• Five yearly - binocular inspection as part of line inspection, physically actuate ABS if supply will not be effected.
• Both Zellweger plants	• 2 total	• Existing plant will be replaced in 2005/06 year. Maintenance likely to focus on software upgrades.
• All SCADA	• 1 total	• Maintenance tends to focus on software upgrades.

Combination strategies

Assets	Population	Maintenance activity
• Dannevirke East feeder • North feeder	• 117.67km of 11kV • 18.71km of LV • Supplying 681 3phase ICP's and 445 1phase ICP's	• Five yearly visual inspection of all easily accessible segments including under-built LV and all cable accessories, including binocular inspection of all three and four-way connections and multi-pole structures. • Five yearly inspection of all other segments of line. • Binocular inspection of any pole-mounted CB's and ABS's as part of line visual inspections. • Ten yearly – climb all three and four-way connection poles and multi-pole structures for close visual and infra-red inspection. • As required – replace insulators, tighten cross-arms and stays, replace conductors, replace poles. • Earth-testing of each transformer every 5 years.
• All CB's on feeders rated Med	• 2 CB's	• Five yearly - binocular inspection of all devices as part of line inspections. <u>Cooper KFE's</u> • Five yearly – maintain vacuum interrupting components <u>Nu-Lec N series</u> • Opportunity – check gas level alarm as part of line inspections • Five yearly – check bushings, confirm pointer free from mechanical obstructions. • As required – return Nu-Lec reclosers to manufacturer for overhaul if fault rating exceeded.
• All ABS's on feeders rated Med	• 18 ABS's	• Five yearly - binocular inspection as part of line inspection, physically actuate ABS if supply will not be effected.

Time-based strategies

Assets	Population	Maintenance activity
• Town #1 feeder • Town #2 feeder • Country feeder • All LV not included elsewhere	• 148.66km of 11kV • 20.76km of LV • Supplying 893 3 phase ICP's and 511 1phase ICP's	• Five yearly - minor repair to easily accessible segments including under-built LV, all devices and all cable accessories. • Five yearly - minor repairs of all other segments of line. • As required – replace major passive components e.g. poles, cross-arms, insulators and conductors.
• Rotary injection plant	• 1 total	• Decommission
• All CB's on feeders rated Low	• 2 CB's	• Five yearly – binocular inspections and/or minor repairs as part of associated line inspection/repairs. <u>Cooper KFE's</u> • Five yearly – maintain vacuum interrupting components <u>Nu-Lec N series</u> • Opportunity – check gas level alarm as part of line inspections • Five yearly – check bushings, confirm pointer free from mechanical obstructions. • As required – return Nu-Lec reclosers to manufacturer for overhaul if fault rating exceeded.
• All ABS's on feeders rated Low	• 26 ABS's	• Five yearly – actuate ABS, repair if necessary.
• Pole-mounted transformers from 50 to 300kVA • Cable-entry transformers 200 and 300kVA	• 174 total	• Five yearly – visual inspection as part of line inspection • Earth-testing of each transformer every 5 years. • As required – return to workshop for complete electrical and mechanical overhaul.
• Three phase transformers less than or equal to 30kVA. • All single phase transformers	• 1,096 total	• Five yearly – visual inspection as part of line inspection • Earth-testing of each transformer every 5 years. • Repair as required unless individual circumstances have risk of catastrophic failure or consequential damages.

Break-down strategies

Assets	Population	Maintenance activity
• LV not associated with any other lines.		• Repair as required unless individual circumstances have risk of catastrophic failure or consequential damages.
• 400V cable and accessories not associated with any other lines		• Repair as required unless individual circumstances have risk of catastrophic failure or consequential damages.

Asset Condition Survey

Scanpower drives all network maintenance from actual asset condition identified from the asset surveys which are carried out on each 11kV feeder on a rolling five year cycle.

The survey is a visual inspection of the condition of poles, crossarms, hardware, conductor, fuses, circuit breakers, voltage regulators, air break switches, transformers, drop out fuses and menacing vegetation.

The information from the survey is used to prioritise an ongoing maintenance programme based on the importance of supply to customers.

Asset Condition Surveys are carried out every five years and the information gathered is used to develop the asset maintenance programme.

The programme for asset condition surveys is shown in the following table.

Figure 30 – Asset Condition Survey Timetable

Feeder	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11
North	Survey 1					Survey 2
Mangatera					Survey 1	
Pacific					Survey 1	
Dannevirke Central	Survey 1					Survey 2
Dannevirke East		Survey 1				
Weber		Survey 1				
Adelaide			Survey 1			
Woodville Town 2				Survey 1		
Woodville Country				Survey 1		
Woodville Town 1			Survey 1			

Maintenance Policy

Maintenance policy comprises a combination of maintenance strategies based on asset condition, manufacturer's recommendations, condition monitoring, break down and Scanpower's own experience.

Scanpower has the philosophy that its maintenance programme must:

- Improve present network reliability
- Be cost effective
- Minimise life-cycle costs
- Ensure safe operation

Scanpower staff undertake asset condition surveys to detect deterioration in components and these are used to develop the asset maintenance programme and the asset replacement programme

Where the equipment services fewer customers, the level of maintenance may decrease slightly as fewer customers are affected by a component failure.

Therefore component servicing and replacement will vary depending on rate of failure and the consequence of failure.

During maintenance, the aim is to maintain continuity of supply, even if this involves reconfiguration of the system or adoption of live line methods.

Condition Based Maintenance

The aim of condition based maintenance is to maintain equipment in good condition to reduce the risk of component failure, hence reduce unplanned outages. This type of maintenance is carried out on a planned basis as stipulated by the equipment manufacturer's routine maintenance schedules.

Condition based maintenance is also carried out periodically in line with industry standards and practice and Scanpower's own knowledge and experience.

Combination Based Maintenance

Combination Based maintenance is carried out after either a defined time interval has expired or a defined number of events have occurred since maintenance was last carried out.

Time Based Maintenance

Time Based maintenance is carried out after the expiry of a defined time interval since the last maintenance was carried out.

Even with the most comprehensive maintenance programme in place, it is practicably impossible to achieve 100% continuity of supply as breakdowns do occur, mainly due to fatigue.

Economic Life of Equipment

The economic life used for the ODV valuation is based on the ODV handbook from the Ministry of Economic Development and typical economic life for particular items is shown below.

Equipment life is dependent on operating environment, maintenance programmes and the quality of the original manufacture and installation.

Figure 31 – Typical Asset Useful Economic Lives

Asset Description	Life in Years
Conductor	60
Poles – Wooden	45
Poles – Concrete	60
Hardwood cross arm and hardware	45
Insulators and pins	60
Transformers	45
Circuit Breakers / ABS	35

Replacement Criteria

Before or after the economic life of a piece of equipment has been reached, it is considered for replacement on the basis of:

- It ceases to be suitable for the intended purpose; or

- It becomes unsafe; or

- The present value of the cost of its replacement plus removing or decommissioning it, less the scrap value recovered, if any, becomes less than the present value of its future maintenance, or

- Its replacement forms part of the least cost development of the network.

To reduce the likelihood of replacing too much equipment in a short span of time, some equipment will need to be replaced before its economic life has been reached based on the above criteria.

Inspections, diagnostic or condition tests, history of equipment performance, problems, defects, test results and work done all determine the frequency of maintenance and time of replacement.

However, Scanpower has set minimum criteria; that the equipment/components must be capable of continuing operation with safety until the next scheduled inspection or maintenance. If this cannot be met, then the equipment/component is replaced.

Timing of Maintenance

The constraints on the timing to be determined are:

(i) Peak loading
(ii) Weather conditions
(iii) Customers' convenience
(iv) System configuration constraints

It is normal practice to schedule maintenance so as to cause the least interference to customers. For domestic and rural customers this would occur in the afternoon and early morning during the weekdays, and during the weekend for non-domestic customers.

Asset Survey Methods

(i) *Asset Condition Surveys*:
Scanpower carries line surveys on an annual basis at five yearly intervals. The surveys involve the use of experienced line mechanics who walk the line and note any visible defects, deterioration of the various components, such as condition of pole, loose or broken binders, cracked insulators, burn marks or damage to conductor and line guards, incorrect conductor sags, broken stays, danger notice defects, proximity of trees to lines, etc.

(ii) *Close-in Inspection*:
This involves de-energising the line to inspect the pole heads, cross arms, insulators, hardware, transformers, air break switches and reclosers, etc, at close quarters, any defects can then be rectified and loose hardware tightened.

(iii) *Pole Testing and Inspection*:
Pole testing is a condition monitoring method to ascertain whether a pole is able to withstand the design load. During pole testing the other components may be reported on and thus eliminate the need for a line patrol.

(iv) *Infrared Scanning*:
An infrared instrument is used to scan the components for hot spots. A significant rise in temperature means the connection is loose or defective. This is carried out on specific items from time to time. We do not follow a specific programme of infrared equipment scanning.

(v) *Fault Frequency Analysis*:
This involves the analysing of fault statistics to determine the problems.

(vi) *KV Test*:
This test gives the condition of the insulation oil and is carried out when maintenance is carried out on transformers and circuit breakers.

Establishing Priority

Feeder lines are ranked in descending order of importance based on the size of potential customer impact.

Condition monitoring, inspection work and maintenance work follow the same order of priority. These are given below:

Dannevirke Network

1. Pacific (This feeds our largest customer)
2. Mangatera
3. North
4. Central
5. East
6. Weber Te Rehunga
7. Adelaide Rd

Woodville Network

1. Town 1
2. Town 2
3. Country

Maintenance Planning Policies (Ten Year Planning Cycle)

11kV Distribution Lines

Analysis was carried out in 2004 to develop a ten year plan so that by the year 2014 there will be no wood pole 11kV lines older than 45 years.

To be up to date by 2014 requires the replacement of 151kms of 11kv line at an annual rate of 15.1kms.

This replacement programme will run in conjunction with the asset condition surveys and maintenance programme.

Low Voltage Lines

Similar to the 11kV lines analysis has been carried out to develop a ten year plan so that by the year 2014 there will be no low voltage lines over 45 years.

To be up to date by 2014 requires that 10.43kms of low tension overhead line be replaced with approximately 20kms of underground cable.

This replacement programme will be run in conjunction with the asset condition survey of overhead lines and the annual survey of transformers in the towns of Dannevirke and Woodville.

Cause of Faults

11kV faults represent the bulk of SAIDI minutes lost with interruptions to supply mainly caused by trees, possums and weather conditions. In some instances component failure occurs due to fault currents. 11kV maintenance therefore focuses on addressing identified factors affecting SAIDI and other safety issues.

Low voltage faults, generally service connection faults, are actioned when the customer or customers affected contact Scanpower and a faultman can be dispatched.

Transformers

Analysis was carried out in 2004 and a ten year transformer replacement programme implemented so by 2014 there will be no transformers on the network older than 48 years. This will require the replacement of 40 units a year for the ten year period.

Condition Based maintenance will be carried out as and when required as a consequence of the findings of the asset condition surveys.

Circuit Breakers / Reclosers

Scanpower currently has twenty-one SF6 vacuum circuit breakers/reclosers in service. These are modern units with the first being installed in 2000. Because of their importance to network operation the units will be inspected annually and whilst they are expected to have a long trouble free operational life any minor defects found will be repaired.

Voltage Regulators

Scanpower has four voltage regulars on its network. These units are visually checked on an annual basis for oil leaks and corrosion and any defects found are repaired.

Air Break Switches

Scanpower has a significant number of air break switches in service on its network and because there are no records of their age it has been assumed that their ages co-inside with the age of the line. These switches will be replaced at the time the line is reconstructed or after the asset condition survey if they are found to have deteriorated or fail to operate.

Scanpower has two remotely controlled air break switches as the first stage of an automation programme which will see a further thirty eight units installed over the next three years.

Earthing

Scanpower will inspect network earths during the asset condition survey and any found damaged will be fixed.

Scanpower will test and repair all network earthing and bonding systems on a ten year cycle to ensure they comply with the Electricity Regulations 1997

5.6 Network Development Initiatives

Scanpower has adopted a formal network development planning process. This looks forward ten years and considers issues such as grid exit point capacity, load growth, 11kV feeder reinforcement, network automation, dynamic efficiency improvement opportunities, improved reliability, customer preferences for additional supply quality and ability of the network to accommodate step changes in load due to the increase/location of industrial load.

On this basis, network development initiatives may be established from:

- Ensuring sufficient capacity is available from GXP's.
- Identification of required network capacity to meet future load growth.
- Reinforcement requirements to ensure load transfer between feeders is possible.
- Network automation with the objective of reducing outage times, operating costs and improvement of reliability.
- Identification of distributed generation possibilities.
- Reducing risk and improving operating efficiency

In the case of proposed development projects, a business case process is followed prior to approval.

A summary of development / capital projects for the coming year is provided below:

Figure 32 – Planned Capital Works / Development Initiatives 2005 / 2006 and Budgets

Scanpower Category	Description	2005/06 Budget
Reconstruction / Replacement	*Waterloo Street (McPhee St-Swinburn St)*	$3,906
	Waterloo Street (Barraud St – Gordon St)	$3,706
	North Feeder (Sub to Law Road)	$78,316
	North Feeder (Law Road to Tamaki West)	$92,056
	North Feeder (Tamaki West to Te Kakapo Valley)	$89,626
	Mangatera Feeder (Sub to Smith Road)	$77,248
	Mangatera Feeder (Smith Road)	$29,529
	Umatoroa Road (link 11kV to Top Grass Road)	$6,829
	Matamau 11kV line and switching reconfiguration	$40,000
Undergrounding LT Supplies	*Waterloo Street (McPhee St-Swinburn St)*	$66,064
	Waterloo Street (Barraud St – Gordon St)	$14,885
	Fox Street, Woodville	$77,805
	Thyra Street	$117,000
	Cadman / Carlyle / Gladstone Streets	$53,034
Transformer Replacement	*Year Two – Transformer Replacement Programme*	$250,000
Switchgear / Automation	*Remote Control Switchgear*	$115,000
	Auto Sectionalisers	$27,000
	Radio Comms Gear for Automation	$30,000
Non Line Assets	*New Ripple Injection Plant – Dannevirke Sub*	$300,000
	5,100 new ripple relay units	$612,000
		$2,084,004

The development initiatives for the coming year focus on:

- Replacement of 11 kV lines.
- Undergrounding of 400V urban lines and services.
- Transformer and ABS replacement.
- Installation of a new load control system and relays.
- Installation of remote automated switches to improve reliability performance and response times.

6.0 Risk Management

Scanpower recognizes risk management as an integral part of good management practice. It is an iterative process consisting of steps, which, when undertaken in sequence, enable continual improvement in decision-making.

6.1 Risk Assessment Methodology

During the 2004/05 year Scanpower performed a detailed network risk assessment based on AS/NZS 4360:1999. The assessment indicated the following risk exposures:

- All feeders have a moderate vulnerability to the most likely earthquake scenario (the absence of zone substations reduces Scanpower's earthquake risk profile in comparison to other utilities that have a 33kV network).
- Feeder poles may be susceptible to deterioration below-ground. The replacement programme instigated will capture the majority of these however pole replacement will take place prior to this as a result of the asset surveys.
- Most feeders are vulnerable to damage from either wind or wind-borne debris for which a range of strengthening measures have been recommended.
- A few feeders are vulnerable to either gradual erosion of land or land-slips.

The intended splitting and separating of feeders near the Dannevirke GXP will reduce Scanpower's overall risk profile.

6.2 Details of Emergency Response and Contingency Plans

Contingency Planning

Scanpower considers its design and construction methodologies are suitable to survive major natural disaster events within their statistical likelihood. The impact of these events if they occur is likely to extend beyond the electricity system and come into the realm of Civil Defence emergency situations. If these arise, Scanpower will assist Civil Defence within the limits of its resources and after Scanpower's network requirements have been taken care of.

Scanpower is a member of the Lifelines Project where utility and transportation network operators are brought together to facilitate and motivate a collective physical risk management process for regional scale events and impacts. The principal output from a lifelines project is the identification of possible physical mitigation measures that operators of utilities and transportation systems can undertake to reduce the risk from the major identified hazards. It is noted that priority has been given to major regional infrastructure such as SH2, Transpower lines, NGC's main gas pipeline and Telecom's network.

Emergency Response

Scanpower has prepared the following three plans to assist in responding to emergencies…

- Disaster Recovery Plan
- Business Continuity Plan
- Customer Communications Strategy

The Disaster Recovery Plan identifies five publicly credible civil emergency scenarios (flood, cloud burst, earthquake, volcanic eruption, and wind storm) that have been adopted by the Tararua District Council and Horizons Regional Council for their planning purposes. The plan then identifies the likely damage to the network and outlines the key processes and resources necessary to restore supply.

The Business Continuity Plan identifies Scanpower's critical business processes (invoicing retailers, receipting payment from retailers, and maintaining business records). A range of naturally occurring, built-environment and wilful human interference hazards that these critical processes might need to survive have been identified. This plan concludes that the "small" nature of these critical tasks, the advent of lap-tops and cellular modems, and the low likelihood of hazard occurrences provides Scanpower with a low risk profile.

The Customer Communications Strategy outlines the level of communication with major customers, customers requiring continuous supply for medical reasons, and the public at large during single-feeder events, multiple-feeder events and superimposed disasters. Under a disaster scenario, Scanpower will coordinate all public communications with the civil defence controllers.

Transpower

Single contingency events at Transpower's points of supply at Dannevirke and Woodville have been discussed with Transpower. Most extended time events would be of an exceptional nature. Scanpower has an arrangement with Transpower for automatic load shedding of up to 32% of its total load under certain frequency conditions.

Spare Equipment

Scanpower is reticulated at 11kV and as such its distribution system is very simple and mainly consists of poles, wires, pole mounted transformers and circuit breakers. The assets that make up the distribution system are common everyday distribution items, which are easily replaced. Scanpower carries a limited stock of poles and transformers.

Design for Risk Management

Customer requirements are for a continuous supply of electricity and there is very low tolerance to outages whether caused by avoidable or unavoidable events.

Insurance

Although insurances are only part of any risk management programme, they require regular reviews of risk management practices to ensure that a reasonable approach is being taken. Scanpower's Material Damage and Business Interruption policy is reviewed annually and modifications added whenever benchmarks indicate the need.

7.0 Performance Evaluation

7.1 Evaluation of Performance (Financial and Service Levels)

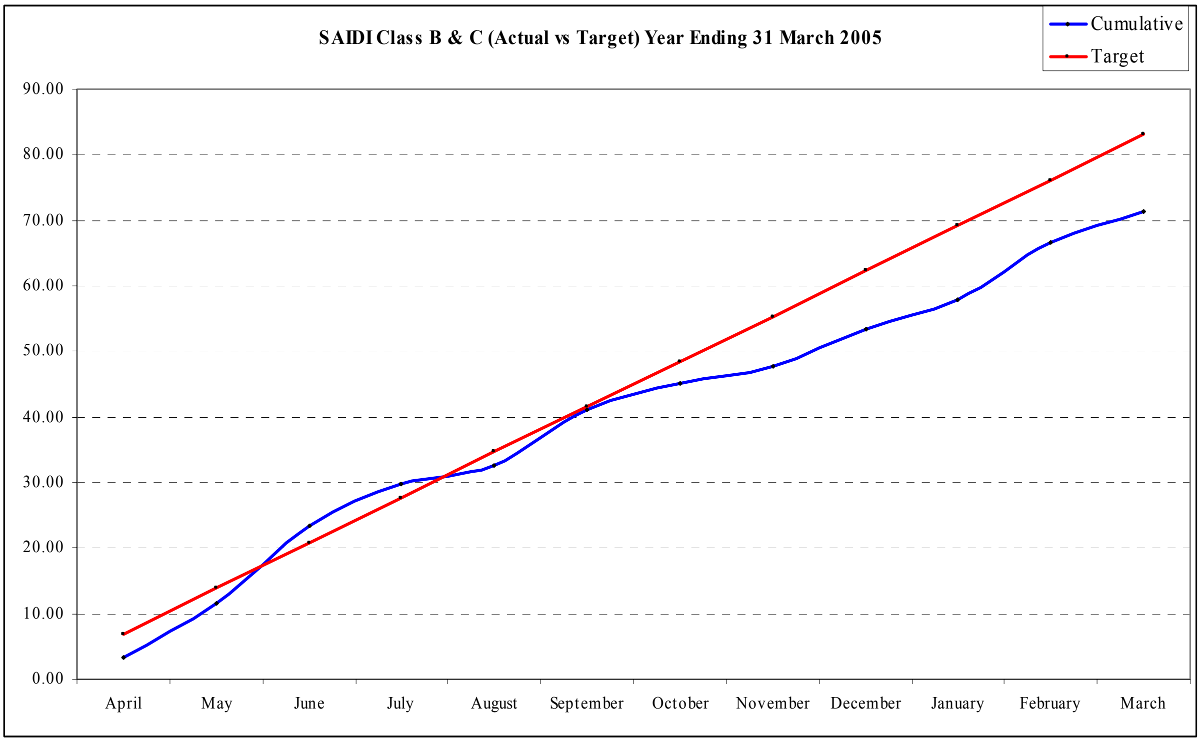
7.11 Reliability Performance 2004 / 2005

Scanpower's Statement of Corporate Intent and business planning target for SAIDI (Class B & C) for the year was 83.09 minutes. Actual performance is compared to this target below.

Figure 33 – Scanpower Consolidated SAIDI Results 2004 / 2005 & Graph

Month	April	May	June	July	August	September
SAIDI C	2.42	7.40	5.56	2.97	1.71	1.92
SAIDI B	0.99	0.87	6.25	3.28	1.02	6.69
MONTHLY TOTAL	3.41	8.28	11.82	6.25	2.73	8.61
YEAR TO DATE TOTAL	**3.41**	**11.68**	**23.50**	**29.75**	**32.48**	**41.09**
TARGET	*6.92*	*13.85*	*20.77*	*27.7*	*34.62*	*41.55*
VARIANCE TO TARGET	*-3.51*	*-2.17*	*2.73*	*2.05*	*-2.14*	*-0.46*

Month	October	November	December	January	February	March
SAIDI C	0.53	2.08	1.16	1.29	7.46	4.31
SAIDI B	3.58	0.52	4.49	3.17	1.19	0.43
MONTHLY TOTAL	4.11	2.60	5.65	4.46	8.65	4.74
YEAR TO DATE TOTAL	**45.20**	**47.81**	**53.46**	**57.92**	**66.57**	**71.31**
TARGET	*48.47*	*55.39*	*62.32*	*69.24*	*76.17*	*83.09*
VARIANCE TO TARGET	*-3.27*	*-7.58*	*-8.86*	*-11.32*	*-9.60*	*-11.78*



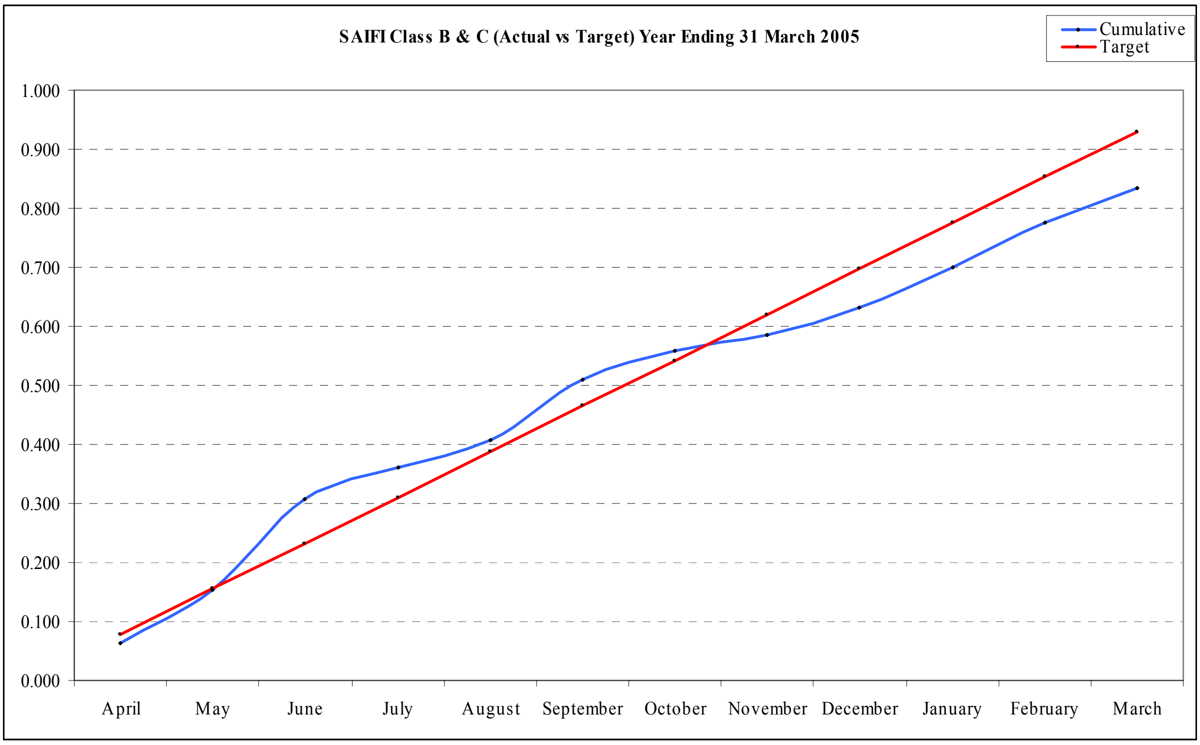
As is evident, SAIDI actual performance results fell within target, with a result of 71.31 in comparison to target of 83.09. After the extremes of 2004, weather conditions were significantly calmer this year. Adoption of live line working practices also assisted in reducing the number of planned outages during the year.

Scanpower's Statement of Corporate Intent and business planning target for SAIFI (Class B & C) for the year was 0.93 interruptions. Actual performance is compared to this target below.

Figure 34 – Scanpower Consolidated SAIFI Results 2004 / 2005 & Graph

Month	April	May	June	July	August	September
SAIFI C	0.039	0.024	0.127	0.040	0.021	0.089
SAIFI B	0.025	0.065	0.028	0.014	0.025	0.014
MONTHLY TOTAL	0.064	0.090	0.154	0.053	0.046	0.103
YEAR TO DATE TOTAL	**0.064**	**0.153**	**0.308**	**0.361**	**0.407**	**0.510**
TARGET	*0.078*	*0.155*	*0.233*	*0.310*	*0.388*	*0.465*
VARIANCE TO TARGET	*-0.014*	*-0.002*	*0.075*	*0.051*	*0.020*	*0.045*

Month	October	November	December	January	February	March
SAIFI C	0.044	0.017	0.031	0.061	0.030	0.022
SAIFI B	0.004	0.012	0.015	0.006	0.048	0.035
MONTHLY TOTAL	0.048	0.028	0.046	0.067	0.078	0.057
YEAR TO DATE TOTAL	**0.558**	**0.586**	**0.632**	**0.699**	**0.777**	**0.834**
TARGET	*0.543*	*0.620*	*0.698*	*0.775*	*0.853*	*0.930*
VARIANCE TO TARGET	*0.015*	*-0.034*	*-0.065*	*-0.076*	*-0.076*	*-0.096*



SAIFI performance broadly correlates with the SAIDI trend reflecting a year of satisfactory reliability performance. As is typically the case, the winter months of June and July provided the most outages, however temperate summer weather conditions counteracted these in terms of overall performance.

In summary, network reliability performance for the year was pleasing, and as the network automation programme continues to roll out in 2005/06 we anticipate further improvements in SAIDI results.

7.12 Financial Performance (Capital & Maintenance Expenditure)

Figure 35 – Financial Performance 2004 / 05

2004 / 2005 FINANCIAL PERFORMANCE	2005 Actual	2005 Planned
CAPITAL EXPENDITURE		
11 kV Line Reconstruction	$286,072	$309,717
LT Replacement & Undergrounding	$171,430	$242,040
Transformer Replacements	$451,608	$250,000
Switchgear / Automation	$227,466	$142,500
TOTAL CAPITAL EXPENDITURE	**$1,136,576**	**$944,257**
MAINTENANCE EXPENDITURE		
Distribution Maintenance	$211,533	$440,000
Faults Maintenance	$155,532	$171,000
Non Line Asset Maintenance	$94,422	$68,000
TOTAL MAINTENANCE EXPENDITURE	**$461,487**	**$679,000**
TOTAL NETWORK EXPENDITURE	**$1,598,063**	**$1,623,257**

Capital Expenditure

11kV Line Reconstruction expenditure was relatively close to budget at $286,072. All planned works were completed successfully during the year by Scanpower's in-house network contracting teams. Operation of an in-house team remains a cost effective option relative to use of external contractors.

Similarly, all planned LT Replacement & Undergrounding projects were completed during the year at a cost of $171,430 against budget of $242,040. Establishment of a dedicated undergrounding team and investment in new plant has improved working practices and efficiency.

In regard to transformer replacements, actual capital costs were $451,608 in comparison to budget of $250,000. This relatively significant difference arose due to increased transformer change volumes.

Whilst 41 transformer changes had been planned, the actual number of new transformer installations was 76. The difference of 35 units occurred as a result of an unexpectedly high number of transformer failures and new installations on the network, particularly in the rural sector. The cost variance of 81% correlates closely to the volume variance of 85%, suggesting that unit costs were largely in line with expectations.

In the Switchgear / Automation area actual capital expenditure was $227,446 against a budget of $142,500. Having completed all planned works, it was possible to expedite the automation roll-out and additional remote control air break switches and sectionalisers were purchased close to the year end, for installation in early 2005/2006.

Over all, it was a busy year for the network team in terms of programmed capital works. Capital expenditure of $1.14m represented an increase of 232% on the prior year ($490,108) and is indicative of entering a capex intensive phase in the life cycle of the network. A large proportion of network assets were originally installed during the 1960s, and these are now falling due for replacement after 45 years.

Maintenance Expenditure

In the maintenance expenditure area, actual Distribution Maintenance costs were $211,533 in comparison to planned of $440,000. Whilst this represented a variance to budget of 52% all planned maintenance for the year was completed and a contingency for unplanned maintenance that had been built into the budget was not spent. A shift in focus from maintenance to capital works has also contributed to this variance.

In terms of Fault Maintenance costs, actual results were reasonably close to budget at $155,532 in comparison to $171,000. As reflected in the network reliability performance results, there were fewer faults than anticipated, thereby reducing over time costs associated with call outs.

Non Line Asset Maintenance costs were $94,422 in comparison to budget of $68,000. Preemptive tree trimming activities were the primary cause of the variance to budget in this cost category.

7.2 Gap Analysis and Identification of Improvement Initiatives

The details of all unplanned outage incidents are recorded for subsequent analysis. This includes causal details (where they can be ascertained), feeder and location information. These records form the basis for a formal annual review as part of the asset management planning process.

In particular, opportunities for improvement related to selection of materials, engineering practice and design are considered for each causal factor grouping.

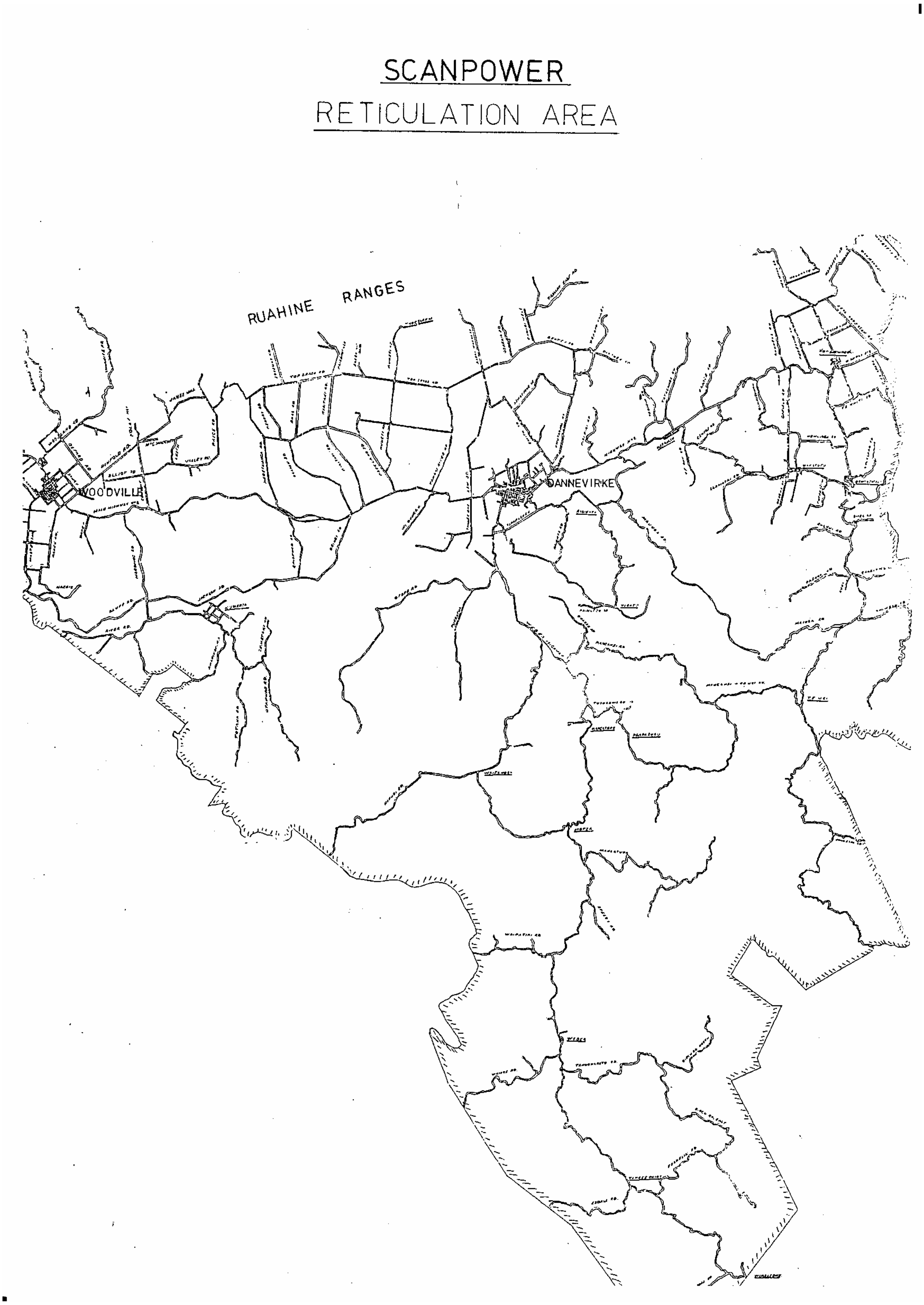
Feeder specific considerations are also reviewed as part of this process for the purposes of identifying problem sections of line.

Scanpower has commenced a five year programme to install remote automated switches on the network. This programme will improve network reliability and responsiveness to system faults by allowing remote operation of switches to be operated from the control room in Dannevirke.

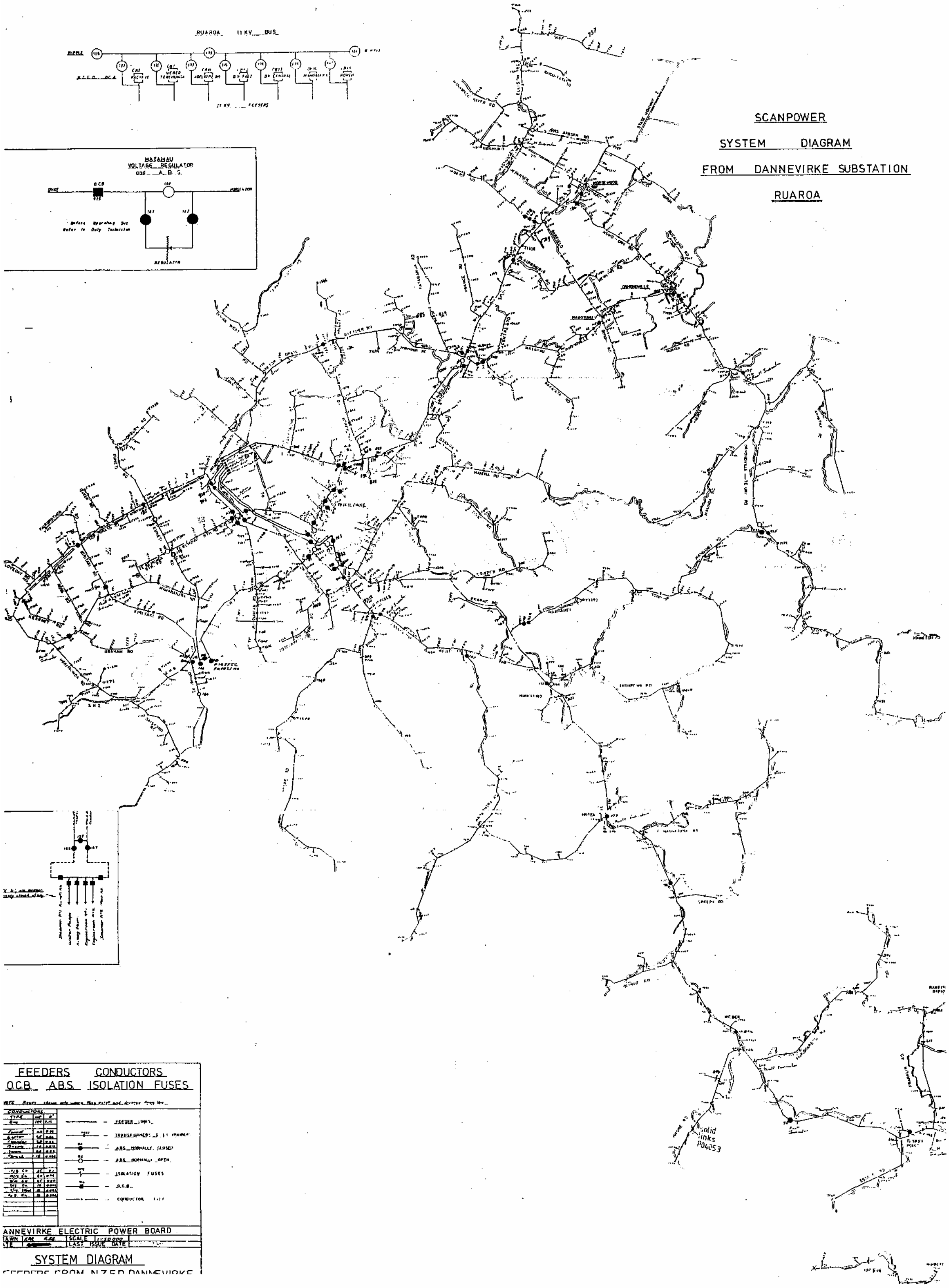
It is anticipated that in the coming year, a structured and intensive programme of tree trimming, associated with the Electricity (Hazards from Trees) Regulations will have a significant, positive impact on network reliability performance.

Appendix A

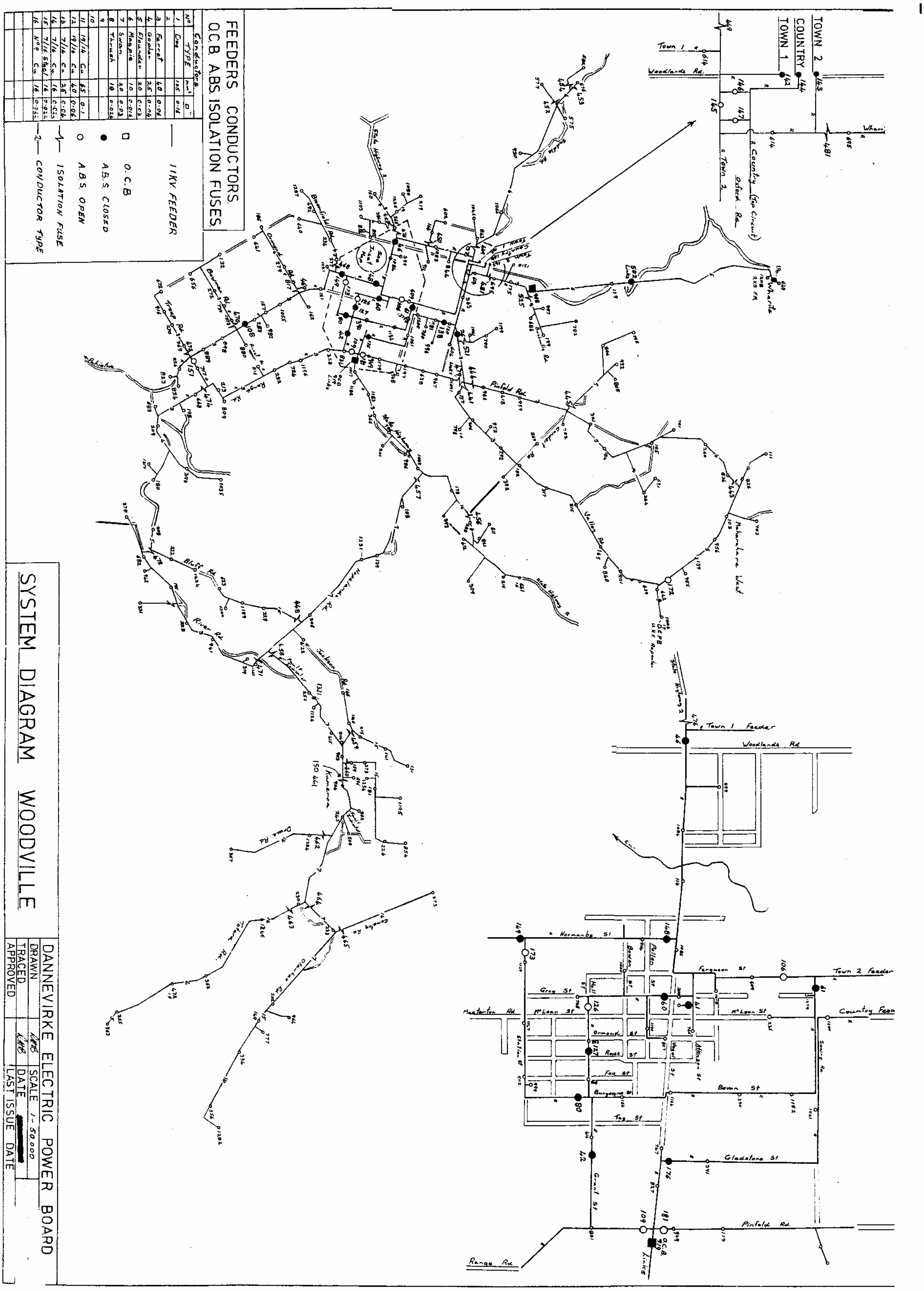
Scanpower Reticulation Area



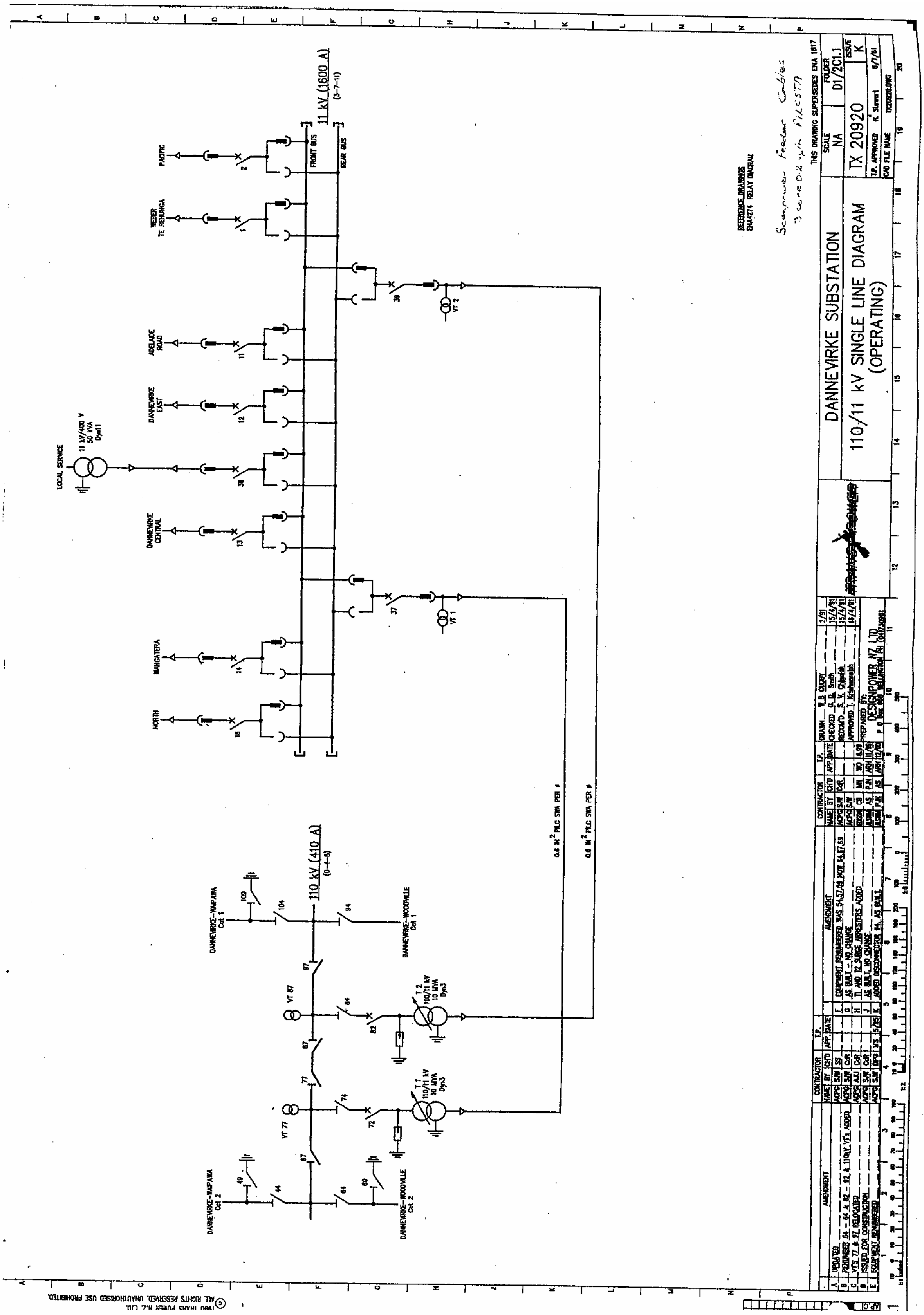
Dannevirke System Diagram



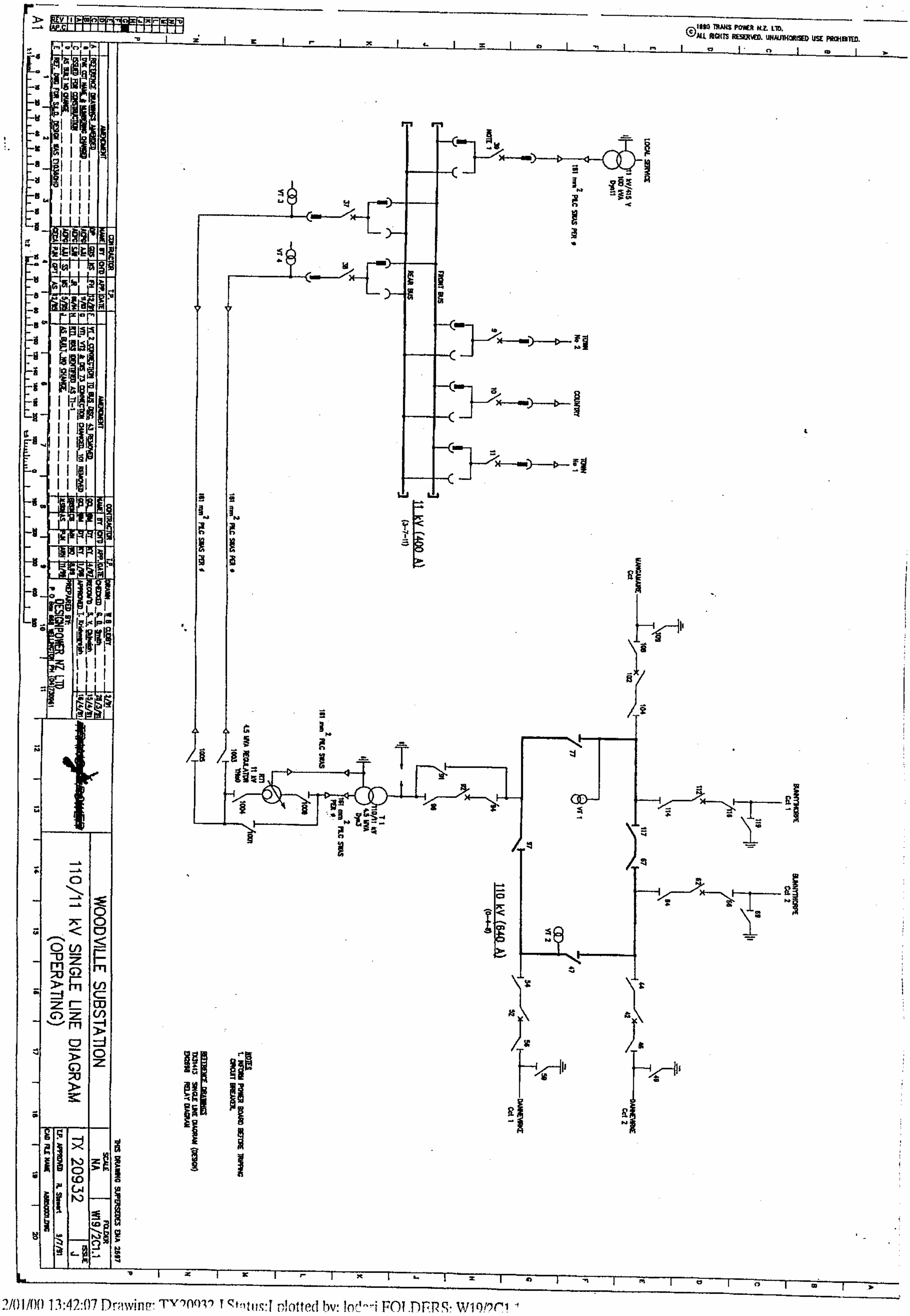
Woodville System Diagram



Dannevirke Substation Line Diagram



Woodville Substation Line Diagram



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