

Independent Engineer's Report on the Asset Adjustment Process of: **WEL Networks**

Final

- 17 July 2013
- Version 3



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Level 3
12-16 Nicholls Lane
Parnell 1149
PO Box 9806
Auckland

Tel: +64 9 928 5500
Fax: +64 9 928 5501
Web: www.skmconsulting.com

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GLOSSARY

EDB	Electricity Distribution Business
DRC	Depreciated Replacement Cost
EDB IM	Electricity Distribution Services Input Methodologies
EDB ID	Electricity Distribution Services Information Disclosure
GIS	Geographic Information System
ODRC	Optimised Depreciated Replacement Cost
ODV	Optimised Deprival Valuation
ORC	Optimised Replacement Cost
RAB	Regulatory Asset Base
RC	Replacement Cost
SKM	Sinclair Knight Merz



Executive Summary

On 22 December 2010 the Commerce Commission (Commission) released a document entitled “*Commerce Act (Electricity Distribution Services Input Methodologies) Determination 2010*” (EDB IM). The EDB IM outlines a set of modifications (referred to as the “asset adjustment process”) that Electricity Distribution Businesses (EDBs) may choose to undertake to their disclosed 2004 ODVs as part of the process to establish an Initial Regulatory Asset Base (Initial RAB) as defined in clause 2.2.2 of the EDB IM.

On 1 October 2012 the Commission released an information disclosure decision (*Decision No NZCC 22*) “*Electricity Distribution Information Disclosure Determination 2012*” (EDB ID).

Clause 2.12.3 of 2.12 of the EDB ID states that EDBs can elect to make adjustments to their disclosed 2004 ODV, in accordance with the EDB IM. Also, that EDBs must secure an independent Engineer’s Report. The requirements of the Engineer’s Report are outlined in Attachment C of the EDB ID.

Sinclair Knight Merz (SKM) was requested by WEL Networks (WEL) to review the changes to its 2004 ODV and to prepare an Engineer’s Report in accordance with Attachment C of the EDB ID (1 October 2012).

WEL proposes an adjustment of \$18.215 million to its 2004 ODV (consisting of asset register errors) and an adjustment of \$4.980 million to its Initial RAB as at 31 March 2009 for the inclusion of load control relays.

The following table outlines the differences between WEL’s original 2004 ODV and its adjusted 2004 ODV following the asset adjustment process (“adjusted 2004 RAB”).

	RC (\$'000)	ORC (\$'000)	DRC (\$'000)	ODRC (\$'000)
2004 ODV	\$ 341,501	\$ 339,123	\$ 190,120	\$ 189,495
Cable Date / Type Corrections	\$ 454	\$ 454	\$ 6,848	\$ 6,848
Cable Length Corrections	\$ 6,266	\$ 6,266	\$ 2,973	\$ 2,973
Distribution Transformer Corrections	\$ 1,825	\$ 1,825	\$ 1,492	\$ 1,492
Line Class Type Corrections	\$ 1,019	\$ 1,019	\$ 595	\$ 595
Other Asset Register Error Corrections	\$ 718	\$ 718	\$ 1,953	\$ 1,953
Re-Apply Existing Multipliers	\$ 1,387	\$ 1,387	\$ 844	\$ 844
Re-Apply Modified Multipliers	\$ 6,699	\$ 6,699	\$ 3,510	\$ 3,510
Adjusted 2004 RAB	\$ 359,868	\$ 357,490	\$ 208,335	\$ 207,710
Total Movement	\$ 18,367	\$ 18,367	\$ 18,215	\$ 18,215

The following table outlines the adjustments to WEL’s disclosed valuation over the period 2004 through 2009 (year ending 31 March).

WEL Networks Asset Adjustment Process



Year	2004 (S'000)	2005 (S'000)	2006 (S'000)	2007 (S'000)	2008 (S'000)	2009 (S'000)
Value of Adjustments (ODV)	\$18,215	\$0	\$0	\$0	\$0	\$4,980



1. Introduction

1.1. Background

Sinclair Knight Merz (SKM) was requested by WEL Networks (WEL) to undertake an independent review of the WEL asset adjustment process. SKM's review was undertaken to determine the appropriateness of the proposed adjustments in respect of the asset adjustment process as set out in clause 2.2.1 of the "Commerce Act (Electricity Distribution Services Input Methodologies) Determination 2010", 22 December 2010 (EDB IM).

This report details the findings of the independent review and has been prepared to comply with the requirements for the Engineer's Report in Attachment C of the Commerce Commission's Decision no. NZCC 22 on information disclosure titled "Electricity Distribution Information Disclosure Determination 2012" (EDB ID), dated 1 October 2012.

A copy of WEL's letter of instruction provided to SKM is included in Appendix B of this report, and the engineer's signed statement, as outlined in Clause 3 of Attachment C of the EDB ID, is provided in Appendix D of this report.

SKM's review principally considered the following elements of the asset adjustment process:

- corrections for asset errors; and
- the reapplication of existing / modified asset multipliers.

1.2. Processes

The preparation of this report has been the responsibility of SKM. We have relied upon information and data prepared by WEL. Wherever possible we have sought to verify this data to check its validity through review and sample checks of WEL's databases and geographical information system (GIS), however we have relied upon the accuracy of WEL's base set of data that they have presented to us and the accuracy of WEL's Asset Management systems.

In the interests of accuracy and completeness, there has been interaction between SKM and WEL during the review. This has been undertaken via telephone discussions, email correspondence and direct meetings.



2. Information Provided by WEL

WEL's original 2004 ODV is contained within a MS-Access database ("source_data.mlb") which was populated from the company's asset management systems / databases. The 2004 ODV Database is accompanied by an additional MS-Access database ("ODRC_prog.mlb"), which calculates WEL's replacement costs (RC) and applicable depreciation (DRC) by asset type. Optimisation of WEL's 2004 ODV asset types was considered separately to these 2004 ODV Databases. At the beginning of the asset adjustment process WEL confirmed that the 2004 ODV Databases were a true representation of WEL's disclosed 2004 ODV.

WEL supplied SKM with a number of documents / files to support the proposed adjustment to its 2004 RAB, as follows:

1. 2011 Asset Management Plan;
2. 2004 ODV Report (PricewaterhouseCoopers, PwC);
3. 2004 ODV Databases (MS-Access "Source_data.mlb" & "ODRC_prog.mlb");
4. MS-excel files:
 - 4.1. *WEL ODV_Model_2004(30_8_04) – PwC.xls* – PricewaterhouseCoopers final workings included in the 2004 ODV Report;
 - 4.2. *WIRE-#568758-v1-Verification_of_2004_ODV_Database_against_2004_ODV_Report.xls* – A reconciliation of the 2004 ODV report and the 2004 ODV Database;
 - 4.3. *WIRE-#590436-v3-RAB_Multiplier_costs_justification.xlsx* – Cable multiplier estimate details developed by WEL's internal estimators;
 - 4.4. *WIRE-#581754-v1-Justificaiton_of_RAB_multipliers.xls* – Various multiplier justification samples;
5. "Successful Implementation of Asset Register Project and 3 Yearly Asset Valuation", Huazhuo Lin, internal WEL presentation, June 2010;
6. "Harnessing Information for Asset Planning, Investment and Growth", John Van Brink, Liquid Learning conference presentation, Asset Information Management Forum, Auckland, 23/24 May 2011;
7. "Conditions Defining the Rugged Multiplier", Roger Oed, August 2012; and
8. A series of WEL Network maps identifying WEL's region and terrain whereby asset multipliers; CBD, Urban, Traffic Management, and Rugged have been applied.
9. "WEL Networks Load Control Relays (July 2013)", a description of load control relays installed on WEL's network.

WEL undertook a process to reconcile the 2004 ODV databases against its reported 2004 ODV. SKM notes that there are three asset class groupings excluded from the 2004 ODV databases, being "Zone Substations", "Customer Service Connection" and "Other System Fixed Assets". WEL's asset adjustment process has excluded any adjustment to these asset classes. SKM also



notes some minor discrepancies exist between the 2004 ODV Report and the 2004 ODV databases, where WEL's databases do not exactly correlate with the 2004 ODV Report. These discrepancies are partly due to optimisation differences occurring externally to the 2004 ODV databases and other small numerical reporting differences. The total magnitude of asset class value miss-alignment, inclusive of optimisation, is approximately 0.2% of WEL's 2004 ODV DRC total. SKM has considered these discrepancies in the context of WEL's adjustment process and is of the opinion they are not material.



3. Consideration of RAB Adjustments

This section sets out the adjustments to the WEL 2004 RAB made under the asset adjustment process.

3.1. Load Control Relays

Reference EDB IM cl 2.2.1(2)(a). An EDB may designate a load control relay asset owned by an EDB, except a 2009 disclosed asset, as of 'included' type. Clause 2.2.1(3) goes on to say that assets to which sub-clause (2)(a) applies may be valued as:

- its depreciated historic cost as at 31 March 2009; or
- if there are insufficient records, then its depreciated carrying value from the general purpose financial statements.

WEL has two forms of load control relays deployed on its network, as a result of the legacy 500Hz ripple injection plants and the more recent 283Hz static ripple injection plants. WEL has estimated the total number of relays to exist on its network in March 2009 at 51,648. This estimate is based on the number of ICP's with a controlled tariff associated with them and which were included in its March 2009 billing cycle. WEL has also checked this figure against its ICP database (suggesting 53,139 load control relays exist) which is used to inform the market, via the Electricity Authority registry, of the physical attributes of each ICP. WEL has advised SKM that the lower figure is its best estimate of relays deployed on its network, particularly as this estimate takes account of financial incentives provided to retailers and consumers when choosing the controlled tariff. SKM is of the opinion that WEL has undertaken a reasonable and possibly conservative approach in estimating the number of load control relays on its network.

WEL accounts for its load control relays as pooled assets i.e., not individually listed, and has confirmed the book value of the assets at 31 March 2009 to be \$4,979,828. This figure has been included in Schedule 5i of the EDB ID, included in Appendix A of this report. WEL has also provided SKM with a report, obtained from an independent and qualified party (PricewaterhouseCoopers), included in Appendix C, stating the process undertaken in valuing its load control relays to be included under clause 2.2.1(2)(a) of the EDB IM.

SKM has considered the estimated number of load control relays (51,648) and the advice in Appendix C and is of the opinion that the book value of assets at 31 March 2009 (\$4,979,828) represented the carrying value included in the general purpose financial statements and is a reasonable value to be included in the WEL's RAB adjustment process.

3.2. Correct Asset Register Errors

Reference EDB IM cl 2.2.1(2)(b). EDBs may correct asset related errors in the light of new information. The allowable corrections being due to:

- assets being omitted in error;



- assets being included in error;
- assets being incorrectly categorised; and
- asset ages, quantity, category or locations being incorrectly recorded.

Since undertaking the 2004 ODV, WEL's asset management systems have been improved and refined significantly. The improvements have involved numerous projects and initiatives that have involved:

- business as usual network data capture;
- field surveys during normal maintenance activities; and
- specific projects initiated by WEL's asset management team.

SKM reviewed WEL's evidence of the projects and initiatives, which included:

- The minutes of project meetings.
- Presentations prepared for internal and external audiences (refer to documents (5 and (6 in Section 2).
- Internal workshop records where information / experience on WEL's network had been captured from key personal.

WEL identified a number of asset categories for which assets were incorrectly recorded in error or omitted in error during the 2004 ODV process which are outlined in the following sections. Standard values included in WEL's 2004 ODV remain unchanged.

3.2.1. Asset Ages Incorrectly Recorded: Cables

WEL's asset management team has undertaken a series of work-streams since 2004 where possible improvement in WEL's underlying data has been identified. Analysis of WEL's asset replacement spend profile, relating specifically to WEL's cable / line asset age profile (see Figure 1 below), is one example which highlights the use of a default commissioning date (1970) applied to the 2004 asset register.

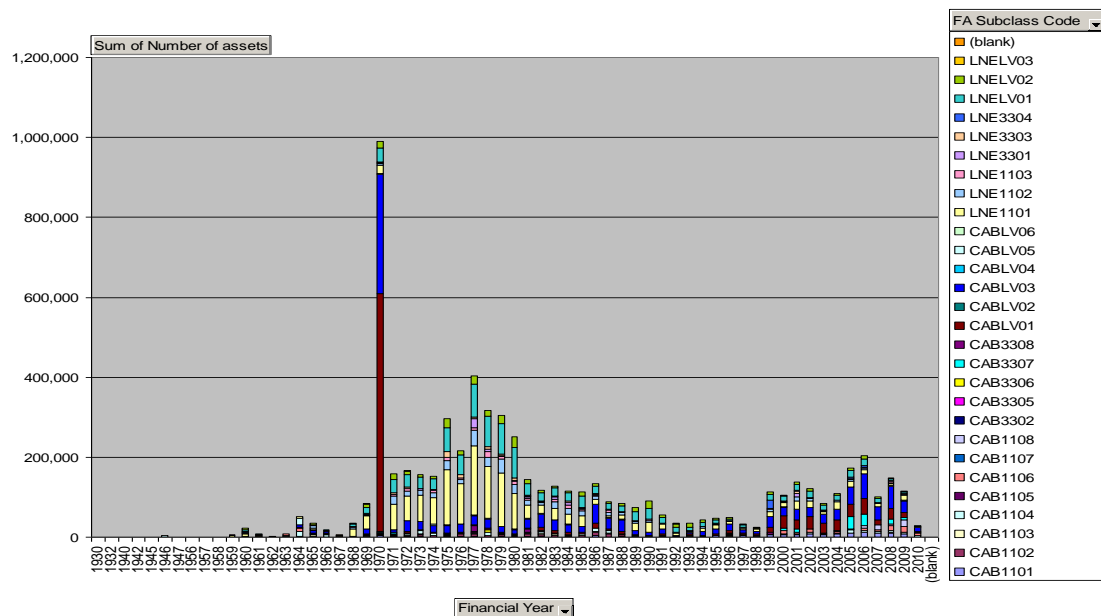
SKM understands that the single commissioning date for the cables was based on a conservative assessment of the age of WEL's cables. The default commissioning date of 1970 was used where the actual dates were not known at the time of the 2004 valuation. WEL selected this date in order to be conservative in its initial RAB assessment. This default date was not an average and subsequent data reviews enabled this default date to be corrected. The revised dates were found by WEL to be generally younger than the 1970 default date used.

SKM's experience is that the capture of cable locations / attributes / ages (for entry into a GIS) is typically undertaken using as-built drawings. Given this fact, SKM questioned WEL regarding the reasons for the cable location / attribute information being captured without the commissioning dates and WEL's response was that:



- The commissioning dates for many of the cables were lost / corrupted during the transfer of digital information to the GIS and or subsequent GIS upgrades¹.
- Most of the cable as-builts used during the digital capture were subsequently lost / discarded on the basis that once captured digitally the paper based as-built records were no longer required².

Given the above facts over the period 2004 through 2010 WEL sought to update the cable (and other asset) commissioning dates via a number of projects.

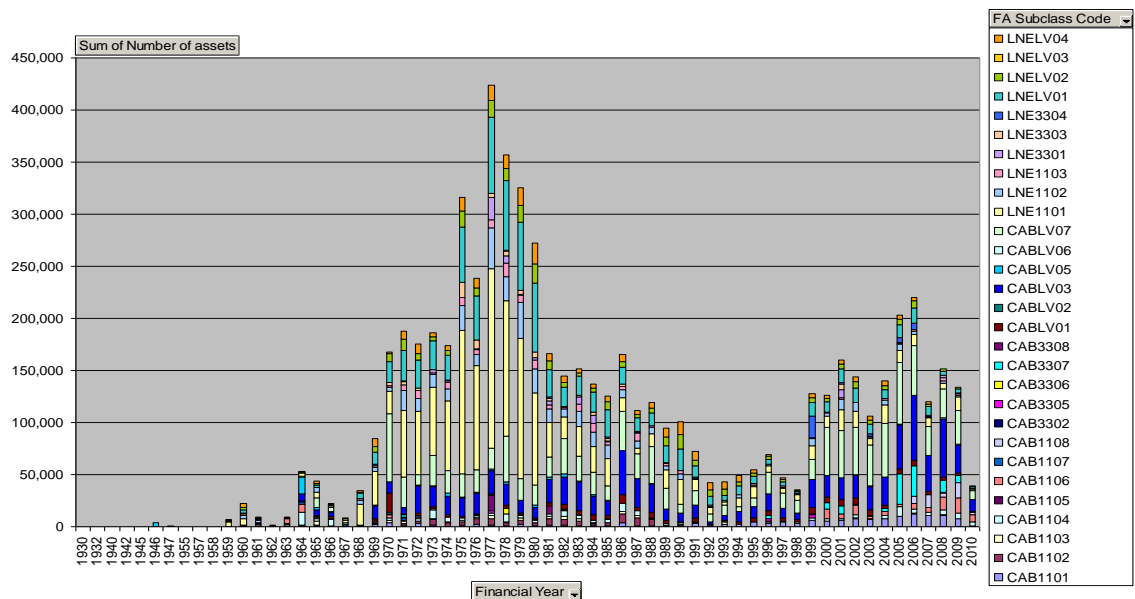


■ **Figure 1: Original Cable & Line Commissioning Dates (document (5 of Section 2))**

Figure 2 is identical to Figure 1 but illustrates WEL's cable / line asset age profile subsequent to GIS data improvements being made.

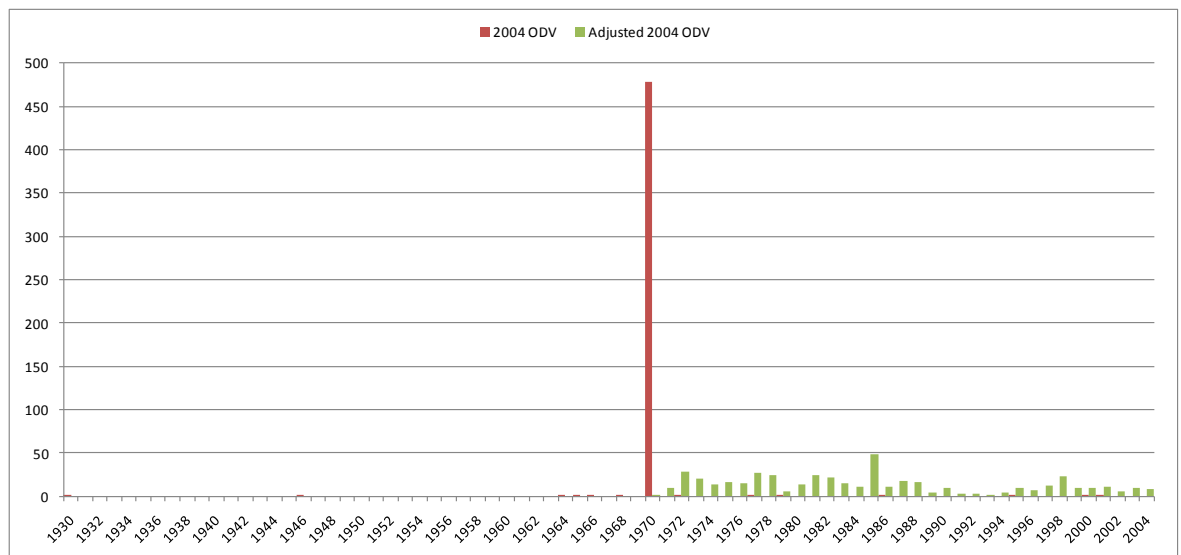
¹ SKM understands that the GIS data capture that WEL undertook prior to 2004 had limited success (i.e. relatively inaccurate). In particular there were significant issues with the translation of cables records (via paper records) to the GIS.

² SKM is aware of this view being taken by some industry participants. The discarding of as-built drawings was primarily driven by the desire to reduce storage costs and duplication of drawing management (GIS and as-built drawings).



■ **Figure 2: Updated Cable & Line Commissioning Dates (document (5) of Section 2)**

WEL's 2004 ODV database included 478km of cable (inclusive of 11kV cable, LV cable, streetlight cables and pilot / communication circuits) with a default commissioning date of 1970 and a further 2km of incorrectly recorded commissioning dates that WEL deemed to be inaccurate during its date improvement work-streams. Figure 3 compares the 2004 ODV age profile (coloured red) with the adjusted age profile (coloured green) for those assets which WEL proposes to adjust.



■ **Figure 3: Age adjustment for Cables (11kV, LV, Streetlight & Pilot / Communication)**

As noted in Section 3.2 the adjusted age profile has been arrived at by undertaking a series of workshops, meetings and asset management data reviews, and also taking into account the networks development over time. In SKM's opinion the adjusted profile appears reasonable and



SKM has confirmed the cable lengths identified in Table 1 are reflected in WEL's GIS database. SKM understands that the reason there are few adjustments where the resulting age is prior to 1970 is due to the conservative assessment undertaken for WEL's 2004 valuation, meaning the revised dates were generally found to be younger than the default date.

Table 1 below provides the movement in WEL's 2004 ODV when correcting the identified date errors, resulting in an increase to WEL's 2004 ODV of \$6.598m. SKM has confirmed the total quantity of cables affected by these adjustments in WEL's ODV database.

Also included in Table 1 is a small adjustment to WEL's cable classes (extra heavy, heavy, medium and light) and insulation (XPLE & PILC) type. The total net movement across all cable types is considered small by SKM, resulting in further adjustment to WEL's 2004 ODV to the ODRC value of \$251k. This value is considered immaterial by SKM and has not been verified in detail.

■ Table 1: Summary of movements in 2004 ODV: Cable Age / Type Adjustment

Opening 2004 ODV Values

Asset	Quantity km	RC (\$'000)	ORC (\$'000)	DRC (\$'000)	ODRC (\$'000)
Cable Type 11kV - xple	134	\$ 11,190	\$ 11,029	\$ 8,195	\$ 8,104
Cable Type 11kV - pilc	313	\$ 26,179	\$ 25,985	\$ 15,361	\$ 15,286
Cable Type LV - xple	791	\$ 41,673	\$ 41,573	\$ 20,835	\$ 20,795
Cable Type LV - pilc	61	\$ 3,231	\$ 3,223	\$ 1,684	\$ 1,681
Streetlight Cables - xple	153	\$ 4,587	\$ 4,554	\$ 2,074	\$ 2,061
Pilot / Communications Circuits (O/H & U/G)	216	\$ 2,221	\$ 2,221	\$ 606	\$ 606
Total	1,668	\$ 89,081	\$ 88,585	\$ 48,755	\$ 48,533

Value modified adjustment

Asset	Quantity km	RC (\$'000)	ORC (\$'000)	DRC (\$'000)	ODRC (\$'000)
<i>Date Errors</i>					
Cable Type 11kV - xple	21	\$ -	\$ -	\$ 651	\$ 651
Cable Type 11kV - pilc	56	\$ -	\$ -	\$ 751	\$ 751
Cable Type LV - xple	185	\$ -	\$ -	\$ 3,791	\$ 3,791
Cable Type LV - pilc	8	\$ -	\$ -	\$ 98	\$ 98
Streetlight Cables - xple	71	\$ -	\$ -	\$ 1,040	\$ 1,040
Pilot / Communications Circuits (O/H & U/G)	139	\$ -	\$ -	\$ 266	\$ 266
<i>Type Errors</i>					
Cable Class Type Corrections	51	\$ 454	\$ 454	\$ 226	\$ 226
Cable Insulation Type Corrections (XPLE & PILC)	2	\$ -	\$ -	\$ 25	\$ 25
Total Movement		\$ 454	\$ 454	\$ 6,848	\$ 6,848

Adjusted 2004 RAB Values

	Quantity km	RC (\$'000)	ORC (\$'000)	DRC (\$'000)	ODRC (\$'000)
Total	1,668	\$ 89,535	\$ 89,039	\$ 55,603	\$ 55,381

3.2.2. Asset Lengths Incorrectly Recorded: Cables

Since 2004 WEL's GIS data has improved significantly. Improvements in both data capture from the field and WEL's GIS data handling technology have allowed it to more accurately define its network. WEL has updated its cable lengths relating to 33kV, 11kV, LV and Streetlight Cables,



resulting in a net increase of 100km through both negative and positive movements in cable lengths.

WEL has confirmed that where Streetlight Cables are included in its ODV calculation no LV reticulation is available on the same street, in accordance with the ODV Handbook clause A.25. SKM has confirmed the total cable lengths held in WEL's GIS and applicable to its 2004 ODV adjustment³.

Table 2 below provides the movement in WEL's 2004 ODV once cable lengths have been adjusted.

■ **Table 2: Summary of movement in 2004 ODV due to asset register errors – Cable Lengths**

Opening 2004 ODV Values

Asset	Quantity km	RC (\$'000)	ORC (\$'000)	DRC (\$'000)	ODRC (\$'000)
Cable Type 33kV - xlpe	24	\$ 4,948	\$ 4,948	\$ 4,326	\$ 4,326
Cable Type 33kV - pilc	59	\$ 10,268	\$ 10,268	\$ 5,729	\$ 5,729
Cable Type 11kV - xlpe	134	\$ 11,190	\$ 11,029	\$ 8,195	\$ 8,104
Cable Type 11kV - pilc	313	\$ 26,179	\$ 25,985	\$ 15,361	\$ 15,286
Cable Type LV - xple	791	\$ 41,673	\$ 41,573	\$ 20,835	\$ 20,795
Cable Type LV - pilc	61	\$ 3,231	\$ 3,223	\$ 1,684	\$ 1,681
Streetlight Cables - xlpe	153	\$ 4,587	\$ 4,554	\$ 2,074	\$ 2,061
Total	1,535	\$ 102,076	\$ 101,580	\$ 58,204	\$ 57,982

Value modified adjustment

Asset	Quantity km	RC (\$'000)	ORC (\$'000)	DRC (\$'000)	ODRC (\$'000)
Cable Type 33kV - xlpe	6	\$ 1,163	\$ 1,163	\$ 915	\$ 915
Cable Type 33kV - pilc	(2)	\$ (360)	\$ (360)	\$ (348)	\$ (348)
Cable Type 11kV - xlpe	11	\$ 1,114	\$ 1,114	\$ 492	\$ 492
Cable Type 11kV - pilc	(6)	\$ (377)	\$ (377)	\$ (170)	\$ (170)
Cable Type LV - xple	75	\$ 4,525	\$ 4,525	\$ 2,094	\$ 2,094
Cable Type LV - pilc	5	\$ 355	\$ 355	\$ 246	\$ 246
Streetlight Cables - xlpe (single circuit only)	(15)	\$ (458)	\$ (458)	\$ (378)	\$ (378)
Streetlight Cables - Sharing a HV Trench	25	\$ 305	\$ 305	\$ 124	\$ 124
Total Movement	100	\$ 6,266	\$ 6,266	\$ 2,973	\$ 2,973

Adjusted 2004 RAB Values

Asset	Quantity km	RC (\$'000)	ORC (\$'000)	DRC (\$'000)	ODRC (\$'000)
Cable Type 33kV - xlpe	30	\$ 6,111	\$ 6,111	\$ 5,241	\$ 5,241
Cable Type 33kV - pilc	57	\$ 9,908	\$ 9,908	\$ 5,381	\$ 5,381
Cable Type 11kV - xlpe	145	\$ 12,304	\$ 12,143	\$ 8,687	\$ 8,596
Cable Type 11kV - pilc	307	\$ 25,802	\$ 25,608	\$ 15,191	\$ 15,116
Cable Type LV - xple	866	\$ 46,198	\$ 46,098	\$ 22,929	\$ 22,889
Cable Type LV - pilc	66	\$ 3,586	\$ 3,578	\$ 1,930	\$ 1,927
Streetlight Cables - xlpe	163	\$ 4,434	\$ 4,401	\$ 1,819	\$ 1,806
Total	1,635	\$ 108,342	\$ 107,846	\$ 61,177	\$ 60,955

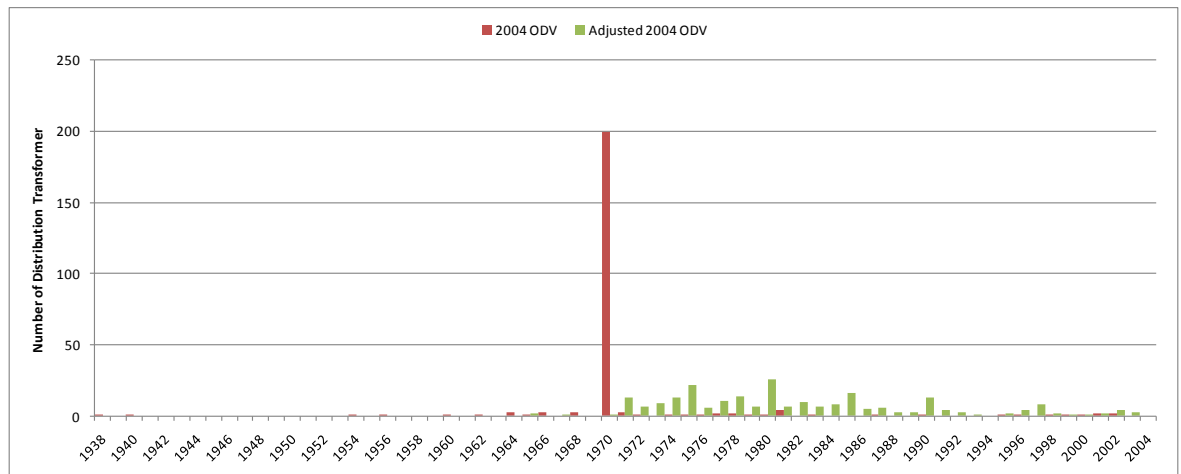
³ Pre-31st March 2004 asset base.



3.2.3. Asset Details Incorrectly Recorded or Omitted in Error: Transformers

WEL has corrected details in its asset register and GIS relating to its distribution transformer asset categories. Errors identified through on-going asset management and data cleansing projects relate to installation date corrections, transformer rating corrections, transformer phase corrections and mounting corrections. In addition, a further 82 transformers were identified as omitted from WEL's 2004 ODV. These assets were identified through a comparison of GIS and SCADA data in 2009. SKM understands WEL's GIS and Asset Management systems were decoupled in 2004, but now this has been resolved.

Similar to WEL's cable assets age re-profiling above, Figure 4 illustrates the age profile of distribution transformers included in WEL's 2004 ODV (coloured red) and the re-profiled asset ages (coloured green) for those assets which WEL proposes to adjust.



■ Figure 4: Age adjustment for Distribution Transformers

A total of 245 transformers were identified as having incorrect commissioning dates, 200 of these were associated with the default commissioning date, 1970. WEL has explained to SKM that the re-profiling of the transformer ages was a result of field surveys of equipment and identifying any installation date markings, using as-built drawings and asset documentation where available, or the date of manufacture marked on the transformer – assumed to be similar to that of the installation date.

SKM understands that the reason there are few adjustments where the resulting age is prior to 1970 is due to the conservative assessment undertaken for WEL's 2004 valuation, meaning the revised dates were generally found to be younger than the default date.

Data cleansing projects and on-going field work has also improved data quality around transformer details such as ratings, phase and mounting arrangements. SKM has undertaken sample checks of WEL's distribution transformer adjustments, confirming details from the proposed changes



against WEL's GIS database. In SKM's opinion WEL's approach to improving the accuracy of its distribution transformer data appears reasonable and appropriate.

Table 3 below provides the movement in WEL's 2004 ODV resulting from the correction of distribution transformer errors.

■ **Table 3: Summary of movements in 2004 ODV due to asset register errors – Distribution Transformers**

Opening 2004 ODV Values

Asset	Quantity No.	RC (\$'000)	ORC (\$'000)	DRC (\$'000)	ODRC (\$'000)
Distribution Transformers	4,731	\$ 40,908	\$ 40,908	\$ 24,421	\$ 24,420
Total Movement		\$ 40,908	\$ 40,908	\$ 24,421	\$ 24,420

Value modified adjustment

Asset	Quantity No.	RC (\$'000)	ORC (\$'000)	DRC (\$'000)	ODRC (\$'000)
Discovered Transformers	82	\$ 991	\$ 991	\$ 800	\$ 800
<i>Other Distribution Transformer Corrections</i>					
Transformer Date Corrections	245	\$ -	\$ -	\$ 327	\$ 327
Transformer Rating Corrections	152	\$ 665	\$ 665	\$ 297	\$ 297
Transformer Phase Corrections	67	\$ 157	\$ 157	\$ 60	\$ 60
Transformer Mounting Corrections	6	\$ 12	\$ 12	\$ 8	\$ 8
Total Movement		\$ 1,825	\$ 1,825	\$ 1,492	\$ 1,492

Adjusted 2004 RAB Values

Asset	Quantity No.	RC (\$'000)	ORC (\$'000)	DRC (\$'000)	ODRC (\$'000)
Distribution Transformers	4,813	\$ 42,733	\$ 42,733	\$ 25,913	\$ 25,912
Total	4,813	\$ 42,733	\$ 42,733	\$ 25,913	\$ 25,912

3.2.4. Asset Type Incorrectly Recorded: Line Class Type

WEL has identified discrepancies in its overhead lines data whereby the line class type (i.e. extra heavy, heavy, medium, or light) for approximately 6 per cent of its network requires updating in the 2004 ODV database. Errors have been identified through WEL's on-going asset management practices and data cleansing projects.

SKM has undertaken sample checks of WEL's line lengths and ODV (DRC) values both prior to WEL's proposed line grade type adjustments and following the adjustment and can confirm its arithmetical accuracy. Adjustments to line class type crosses a wide number of WEL's ODV asset types resulting in a moderate net increase to WEL's 2004 ODV by \$595k, or 1% of WEL's line asset 2004 ODV DRC value.

Table 4 below provides the movement in WEL's 2004 ODV resulting from the line class/type corrections discussed above.



■ **Table 4: Summary of movements in 2004 ODV due to asset register errors – Line Class Type Corrections**

Opening 2004 ODV Values

Asset	Quantity		RC (\$'000)		ORC (\$'000)		DRC (\$'000)		ODRC (\$'000)
33kV Lines	190	\$	12,603	\$	12,356	\$	7,792	\$	7,665
11kV Lines	2,088	\$	57,392	\$	57,392	\$	32,804	\$	32,804
LV Lines	1,141	\$	28,210	\$	28,210	\$	16,033	\$	16,033
LV Streetlight Lines	115	\$	1,731	\$	1,731	\$	1,013	\$	1,013
Total Movement	3,534	\$	99,936	\$	99,689	\$	57,642	\$	57,515

Value modified adjustment

Asset	Quantity		RC (\$'000)		ORC (\$'000)		DRC (\$'000)		ODRC (\$'000)
Lines Class Type Corrections	206	\$	1,019	\$	1,019	\$	595	\$	595
Total Movement	206	\$	1,019	\$	1,019	\$	595	\$	595

Adjusted 2004 RAB Values

Asset	Quantity		RC (\$'000)		ORC (\$'000)		DRC (\$'000)		ODRC (\$'000)
Total	3,534	\$	100,955	\$	100,708	\$	58,237	\$	58,110

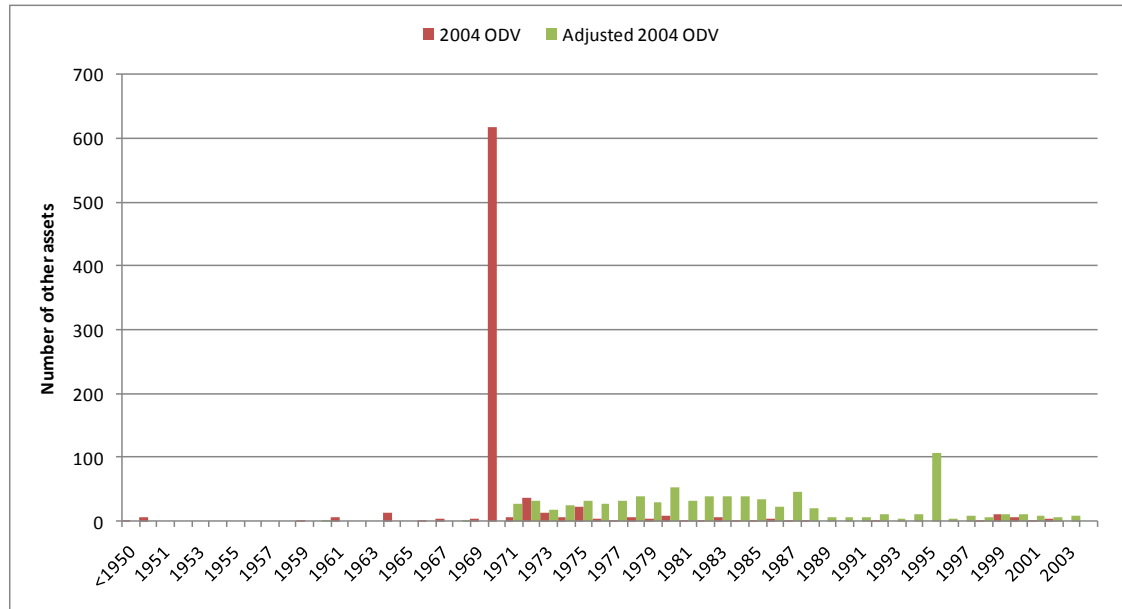
3.2.5. Asset Details Incorrectly Recorded or Omitted in Error: Other Assets

WEL has identified a range of “Other Assets” that have either had incorrect details recorded in the 2004 ODV database or were omitted altogether. Identification of these errors has occurred primarily through on-going field data collection and a number of data cleansing activities / projects.

Asset types included under WEL’s Other Assets description relate to the Distribution Asset Class and include Arrestors, Fuses, Switches, and Pillars, Sectionalisers, Load Break Switches and such like.

A total of 810 Other Assets have been identified as requiring age profile adjustments, with 618 of the identified assets originally containing the common default commissioning date of 1970 used in WEL’s 2004 ODV valuation. This error accounts for the majority of movement in the 2004 ODV relating to Other Assets resulting in an increase of \$1.627m to WEL’s 2004 ODV. Figure 5 illustrates the re-profiling of different assets from the 2004 ODV (coloured red) to the proposed profile (coloured green) for those assets which WEL proposes to adjust.

SKM notes that 108 assets have been allocated a date of 1995. The quantity of assets allocated to this year appeared to be disproportionate to other years and has warranted further investigation. WEL was able to supply SKM with supplementary data suggesting the 108 assets identified fit within the greater population of Other Assets. WEL has also advised that 1995 was a year where more intensive installation of arrestors took place on its network.



■ **Figure 5: Age adjustments for “Other Assets” (Arrestors, Fuses, Switches, and Pillars etc)**

SKM understands that the reason there are few adjustments where the resulting age is prior to 1970 is due to the conservative assessment undertaken for WEL’s 2004 valuation, meaning the revised dates were generally found to be younger than the default date.

Details of assets incorrectly recorded in the asset register associated with the Distribution Asset Class have been identified by WEL. The 2004 ODV incorrectly recorded 35 “Load Break Switch” assets as “Disconnecter 3 ph” assets, and 75 “Distribution Substation Ground Mounted” assets as “Distribution Substation Pole Mounted”. WEL’s adjustment to these asset classes result in a small net increase in WEL’s 2004 ODV of \$51k and \$151k respectively. WEL has provided SKM with evidence in the form of asset listings included in its adjustment and SKM can confirm that the small value uplift is in line with ODV handbook standard values.

WEL has identified 97 Lightning Arrestor assets unaccounted for in its 2004 ODV. This is a result of on-going field data collection and results in a small increase of \$123k to WEL’s 2004 ODV. SKM has confirmed the number of lightning arrestors prior to any adjustment and following WEL’s proposed adjustment. In SKM’s opinion the resulting adjustment is for identified Lightning Arrestors is immaterial.

Table 5 below provides the movement in WEL’s 2004 ODV resulting from the correction of the Other Asset collection details.



■ **Table 5: Summary of movements in 2004 ODV due to asset register errors – Other Assets**

Opening 2004 ODV Values

Asset	Quantity	RC (\$'000)	ORC (\$'000)	DRC (\$'000)	ODRC (\$'000)
Distribution Load Break Switch	96	\$ 624	\$ 624	\$ 453	\$ 453
Distribution Substation - Ground Mounted	1,192	\$ 4,768	\$ 4,768	\$ 2,998	\$ 2,998
Distribution Lightning Arrestor	649	\$ 1,623	\$ 1,623	\$ 524	\$ 524
Total		\$ 7,015	\$ 7,015	\$ 3,975	\$ 3,975

Value modified adjustment

Asset	Quantity	RC (\$'000)	ORC (\$'000)	DRC (\$'000)	ODRC (\$'000)
Other Asset - Date Corrections	810	\$ -	\$ -	\$ 1,627	\$ 1,627
Distribution Load Break Switch	35	\$ 105	\$ 105	\$ 51	\$ 51
Distribution Substation - Ground Mounted	75	\$ 354	\$ 354	\$ 152	\$ 152
Distribution Lightning Arrestor	97	\$ 259	\$ 259	\$ 123	\$ 123
Total Movement		\$ 718	\$ 718	\$ 1,953	\$ 1,953

Adjusted 2004 RAB Values

Asset	Quantity	RC (\$'000)	ORC (\$'000)	DRC (\$'000)	ODRC (\$'000)
Other Asset - Date Corrections	810	\$ -	\$ -	\$ 1,627	\$ 1,627
Distribution Load Break Switch	131	\$ 729	\$ 729	\$ 504	\$ 504
Distribution Substation - Ground Mounted	1,267	\$ 5,122	\$ 5,122	\$ 3,150	\$ 3,150
Distribution Lightning Arrestor	746	\$ 1,882	\$ 1,882	\$ 647	\$ 647
Total	2,954	\$ 7,733	\$ 7,733	\$ 5,928	\$ 5,928

3.3. Reapplication of Asset Multipliers

Reference EDB IM cl 2.2.1(2)(c)(d). EDBs may reapply existing and or modified multipliers where more accurate information has become available.

WEL proposes to make four adjustments to its application of multipliers that were either used incorrectly or previously excluded from its 2004 ODV. These are to:

- redefine the regions to which the urban multiplier is applied;
- redefine the regions to which traffic management is applied;
- apply the CBD multiplier, which was excluded in error from WEL's 2004 ODV calculations; and
- define the previously excluded rugged terrain areas and multiplier.

WEL has provided a summary justification of its multiplier adjustment process which has been included in Appendix E.

3.3.1. Re-apply an existing multiplier: Urban multiplier

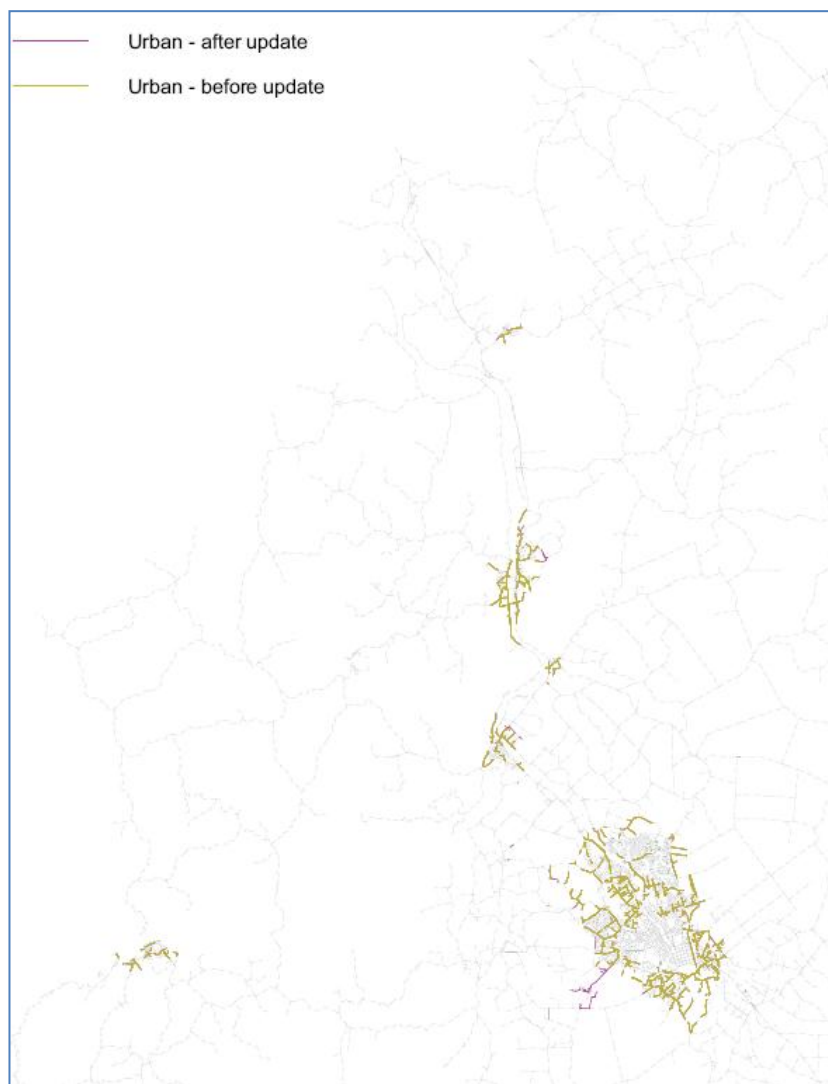
Due to on-going data improvements undertaken by WEL since 2004, it has refined its applicable urban areas. Specifically, WEL's GIS database was updated in 2009 with Hamilton City Council's



classification of urban areas allowing a more accurate definition of WEL's network located in urban areas.

WEL's data cleansing has resulted in an additional 15km of overhead lines proposed to be classified within urban areas, the majority of which is an extension to the south east of Hamilton, bringing WEL's total urban area classification enveloping 301km of overhead lines. WEL has not adjusted the level of multiplier included in its 2004 ODV Report; this remains at 1.8.

Figure 6 provides an illustration of WEL's Urban multiplier applied in its 2004 ODV (coloured green) and the proposed additional urban multiplier areas (coloured purple), applicable to 15km of WEL's overhead lines.



■ **Figure 6: Adjusted 2004 Urban Multiplier**



The resulting uplift to WEL's adjusted 2004 RAB is small (\$234k). SKM has not verified the translation of information from Hamilton City Council to WEL's GIS. Table 6 below provides the movement in WEL's adjusted 2004 RAB resulting from the reapplication of its urban multiplier.

■ **Table 6: Reapplying an existing Urban multiplier**

Opening 2004 ODV Values		Quantity		RC		ORC		DRC		ODRC	
Asset		km		(\$'000)		(\$'000)		(\$'000)		(\$'000)	
Multiplier - Urban		286	\$	15,176	\$	15,176	\$	9,248	\$	9,248	
Total			\$	15,176	\$	15,176	\$	9,248	\$	9,248	

Value modified adjustment		Quantity		RC		ORC		DRC		ODRC	
		km		(\$'000)		(\$'000)		(\$'000)		(\$'000)	
Multiplier - Urban - increased area		15	\$	398	\$	398	\$	234	\$	234	
Total Movement		15	\$	398	\$	398	\$	234	\$	234	

Adjusted 2004 RAB Values		Quantity		RC		ORC		DRC		ODRC	
Asset		km		(\$'000)		(\$'000)		(\$'000)		(\$'000)	
Multiplier - Urban		301	\$	15,574	\$	15,574	\$	9,482	\$	9,482	
Total		301	\$	15,574	\$	15,574	\$	9,482	\$	9,482	

3.3.2. Re-apply an existing multiplier: Traffic Management

WEL's 2004 ODV traffic management data was originally based on traffic management information created manually and superimposed onto WEL's GIS. This manual application resulted in a number of restricted areas being selected and therefore applicable to traffic management allowances across WEL's network. WEL's data handling of GIS information has improved significantly since 2004. Consequently, the traffic management allowances have been able to be refined and more accurately applied.

Figure 7 and Figure 8 below illustrate the reapplication of WEL's existing traffic management allowances based on level 1 and 2 traffic management allowances. Traffic management allowances included in WEL's 2004 ODV are coloured green, with purple marking the additional overhead lines and underground cables proposed to be included.

WEL's traffic management base data has come from purchased GeoSmart⁴ data which is derived from the widely used LINZ CRS⁵ data. WEL has confirmed there has been no change to ODV Handbook values applicable to its traffic management allowances and this has been verified in WEL's database by SKM. SKM has not verified the translation of the LINZ CRS data into WEL's GIS.

⁴ <http://www.geosmart.co.nz>

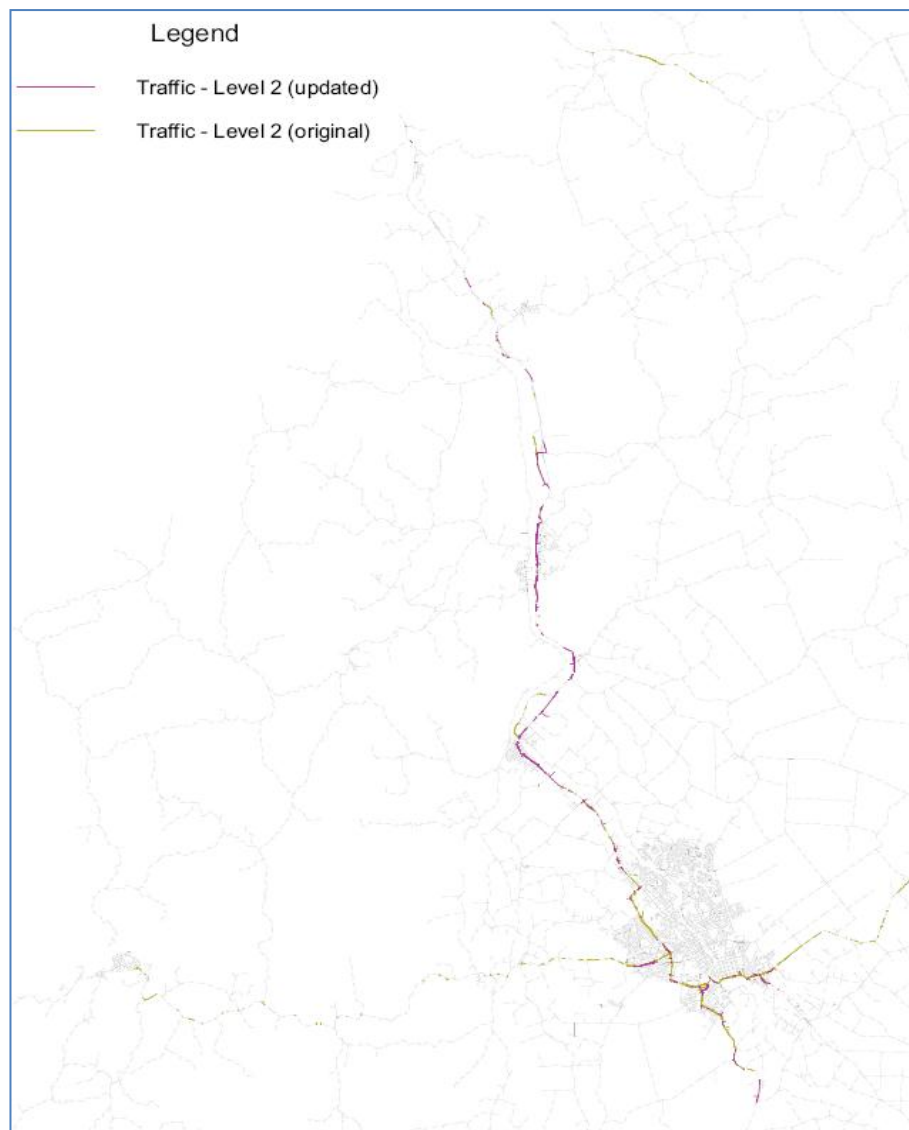
⁵ Land Information New Zealand Core Record System data.



WEL's proposed traffic management allowance adjustments result in a small uplift to the value of \$610k to WEL's adjusted 2004 RAB. This is less than 1% of WEL's total traffic management allowance across its network.



■ **Figure 7: Adjusted Traffic Management Level 1 area**



■ **Figure 8 Adjusted Traffic Management Level 2 area**

Table 7 below provides the movement in WEL's adjusted 2004 RAB resulting from the application of its traffic management allowances across the WEL network.



■ Table 7 Re-applying Traffic Management allowances

Opening 2004 ODV Values

Asset	Quantity km	RC (\$'000)	ORC (\$'000)	DRC (\$'000)	ODRC (\$'000)
Traffic Management - Overhead Lines Level 1	1,976	\$ 66,656	\$ 66,656	\$ 38,368	\$ 38,368
Traffic Management - Overhead lines Level 2	21	\$ 1,112	\$ 1,112	\$ 651	\$ 651
Traffic Management - Underground Cables Level 1	754	\$ 61,325	\$ 61,325	\$ 34,398	\$ 34,398
Traffic Management - Underground Cables Level 2	33	\$ 4,493	\$ 4,493	\$ 2,949	\$ 2,949
Total		\$ 133,586	\$ 133,586	\$ 76,366	\$ 76,366

Value modified adjustment

Asset	Quantity km	RC (\$'000)	ORC (\$'000)	DRC (\$'000)	ODRC (\$'000)
Traffic Management Overhead Lines Level 1	293	\$ 87	\$ 87	\$ 50	\$ 50
Traffic Management Overhead Lines Level 2	32	\$ 18	\$ 18	\$ 11	\$ 11
Traffic Management - Underground Cables Level 1	297	\$ 770	\$ 770	\$ 484	\$ 484
Traffic Management - Underground Cables Level 2	50	\$ 115	\$ 115	\$ 66	\$ 66
Total Movement		\$ 990	\$ 990	\$ 610	\$ 610

Adjusted 2004 RAB Values

Asset	Quantity km	RC (\$'000)	ORC (\$'000)	DRC (\$'000)	ODRC (\$'000)
Traffic Management Overhead Lines Level 1	2,269	\$ 66,742	\$ 66,742	\$ 38,418	\$ 38,418
Traffic Management Overhead Lines Level 2	53	\$ 1,130	\$ 1,130	\$ 661	\$ 661
Traffic Management - Underground Cables Level 1	1,051	\$ 62,095	\$ 62,095	\$ 34,883	\$ 34,883
Traffic Management - Underground Cables Level 2	83	\$ 4,608	\$ 4,608	\$ 3,015	\$ 3,015
Total		\$ 134,575	\$ 134,575	\$ 76,977	\$ 76,977

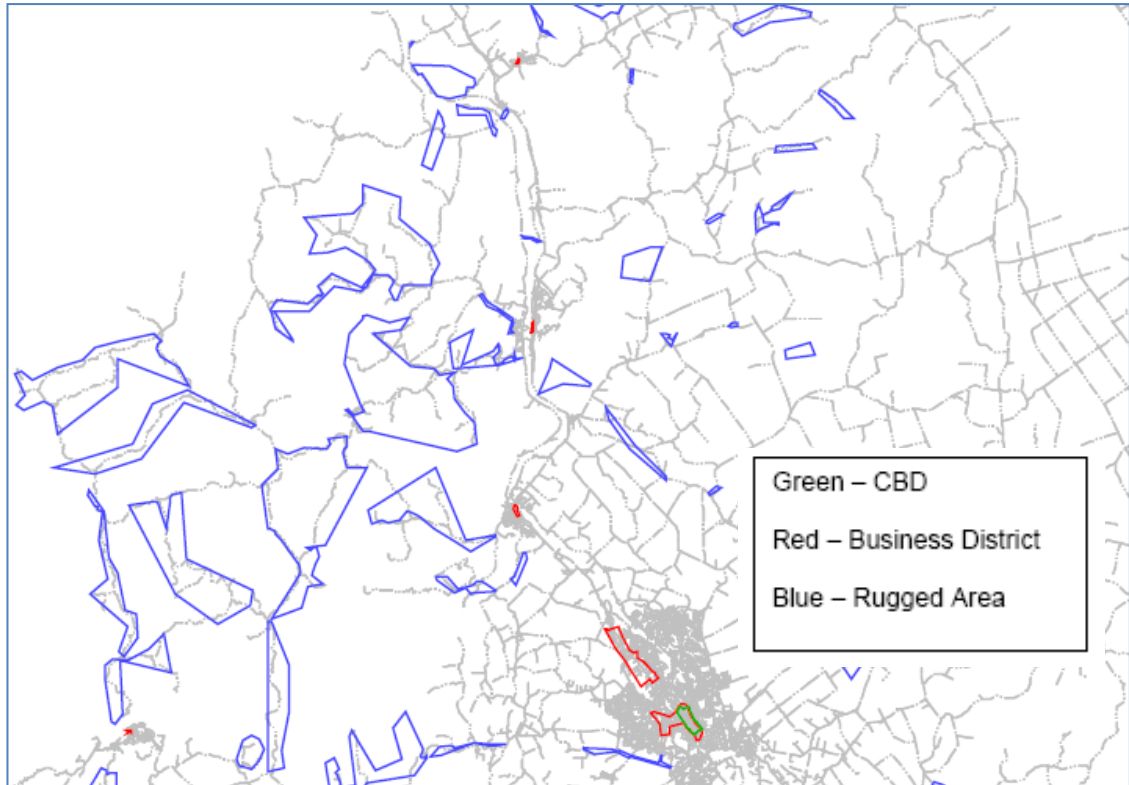
3.3.3. Re-apply a modified multiplier: CBD multiplier

WEL's report on its 2004 ODV stated a CBD multiplier of 1.25 was applied to 95km of 33kV, 11kV and LV cables within its designated CBD area. WEL has since discovered that this was not the case and the CBD was in error excluded from its 2004 ODV database calculations.

WEL has reapplied its CBD multiplier using its 2004 ODV stated figure of 1.25, applicable to the same CBD polygon (including Hamilton CBD), resulting in a small uplift to the 2004 ODV DRC of \$616k.

In addition, WEL has undertaken further review of its application of its CBD multiplier to its assets and where more accurate information is now available on WEL's greater area network. WEL proposes to redefine its CBD areas into two tiers:

- "Tier 1" includes the original CBD area of Hamilton using an increased CBD multiplier, from 1.25 to 1.5 (marked as a **green** polygon in Figure 9); and
- a "Tier 2" CBD multiplier has been applied where areas are consistent with built up townships or lighter CBD areas such as an extended portion of central Hamilton, Te Rapa, Huntly, Raglan & Te Kauwhata, applying a reduced multiplier of 1.2 (marked as **red** polygons in Figure 9).



■ **Figure 9 Adjusted 2004 CBD Multiplier⁶**

The difference between tier 1 and tier 2 CBD multipliers is the density of activity and infrastructure to be accounted for when undertaking cable installations. WEL's Tier 1 CBD multiplier, which includes the Hamilton CBD, accounts for the restricted access times, special reticulation requirements and areas requiring substantial reinstatement. Tier 2 CBD areas take into account similar activities however WEL has specifically accounted for gas infrastructure, and the additional costs associated with works around Vector pipelines, and increased traffic volumes relating to those less intensive areas identified.

WEL has provided SKM with references to Vector's gas pipeline⁷ it has accounted for when undertaking cable installations, indicating areas of increased cost and consideration. These relate to the extended Hamilton CBD, Ngarauawahia and Huntly CBD areas.

WEL has provided SKM with installation cost estimates as justification for the level of multiplier to be applied to each of its tier 1 and 2 CBD multipliers. In SKM's opinion the level of multiplier WEL is proposing to use are reasonable, are a fair reflection of the increased consideration of

⁶ Blue polygons indicate rugged areas and are to be ignored in the context of the CBD multiplier.

⁷ <http://vector.co.nz/contact-us/get-connected/gas-network-search>



undertaking cable installation work in the identified areas. The resulting impact on WEL's adjusted 2004 RAB is approximately 1% to 1.5% of WEL's 2004 ODV DRC value.

Table 8 below provides the movement in WEL's 2004 ODV resulting from the inclusion of the original CBD multiplier and redefined CBD multipliers based on WEL's tier 1 and 2 definitions. SKM notes the first line in the table illustrating the error identified in not applying WEL's 2004 ODV CBD multiplier of 1.25 to its assets.

■ **Table 8: Reapplying an modified CBD multiplier**

Opening 2004 ODV Values
Asset

	Quantity km	RC (\$'000)	ORC (\$'000)	DRC (\$'000)	ODRC (\$'000)
CBD Multiplier (2004 ODV 1.25)	95	\$ -	\$ -	\$ -	\$ -
Total		\$ -	\$ -	\$ -	\$ -

Value modified adjustment

	Quantity km	RC (\$'000)	ORC (\$'000)	DRC (\$'000)	ODRC (\$'000)
CBD Multiplier (2004 ODV @ 1.25)	95	\$ 1,256	\$ 1,256	\$ 616	\$ 616
CBD Multiplier (Tier 1 @ 1.5)	95	\$ 1,255	\$ 1,255	\$ 616	\$ 616
CBD Multiplier (Tier 2 @ 1.2)	153	\$ 1,457	\$ 1,457	\$ 810	\$ 810
Total Movement		\$ 3,968	\$ 3,968	\$ 2,042	\$ 2,042

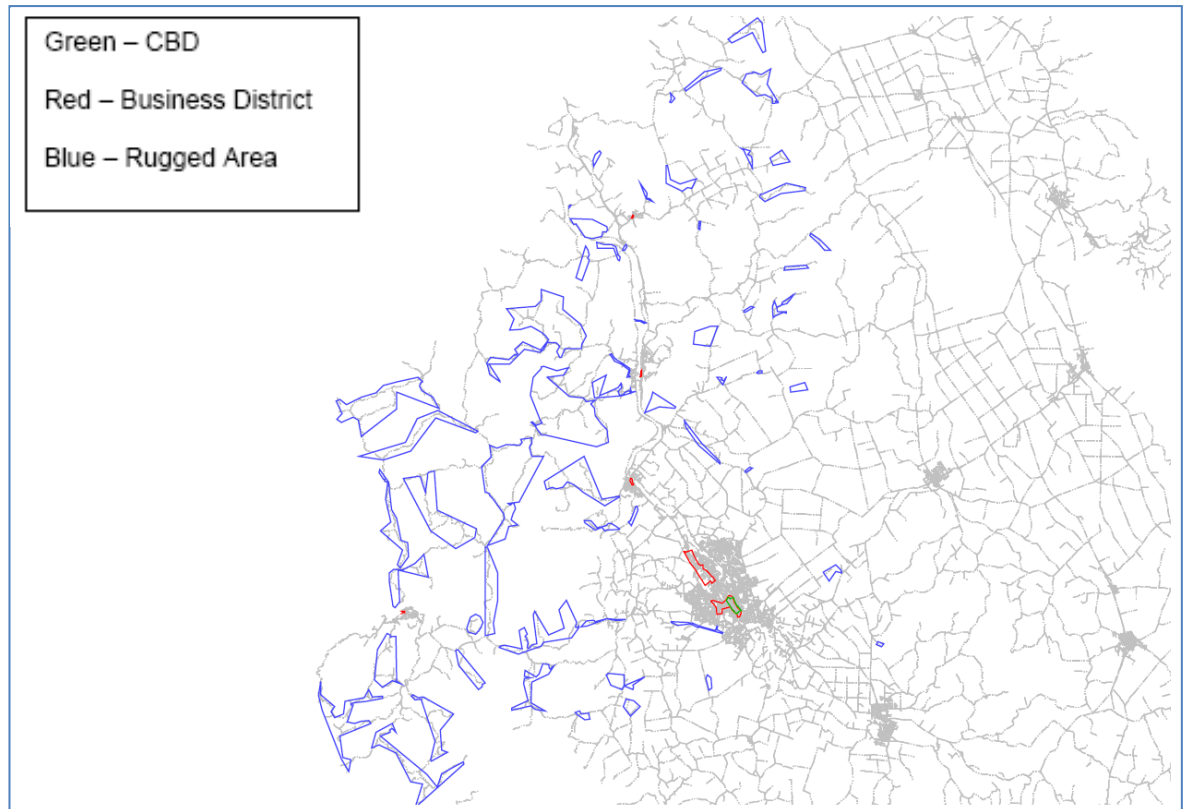
Adjusted 2004 RAB Values
Asset

	Quantity km	RC (\$'000)	ORC (\$'000)	DRC (\$'000)	ODRC (\$'000)
CBD Multiplier	248	\$ 3,968	\$ 3,968	\$ 2,042	\$ 2,042
Total	248	\$ 3,968	\$ 3,968	\$ 2,042	\$ 2,042

3.3.4. Re-apply a modified multiplier: Rugged multiplier

WEL's 2004 ODV did not include a rugged multiplier application across its network. Since 2004 WEL has undertaken work to redefine its rugged areas in the form of workshops, interviews with key personnel with considerable experience on the network, and on-going information gathering applicable to cost estimation and overhead line construction considerations.

Figure 10 below provides a high level illustration of the areas now captured by WEL in its determination of rugged areas (marked in blue). WEL has described much of the identified areas as peaty and swampy, requiring additional construction costs in terms of access and greater costs in the form to installation equipment and raw materials, such as additional pole bracing.



■ **Figure 10: Adjusted 2004 Rugged Multiplier⁸**

WEL's newly identified rugged areas consist of 544km of overhead lines, ranging from the peaty and swampy lands in the north east Waikato to the south of Hamilton, and taking in the more challenging hill country of Waikato's west coast, both north and south of Raglan, accounting for areas associated with high wind weather conditions.

WEL proposes to utilise a multiplier at the level of 1.25, from a possible range provided by the Commission of 1.2 to 1.8 (SKM notes the Commission's previously notified rugged multiplier range was 1.2 to 1.3).

Table 9 below provides the movement in WEL's 2004 ODV resulting from the application of its rugged multiplier across the WEL network.

⁸ Green and red polygons indicate CBD areas and are to be ignored in the context of the rugged multiplier.



■ **Table 9: Reapplying an modified Rugged multiplier**

Opening 2004 ODV Values

Asset	Quantity km	RC (\$'000)	ORC (\$'000)	DRC (\$'000)	ODRC (\$'000)
Rugged Multiplier - Overhead Lines	- \$	- \$	- \$	- \$	-
Total	- \$	- \$	- \$	- \$	-

Value modified adjustment

	Quantity km	RC (\$'000)	ORC (\$'000)	DRC (\$'000)	ODRC (\$'000)
Rugged Multiplier	544 \$	2,731 \$	2,731 \$	1,467 \$	1,467
Total Movement	544 \$	2,731 \$	2,731 \$	1,467 \$	1,467

Adjusted 2004 RAB Values

Asset	Quantity km	RC (\$'000)	ORC (\$'000)	DRC (\$'000)	ODRC (\$'000)
Rugged Multiplier - Overhead Lines	544 \$	2,731 \$	2,731 \$	1,467 \$	1,467
Total	544 \$	2,731 \$	2,731 \$	1,467 \$	1,467

3.4. Re-apply Optimisation and/or Economic Value Test

Reference EDB IM cl 2.2.1(2)(e). EDBs may reconsider the application of optimisation based on the network conditions during 2009.

WEL has not proposed any optimisation or EV adjustments to its adjusted 2004 RAB.



4. Summary

WEL's asset adjustment process has focused on two areas:

- including assets that were excluded in error during the 2004 ODV; and
- correcting errors in relation to the reapplication of existing / modified multipliers.

WEL proposes an adjustment of \$4.980m, reflecting the inclusion of WEL's load control relays as at 31 March 2009, and a 2004 adjustment totalling \$18.215m consisting of those errors cited above.

Table 10 below summarises the impact on WEL's adjusted 2004 RAB arising from the asset adjustment process.

■ **Table 10: Summary of asset adjustment process**

	RC (\$'000)	ORC (\$'000)	DRC (\$'000)	ODRC (\$'000)
2004 ODV	\$ 341,501	\$ 339,123	\$ 190,120	\$ 189,495
Cable Date / Type Corrections	\$ 454	\$ 454	\$ 6,848	\$ 6,848
Cable Length Corrections	\$ 6,266	\$ 6,266	\$ 2,973	\$ 2,973
Distribution Transformer Corrections	\$ 1,825	\$ 1,825	\$ 1,492	\$ 1,492
Line Class Type Corrections	\$ 1,019	\$ 1,019	\$ 595	\$ 595
Other Asset Register Error Corrections	\$ 718	\$ 718	\$ 1,953	\$ 1,953
Re-Apply Existing Multipliers	\$ 1,387	\$ 1,387	\$ 844	\$ 844
Re-Apply Modified Multipliers	\$ 6,699	\$ 6,699	\$ 3,510	\$ 3,510
Adjusted 2004 RAB	\$ 359,868	\$ 357,490	\$ 208,335	\$ 207,710
Total Movement	\$ 18,367	\$ 18,367	\$ 18,215	\$ 18,215

Appendix A Summary of Asset Value Adjustments: Schedule 5i

		Company Name					WEL Networks				
		For Year Ended					31-Mar-13				
SCHEDULE 5i: REPORT ON INTITAL RAB ADJUSTMENT											
Under clause 2.2.1 of the IM determination an EDB may undertake an asset adjustment process in setting their initial RAB.											
If the EDB has adjusted its RAB in accordance with clause 2.2.1 of the IM determination, it must complete this schedule when disclosing information relating to the year ending 31 March 2012											
ref											
8	Summary of Engineer's Valuation Adjustments (at time asset enters regulatory asset register)										
9		2004 *	2005	2006	2007	2008	2009				
10	Asset adjustment process - adjustments	(£000)	(£000)	(£000)	(£000)	(£000)	(£000)				
11											
12	Include load control relays										4,980
13	Correct asset register errors for 2004 ODV assets										
14	Cable Date / Type Corrections	6,848									
15	Cable Length Corrections	2,973									
16	Distribution Transformer Corrections	1,492									
17	Lines Class / Type Corrections	595									
18	Other Asset Register Error Corrections	1,953									
19		13,862									
20	Correct asset register errors for 2005 – 2009 assets										
21											
22											
23											
24											
25	Re-apply an existing multiplier to 2004 ODV assets										
26	Re-apply Existing Multipliers	844									
27											
28											
29		844									
30	Re-apply a modified multiplier to 2004 ODV assets										
31	Re-apply Modified Multipliers	3,510									
32											
33											
34		3,510									
35	Re-apply optimisation or EV tests to 2004 ODV assets										
36											
37											
38											
39											
40											
41	Total value of adjustments by disclosure year	18,215									
42	* Includes assets which first entered the regulatory asset register in a disclosure year prior to 2004.										
43											



Appendix B WEL Networks Instructions to Engineer

27 April 2012

Richard Fairbairn
Sinclair Knight Merz
PO Box 9806
Newmarket 1149
AUCKLAND

Dear Richard,

ENGINEERING REPORT IN RESPECT OF THE INITIAL REGULATORY ASSET BASE

Further to our recent discussions, WEL Networks Limited (WEL) wishes to provide Sinclair Knight Merz (SKM) with written instructions that outline our requirements for the initial Regulatory Asset Base (RAB) review that we are undertaking.

WEL is aware of a requirement to supply information to the Commerce Commission, published on 16 January 2012 under Draft Commerce Act (Electricity Distribution Services Information Disclosure) Determination 2012. It requires Electricity Distribution Businesses (EDBs) to provide to the Commerce Commission with, among other things, an Engineer's report that complies with the requirements specified in Appendix B of the notice if the EDB has elected to undertake the asset adjustment process as permitted by and outlined in clause 2.2.1 of the Commerce Act (Electricity Distribution Services Input Methodologies) Determination 2010. WEL expects to have to submit to the Commerce Commission by late 2012, along with Directors Certificates and an Independent Assurance Report.

WEL has elected to undertake an asset adjustment, we are therefore engaging SKM to assist with our review of the RAB and provide a report which complies with Appendix B as noted above. WEL expects that we will undertake the bulk of the database work which will include the identification of relevant assets, review of installation dates change, review of categorisation, review of multipliers and provide SKM with data that supports our proposed changes. SKM would then review and audit this work through on-site visits, inspections and discussions with the relevant staff and produce the Engineer's report.

We look forward to working on this project with you.

Yours faithfully,



Huazhuo Lin
PERFORMANCE AND ASSET INVESTMENT MANAGER



WEL Networks Limited
114 Maui Street, Te Rapa

PO Box 925
Hamilton 3240
New Zealand

Telephone +64 7 850 3100
Fax +64 7 850 3210

Email connect@wel.co.nz
www.wel.co.nz



Appendix C PwC Load Control Relays Report



Engagement Procedures Report

To: WEL Networks Limited on the load control relays book value at 31 March 2009.

WEL Networks Limited intends to provide to the Commerce Commission “Schedule 5i: Report on Initial RAB Adjustment” for the year ended 31 March 2013. This schedule includes an adjustment for load control relays as at 31 March 2009. Due to the limited information available at 31 March 2009, the approach has been to take the DRC valuation performed for the purpose of the audited general purpose financial statements for the year ended 31 March 2010 and make adjustments for depreciation and additions.

We set out below the findings of the work we have carried out in relation to the agreed upon procedures engagement on the load control relays book value at 31 March 2009 (the “Book Value”) completed in accordance with our letter of engagement dated 25 June 2013.

Purpose of report

The procedures were performed solely to satisfy the requirement of the Commerce Commission as part of the process of restating the Regulated Asset Base of WEL Networks Limited. Our factual findings are reported in response to the agreed procedures.

Directors’ responsibilities

The Directors are responsible for the agreeing what procedures will be completed and for the assertions that are the subject of those procedures.

Our responsibilities

We have been engaged to perform the engaged procedures set out below and to report our findings to WEL Networks Limited.

Scope of work

Our engagement was undertaken in accordance with the basic principles and general guidance set out in the Agreed Upon Procedures Standards and Guidelines of the New Zealand Institute of Chartered Accountants. The responsibility for determining the adequacy or otherwise of the procedures agreed to be performed is that of the Directors of WEL Networks Limited. We disclaim any assumption of responsibility for the adequacy or otherwise of the procedures requested by you.

A summary of the procedures performed is as follows:

1. Agree the load control relays book value at 31 March 2010 to the DRC valuation recorded in the audited financial statements for the year ended 31 March 2010.
2. Agree the depreciation charge in respect of the load control relays for the year ended 31 March 2010 to underlying accounting records.
3. Agree the additions of load control relays during the year ended 31 March 2010 to underlying accounting records.
4. Recalculate the sum of the above, which derives the load control relays book value at 31 March 2009.



As the above procedures do not constitute either an audit in accordance with New Zealand generally accepted auditing standards or a review in accordance with review engagement standards in New Zealand, we do not express any assurance on the load control relays book value at 31 March 2009.

Findings

We report as follows:

With respect to 1 above, we agreed the load control relays book value at 31 March 2010 to the DRC valuation recorded in the audited financial statements for the year ended 31 March 2010, with no exceptions noted.

With respect to 2 above, we agreed the depreciation charge in respect of the load control relays for the year ended 31 March 2010 to underlying accounting records, with no exceptions noted.

With respect to 3 above, we agreed the additions of load control relays during the year ended 31 March 2010 to underlying accounting records, with no exceptions noted.

With respect to 4 above, we recalculated the sum of the above, which derives the load control relays book value at 31 March 2009, with no exceptions noted.

The amounts and calculation referred to above are attached as Appendix A to this report.

This engagement procedures report dated 26 June 2013 is solely for the purpose set out in the second paragraph of this report, and is not to be used for any other purpose or distributed to any other party.

A handwritten signature in cursive script, reading 'PricewaterhouseCoopers', with a horizontal line underneath.

Chartered Accountants
27 June 2013

Auckland, New Zealand

Appendix A

Ripple control relays at 31 March 2010	\$	4,891,143
add back depreciation for the year	\$	206,523
deduct additions for the year	-\$	117,838
Derived DRC net book value at 31 March 2009	\$	4,979,828



Appendix D Signed Statement by Engineer



Huazhuo Lin
Performance Asset Investment Manager
WEL Networks Ltd
PO Box 925
Hamilton 3240
New Zealand

17 July 2013

ZP01298/ZP00385

Dear Sir,

**Statement Regarding Independent Engineer's Report on the
Asset Adjustment Process of WEL Networks Ltd**

Introduction

Sinclair Knight Merz Ltd (SKM) was requested by WEL Networks Ltd (WEL) to undertake an independent review of proposed adjustments to WEL's regulatory asset base as at 31st March 2004. This review was undertaken to determine the appropriateness of the proposed adjustments in respect of the process set out in clause 2.2.1 of the "Commerce Act (Electricity Distribution Services Input Methodologies) Determination 2010", 22 December 2010 (EDB IM).

SKM's findings are set out in the enclosed report which has been prepared to comply with the requirements for the Engineer's report in Attachment C of the Commerce Commission's information disclosure titled "Electricity Distribution Information Disclosure Determination 2012" (EDB ID), dated 1 October 2012.

Confirmation of Independence and Qualifications

I, as a chartered professional engineer (as defined in section 6 of the Chartered Professional Engineers Act 2002), can confirm that:

- 1) SKM has acted independently with respect to WEL and its subsidiaries and affiliates;
- 2) SKM has significant experience in New Zealand, Australia and the United Kingdom in relation to the valuation of electricity networks for both regulatory and financial reporting purposes. SKM's review and the preparation of the report has been undertaken by Mr Cameron Parker, Mr Stephen Wightman and Dr Richard Fairbairn. Mr Wightman and Dr Fairbairn are professionally qualified and experienced in the type of work concerned and are familiar with the WEL network;
- 3) the report is in writing and accessible in electronic (PDF file-type) format and includes a copy of the written instructions provided to SKM by WEL (included as Appendix B to the enclosed report), including any subsequent variations or modifications;



- 4) the report includes a table summarising the various asset value adjustments corresponding to Schedule 5i of the Information Disclosure Notice Templates (please see Appendix A to the enclosed report);
- 5) the report provides the minimum information for each category of asset adjustment outlined in Table 1 of Attachment C of the EDB ID, together with such additional information sufficient to allow a reader:
 - i. to understand the data, information, calculations and assumptions employed in respect of each category of asset adjustment;
 - ii. to understand the extent to which professional judgement was exercised by SKM and the effect of that judgement in deriving the resultant asset values;
 - iii. to verify the arithmetical accuracy of the asset adjustment calculations; and
- 6) the report may be publicly disclosed by WEL pursuant to an information disclosure determination in relation to WEL made by the Commission under section 52P of the Commerce Act (1986).

I can confirm that SKM is satisfied that:

- i. the rules in the ODV handbook have been properly applied for assets which had not had an ODV valuation calculated originally, as required by clause 2.2.1 of the EDB IM;
- ii. where values under Generally Accepted Accounting Practice (GAAP) have been relied on, those values have been supplied or reviewed by an appropriately qualified party (e.g. accounting practitioner); and
- iii. the report meets the requirements of Attachment C of the EDB ID.

SIGNED on behalf of Sinclair Knight Merz Ltd by:

Designated Engineer

A handwritten signature in blue ink, appearing to read 'R Fairbairn', is written over a light blue rectangular background.

R Fairbairn, MIPENZ, CPEng

Assessor

A handwritten signature in black ink, appearing to read 'S Wightman', is written over a light blue rectangular background.

S. Wightman, MIPENZ
Sinclair Knight Merz



Appendix E WEL's Justification of Applied Multipliers

Multiplicative factors used in 2004 ODV Regulatory Asset Base (RAB) Adjustment Process

Background

ODV valuations are based on standard, tabulated costs. The standard costs are for precisely defined conditions. However, a number of exceptions are also defined. Where exceptions exist, the replacement costs are typically higher. A set of adjustment factors are defined to modify the standard costs. There are two types of factor: multiplicative and additive. The traffic management factors are added to the standard cost of each asset where applicable. The other factors are all multiplicative. This document provides justification for the selection of the values assigned to the multiplicative factors applied to the WEL ODV RAB re-valuation. The traffic management costs are precisely prescribed in the ODV Handbook, August 2004, so not considered any further here.

The multiplicative factors are:

- Urban factor
- Central business district factor
- Rugged factor
- Remote factor.

The ODV Handbook defines acceptable ranges for these values. The exact values used within each company can be derived from the cost structures of that company. The ideal method is to derive the factors from actual costs. Unfortunately, this is often not practical because so many random variables affect actual projects. Therefore the other way to derive a meaningful figure for the factors is to select a large number of projects and average the costs. This is not practical for all parts of the network. Some parts are well established and have had no relevant projects completed with that area over recent years. Where actual costs are unavailable, the standard, internal project costing methodology is applied. This is based on a “Compatible Unit Estimation” tool.

The unit replacement costs derived from WEL’s Compatible Unit Estimation (CUE) tool include material and labour costs for normal conditions, which is the same principle as used to derive ODV costs. The unit replacement costs should be adjusted for abnormal conditions. The unit costs are based on market values. The materials are purchased through a rigorous competitive process and it is these figures that are used in the CUE.

The labour costs are also tied to market values. WEL has its own network staff, who account for the majority of the expenditure on the network. Their productivity and costs are monitored closely. Their productivity is about 98%, meaning the actual manhours match the budgeted hours (i.e. the CUE value).

Generally the annual workload exceeds WEL's internal capacity to complete it. Thus a portion is contracted out. This enables WEL to ensure its internal cost structure is competitive. In conclusion the values for materials and labour used within the CUE are competitive market values, so using the CUE as a basis for calculating the multipliers is based on market values and is valid.

In the original 2004 ODV submission only the urban and traffic management factors were utilised. The urban factor used for the RAB valuations has not changed from that original value, so is not discussed any further in this document. The central business district and rugged factors have been added into the 2012 RAB adjustment process. Following earlier practices (but which post dated the 2004 ODV), the central business district factor has been subdivided into two, which better reflects the physical conditions within the WEL network. These are described in detail below. The rugged area has also been added since 2004.

Central Business District Factor Tier 1

The Central Business District, Tier 1, factor applies to cables buried in areas with a very high density of underground services. This multiplier takes into account restricted access times, special reticulation requirements and areas requiring substantial reinstatement or special backfilling.

In practice this classification only applies to Hamilton CBD at this point in time. The infrastructure for the Hamilton Central Business District (CDB) has been well established since 1940s, so no recent, actual costs are available. Thus, in order to assess the costs, the WEL Design Team designed and costed 1km of new cable for the CBD using 2012 prices. The asset costs were then converted back to 2004 values based on public CPIs. This designed CBD cost was then compared with ODV standard cost to find the CBD ratio. This process was repeated for each of the cable grades heavy, medium and light. The results are shown in the Table 1 below.

Project Description	Multiplier Region	ODV Handbook Asset Class	2004 ODV HANDBOOK RC (NZ\$'000)	Year	Cost/asset/km (NZ\$'000)	CPI Index	Inferred 2004 Cost (NZ'000)	Inferred Multiplier	Weightings
Installation of 1 km of extra heavy EHV underground cable in CBD	CBD Multiplier - Tier 1	32 kV cables > 240 mm ² Al	230	2012	437	0.80	349	1.52	0%
Installation of 1 km of heavy EHV underground cable in CBD	CBD Multiplier - Tier 1	33 kV cables <= 240 mm ² Al	175	2012	399	0.80	318	1.82	4%
Installation of 1 km of extra heavy HV underground cable in CBD	CBD Multiplier - Tier 1	11 kV cables > 300 mm ² Al	165	2012	237	0.80	189	1.14	0%
Installation of 1 km of heavy HV underground cable in CBD	CBD Multiplier - Tier 1	11 kV cables > 240 mm ² Al and <= 300 mm ² Al	125	2012	222	0.80	177	1.42	12%
Installation of 1 km of medium HV underground cable in CBD	CBD Multiplier - Tier 1	11 kV cables > 90 mm ² Al and <= 240 mm ² Al	103	2012	177	0.80	141	1.37	17%
Installation of 1 km of light HV underground cable in CBD	CBD Multiplier - Tier 1	11 kV cables <= 90 mm ² Al	81	2012	151	0.80	120	1.49	2%
Installation of 1 km of heavy LV underground cable in CBD	CBD Multiplier - Tier 1	400 V cables > 240 mm ² Al	72	2012	189	0.80	151	2.09	0%
Installation of 1 km of medium LV underground cable in CBD	CBD Multiplier - Tier 1	400 V cables <= 240 mm ² Al	63	2012	145	0.80	116	1.84	64%

Table 1 Summary of calculations of CBD Tier 1 factor.

The weighted average (based on cable lengths) of these values is 1.7, which supports the value of 1.5 used in RAB adjustment process.

The central business district is defined by the Hamilton City Council. The boundary has been transferred into the Geographic Information System (GIS).

Central Business District Factor Tier 2

The Central Business District, Tier 2, factor is a smaller factor than Tier1 and applies to cables buried in areas with a high density of underground services. In practice this applies mainly to town centres other than Hamilton CBD, but can include arterial routes and other high density areas. The infrastructure for these areas is generally well established so no recent, actual costs are available. Thus the same method was used as for Tier 1 CBD. The results are shown in the Table 2 below.

Project Description	Multiplier Region	ODV Handbook Asset Class	2004 ODV HANDBOOK RC (NZ\$'000)	Year	Cost/asset/km (NZ\$'000)	CPI Index	Inferred 2004 Cost (NZ'000)	Inferred Multiplier	Weightings
Installation of 1 km of extra heavy EHV underground cable in Town	CBD Multiplier - Tier 2	33 kV cables > 240 mm ² Al	230	2012	422	0.80	336	1.46	0%
Installation of 1 km of heavy EHV underground cable in Town	CBD Multiplier - Tier 2	33 kV cables <= 240 mm ² Al	175	2012	383	0.80	306	1.75	2%
Installation of 1 km of extra heavy HV underground cable in Town	CBD Multiplier - Tier 2	11 kV cables > 300 mm ² Al	165	2012	197	0.80	157	0.95	0%
Installation of 1 km of heavy HV underground cable in Town	CBD Multiplier - Tier 2	11 kV cables > 240 mm ² Al and <= 300 mm ² Al	125	2012	183	0.80	146	1.17	11%
Installation of 1 km of medium HV underground cable in Town	CBD Multiplier - Tier 2	11 kV cables > 50 mm ² Al and <= 240 mm ² Al	103	2012	163	0.80	130	1.26	13%
Installation of 1 km of light HV underground cable in Town	CBD Multiplier - Tier 2	11 kV cables <= 50 mm ² Al	81	2012	137	0.80	109	1.35	13%
Installation of 1 km of heavy LV underground cable in Town	CBD Multiplier - Tier 2	400 V cables > 240 mm ² Al	72	2012	176	0.80	140	1.94	0%
Installation of 1 km of medium LV underground cable in Town	CBD Multiplier - Tier 2	400 V cables <= 240 mm ² Al	63	2012	132	0.80	105	1.66	61%

Table 2 Summary of calculations of CBD Tier 2 factor.

The weighted average (based on cable lengths) of these values is 1.5, which supports the value used in RAB.

The areas where the Tier 2 factor is applied are summarised in Table 3 below:

Area	Tier 2 Factor
Hamilton Business District	1.2
Huntly Business District	1.2
Ngaruawahia Business District	1.2
Raglan Business District	1.2
Te Kauwhata Business District	1.2
Te Rapa Business District	1.2

Table 3 Summary of where CBD Tier 2 factors are applied.

The criteria for selecting Tier 2 areas are:

- Difficulty of access, e.g. a restriction on the hours allowed for road openings
- Density and type of underground services in the area e.g. gas services cause increased costs due to the additional safety constraints.

These areas are defined in the GIS.

Rugged Factor

This multiplier takes into account assets to be installed in rugged, rocky ground or other difficult soil conditions. The following guidelines were issued to guide classification of rugged areas:

Access

Access can be difficult for a number of reasons:

- Physical
 - Steep country, costs include specialised machinery and construction of expensive access roads
 - Off road, which can require the construction of access roads
 - Swampy or peat country, even if it is beside the road, extra trucks for the extra poles and extra foundations and poles closer together
 - Exposed to high winds, including coastal areas and ridges, requiring strengthened design
 - Exposed to corrosive environment e.g. sea, requiring the use of more expensive materials and construction techniques.

- Legal

The following costs cannot be included, since they are assumed to be in the standard costs, see below.

- Cost of easements, not only the legal costs, but settlement costs, time spent negotiating, subsequent on-going costs
- Cost of RMA
- Cost of alternate routes as a result of lack of agreement from land owners.

Labour costs

- Long spans, requiring an extra truck to hold up the conductor, rather than just an EPV, Note this refers to long spans across such things as gullies or over water. It does not refer to the normal 80m spans in the rural areas.

Features to look for when in the field

- Steep country
- Swampy country or peat
- Rocky ground, requiring extra machinery to excavate the holes for the poles
- Dense bush or scrub
- Exposure to winds, e.g. coastal or ridges

- Exposure to adverse environment e.g. near the sea
- Across gullies, e.g. long spans have higher cost
- Surface conditions, such as concrete, tar seal or crops

Determining a Value for the Rugged Factor

The value chosen for the rugged multiplier in the WEL network is 1.25, which is the average value allowed by the ODV 2004 Handbook. The WEL network does have rugged areas with difficult terrain. Even flat areas can incur significant additional cost because of the peat bogs in the area. These restrict access to the summer months and require extra expenditure to ensure poles stay erect during winter months. Therefore from an empirical perspective the average value is justified.

In addition an assessment has been completed using existing jobs. A number of jobs were assessed for suitability. Fifteen recent jobs were found to be relevant. The total value of the job was assessed first. Next the cost components, which were due to the rugged nature of the terrain, were extracted. Then the ratio was calculated for each job. Finally, the average of all fifteen jobs was calculated. The calculated value is 1.44, which supports WEL value of 1.25. Table 4 below summarises the results.

Type of multipliers	Work Order	Address	Total Costs	Total costs excluding rugged area's complication factors	Multiplier
Rugged	40001211	285 Exelby Rd, Rotokauri, Pole Replacement - 516725	8,576.68	7,105.68	1.21
Rugged	40002607	413C Waingaro Rd, Waingaro - Pole Replacement - 518728	11,070.54	4,478.54	2.47
Rugged	40002323	SH1, Huntly - Pole Replacement - 509586 - GLACB5	17,333.41	4,068.41	4.26
Rugged	40002809	3680 Ohaupo Rd, Ohaupo - Pole Replacement - 541542	4,755.51	4,414.51	1.08
Rugged	40001572	Heaven Rd, Maramarua - Crossarm Replacement - 515486 - L1 11kV	6,663.97	5,981.97	1.11
Rugged	40002718	off Heaven, Pokeno/Thames SH2, Maramarua - Crossarm Replacement - 525562	8,416.48	7,734.48	1.09
Rugged	40002993	38 Te Puea Ave, Meremere - Pole Replacement - 507581	4,916.28	4,234.28	1.16
Rugged	40001405	Tuturimu Rd, Ruapuke - Crossarm Replacement - 526954 - L2 11kV	7,971.57	7,289.57	1.09
Rugged	40001589	off Ohautira Rd, Te Uku - Crossarm Replacement - 526070	7,203.87	6,521.87	1.10
Rugged	40001621	58 Heaven Rd, Maramarua - Crossarm Replacement - 515499 - L2 11kV	7,403.28	6,721.28	1.10
Rugged	40001338	Finlayson Rd, Kopuku - Crossarm Replacement - 522505 - L1 400V	4,695.11	4,013.11	1.17
Rugged	40001626	2488 SH2, Maramarua - Crossarm Replacement - 517893 - L1 11kV	4,886.06	4,204.06	1.16
Rugged	40001590	Mangakino Rd, Waitetuna - Crossarm Replacement - 524813 - L1 11kV	4,498.74	3,704.74	1.21
Rugged	40002571	cnr Taniwha & Waerenga Rds, Te Kauwhata - Pole Replacement - 525101	12,455.76	12,001.76	1.04
Rugged	40001949	ABS replacement by Auto Sectos Switch	52,370.25	39,370.25	1.33

Table 4 Summary of the rugged multiplier calculations.