ELECTRICITY INDUSTRY PARTICIPATION CODE
DISTRIBUTED UNMETERED LOAD AUDIT REPORT

For

HURUNUI DISTRICT COUNCIL
AND MERIDIAN ENERGY

Prepared by: Rebecca Elliot

Date audit commenced: 20 July 2020

Date audit report completed: 27 August 2020

Audit report due date: 28 August 2020

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EXECUTIVE SUMMARY

This audit of the Hurunui District Council (**HDC**) DUML database and processes was conducted at the request of Meridian Energy Limited (**Meridian**), in accordance with clause 15.37B. The purpose of this audit is to verify that the volume information is being calculated accurately, and that profiles have been correctly applied.

The audit was conducted in accordance with the audit guidelines for DUML audits version 1.1.

Hurunui DC have changed from using the Mainpower database to the council's RAMM database for reconciliation from April 2020. PJL Maintenance manage the field maintenance. A monthly wattage report is provided to Meridian to calculate the kW value.

Six non-compliances were found, and two recommendations are made.

The HDC monthly wattage report is created using base data extracted from RAMM some time ago, and the gear wattages are appended to it using a look up of lamp wattages provided from the Mainpower database. Any changes made in RAMM are manually adjusted in the database extract. There have been no changes made since RAMM has been used. I found a variance between the data extract used by HDC to create the monthly report and those in the database extract that HDC are using to create the monthly report. HDC are seeking assistance to get the monthly wattage report produced from the RAMM database.

Database accuracy is described as follows:

Result	Percentage	Comments
The point estimate of R	100.7	Wattage from survey is higher than the database wattage by 0.7%
R_L	96.9	With a 95% level of confidence it can be concluded that the error could be between -3.1% and 6.2%
R_H	106.2	

The variability of the sample results across the strata means that the true wattage (installed in the field) could be between 3.1% lower and 6.2% higher than the wattage recorded in the DUML database. Non-compliance is recorded because the potential error is greater than ±5.0%.

- In absolute terms the installed capacity is estimated to be 1.9 kW higher than the database indicates.
- There is a 95% level of confidence that the installed capacity is between 8.5 kW lower to 16.8 kW higher than the database.
- In absolute terms, total annual consumption is estimated to be 1,900 kWh higher than the DUML database indicates.
- There is a 95% level of confidence that the annual consumption is between 8,500kWh p.a. lower to 16,800 kWh p.a. higher than the database indicates.

The future risk rating of 18 indicates that the next audit be completed in six months. I have considered this in conjunction with Meridian's comments and recommend that the next audit be undertaken in nine months.

The matters raised are detailed below:

AUDIT SUMMARY

NON-COMPLIANCES

Subject	Section	Clause	Non-Compliance	Controls	Audit Risk Rating	Breach Risk Rating	Remedial Action
Deriving submission information	2.1	11(1) of Schedule 15.3	Monthly wattage report variance with RAMM database resulting in potential under submission of 19,705.4 kWh per annum. Database is not confirmed as accurate with a 95% level of confidence resulting in an estimated under submission of 1,900 kWh per annum. Nine items of load with no lamp wattage assigned, resulting in an estimated under submission of 846 kWh per annum. 15 items of load have the incorrect wattage applied in the DUML database which would result in an estimated under submission of 136.67 kWh per annum. The data used for submission does not track changes at a daily basis and is provided as a snapshot.	Weak	Medium	6	Identified
ICP Identifier	2.2	11(2) (a) & (aa) of Schedule 15.3	One item of load with no ICP allocated.	Moderate	Low	2	Cleared
Description and capacity of load	2.4	11(2)(c) and (d) of Schedule 15.3	Nine items of load with no wattage value recorded resulting in an estimated minor under submission of 846 kWh.	Moderate	Low	2	Investigating
All load recorded in database	2.5	11(2A) and (d) of Schedule 15.3	Two additional lights found in the field.	Moderate	Low	2	Identified

Subject	Section	Clause	Non-Compliance	Controls	Audit Risk Rating	Breach Risk Rating	Remedial Action
Database accuracy	3.1	15.2 and 15.37B(b)	Database is not confirmed as accurate with a 95% level of confidence resulting in an estimated under submission of 1.900 kWh per annum. 15 items of load have the incorrect wattage applied in the DUML database which would result in under submission of 136.67 kWh per annum. Nine items of load with no wattage value recorded resulting in an estimated minor under submission of 846 kWh. HDC ICPs incorrectly assigned to the NZTA items of load. These are reconciled to the NZTA ICPs in a separate database so there is no impact on reconciliation.	Moderate	Low	2	Identified

Subject	Section	Clause	Non-Compliance	Controls	Audit Risk Rating	Breach Risk Rating	Remedial Action
Volume information accuracy	3.2	15.2 and 15.37B(c)	Monthly wattage report variance with RAMM database resulting in potential under submission of 19,705.4 kWh per annum. Database is not confirmed as accurate with a 95% level of confidence resulting in an estimated under submission of 1,900 kWh per annum. Nine items of load with no lamp wattage assigned, resulting in an estimated under submission of 846 kWh per annum. 15 items of load have the incorrect wattage applied in the DUML database which would result in an estimated under submission of 136.67 kWh per annum. The data used for submission does not track changes at a daily basis and is provided as a snapshot.	Moderate	Weak	6	Identified
Future Risk Rating						18	

Future risk rating	0	1-4	5-8	9-15	16-18	19+
Indicative audit frequency	36 months	24 months	18 months	12 months	6 months	3 months

RECOMMENDATIONS

Subject	Section	Recommendation
Description and capacity of load.	2.4	Confirm ownership of the nine lights thought to be private with no wattage recorded.
Database accuracy	3.1	Review festive light process to ensure these are captured in the RAMM database when connected.

ISSUES

Subject	Section	Description	Issue
		Nil	

1. ADMINISTRATIVE

1.1. Exemptions from Obligations to Comply with Code

Code reference

Section 11 of Electricity Industry Act 2010.

Code related audit information

Section 11 of the Electricity Industry Act provides for the Electricity Authority to exempt any participant from compliance with all or any of the clauses.

Audit observation

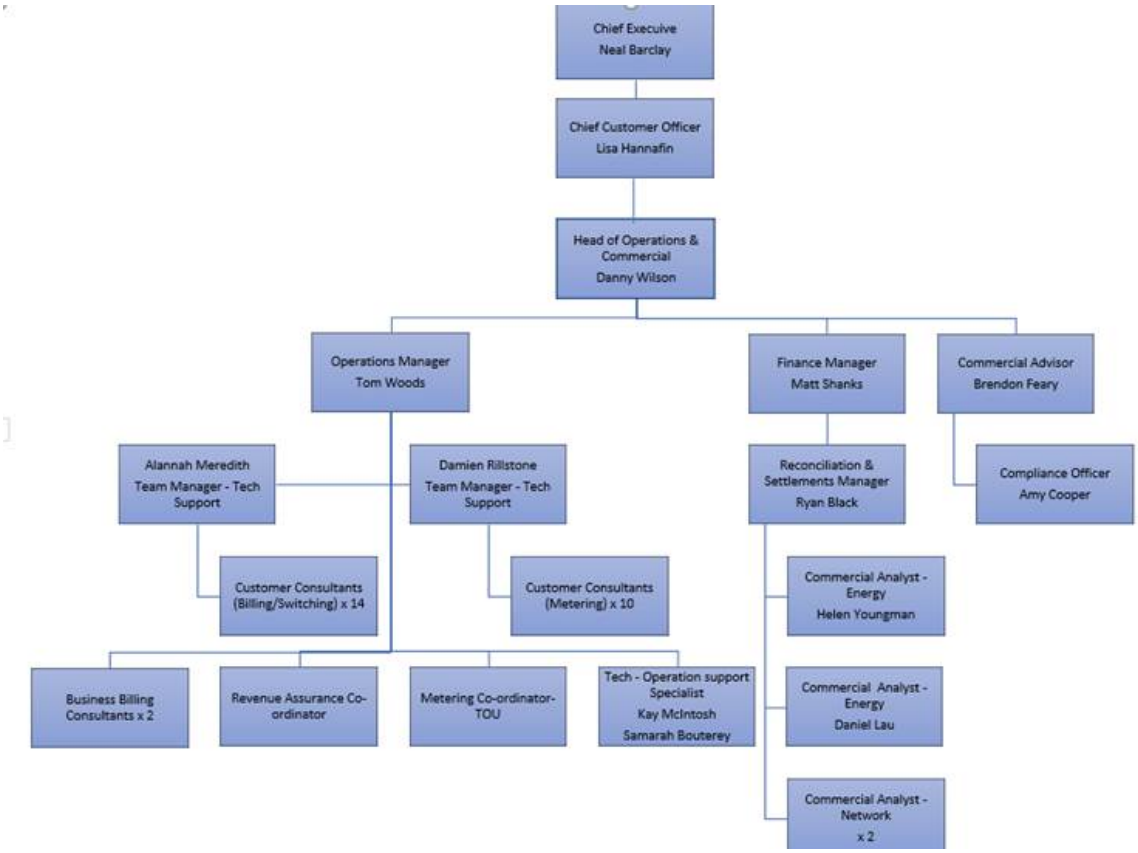
The Electricity Authority's website was reviewed to identify any exemptions relevant to the scope of this audit.

Audit commentary

There are no exemptions in place relevant to the scope of this audit.

1.2. Structure of Organisation

Meridian provided the relevant organisational structure:



1.3. Persons involved in this audit

Auditors:

Name	Title	Company
Rebecca Elliot	Auditor	Veritek

Other personnel assisting in this audit were:

Name	Title	Company
Kait Murray	Technical Assistant - Roading	Hurunui District Council
Amy Cooper	Compliance Officer	Meridian Energy
Daniel Lau	Energy Data Analyst	Meridian Energy

1.4. Hardware and Software

The SQL database used for the management of DUML is remotely hosted by RAMM Software Ltd. The database is commonly known as "RAMM" which stands for "Roading Asset and Maintenance Management". The specific module used for DUML is called RAMM Contractor.

The database is backed-up in accordance with standard industry procedures. Access to the database is secure by way of password protection.

Systems used by the trader and their agent to calculate submissions are assessed as part of their reconciliation participant audits.

1.5. Breaches or Breach Allegations

There are no breach allegations relevant to the scope of this audit.

1.6. ICP Data

ICP Number	Description	NSP	Profile	Number of items of load	Database wattage (watts)
0000366311MP08B	HURUNUI DISTRICT COUNCIL-WRP0331	WPR0331	DST	590	44,683
0000366312MPC4B	HURUNUI DISTRICT COUNCIL-CUL0331	CUL0331	DST	497	33,624
0000366313MP00E	HURUNUI DISTRICT COUNCIL-WRP0661	WPR0661	DST	142	9,360
0000700980MP704	STREETLIGHTS ASY0111 HDC	ASY0111	DST	8	388
Total				1,238	88,098

The RAMM database has the NZTA lights incorrectly recorded against the HDC ICP number. HDC have been provided with the correct ICP numbers as these lights are already submitted to the market by Genesis under the NZTA ICPs, therefore the corrected HDC lights are recorded in the table below and these were audited for this report:

ICP Number	Description	NSP	Profile	Number of items of load	Database wattage (watts)
0000366311MP08B	HURUNUI DISTRICT COUNCIL-WRP0331	WPR0331	DST	507	25,248
0000366312MPC4B	HURUNUI DISTRICT COUNCIL-CUL0331	CUL0331	DST	494	33,288
0000366313MP00E	HURUNUI DISTRICT COUNCIL-WRP0661	WPR0661	DST	120	4,269
0000700980MP704	STREETLIGHTS ASY0111 HDC	ASY0111	DST	8	348
Total				1,130	63,236

The last audit noted that there was no ICP for streetlights connected to the ASY0111 NSP. Mainpower created an ICP on 22/05/20 and backdated this to a 1/08/18 start date. The submission against this ICP is discussed in **section 2.1**.

1.7. Authorisation Received

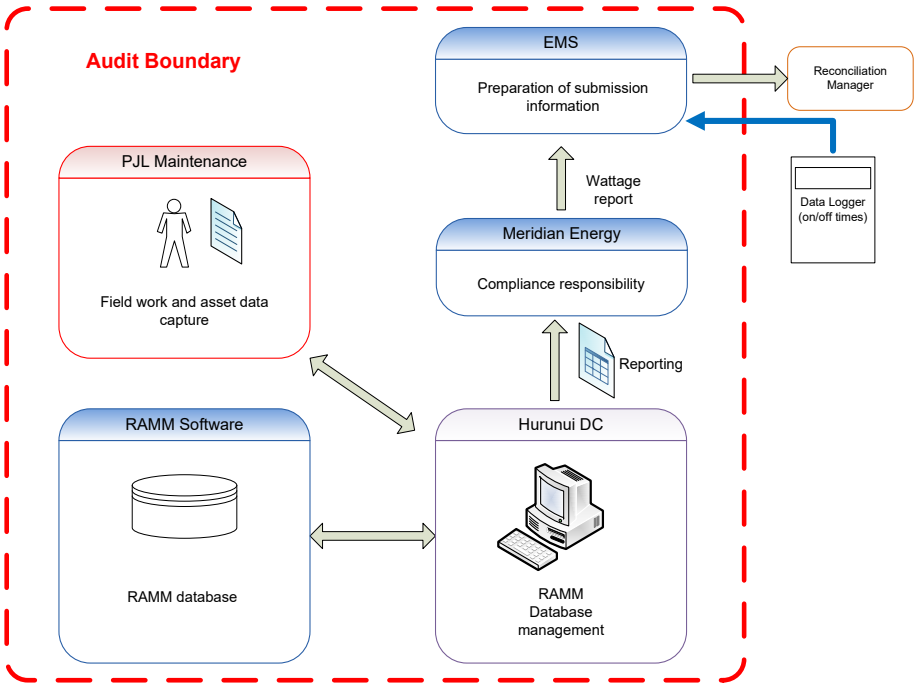
All information was provided directly by Meridian and HDC.

1.8. Scope of Audit

This audit of the Hurunui District Council (HDC) DUML database and processes was conducted at the request of Meridian Energy Limited (Meridian), in accordance with clause 15.37B. The purpose of this audit is to verify that the volume information is being calculated accurately, and that profiles have been correctly applied.

The audit was conducted in accordance with the audit guidelines for DUML audits version 1.1.

The database is remotely hosted by RAMM Software Ltd and is managed by HDC, who is Meridian's customer. Reporting is provided by HDC to Meridian on a monthly basis. The fieldwork and asset data capture are conducted by PJL Maintenance. The scope of the audit encompasses the collection, security and accuracy of the data, including the preparation of submission information based on the database reporting. The diagram below shows the audit boundary for clarity.



The field audit was undertaken of a statistical sample of 165 items of load on 10th August 2020.

1.9. Summary of previous audit

The previous audit was completed in October 2019 by Rebecca Elliot of Veritek Limited. This audit found five non-compliances and one recommendation was made. The current statuses of the audit findings are detailed below:

Table of Non-Compliance

Subject	Section	Clause	Non-compliance	Status
Deriving submission information	2.1	11(1) of Schedule 15.3	No ICP for NSP ASY0111 resulting in an estimated under submission of 1,571.73 kWh per annum. Database is not confirmed as accurate with a 95% level of confidence. 34 items of load have the incorrect wattage applied in the DUML database which would result in under submission of 205 kWh per annum. The data used for submission does not track changes at a daily basis and is provided as a snapshot.	Cleared Still existing Still existing Still existing
ICP Identifier	2.2	11(2) (a) & (aa) of Schedule 15.3	No ICP for NSP ASY0111 resulting in an estimated under submission of 1,571.73 kWh per annum.	Cleared

Subject	Section	Clause	Non-compliance	Status
All load recorded in database	2.5	11(2A) and (d) of Schedule 15.3	Six additional lights found in the field.	Still existing
Database accuracy	3.1	15.2 and 15.37B(b)	Database is not confirmed as accurate with a 95% level of confidence. 34 items of load have the incorrect wattage applied in the DUML database which would result in under submission of 205 kWh per annum. No ICP for lights associated with NSP ASY0111 resulting in an estimated under submission of 1,571.73 kWh per annum.	Still existing Still existing Cleared
Volume information accuracy	3.2	15.2 and 15.37B(c)	No ICP for NSP ASY0111 resulting in an estimated under submission of 1,571.73 kWh per annum. Database is not confirmed as accurate with a 95% level of confidence. 34 items of load have the incorrect wattage applied in the DUML database which would result in under submission of 205 kWh per annum. The data used for submission does not track changes at a daily basis and is provided as a snapshot.	Cleared Still existing Still existing Still existing

1.10. Distributed unmetered load audits (Clause 16A.26 and 17.295F)

Code reference

Clause 16A.26 and 17.295F

Code related audit information

Retailers must ensure that DUML database audits are completed:

1. *by 1 June 2018 (for DUML that existed prior to 1 June 2017)*
2. *within three months of submission to the reconciliation manager (for new DUML)*
3. *within the timeframe specified by the Authority for DUML that has been audited since 1 June 2017.*

Audit observation

Meridian have requested Veritek to undertake this streetlight audit.

Audit commentary

This audit report confirms that the requirement to conduct an audit has been met for this database.

Audit outcome

Compliant

2. DUML DATABASE REQUIREMENTS

2.1. Deriving submission information (Clause 11(1) of Schedule 15.3)

Code reference

Clause 11(1) of Schedule 15.3

Code related audit information

The retailer must ensure the:

- *DUML database is up to date*
- *methodology for deriving submission information complies with Schedule 15.5.*

Audit observation

The process for calculation of consumption was examined.

Audit commentary

Meridian reconciles this DUML load using the DST profile. The on and off times are derived from a data logger read by EMS. This information is used to create a shape file. Meridian supplies EMS with the capacity information and EMS calculates the kWh figure for each ICP and includes this in the relevant AV080 file. This process was examined during EMS's audit in June 2020 and I confirm compliance. I also checked the figures for June 2020, and I confirmed the kW values matched the monthly wattage report, but this did not match to the database kW as detailed in the table below:

ICP	dB wattage excl. NZTA	July wattage report from HDC	Difference	Annualised
0000366311MP08B	25,248	23,193	2,055	8,776.9
0000366312MPC4B	33,288	30,896	2,392	10,216.2
0000366313MP00E	4,269	4,082	187	798.7
0000700980MP704	348	368	-20	-85.4
TOTAL	63,153	58,539	4,614	19,706.4

The variance between the database wattage and the monthly report is estimated to result in under submission of 19,706.4 kWh per annum. The HDC monthly wattage report is created using base data extracted from RAMM some time ago, and the gear wattages are appended to it using a look up of lamp wattages provided from the Mainpower database. Any changes made in RAMM are also made in the spreadsheet. HDC are unable to produce a monthly wattage report from RAMM. They have approached RAMM to assist in getting a report directly from RAMM to no avail and are now consulting with other RAMM users to see if they can assist in getting reporting put in place. This is recorded as non-compliance below.

The last audit found that there was no ICP for the lights associated with NSP ASY0111. Mainpower created an ICP for this NSP on 22/05/20 and backdated this to a start date of 1/08/18. Meridian have processed revisions to account for this.

Examination of the database found:

Issue	Estimated volume information impact (annual kWh)
One item of load does not have an ICP number recorded. This is detailed in **section 2.2**.	Very minor amount of under submission from the one light with no ICP assigned.
The NZTA lights have the HDC assigned to them. This is detailed in **section 3.1**.	No impact for the incorrect ICP allocation of NZTA lights.
Nine items of load with no lamp wattage. This is detailed in **section 2.4**.	Under submission of 846 kWh
15 items of load have the incorrect wattages recorded. This is detailed in **section 3.1**.	Under submission of 136.67 kWh per annum

The field audit against the database quantities found that the database is not confirmed as accurate with a 95% level of confidence resulting in an estimated under submission of 1,900 kWh per annum. This is detailed in **section 3.1**.

On 18 June 2019, the Electricity Authority issued a memo confirming that the code requirement to calculate the correct monthly load must:

- take into account when each item of load was physically installed or removed, and
- wash up volumes must take into account where historical corrections have been made to the DUML load and volumes.

The current data used is a snapshot and this practice is non-compliant.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 2.1 With: Clause 11(1) of Schedule 15.3 From: 17-Oct-19 To: 31-Jul-20	Monthly wattage report variance with RAMM database resulting in potential under submission of 19,705.4 kWh per annum. Database is not confirmed as accurate with a 95% level of confidence resulting in an estimated under submission of 1,900 kWh per annum. Nine items of load with no lamp wattage assigned, resulting in an estimated under submission of 846 kWh per annum. 15 items of load have the incorrect wattage applied in the DUML database which would result in an estimated under submission of 136.67 kWh per annum. The data used for submission does not track changes at a daily basis and is provided as a snapshot. Potential impact: Medium Actual impact: Medium Audit history: Once Controls: Weak Breach risk rating: 6
Audit risk rating	**Rationale for audit risk rating**
Medium	Controls are rated as weak as the monthly report is not being directly generated from the RAMM database. The impact is assessed to be medium based on the estimated database errors found.

Actions taken to resolve the issue	Completion date	Remedial action status
We have requested Hurunui DC supply a full database extract going forward rather than continuing with the out of date summary report. We will assess the historic difference in volumes and revise submissions where required.	October 2020	Identified
Items of load with no lamp wattage are under investigation to determine ownership.	31 October 2020	
Other minor discrepancies are in the process of being corrected in the database.	31 October 2020	
Preventative actions taken to ensure no further issues will occur	**Completion date**	
Receipt of a monthly report from the database will address the biggest risk identified.		

2.2. ICP identifier and items of load (Clause 11(2)(a) and (aa) of Schedule 15.3)

Code reference

Clause 11(2)(a) and (aa) of Schedule 15.3

Code related audit information

The DUML database must contain:

- *each ICP identifier for which the retailer is responsible for the DUML*
- *the items of load associated with the ICP identifier.*

Audit observation

The database was checked to confirm the correct ICP was recorded against each item of load.

Audit commentary

An ICP is recorded for all but one item of load.

Item of load	Wattage
4 Brighton Street	83W

This will be resulting in a very minor amount of under submission. This was corrected during the site audit.

The accuracy of the ICPs is discussed in in **sections 2.1, 3.1** and **3.2**.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 2.2 With: Clause 11(2) (a) & (aa) of Schedule 15.3 From: 17-Oct-19 To: 31-Jul-20	One item of load with no ICP allocated. Potential impact: Low Actual impact: Low Audit history: Once previously Controls: Moderate Breach risk rating: 2
Audit risk rating	**Rationale for audit risk rating**
Low	Controls are rated as moderate. HDC have only recently started using their RAMM database for the reconciliation of streetlights and are understand the requirements of ICP allocation and will be checking for items of load with no ICP allocated. The impact is assessed to be low to none as only one item of load with no ICP allocated was found and has been corrected.

Actions taken to resolve the issue	Completion date	Remedial action status
As reported an ICP has now been assigned to the one item of load identified.	Complete	Cleared
Preventative actions taken to ensure no further issues will occur	**Completion date**	
Receipt of a full database extract monthly will enable any future items of load with no ICP recorded to be identified and followed up.	Ongoing	

2.3. Location of each item of load (Clause 11(2)(b) of Schedule 15.3)

Code reference

Clause 11(2)(b) of Schedule 15.3

Code related audit information

The DUML database must contain the location of each DUML item.

Audit observation

The database was checked to confirm the location is recorded for all items of load.

Audit commentary

The database contains the nearest street address, pole numbers and Global Positioning System (GPS) coordinates for each item of load, and users in the office and field can view these locations on a mapping system.

Audit outcome

Compliant

2.4. Description and capacity of load (Clause 11(2)(c) and (d) of Schedule 15.3)

Code reference

Clause 11(2)(c) and (d) of Schedule 15.3

Code related audit information

The DUML database must contain:

- *a description of load type for each item of load and any assumptions regarding the capacity*
- *the capacity of each item in watts.*

Audit observation

The database was checked to confirm that it contained a field for lamp type and wattage capacity and included any ballast or gear wattage and that all items of load were recorded.

Audit commentary

Lamp make, lamp model, lamp wattage and ballast wattage are included in the database and all, but nine items of load were populated. These are thought to be private lights, but they have the HDC ICP allocated to them and are expected to be submitted as part of the HDC load. I recommend that these lights are investigated to confirm the correct ownership and whether they are being reconciled.

Item of load	Pole Number	Lamp Make
KEREU RISE	12664	Unknown
LOCHIEL DR	12539	LED - Windsor
LOCHIEL DR	12540	LED - Windsor
WOODBANK RD	12533	LED - Windsor
WOODBANK RD	12534	LED - Windsor
WOODBANK RD	12535	LED - Windsor
WOODBANK RD	12536	LED - Windsor
WOODBANK RD	12537	LED - Windsor
WOODBANK RD	12538	LED - Windsor

Description	Recommendation	Audited party comment	Remedial action
Description and capacity of load	Confirm ownership of the nine lights thought to be private with no wattage recorded.	Ownership of lights is being investigated by HDC	Investigating

Assuming these are 22W LED lights like the majority of lights in the HDC database, this will be resulting in an estimated minor under submission of 846 kWh per annum. This is recorded as non-compliance below and in **sections 2.1, 3.1** and **3.2**.

The wattage field contained within RAMM is not used in the monthly wattage report. The HDC monthly wattage report is created using base data extracted from RAMM some time ago and the gear wattages are appended to it using a look up of lamp wattages provided from the Mainpower database. Any changes made in RAMM are also made in the spreadsheet. The accuracy of lamp descriptions, wattages and ballasts is recorded in **section 3.1**.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 2.4 With: Clause 11(2)(c) and (d) of Schedule 15.3 From: 17-Oct-19 To: 31-Jul-20	Nine items of load with no wattage value recorded resulting in an estimated minor under submission of 846 kWh. Potential impact: Low Actual impact: Low Audit history: None Controls: Moderate Breach risk rating: 2
Audit risk rating	**Rationale for audit risk rating**
Low	The controls are rated as moderate as HDC are now aware of the use of ICPs in the database and are putting validation in place to ensure that the correct ICP is recorded against each item of load. The impact is assessed to be low due to the small number of lights affected.

Actions taken to resolve the issue	Completion date	Remedial action status
Ownership of lights is being investigated by HDC and database information will be updated when ownership has been established.	31 October 2020	Investigating
Preventative actions taken to ensure no further issues will occur	**Completion date**	

2.5. All load recorded in database (Clause 11(2A) of Schedule 15.3)

Code reference

Clause 11(2A) of Schedule 15.3

Code related audit information

The retailer must ensure that each item of DUML for which it is responsible is recorded in this database.

Audit observation

The field audit was undertaken of 165 lights on 10th August 2020 using the statistical sampling methodology.

Audit commentary

The field audit discrepancies found are detailed in the table below:

Street	Database count	Field count	Light count differences	Wattage recorded incorrectly	Comments
Acheron Heights	5	5	-	1	1x incorrect wattage, 19W LED found in the field recorded as a 100W HPS in the database.
Carters Slip Road	7	7	-	1	Incorrect ballast applied to the 70W MH light.
Highfield St- Culverden	4	5	+1	-	1x additional 100w HPS found in field.
Mays Ave	1	2	+1	-	1x additional 22W LED found in field.
Total	**165**	**167**	**+2**	**2**	

The field audit found two more lamps in the field than were recorded in the database. This is recorded as non-compliance below.

The database accuracy is discussed in **section 3.1**.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 2.5 With: Clause 11(2A) of Schedule 15.3 From: 17-Oct-19 To: 31-Jul-20	Two additional lights found in the field. Potential impact: Low Actual impact: Low Audit history: Twice previously Controls: Moderate Breach risk rating: 2
Audit risk rating	**Rationale for audit risk rating**
Low	The controls are rated as moderate as the processes in place will ensure that the data is recorded correctly most of the time. The impact is assessed to be low due to the small number of additional lights found in the field in relation to the overall count of the items of load.

Actions taken to resolve the issue	Completion date	Remedial action status
The 2 additional lights found will be confirmed and added to the database.	31 October 2020	Identified
Preventative actions taken to ensure no further issues will occur	**Completion date**	

2.6. Tracking of load changes (Clause 11(3) of Schedule 15.3)

Code reference

Clause 11(3) of Schedule 15.3

Code related audit information

The DUML database must track additions and removals in a manner that allows the total load (in kW) to be retrospectively derived for any given day.

Audit observation

The process for tracking of changes in the database was examined.

Audit commentary

The RAMM database functionality achieves compliance with the code.

The change management process and the compliance of the database reporting provided to Meridian is detailed in **sections 3.1** and **3.2**.

Audit outcome

Compliant

2.7. Audit trail (Clause 11(4) of Schedule 15.3)

Code reference

Clause 11(4) of Schedule 15.3

Code related audit information

The DUML database must incorporate an audit trail of all additions and changes that identify:

- *the before and after values for changes*
- *the date and time of the change or addition*
- *the person who made the addition or change to the database.*

Audit observation

The database was checked for audit trails.

Audit commentary

HDC demonstrated a complete audit trail of all additions and changes to the database information.

Audit outcome

Compliant

3. ACCURACY OF DUML DATABASE

3.1. Database accuracy (Clause 15.2 and 15.37B(b))

Code reference

Clause 15.2 and 15.37B(b)

Code related audit information

Audit must verify that the information recorded in the retailer's DUML database is complete and accurate.

Audit observation

A database extract was provided, and I assessed the accuracy of this by using the DUML Statistical Sampling Guideline. The table below shows the survey plan.

Plan Item	Comments
Area of interest	Hurunui DC region
Strata	The database contains items of load in Hurunui, excluding NZTA. The area has three distinct sub regions, split by NSP. The processes for the management of Hurunui DC items of load are the same, but I decided to place the items of load into three strata, as follows: 1. HDC A-CL 2. HDC CO-LU 3. HDC LY- Z1
Area units	I created a pivot table of the roads in each area and I used a random number generator in a spreadsheet to select a total of 37 sub-units (roads).
Total items of load	165 items of load were checked.

Wattages were checked for alignment with the published standardised wattage table produced by the Electricity Authority against the database or in the case of LED lights against the LED light specification.

The change management process and timeliness of database updates was evaluated.

Audit commentary

Field Audit Findings

A field audit was conducted of a statistical sample of 165 items of load. The "database auditing tool" was used to analyse the results, which are shown in the table below.

Result	Percentage	Comments
The point estimate of R	100.7	Wattage from survey is higher than the database wattage by 0.7%
R_L	96.9	With a 95% level of confidence it can be concluded that the error could be between -3.1% and 6.2%
R_H	106.2	

These results were categorised in accordance with the "Distributed Unmetered Load Statistical Sampling Audit Guideline", effective from 01/02/19 and the table below shows that Scenario C (detailed below) applies.

The conclusion from Scenario C is that the variability of the sample results across the strata means that the true wattage (installed in the field) could be between 3.3% lower and 6.9% higher than the wattage recorded in the DUML database. Non-compliance is recorded because the potential error is greater than 5.0%.

In absolute terms the installed capacity is estimated to be 1.9 kW higher than the database indicates.

There is a 95% level of confidence that the installed capacity is between 8.5 kW lower to 16.8 kW higher than the database.

In absolute terms, total annual consumption is estimated to be 1,900 kWh higher than the DUML database indicates.

There is a 95% level of confidence that the annual consumption is between 8,500kWh p.a. lower to 16,800 kWh p.a. higher than the database indicates.

Scenario	Description
A - **Good accuracy, good precision**	This scenario applies if: (a) R_H is less than 1.05; and (b) R_L is greater than 0.95 The conclusion from this scenario is that: (a) the best available estimate indicates that the database is accurate within +/- 5 %; and (b) this is the best outcome.
B - **Poor accuracy, demonstrated with statistical significance**	This scenario applies if: (a) the point estimate of R is less than 0.95 or greater than 1.05 (b) as a result, either R_L is less than 0.95 or R_H is greater than 1.05. There is evidence to support this finding. In statistical terms, the inaccuracy is statistically significant at the 95% level
C - **Poor precision**	This scenario applies if: (a) the point estimate of R is between 0.95 and 1.05 (b) R_L is less than 0.95 and/or R_H is greater than 1.05 The conclusion from this scenario is that the best available estimate is not precise enough to conclude that the database is accurate within +/- 5 %

Lamp description and capacity accuracy

I checked the wattage being applied in the database and found that 15 lamps had a discrepancy when compared to the standardised wattage table. This is detailed in the table below:

Lamp Type	Database Total Lamp Wattage	EA Standardised Total Wattage	Variance	Database Quantity	Estimated Annual kWh effect on consumption
160w MV	184	175	-9	4	-153.76
70W MH	77	83	6	2	51.25
35W MH	38	45	7	2	59.79
70w MH	77	83	6	7	179.38
Total estimated annual effect on submission					136.67

The incorrect capacities will be resulting in a nett estimated under submission of 136.67 kWh per annum (based on annual burn hours of 4,271 as is detailed in the DUML database auditing tool).

As detailed in **section 2.4**, there are nine items of load with no wattage populated resulting in an estimated under submission of 846 kWh per annum.

I checked the LED lights against the LED light specification sheets and confirmed them to be correct.

Change management process findings

The field contractor has changed from Mainpower to PJL Maintenance during the audit period. There have been no changes made since the contract changed but these are expected to be provided in hard copy by the contractor, and this information would then be entered into the database by HDC.

As the majority of lights are now LED, outage patrols are no longer undertaken.

All new connections are approved via HDC either as a variation to the current contract or a separate work order. This ensures HDC have knowledge of all new connections installed by PJL.

Any significant changes (Upgrades, changed wattage, etc.) are sent to HDC via email in addition to notification through the HDC Magiq CSR portal and the database is updated accordingly.

Festive lights were being installed by Mainpower. HDC are investigating this as Mainpower are no longer the contractors and the HDC people now managing the database were unaware of these lights. I have recommended that they liaise with Mainpower to understand where they were being installed and then put a process in place with the new contractors to ensure that these lights are recorded in the RAMM database going forward.

Description	Recommendation	Audited party comment	Remedial action
Database Accuracy	Review festive light process to ensure these are captured in the RAMM database when connected.	Processes related to festive light installation and recording is under investigation by Hurunui DC and we will follow up with them in November to ensure any festive lighting that has been connected is accounted for.	Investigating

ICP

NZTA lights have been added to RAMM so that any that are repaired are on-charged to NZTA. These lights are recorded in the Mainpower database and submitted by Genesis. These have been incorrectly allocated the HDC ICP numbers. I have provided the NZTA ICP number for the relevant NSP so this can be corrected. This is detailed in **section 1.6**. There is no impact on submission.

The last audit found that there was no ICP for the lights associated with NSP ASY0111. Mainpower created an ICP for this NSP on 22/05/20 and backdated this to a start date of 1/08/18. Meridian have processed revisions to account for this.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 3.1 With: Clause 15.2 and 15.37B(b) From: 17-Oct-19 To: 31-Jul-20	Database is not confirmed as accurate with a 95% level of confidence resulting in an estimated under submission of 1,900 kWh per annum. 15 items of load have the incorrect wattage applied in the DUML database which would result in under submission of 136.67 kWh per annum. Nine items of load with no wattage value recorded resulting in an estimated minor under submission of 846 kWh. HDC ICPs incorrectly assigned to the NZTA items of load. These are reconciled to the NZTA ICPs in a separate database so there is no impact on reconciliation. Potential impact: Low Actual impact: Low Audit history: None Controls: Moderate Breach risk rating: 2
Audit risk rating	**Rationale for audit risk rating**
Low	Controls are rated as moderate, as they are sufficient to mitigate the risk most of the time but there is room for improvement. The impact is assessed to be low based on the estimated database errors found.

Actions taken to resolve the issue	Completion date	Remedial action status
We have requested Hurunui DC supply a full database extract going forward rather than continuing with the out of date summary report. We will assess the historic difference in volumes and revise submissions where required.	October 2020	Identified
Items of load with no lamp wattage are under investigation to determine ownership.	31 October 2020	
Other minor discrepancies are in the process of being corrected in the database.	31 October 2020	
Preventative actions taken to ensure no further issues will occur	**Completion date**	
Receipt of a monthly report from the database will address the biggest risk identified.		

3.2. Volume information accuracy (Clause 15.2 and 15.37B(c))

Code reference

Clause 15.2 and 15.37B(c)

Code related audit information

The audit must verify that:

- *volume information for the DUML is being calculated accurately*
- *profiles for DUML have been correctly applied.*

Audit observation

The submission was checked for accuracy for the month the database extract was supplied. This included:

- checking the registry to confirm that all ICPs have the correct profile and submission flag, and
- checking the database extract combined with the burn hours against the submitted figure to confirm accuracy.

Audit commentary

Meridian reconciles this DUML load using the DST profile. The on and off times are derived from a data logger read by EMS. This information is used to create a shape file. Meridian supplies EMS with the capacity information and EMS calculates the kWh figure for each ICP and includes this in the relevant AV080 file. This process was examined during EMS's audit in June 2020 and I confirm compliance. I also checked the figures for June 2020, and I confirmed the kW values matched the monthly wattage report, but this did not match to the database kW as detailed in **section 2.1**. The variance between the database wattage and the data extract used by HDC to create the monthly report is estimated to result in an under submission of 19,706.4 kWh per annum.

The last audit found that there was no ICP for the lights associated with NSP ASY0111. Mainpower created an ICP for this NSP on 22/05/20 and backdated this to a start date of 1/08/18. Meridian have processed revisions to account for this.

Examination of the database found:

Issue	Estimated volume information impact (annual kWh)
One item of load does not have an ICP number recorded. This is detailed in **section 2.2**.	Very minor amount of under submission from the one light with no ICP assigned. No impact for the incorrect ICP allocation of NZTA lights.
The NZTA lights have the HDC assigned to them. This is detailed in **section 3.1**.	No impact for the incorrect ICP allocation of NZTA lights.
Nine items of load with no lamp wattage. This is detailed in **section 2.4**.	Under submission of 846 kWh.
15 items of load have the incorrect wattages recorded. This is detailed in **section 3.1**.	Under submission of 136.67 kWh per annum.

The field audit against the database quantities found that the database is not confirmed as accurate with a 95% level of confidence resulting in an estimated under submission of 1.900 kWh per annum. This is detailed in **section 3.1**.

On 18 June 2019, the Electricity Authority issued a memo confirming that the code requirement to calculate the correct monthly load must:

- take into account when each item of load was physically installed or removed, and
- wash up volumes must take into account where historical corrections have been made to the DUML load and volumes.

The current data used is a snapshot and this practice is non-compliant.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 3.2 With: Clause 15.2 and 15.37B(c) From: 17-Oct-19 To: 31-Jul-20	Monthly wattage report variance with RAMM database resulting in potential under submission of 19,705.4 kWh per annum. Database is not confirmed as accurate with a 95% level of confidence resulting in an estimated under submission of 1,900 kWh per annum. Nine items of load with no lamp wattage assigned, resulting in an estimated under submission of 846 kWh per annum. 15 items of load have the incorrect wattage applied in the DUML database which would result in an estimated under submission of 136.67 kWh per annum. The data used for submission does not track changes at a daily basis and is provided as a snapshot. Potential impact: Medium Actual impact: Medium Audit history: Once Controls: Weak Breach risk rating: 6
Audit risk rating	**Rationale for audit risk rating**
Medium	Controls are rated as weak as the monthly report is not being directly generated from the RAMM database. The impact is assessed to be medium based on the estimated database errors found.

Actions taken to resolve the issue	Completion date	Remedial action status
We have requested Hurunui DC supply a full database extract going forward rather than continuing with the out of date summary report. We will assess the historic difference in volumes and revise submissions where required.	October 2020	Identified
Items of load with no lamp wattage are under investigation to determine ownership.	31 October 2020	
Other minor discrepancies are in the process of being corrected in the database.	31 October 2020	
Preventative actions taken to ensure no further issues will occur	**Completion date**	
Receipt of a monthly report from the database will address the biggest risk identified.		

CONCLUSION

Hurunui DC have changed from using the Mainpower database to the council's RAMM database for reconciliation from April 2020. PJL Maintenance manage the field maintenance. A monthly wattage report is provided to Meridian to calculate the kW value.

Six non-compliances were found, and two recommendations are made.

The HDC monthly wattage report is created using base data extracted from RAMM some time ago, and the gear wattages are appended to it using a look up of lamp wattages provided from the Mainpower database. Any changes made in RAMM are manually adjusted in the database extract. There have been no changes made since RAMM has been used. I found a variance between the data extract used by HDC to create the monthly report and those in the database extract that HDC are using to create the monthly report. HDC are seeking assistance to get the monthly wattage report produced from the RAMM database.

Database accuracy is described as follows:

Result	Percentage	Comments
The point estimate of R	100.7	Wattage from survey is higher than the database wattage by 0.7%
R_L	96.9	With a 95% level of confidence it can be concluded that the error could be between -3.1% and 6.2%
R_H	106.2	

The variability of the sample results across the strata means that the true wattage (installed in the field) could be between 3.1% lower and 6.2% higher than the wattage recorded in the DUML database. Non-compliance is recorded because the potential error is greater than ±5.0%.

- In absolute terms the installed capacity is estimated to be 1.9 kW higher than the database indicates.
- There is a 95% level of confidence that the installed capacity is between 8.5 kW lower to 16.8 kW higher than the database.
- In absolute terms, total annual consumption is estimated to be 1,900 kWh higher than the DUML database indicates.
- There is a 95% level of confidence that the annual consumption is between 8,500kWh p.a. lower to 16,800 kWh p.a. higher than the database indicates.

The future risk rating of 18 indicates that the next audit be completed in six months. I have considered this in conjunction with Meridian's comments and recommend that the next audit be undertaken in nine months.

PARTICIPANT RESPONSE

Meridian have reviewed this report and their comments are recorded in the body of the report. No further comments were provided.