ELECTRICITY INDUSTRY PARTICIPATION CODE
DISTRIBUTED UNMETERED LOAD AUDIT REPORT

VERITEK

For

HAMILTON CITY COUNCIL AND MERIDIAN ENERGY

Prepared by: Steve Woods

Date audit commenced: 3 December 2019

Date audit report completed: 3 February 2020

Audit report due date: 01-Feb-20

TABLE OF CONTENTS

EXECUTIVE SUMMARY

This audit of the Hamilton City Council Unmetered Streetlights (**HCC**) 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 Infrastructure Alliance, on behalf of HCC, HCC being Meridian's customer. Infrastructure Alliance is a joint venture between HCC and Downer which provides infrastructure management across all of HCC assets. They provide reporting to Meridian on a monthly basis.

The main issues found during the audit are as follows.

- 100 Christmas lights have been added to the database but rather than record the actual light values and include them for the period they are burning the total wattage x total hours have been averaged across the whole year.
- The analysis of ballasts found 2,635 items of load with the incorrect ballast applied. HCC has updated many of the discrepancies since the audit and the latest database output shows an increase of 8.85kW or approx. 37,812 kWh per annum.
- In absolute terms, total annual consumption is estimated to be 7,800 kWh lower than the DUML database indicates, based on a field audit of 545 items of load.
- Submission is based on a snapshot of the database at the end of the month and does not consider historic adjustments or the fact that lights can be livened before they are entered into the database. I recommend the new connection process is improved in conjunction with WEL Networks.

The audit found four non-compliance issues and makes one recommendation. The future risk rating of 14 indicates that the next audit be completed in 12 months. I agree with this recommendation.

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	In absolute terms, total annual consumption is estimated to be 7,800 kWh lower than the DUML database indicates Analysis of the ballasts applied indicate an under submission of 37,812 kWh per annum. Christmas light volumes included for the whole year and not the electrically connected period. Submission is based on a snapshot of the database at the end of the month and does not consider historic adjustments or the fact that lights can be livened before they are entered into the database.	Moderate	Medium	4	Identified
All load recorded in the database	2.5	11(2A) of Schedule 15.3	Eight items of load are missing from the database	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)	In absolute terms, total annual consumption is estimated to be 7,800 kWh lower than the DUML database indicates Analysis of the database identified 171 items of load with an invalid light description. Analysis of the ballasts applied indicate an under submission of 37,812 kWh per annum. Christmas light volumes included for the whole year and not the electrically connected period.	Moderate	Medium	4	Identified
Volume information accuracy	3.2	15.2 and 15.37B(c)	In absolute terms, total annual consumption is estimated to be 7,800 kWh lower than the DUML database indicates Analysis of the ballasts applied indicate an under submission of 37,812 kWh per annum. Christmas light volumes included for the whole year and not the electrically connected period. Submission is based on a snapshot of the database at the end of the month and does not consider historic adjustments or the fact that lights can be livened before they are entered into the database.	Moderate	Medium	4	Identified
Future Risk Rating						14	

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	Description	Action
Tracking of load change	2.6	Review electrical connection process to ensure new items of load are recorded in RAMM for the correct electrical connection date.	Identified

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

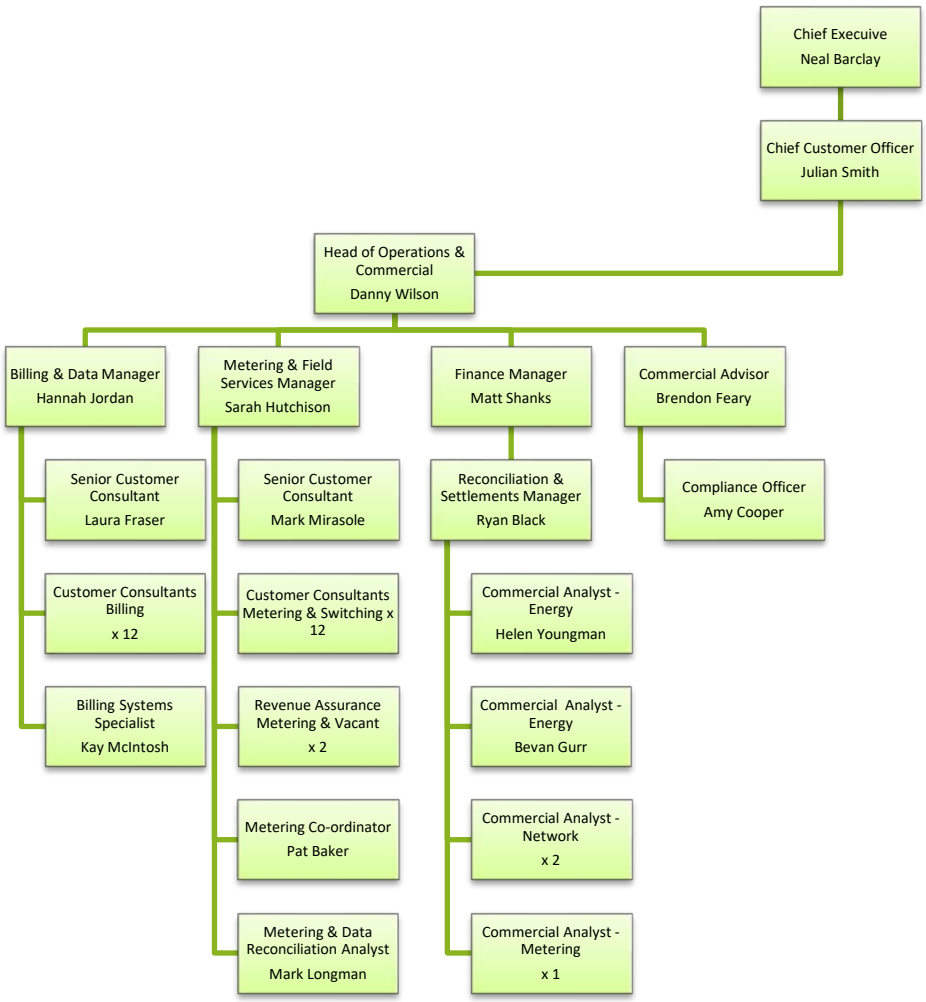
Section 11 of the Electricity Industry Act provides for the Electricity Authority to exempt any participant from compliance with all or any of the clauses.

Audit commentary

Meridian confirms that 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

Auditor:

Steve Woods

Veritek Limited

Electricity Authority Approved Auditor

Other personnel assisting in this audit were:

Name	Title	Company
Amy Cooper	Compliance Officer	Meridian
Gerald Wen	Asset Information Manager	Infrastructure Alliance
Paul Griffiths	Project Manager	Infrastructure Alliance
Shaun Peterson	Operations Manager	Infrastructure Alliance

1.4. Hardware and Software

Section 1.8 records that Roading Asset and Maintenance Management database, commonly known as RAMM continues to be used the management of DUML. This is remotely hosted by RAMM Software Ltd. The specific module used for DUML is called "SLIMM" which stands for "Streetlighting Inventory Maintenance Management".

Infrastructure Alliance confirmed that the database back-up is in accordance with standard industry procedures. Access to the database is secure by way of password protection.

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)
0000011087WE366	HCC Streetlights, Hamilton	HAM0331	DST	17,028	1,172,148
0000025004WED40	HCC Under Veranda Streetlights, Hamilton	HAM0331	DST	1,099	80,063
TOTAL				18,127	1,252,211

1.7. Authorisation Received

All information was provided directly by Meridian or Infrastructure Alliance.

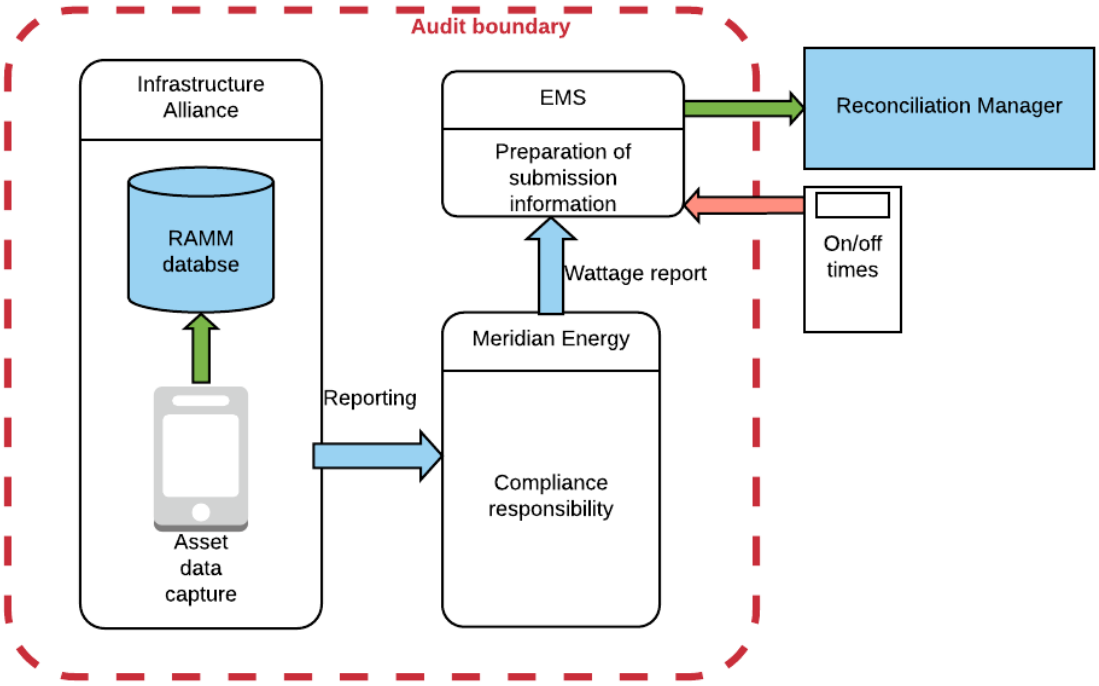
1.8. Scope of Audit

This audit of the Hamilton City Council Unmetered Streetlights (**HCC**) 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 Infrastructure Alliance, on behalf of HCC, HCC being Meridian's customer. Infrastructure Alliance is a joint venture between HCC and Downer which provides infrastructure management across all of HCC assets. They provide reporting to Meridian on a monthly basis.

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 the current arrangements for clarity.



The field audit was undertaken of a statistical sample of 545 items of load.

1.9. Summary of previous audit

The previous audit was undertaken by Rebecca Elliot of Veritek Limited in December 2018 for a different Trader. The findings from the previous audit are detailed below:

Table of Non-Compliance

Subject	Section	Clause	Non-compliance	Status
Deriving submission information	2.1	11(1) of Schedule 15.3	1,021 items of load with the incorrect ICP or light owner allocated. 323 items of load excluded from the monthly wattage report due to being incorrectly recorded as metered lights resulting in an estimated annual under submission of 115,372 kWh. Analysis of the ballasts applied indicate an under submission of 28,825 kWh. Ballast is being averaged in the monthly wattage report to Meridian. Christmas light volumes included for the whole year and not the electrically connected period.	Still existing
ICP Identifier	2.2	11(2) (a) & (aa) of Schedule 15.3	Five items of load with no ICP recorded.	Cleared
All load recorded in the database	2.5	11(2A) of Schedule 15.3	Items of load are missing from the database.	Still existing

Subject	Section	Clause	Non-compliance	Status
Database accuracy	3.1	15.2 and 15.37B(b)	1,021 items of load with the incorrect ICP or light owner allocated. 323 items of load incorrectly recorded as a metered light but are unmetered. Analysis of the database identified 930 items of load with an invalid light description. Analysis of the ballasts applied indicate an under submission of 28,825 kWh per annum. Ballast is being averaged in the monthly wattage report to Meridian. Christmas light volumes included for the whole year and not the electrically connected period.	Still existing
Volume information accuracy	3.2	15.2 and 15.37B(c)	1,021 items of load with the incorrect ICP or light owner allocated. 323 items of load excluded from the monthly wattage report due to being incorrectly recorded as metered lights resulting in an estimated annual under submission of 115,372 kWh. Analysis of the ballasts applied indicate an under submission of 28,825 kWh. Ballast is being averaged in the monthly wattage report to Meridian. Christmas light volumes included for the whole year and not the electrically connected period.	Still existing

Table of Recommendations

Subject	Section	Description	Status
Tracking of load change	2.6	Review electrical connection process to ensure new items of load are recorded in RAMM for the correct electrical connection date.	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 within the required timeframe. Compliance is confirmed

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 and the application of profiles was checked. The database was checked for accuracy.

Audit commentary

Meridian reconciles this DUML load using the DST profile. The total volume submitted to the Reconciliation Manager is based on a monthly database report derived from RAMM and the "burn time" which is sourced from data loggers installed on the Counties and Powerco networks. 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 audited during Meridian's reconciliation participant audit and EMS' agent audit.

The capacities supplied to EMS for October 2019 were checked and confirmed to be the same as the database.

HCC have indicated that they are only responsible for lights where the asset owner is recorded as "*Local Authority or Local Authority – Metered light*". This excludes 102 lights with the DUML ICP recorded against them. HCC has notified WEL Networks that these items of load will need to be dealt with as "shared unmetered load" ICPs. WEL is investigating these records. It was confirmed that the NZTA lights, previously recorded in the HCC database, are contained in the NZTA database.

The previous audit recorded that there were lights with "*Local Authority- Metered light*" recorded against them but that had the UML ICP recorded against them. This has now been resolved.

100 Christmas lights have been added to the database but rather than record the actual light values and include them for the period they are burning the total wattage x total hours have been averaged across the whole year. This is recorded as non-compliance.

The analysis of ballasts found 2,635 items of load with the incorrect ballast applied. This is a good improvement from the previous audit where the number was almost double this. HCC has updated many of the discrepancies since the audit and the latest database output shows an increase of 8.85kW or approx. 37,812 kWh per annum.

In absolute terms, total annual consumption is estimated to be 7,800 kWh lower than the DUML database indicates.

Submission is based on a snapshot of the database at the end of the month and does not consider historic adjustments or the fact that lights can be livened before they are entered into the database.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 2.1 With: Clause 11(1) of Schedule 15.3 From: 01-Dec-18 To: 10-Dec-19	In absolute terms, total annual consumption is estimated to be 7,800 kWh lower than the DUML database indicates Analysis of the ballasts applied indicate an under submission of 37,812 kWh per annum. Christmas light volumes included for the whole year and not the electrically connected period. Submission is based on a snapshot of the database at the end of the month and does not consider historic adjustments or the fact that lights can be livened before they are entered into the database. Potential impact: High Actual impact: Medium Audit history: Three times Controls: Moderate Breach risk rating: 4
Audit risk rating	**Rationale for audit risk rating**
Medium	The controls are rated as moderate, because they are sufficient to ensure that lamp information is correctly recorded most of the time. The impact is assessed to be medium, based on the kWh differences described above.

Actions taken to resolve the issue	Completion date	Remedial action status
The issues identified in this report will be raised with HCC for resolution including; • Correction of remaining incorrect ballasts • Resolution of Christmas light volumes in the database • Update of invalid light descriptions • Review of field audit findings	31 Dec 2020	Identified
Preventative actions taken to ensure no further issues will occur	**Completion date**	
Once the database is up to date, current processes should ensure this remains materially accurate		

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 every item of load.

Audit outcome

Compliant

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 each item of load had a value recorded in these fields.

Audit commentary

The database contains two records for wattage, firstly the lamp wattage and secondly the gear wattage, which represents ballast losses. The gear wattage is recorded in the database which meets the requirements of this clause. I found no blank records. The accuracy of the description and wattages recorded is discussed in **section 3.1.**

Audit outcome

Compliant

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 a statistical sample of 515 items of load on 15 & 16 December 2018.

Audit commentary

The field audit findings are detailed in the table below:

Street	Database count	Field count	Light count differences	Wattage recorded incorrectly	Comments
CALLUM BRAE DRIVE (5055)	24	25	+1	-	1 x additional 150W HPS
EAGLE WAY (5417)	6	7	+1	1	1 x additional LED 1 x LED recorded as 150 HPS
ELENORA CLOSE (5335)	1	2	+1	-	1 x additional 70W HPS
GALLAGHER DRIVE (1454)	11	13	+2	-	2 x additional LED
GEOFFREY PLACE (352)	1	2	+1	-	1 x additional LED
JONES CRES #23 ACCESSWAY (8163)	2	3	+1	-	1 x additional LED
MAITLAND STREET (565)	8	7	-1	-	1 x 76W LED not found
MOA CRESCENT (NORTH) (5162)	1	2	+1	-	1 x additional LED
OHAUPO ROAD (SOUTH BOUND) (1269)	8	8	-	6	6 x LED recorded as 100W MH
TAWA STREET (906)	19	19	-	1	1 x 150W HPS recorded as LED
TRAUZER PLACE (5555)	6	6	-	1	1 x 70W HPS recorded as 92W LED
TRELOAR STREET (938)	2	2	-	1	1 x LED recorded as 100W HPS

I found nine lamp count errors (over and under) in the field audit. There were eight lamps found in the field that were not recorded in the database.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 2.5 With: Clause 11(2A) of Schedule 15.3 From: 01-Dec-18 To: 10-Dec-19	Eight items of load are missing from the database. Potential impact: Low Actual impact: Low Audit history: Twice Controls: Moderate Breach risk rating: 2
Audit risk rating	**Rationale for audit risk rating**
Low	The controls are rated as moderate, because they are sufficient to ensure that lamp information is correctly recorded most of the time. The impact is rated as low because the quantity was low.

Actions taken to resolve the issue	Completion date	Remedial action status
Field audit findings will be provided to HCC for review	31 March 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 database tracks additions and removals as required by this clause.

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

The RAMM database has 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

The DUML Statistical Sampling Guideline was used to determine the database accuracy. The table below shows the survey plan.

Plan Item	Comments
Area of interest	Hamilton City area
Strata	The database contains items of load in Hamilton City Council area. The area has three distinct sub groups. Urban, under verandah and central city. The processes for the management of HCC items of load are the same, but I decided to place the items of load into four strata by road name, as follows: 1. A-F 2. G-M 3. N-S 4. S-Z
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 77 sub-units.
Total items of load	545 items of load were checked.

Wattages were checked for alignment with the published standardised wattage table produced by the Electricity Authority.

The accuracy of the ICP assignment was examined. This is also discussed in **sections 2.1** & **3.2**.

Audit commentary

Database accuracy based on the field audit

A field audit was conducted of a statistical sample of 545 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	99.9	Wattage from survey is lower than the database wattage by 0.1%
R_L	94.7	

R_H	102.4	With a 95% level of confidence it can be concluded that the error could be between -5.3% and +2.4%

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 5.3% lower and 2.4 % 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 2.0 kW lower than the database indicates.

There is a 95% level of confidence that the installed capacity is between 66 kW lower to 30 kW higher than the database.

In absolute terms, total annual consumption is estimated to be 7,800 kWh lower than the DUML database indicates.

There is a 95% level of confidence that the annual consumption is between 281,100 kWh p.a. lower to 129,200 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

The analysis of ballasts found 2,635 items of load with the incorrect ballast applied. This is a good improvement from the previous audit where the number was almost double this. HCC has updated many of the discrepancies since the audit and the latest database output shows an increase of 8.85kW or approx. 37,812 kWh per annum.

100 Christmas lights have been added to the database but rather than record the actual light values and include them for the period they are burning the total wattage x total hours have been averaged across the whole year. This is recorded as non-compliance.

The check of wattages found 171 items of load with insufficient detail in the lamp model field to identify the light type.

Light Type	Quantity
30 LED	157
Energy Saver Fluro	2
Gamma 6	5
Pracht Troj Underpass	6
To be confirmed	1
TOTAL	171

NZTA lighting

NZTA lighting is included in a separate NZTA database with different ICPs.

ICP accuracy

All items of load appear to have the correct ICPs recorded.

Location accuracy

The location details are accurate and complete.

Change management process findings

Submission is based on a snapshot of the database at the end of the month and does not consider historic adjustments or the fact that lights can be livened before they are entered into the database.

The processes were reviewed for ensuring that changes in the field are notified through to Infrastructure Alliance. All maintenance work in the field is entered directly into "Pocket RAMM". There is an audit process in place which checks both quality of workmanship and accuracy of asset capture. Any errors found are corrected.

There are approx. 3,000 of 18,000 lamps yet to be upgraded to LED.

There have been no changes to the new connection process. WEL Networks liven the streetlights. Lights in new subdivisions are added to RAMM once the "as-builts" are received. The HCC Operations team have a fortnightly meeting with the Council development team to discuss what work is coming through, but the electrical connection date is not always known. This can be slow in some instances and in others the lights are being added to RAMM before they are electrically connected. I repeat the last audit's recommendation that the new connection process be reviewed in consultation with WEL Network to better capture the correct livening date.

Recommendation	Description	Audited party comment	Remedial action

Regarding: Clause 11(3) of Schedule 15.3	Review electrical connection process to ensure new items of load are recorded in RAMM for the correct electrical connection date.	Meridian will attempt to engage HDC and WEL to review this process.	Identified

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 3.1 With: Clause 15.2 and 15.37B(b) From: 01-Dec-18 To: 10-Dec-19	In absolute terms, total annual consumption is estimated to be 7,800 kWh lower than the DUML database indicates Analysis of the database identified 171 items of load with an invalid light description. Analysis of the ballasts applied indicate an under submission of 37,812 kWh per annum. Christmas light volumes included for the whole year and not the electrically connected period. Potential impact: High Actual impact: Medium Audit history: Twice Controls: Moderate Breach risk rating: 4
Audit risk rating	**Rationale for audit risk rating**
Medium	The controls are rated as moderate, because the inaccuracies are being addressed through the LED roll out and accuracy will continue to improve. The impact is assessed to be medium, based on the kWh differences described above and in sections **2.1** & **3.2.**

Actions taken to resolve the issue	Completion date	Remedial action status
The issues identified in this report will be raised with HCC for resolution including; • Correction of remaining incorrect ballasts • Resolution of Christmas light volumes in the database • Update of invalid light descriptions Review of field audit findings	31 Dec 2020	Identified
Preventative actions taken to ensure no further issues will occur	**Completion date**	

Once the database is up to date, current processes should ensure this remains materially accurate		

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 the ICP has the correct profile and submission flag
- 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 total volume submitted to the Reconciliation Manager is based on a monthly database report derived from RAMM and the "burn time" which is sourced from data loggers installed on the Counties and Powerco networks. 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 audited during Meridian's reconciliation participant audit and EMS' agent audit.

The capacities supplied to EMS for October 2019 were checked and confirmed to be the same as the database.

HCC have indicated that they are only responsible for lights where the asset owner is recorded as "*Local Authority or Local Authority – Metered light"*. This excludes 102 lights with the DUML ICP recorded against them. HCC has notified WEL Networks that these items of load will need to be dealt with as "shared unmetered load" ICPs. WEL is investigating these records. It was confirmed that the NZTA lights, previously recorded in the HCC database, are contained in the NZTA database.

The previous audit recorded that there were lights with "*Local Authority- Metered light*" recorded against them but that had the UML ICP recorded against them. This has now been resolved.

100 Christmas lights have been added to the database but rather than record the actual light values and include them for the period they are burning the total wattage x total hours have been averaged across the whole year. This is recorded as non-compliance.

The analysis of ballasts found 2,635 items of load with the incorrect ballast applied. This is a good improvement from the previous audit where the number was almost double this. HCC has updated many of the discrepancies since the audit and the latest database output shows an increase of 8.85kW or approx. 37,812 kWh per annum.

In absolute terms, total annual consumption is estimated to be 7,800 kWh lower than the DUML database indicates.

Submission is based on a snapshot of the database at the end of the month and does not consider historic adjustments or the fact that lights can be livened before they are entered into the database.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 3.2 With: Clause 15.2 and 15.37B(c) From: 01-Dec-18 To: 10-Dec-19	In absolute terms, total annual consumption is estimated to be 7,800 kWh lower than the DUML database indicates Analysis of the ballasts applied indicate an under submission of 37,812 kWh per annum. Christmas light volumes included for the whole year and not the electrically connected period. Submission is based on a snapshot of the database at the end of the month and does not consider historic adjustments or the fact that lights can be livened before they are entered into the database. Potential impact: High Actual impact: Medium Audit history: Three times Controls: Moderate Breach risk rating: 4
Audit risk rating	**Rationale for audit risk rating**
Medium	The controls are rated as moderate, because they are sufficient to ensure that lamp information is correctly recorded most of the time. The impact is assessed to be medium, based on the kWh differences described above.

Actions taken to resolve the issue	Completion date	Remedial action status
The issues identified in this report will be raised with HCC for resolution including; • Correction of remaining incorrect ballasts • Resolution of Christmas light volumes in the database • Update of invalid light descriptions Review of field audit findings	31 Dec 2020	Identified
Preventative actions taken to ensure no further issues will occur	**Completion date**	
Once the database is up to date, current processes should ensure this remains materially accurate		

CONCLUSION

The database is remotely hosted by RAMM Software Ltd and is managed by Infrastructure Alliance, on behalf of HCC, HCC being Meridian's customer. Infrastructure Alliance is a joint venture between HCC and Downer which provides infrastructure management across all of HCC assets. They provide reporting to Meridian on a monthly basis.

The main issues found during the audit are as follows.

- 100 Christmas lights have been added to the database but rather than record the actual light values and include them for the period they are burning the total wattage x total hours have been averaged across the whole year.
- The analysis of ballasts found 2,635 items of load with the incorrect ballast applied. HCC has updated many of the discrepancies since the audit and the latest database output shows an increase of 8.85kW or approx. 37,812 kWh per annum.
- In absolute terms, total annual consumption is estimated to be 7,800 kWh lower than the DUML database indicates, based on a field audit of 545 items of load.
- Submission is based on a snapshot of the database at the end of the month and does not consider historic adjustments or the fact that lights can be livened before they are entered into the database. I recommend the new connection process is improved in conjunction with WEL Networks.

The audit found four non-compliance issues and makes one recommendation. The future risk rating of 14 indicates that the next audit be completed in 12 months. I agree with this recommendation.

PARTICIPANT RESPONSE