ELECTRICITY INDUSTRY PARTICIPATION CODE
DISTRIBUTED UNMETERED LOAD AUDIT REPORT

VERITEK

For

HAMILTON CITY COUNCIL AND MERIDIAN ENERGY

Prepared by: Rebecca Elliot

Date audit commenced: 7 January 2021

Date audit report completed: 26 January 2021

Audit report due date: 01-Feb-21

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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.

Overall HCC has made good progress in improving the database accuracy during the audit period. The field audit conducted of 605 items of load confirmed that the database fell within the accuracy threshold of +/-5%.

The audit identified some further opportunities to further improve the accuracy.

- The 100 Christmas lights that were added to the database continue to be recorded with an average wattage over the whole year rather than the actual light values for the period they are burning. This is because there is no reliable mechanism to ensure that they are added and removed each year, so HCC have opted to include them all year rather than not at all.
- The analysis of ballasts found 148 items of load with the incorrect ballast applied resulting in an estimated minor under submission of 3,903 kWh per annum. This is an excellent reduction from the 37,812 kWh of under submission reported in the last audit. These have been passed to HCC to correct.
- The analysis of the light descriptions identified 56 items of load with either a light description that could not be verified, or the incorrect wattage applied. This included 17 lights that are recorded in the database as 150W HPS, but the light description identifies these as 400W HPS. HCC are investigating those that cannot be confirmed and correcting those with the incorrect wattage applied. This will be resulting in an estimated under submission of 19,190 kWh per annum.
- 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 audit found five non-compliance issues and makes one recommendation. The future risk rating of seven indicates that the next audit be completed in 18 months. I have considered this in conjunction with Meridian's responses and 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	Christmas light volumes included for the whole year and not the electrically connected period. Analysis of the ballasts applied indicate a minor under submission of 3,903 kWh per annum. Analysis of the database found 56 lights with a light description that could not be verified, or the incorrect wattage applied according to the light specifications. This will be resulting in an estimated under submission of an estimated 19,190 kWh per annum. This variance is a result of 17 HPS lights with the incorrect wattage applied. Submission is based on a snapshot of the database at the end of the month and does not consider historic adjustments.	Moderate	Low	2	Identified
ICP identifier and items of load	2.2	11(2)(aa) of Schedule 15.3	22 items of load with no ICP recorded.	Strong	Low	1	Identified
All load recorded in the database	2.5	11(2A) of Schedule 15.3	One item of load 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)	Analysis of the ballasts applied indicate an estimated under submission of 3, 903 kWh per annum. Analysis of the database found 56 lights with a light description that could not be verified, or the incorrect wattage applied according to the light specifications. This will be resulting in an estimated under submission of an estimated 19,190 kWh per annum. This variance is a result of 17 HPS lights with the incorrect wattage applied. Christmas light volumes included for the whole year and not the electrically connected period.	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)	Christmas light volumes included for the whole year and not the electrically connected period. Analysis of the ballasts applied indicate a minor under submission of 3,903 kWh per annum. Analysis of the database found 56 lights with a light description that could not be verified, or the incorrect wattage applied according to the light specifications. This will be resulting in an estimated under submission of an estimated 19,190 kWh per annum. This variance is a result of 17 HPS lights with the incorrect wattage applied. Submission is based on a snapshot of the database at the end of the month and does not consider historic adjustments.	Moderate	Low	2	Identified
Future Risk Rating						7	

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
Tracking of load change	2.6	Review electrical connection process with WEL Network end to end to ensure that new streetlights are being reconciled from the time of electrical connection if they have already been vested to HCC at this point.

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

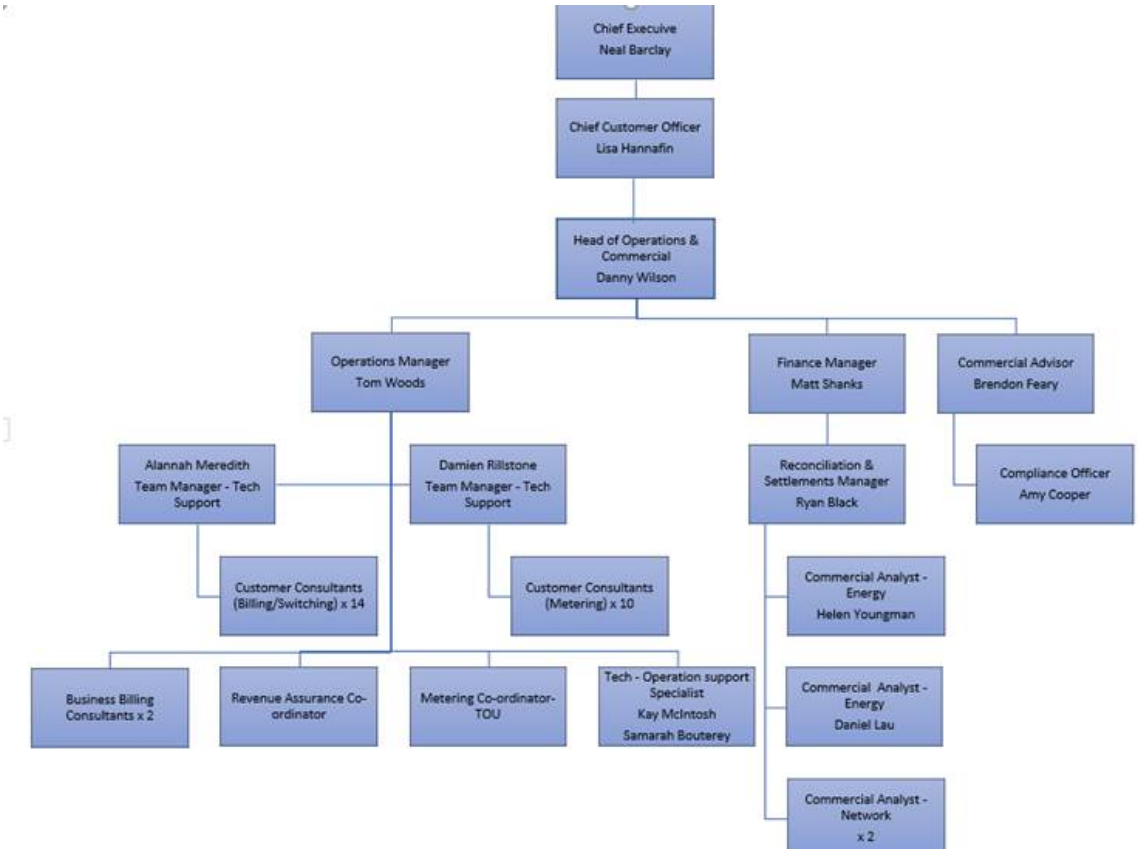
Section 11 of the Electricity Industry Act provides for the Electricity Authority to exempt any participant from compliance with all or any of the clauses.

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:

Rebecca Elliot

Veritek Limited

Electricity Authority Approved Auditor

Other personnel assisting in this audit were:

Name	Title	Company
Amy Cooper	Compliance Officer	Meridian
Daniel Lau	Commercial Analyst- Energy	Meridian
Gerald Wen	Asset Information Manager	Infrastructure Alliance
Paul Griffiths	Project Manager	Infrastructure Alliance
Shaun Peterson	Operations Manager	Infrastructure Alliance
Martin Lynch	Energy Consultant	Hamilton City Council

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.

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)
0000011087WE366	HCC Streetlights, Hamilton	HAM0331	DST	17,350	1,189,041
0000025004WED40	HCC Under Veranda Streetlights, Hamilton	HAM0331	DST	1,186	84,017
TOTAL				18,536	1,273,058

1.7. Authorisation Received

All information was provided directly by Meridian or Infrastructure Alliance.

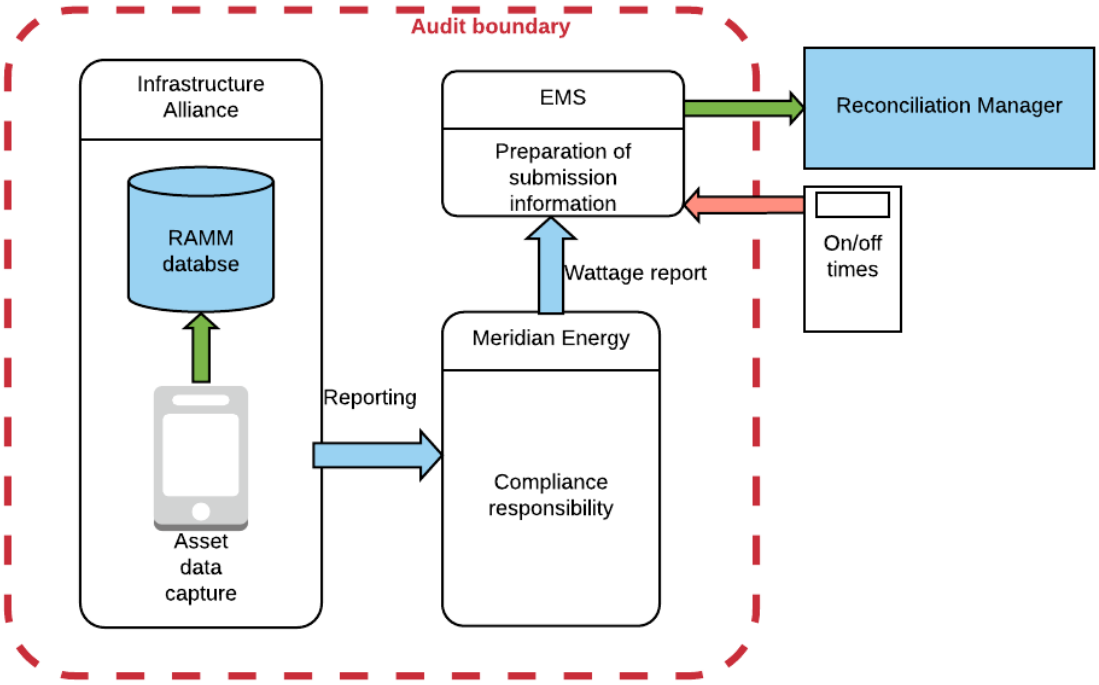
1.8. Scope of Audit

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 604 items of load on 12 January 2021.

1.9. Summary of previous audit

The previous audit was undertaken by Steve Woods of Veritek Limited in December 2019. The findings from the previous audit are detailed below with the current status of the items raised:

Table of Non-Compliance

Subject	Section	Clause	Non-compliance	Status
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	Cleared
			Analysis of the ballasts applied indicate an under submission of 37,812 kWh per annum.	Still existing but greatly reduced
			Christmas light volumes included for the whole year and not the electrically connected period.	Still existing
			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.	Still existing
All load recorded in the database	2.5	11(2A) of Schedule 15.3	Eight items of load are missing from the database	Still existing
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	Cleared
			Analysis of the database identified 171 items of load with an invalid light description.	Still existing
			Analysis of the ballasts applied indicate an under submission of 37,812 kWh per annum.	Still existing but greatly reduced
			Christmas light volumes included for the whole year and not the electrically connected period.	Still existing

Subject	Section	Clause	Non-compliance	Status
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	Still existing
			Analysis of the ballasts applied indicate an under submission of 37,812 kWh per annum.	Still existing but greatly reduced
			Christmas light volumes included for the whole year and not the electrically connected period.	Still existing
			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.	Still existing

Table of Recommendations

Subject	Section	Description	Status
Database Accuracy	3.1	Review electrical connection process to ensure new items of load are recorded in RAMM for the correct electrical connection date.	Updated recommendation

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.

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 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 December 2020 were checked and confirmed to be the same as the database.

The last audit stated that HCC are only responsible for lights where the asset owner is recorded as "*Local Authority or Local Authority – Metered light"*. The 102 private lights that had the HCC DUML ICP assigned to them have been removed from the RAMM database. These are with WEL Networks to resolve.

The issue regarding the 100 Christmas lights added to the database reported in the last audit is still present. Rather than record the actual light values and include them for the period they are burning the total wattage x total hours these have been averaged across the whole year. This is because there is no reliable mechanism to ensure that they are added and removed each year. This is recorded as non-compliance.

Analysis of the database detailed in **section 3.1**. found:

- the field audit found that the database accuracy fell within the +/-5% threshold,
- the analysis of ballasts found 148 items of load with the incorrect ballast applied, resulting in a minor under submission of 0.913 kW or approximately 3,903 kWh per annum, which is an excellent reduction from the 37,812 kWh of under submission reported in the last audit, and
- the analysis of the light descriptions identified 56 items of load with either a light description that could not be verified or the incorrect wattage applied (including 17 lights that are recorded in the database as 150W HPS, but the light description identifies these as 400W HPS) resulting in an estimated under submission of 19,190 kWh per annum - HCC are investigating those that cannot be confirmed and correcting those with the incorrect wattage applied.

Submission continues to be based on a snapshot of the database at the end of the month and does not consider historic adjustments.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 2.1 With: Clause 11(1) of Schedule 15.3 From: 01-Dec-18 To: 21-Dec-20	Christmas light volumes included for the whole year and not the electrically connected period. Analysis of the ballasts applied indicate a minor under submission of 3,903 kWh per annum. Analysis of the database found 56 lights with a light description that could not be verified, or the incorrect wattage applied according to the light specifications. This will be resulting in an estimated under submission of an estimated 19,190 kWh per annum. This variance is a result of 17 HPS lights with the incorrect wattage applied. 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: Low Actual impact: Low Audit history: Multiple times 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 assessed to be low due to the overall database accuracy being good and the few variances found are in the process of being fixed.

Actions taken to resolve the issue	Completion date	Remedial action status
We will work with HCC to resolve recording and reporting of Christmas lights. Ballast and wattage discrepancies identified are in the process of being investigated and corrected where necessary. Historic submissions will be revised where material variances are identified.	30/04/2021 31/03/2021	Identified
Preventative actions taken to ensure no further issues will occur	**Completion date**	

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 22 items of load. These were examined and these items of load are associated with metered supplies. HCC are adding the appropriate ICP to these items of load. The lack of an ICP being recorded against these is recorded as non-compliance.

Audit outcome

Non-compliant

<table>
<tr><th>Non-compliance</th><th colspan="3">Description</th></tr>
<tr><td>Audit Ref: 2.2
With: Clause 11(2)(aa) of Schedule 15.3

From: 11-Dec-19
To: 21-Dec-20</td><td colspan="3">22 items of load with no ICP recorded.
Potential impact: Low
Actual impact: None
Audit history: None
Controls: Strong
Breach risk rating: 1</td></tr>
<tr><th>Audit risk rating</th><th colspan="3">Rationale for audit risk rating</th></tr>
<tr><td>Low</td><td colspan="3">The controls are rated as strong as all unmetered items of load are correctly labelled and the process is robust to ensure that all unmetered items of load have an ICP assigned.
The impact is assessed to be none, but low is the only available option.</td></tr>
<tr><th colspan="2">Actions taken to resolve the issue</th><th>Completion date</th><th>Remedial action status</th></tr>
<tr><td colspan="2">ICPs are being added to the metered supplies.</td><td>28/02/2021</td><td rowspan="3">Identified</td></tr>
<tr><th colspan="2">Preventative actions taken to ensure no further issues will occur</th><th>Completion date</th></tr>
<tr><td colspan="2"></td><td></td></tr>
</table>

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 604 items of load on 12 January 2021.

Audit commentary

The field audit discrepancy findings are detailed in the table below:

Street	Database count	Field count	Light count differences	Wattage recorded incorrectly	Comments
BISLEY ROAD	3	3		1	1x L110 found in the field- recorded as 92W LED.
CORRIN STREET	7	8	+1		1x additional 36W LED found in the field.
FARRINGDON AVENUE (EASTBOUND)	5	5		2	2x 150W HPS found in the field – recorded as 70W HPS.
HUKANUI RD #26 ACCESSWAY	1	1		1	1x HPS or similar found in the field recorded as LED.
NEWCASTLE ROAD HLA (#63-#99)	1	1		1	1x 92W LED found in the field recorded as 120W LED.
SAVANNAH PLACE	4	4		1	1x 70W HPS found in the field – recorded as 34W LED.
THOMAS ROAD	36	36		1	1x 92W LED found in the field- recorded as 250W HPS.
WALTHAM PLACE	6	5	-1		1x 150W HPS not found in the field.
WHA STREET	13	11	-2		2x 36W LED not found in the field - recorded as double heads but single heads found.
TOTAL	605	603	4	7	

The field audit found one additional lamp in the field. This is recorded as non-compliance below.

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

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 2.5 With: Clause 11(2A) of Schedule 15.3 From: 11-Dec-19 To: 21-Dec-20	One item of load missing from the database. Potential impact: Low Actual impact: Low Audit history: Three times previously 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 as only one additional item of load was found.

Actions taken to resolve the issue	Completion date	Remedial action status
Field audit findings have been provided to HCC to investigate and update the database.	31/03/2021	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 87 sub-units.
Total items of load	604 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 604 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	99.5	Wattage from survey is lower than the database wattage by 0.5%
R_L	97.9	With a 95% level of confidence, it can be concluded that the error could be between -2.1% and +1.6%
R_H	101.6	

Compliance is recorded because the best estimate indicates that the database is accurate within ±5.0%.

In absolute terms the installed capacity is estimated to be 0.06 kW lower than the database indicates.

There is a 95% level of confidence that the installed capacity is between 27 kW lower to 21 kW higher than the database.

In absolute terms, total annual consumption is estimated to be 27,500 kWh lower than the DUML database indicates.

There is a 95% level of confidence that the annual consumption is between 114,400 kWh p.a. lower to 89,500 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 148 items of load with the incorrect ballast applied. The volume of these has decreased significantly since the last audit as HCC corrected these or they were replaced in the field with LED lights. The incorrect wattages will be resulting in a minor under submission of 0.913 kW or approx. 3,903 kWh per annum. This is an excellent reduction from the 37,812 kWh reported in the last audit.

As reported in the last audit, 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 below and in **sections 2.1** and **3.2**.

The database was examined to confirm that the light descriptions were sufficient to determine the correct lamp wattage has been applied. The vast majority of lights have good detail to confirm the correct wattage has been applied. There were 438 lights that required further examination, and these were examined during the audit and light specifications were provided for the majority of these. A small number were unable to be determined and will require a site visit to confirm the correct wattage whilst others have the incorrect wattage applied. HCC has committed to confirm and correct these. The findings are detailed in the table below:

Light Type	Quantity	Wattage applied	Expected wattage	Variance Watts
4 ft Coreline LED40S L1200	1	41	28.6	-12.4
5 ft Coreline LED60S L1500	10	57	49	-80
Double 5FT Fluro	2	84	77	-14
GOUGH K190	1	90	?	Being investigated
Pracht Troj Underpass	6	132	?	Being investigated
Single 5FT Fluro	6	35	36.5	9.6
Super 4Y High Output	17	168	438	4,590
TABLED OB 4.7-9	3	13		Being investigated
TECEO2 (64 LED)	10	70	?	Being investigated
TOTAL	56			4,493.2

The incorrect wattages applied will be resulting in an estimated under submission of 19,190 kWh per annum. The effect of these is minor compared to the 17 “Super 4Y High Output” lamps which are 400W HPS not 150W HPS as recorded in the database. This is recorded as non-compliance below.

I confirmed that HCC have no plans to use a CMS system and therefore will not be dimming the lights so the wattage recorded in the database is what will be burning in the field.

NZTA lighting

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

ICP accuracy

All unmetered items of have the correct ICPs recorded. As detailed in section 2.2, there are 22 items of load with no ICP recorded. These were confirmed to be associated with metered ICPs and HCC are updating the database to reflect this. These are recorded as non-compliance below.

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.

HCC has made good progress during the audit period to upgrade the remaining lights to LED. The next programme of work has been started this month and is expected to be complete by the end of July 2021. This will leave only a small number of decorative or hard to access lights to be replaced.

The new connection process was discussed. The HCC Operations team have a fortnightly meeting with the Council development team to discuss what work is coming through. The Development team liaise with the developer in relation to the progress of this work. WEL Networks liven the streetlights. They require a new connection application be applied for all new streetlight connections before the lights are electrically connected. HCC will only add lights to the database once they have been vested. Most lights have already been livened prior to this date highlighting a break down in the process. I recommend that Meridian and HCC liaise with WEL Network to review this process to ensure that lights are not being livened without them being reconciled against an ICP.

Recommendation	Description	Audited party comment	Remedial action
Regarding: Clause 11(3) of Schedule 15.3	Review electrical connection process with WEL Network end to end to ensure that new streetlights are being reconciled from the time of electrical connection if they have already been vested to HCC at this point.	This will be discussed/reviewed with HCC to determine whether there are changes that can be implemented.	Identified

HCC process for vesting is robust. Prior to the vesting of the lights there is a walk through to confirm what has been provided in the "as-builts" is what is in the field. Once happy with the assets, HCC accept ownership of the asset and add this to RAMM.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 3.1 With: Clause 15.2 and 15.37B(b) From: 11-Dec-19 To: 21-Dec-21	Analysis of the ballasts applied indicate an estimated under submission of 3, 903 kWh per annum. Analysis of the database found 56 lights with a light description that could not be verified, or the incorrect wattage applied according to the light specifications. This will be resulting in an estimated under submission of an estimated 19,190 kWh per annum. This variance is a result of 17 HPS lights with the incorrect wattage applied. Christmas light volumes included for the whole year and not the electrically connected period. Potential impact: Low Actual impact: Low Audit history: Three times Controls: Moderate Breach risk rating: 2
Audit risk rating	**Rationale for audit risk rating**
Low	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 low due to the overall database accuracy being good and the few variances found are in the process of being fixed.

Actions taken to resolve the issue	Completion date	Remedial action status
We will work with HCC to resolve recording and reporting of Christmas lights. Ballast and wattage discrepancies identified are in the process of being investigated and corrected where necessary. Historic submissions will be revised where material variances are identified.	30/04/2021 31/03/2021	Identified
Preventative actions taken to ensure no further issues will occur	**Completion date**	

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, 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 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 December 2020 were checked and confirmed to be the same as the database.

The last audit stated that HCC are only responsible for lights where the asset owner is recorded as "*Local Authority or Local Authority – Metered light"*. The 102 private lights that had the HCC DUML ICP assigned to them have been removed from the RAMM database. These are with WEL Networks to resolve.

The issue regarding the 100 Christmas lights added to the database reported in the last audit is still present. Rather than record the actual light values and include them for the period they are burning the total wattage x total hours these have been averaged across the whole year. This is because there is no reliable mechanism to ensure that they are added and removed each year. This is recorded as non-compliance.

Analysis of the database detailed in **section 3.1**. found:

- the field audit found that the database accuracy fell within the +/-5% threshold,
- the analysis of ballasts found 148 items of load with the incorrect ballast applied, resulting in a minor under submission of 0.913 kW or approximately 3,903 kWh per annum, which is an excellent reduction from the 37,812 kWh of under submission reported in the last audit, and
- the analysis of the light descriptions identified 56 items of load with either a light description that could not be verified or the incorrect wattage applied (including 17 lights that are recorded in the database as 150W HPS, but the light description identifies these as 400W HPS) resulting in an estimated under submission of 19,190 kWh per annum - HCC are investigating those that cannot be confirmed and correcting those with the incorrect wattage applied.

Submission continues to be based on a snapshot of the database at the end of the month and does not consider historic adjustments.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 3.2 With: Clause 15.2 and 15.37B(c) From: 01-Dec-18 To: 21-Dec-20	Christmas light volumes included for the whole year and not the electrically connected period. Analysis of the ballasts applied indicate a minor under submission of 3,903 kWh per annum. Analysis of the database found 56 lights with a light description that could not be verified, or the incorrect wattage applied according to the light specifications. This will be resulting in an estimated under submission of an estimated 19,190 kWh per annum. This variance is a result of 17 HPS lights with the incorrect wattage applied. Submission is based on a snapshot of the database at the end of the month and does not consider historic adjustments. Potential impact: Low Actual impact: Low Audit history: Multiple times 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 assessed to be low due to the overall database accuracy being good and the few variances found are in the process of being fixed.

Actions taken to resolve the issue	Completion date	Remedial action status
We will work with HCC to resolve recording and reporting of Christmas lights. Ballast and wattage discrepancies identified are in the process of being investigated and corrected where necessary. Historic submissions will be revised where material variances are identified.	30/04/2021 31/03/2021	Identified
Preventative actions taken to ensure no further issues will occur	**Completion date**	

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.

Overall HCC has made good progress in improving the database accuracy during the audit period. The field audit conducted of 605 items of load confirmed that the database fell within the accuracy threshold of +/-5%.

The audit identified some further opportunities to further improve the accuracy.

- The 100 Christmas lights that were added to the database continue to be recorded with an average wattage over the whole year rather than the actual light values for the period they are burning. This is because there is no reliable mechanism to ensure that they are added and removed each year, so HCC have opted to include them all year rather than not at all.
- The analysis of ballasts found 148 items of load with the incorrect ballast applied resulting in an estimated minor under submission of 3,903 kWh per annum. This is an excellent reduction from the 37,812 kWh of under submission reported in the last audit. These have been passed to HCC to correct.
- The analysis of the light descriptions identified 56 items of load with either a light description that could not be verified, or the incorrect wattage applied. This included 17 lights that are recorded in the database as 150W HPS, but the light description identifies these as 400W HPS. HCC are investigating those that cannot be confirmed and correcting those with the incorrect wattage applied. This will be resulting in an estimated under submission of 19,190 kWh per annum.
- 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 audit found five non-compliance issues and makes one recommendation. The future risk rating of seven indicates that the next audit be completed in 18 months. I have considered this in conjunction with Meridian's responses and agree with this recommendation.

PARTICIPANT RESPONSE

Meridian have reviewed this report and the comments are contained within the body of the report. No further comments were provided.