

**ELECTRICITY INDUSTRY PARTICIPATION CODE  
DISTRIBUTED UNMETERED LOAD AUDIT REPORT**

For

**RUAPEHU DISTRICT COUNCIL  
AND MERIDIAN ENERGY LIMITED  
NZBN: 9429037696863**

Prepared by: Rebecca Elliot

Date audit commenced: 10 October 2022

Date audit report completed: 10 February 2023

Audit report due date: 01 March 2023

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## EXECUTIVE SUMMARY

This audit of the **Ruapehu District Council (RDC)** 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 scope of the audit encompasses the collection, security, and accuracy of the data, including the preparation of submission information.

Meridian reconciles this DUML load using the DST profile. The on and off times are derived from a data logger read by EMS and are 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. I compared the RDC database provided to the capacity information Meridian supplied to EMS for the month of October 2022 and I confirm it matches.

RDC has had some changes to staff and the agents managing the RAMM database during the audit period. Some roles are still to be filled. GHD Limited now manage the database and Alf Downs Streetlighting Limited (Alf Downs) continues to manage the field work on behalf of RDC.

Overall, the accuracy and processes in place to manage the database are robust. This is supported by the field audit confirming that the database is within the accuracy threshold of +/-5%.

I identified three opportunities for improvement and found four non-compliances. The future risk rating of seven indicates that the next audit be completed in 18 months. I have considered this along with Meridian's comments, that the field audit found the database is within the accuracy threshold and I recommend that the next audit be in 24 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	<p>Two lights with the incorrect wattage recorded resulting in an estimated under submission of 1,034 kWh per annum.</p> <p>158 lights with the incorrect ballast wattage recorded resulting in an estimated under submission of 1,145.27 kWh per annum.</p> <p>A small number of decorative lights are not recorded in the RAMM database resulting in a small amount of under submission.</p> <p>Up to 24 Waka Kotahi items of load being reconciled in both the Waka Kotahi database and RDC resulting in a potential over submission of up to 12,484kWh per annum.</p> <p>The monthly database extract provided does not track changes at a daily basis and is provided as a snapshot.</p> <p>The livening date of new streetlights is not captured in the database.</p>	Moderate	Low	2	Identified
All load recorded in the database	2.5	11(2A) of Schedule 15.3	<p>One additional items of load identified in the field from a sample of 131 lights examined.</p>	Strong	Low	1	Identified
Database accuracy	3.1	15.2 and 15.37B(b)	<p>Two lights with the incorrect wattage recorded resulting in an estimated under submission of 1,034 kWh per annum.</p> <p>158 lights with the incorrect ballast wattage recorded resulting in an estimated under submission of 1,145.27 kWh per annum.</p> <p>Up to 24 Waka Kotahi items of load being reconciled in both the Waka Kotahi database and RDC resulting in a potential over submission of up to 12,484kWh per annum.</p> <p>A small number of decorative lights are not recorded in the</p>	Moderate	Low	2	Identified

Subject	Section	Clause	Non-Compliance	Controls	Audit Risk Rating	Breach Risk Rating	Remedial Action
			RAMM database resulting in a small amount of under submission.				
Volume information accuracy	3.2	15.2 and 15.37B(c)	<p>Two lights with the incorrect wattage recorded resulting in an estimated under submission of 1,034 kWh per annum.</p> <p>158 lights with the incorrect ballast wattage recorded resulting in an estimated under submission of 1,145.27 kWh per annum.</p> <p>A small number of decorative lights are not recorded in the RAMM database resulting in a small amount of under submission.</p> <p>Up to 24 Waka Kotahi items of load being reconciled in both the Waka Kotahi database and RDC resulting in a potential over submission of up to 12,484kWh per annum.</p> <p>The monthly database extract provided does not track changes at a daily basis and is provided as a snapshot.</p> <p>The livening date of new streetlights is not captured in the database.</p>	Moderate	Low	2	Identified
Future Risk Rating						7	

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

## RECOMMENDATIONS

Subject	Section	Recommendation
Database Accuracy	3.1	Liaise with Waka Kotahi trader and RDC to determine ownership and therefore which database the 24 items of load should be reconciled to.
		Review the new streetlight new connection process with RDC, GHD and the Lines Company to ensure that the livening date for new streetlights is captured in RAMM.
		Liaise with RDC to get the decorative lights recorded in the database.

## 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

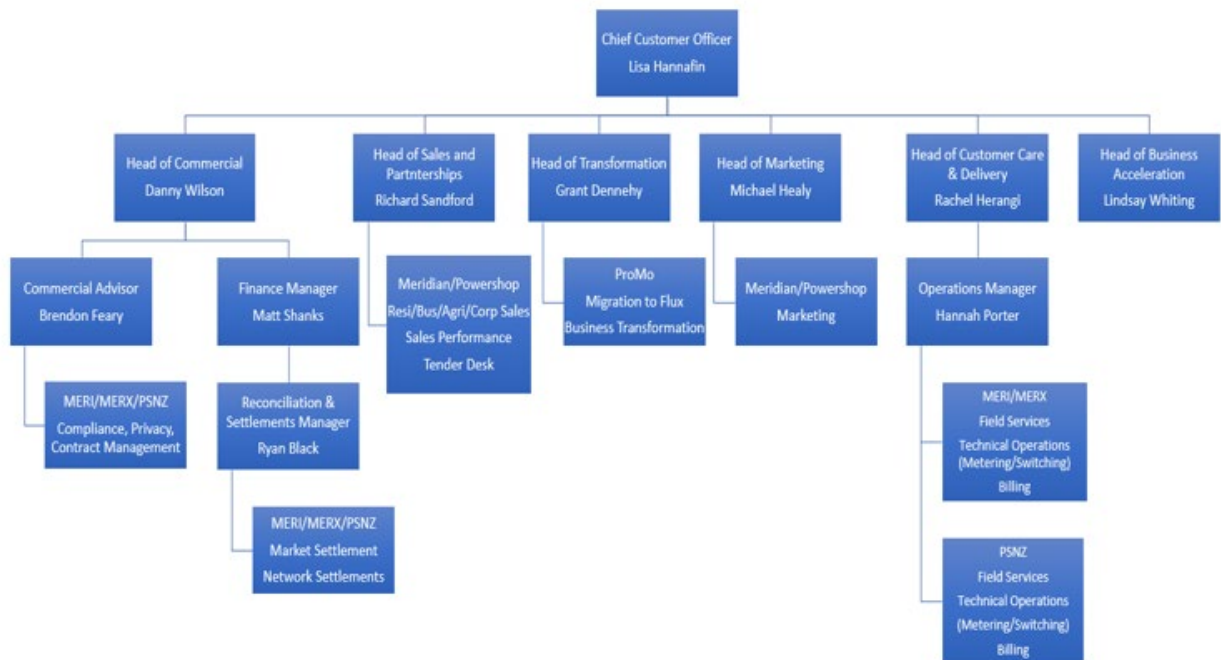
The Electricity Authority's website was reviewed to identify any exemptions relevant to the scope of this audit.

#### Audit commentary

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

### 1.2. Structure of Organisation

Meridian provided a copy of their organisation 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
Vini Dutra	Infrastructure Executive Manager	Ruapehu DC
Amy Cooper	Compliance Officer	Meridian Energy
Melanie Matthews	Quality and Compliance Advisor	Meridian Energy

### 1.4. 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

## 1.5. Hardware and Software

The SQL database used for the management of DUML is remotely hosted by thinkproject New Zealand Limited (formerly RAMM NZ Ltd). The database is commonly known as “RAMM” which stands for “Road Assessment and Maintenance Management”. The specific module used for DUML is called RAMM Contractor.

thinkproject New Zealand Limited backs up the database and assists with disaster recovery as part of their hosting service.

Nightly backups are performed. As a minimum, daily backups are retained for the previous five working days, weekly backups are retained for the previous four weeks, and monthly backups are retained for the previous six months.

Meridian Energy and EMS’ systems used in the process are discussed in their reconciliation audit report.

## 1.6. Breaches or Breach Allegations

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

## 1.7. ICP Data

ICP Number	Description	NSP	Profile	Number of items of load	Database wattage (watts)
0001111172WMDBA	STREETLIGHTS RUAPEHU DISTRICT COUNCIL NATIONAL PARK	NPK0331	STL	72	6,096
0001111174WMC35	STREETLIGHTS RUAPEHU DISTRICT COUNCIL OHAKUNE	OKN0111	STL	367	32,609
0008807442WME14	STREETLIGHTS RUAPEHU DISTRICT COUNCIL TAUMARUNUI	ONG0331	STL	921	83,413
Private				21	1,570
<b>Total</b>				<b>1,381</b>	<b>123,688</b>



The last audit included the Waka Kotahi lights. During the audit period, they have taken management of their streetlighting load inhouse and therefore have removed their street light load from the council database. During this transition it was identified in the Waka Kotahi Waikato 2022 DUMML audit report that both RDC and Waka Kotahi were submitting the Waka Kotahi streetlight load. Meridian worked with the Waka Kotahi’s retailer, and Meridian continued to submit the Waka Kotahi lights until the ICPs were switched to Waka Kotahi’s traders. Genesis have revised their submissions from April 2022 to August 2022 to exclude this load, so submission is correct.

ICP Number	Description	NSP	Profile	Number of items of load	Database wattage (watts)
0001111171WM17A	STREETLIGHTS TRANSIT URBAN TAUMARUNUI	ONG0331	STL	139	21,415
0001111173WM1FF	STREETLIGHTS TRANSIT URBAN NATIONAL PARK	NPK0331	STL	26	4,503
0001111175WM070	STREETLIGHTS TRANSIT URBAN OHAKUNE	OKN0111	STL	37	6,783
<b>Total</b>				<b>202</b>	<b>32,701</b>

**Private lights**

As recorded in the last audit, there are 21 private lights are recorded in the database and are correctly excluded from submission:

- 16 lights are owned by DoC and situated near Chateau Tongariro; these lights have been confirmed to belong to the Whakapapa Village DoC DUMML database and are being reconciled against ICP 0088055801WMB6F,
- two lights are located at The Lines Company’s depot. They have created standard unmetered load ICPs to account for this load,
- two lights are metered through the Top 10 Holiday Park’s installation and are not part of the DUMML load, and
- one light is inside the grounds of the National Park School.

**1.8. Authorisation Received**

All information was provided directly by Meridian and RDC.

**1.9. Scope of Audit**

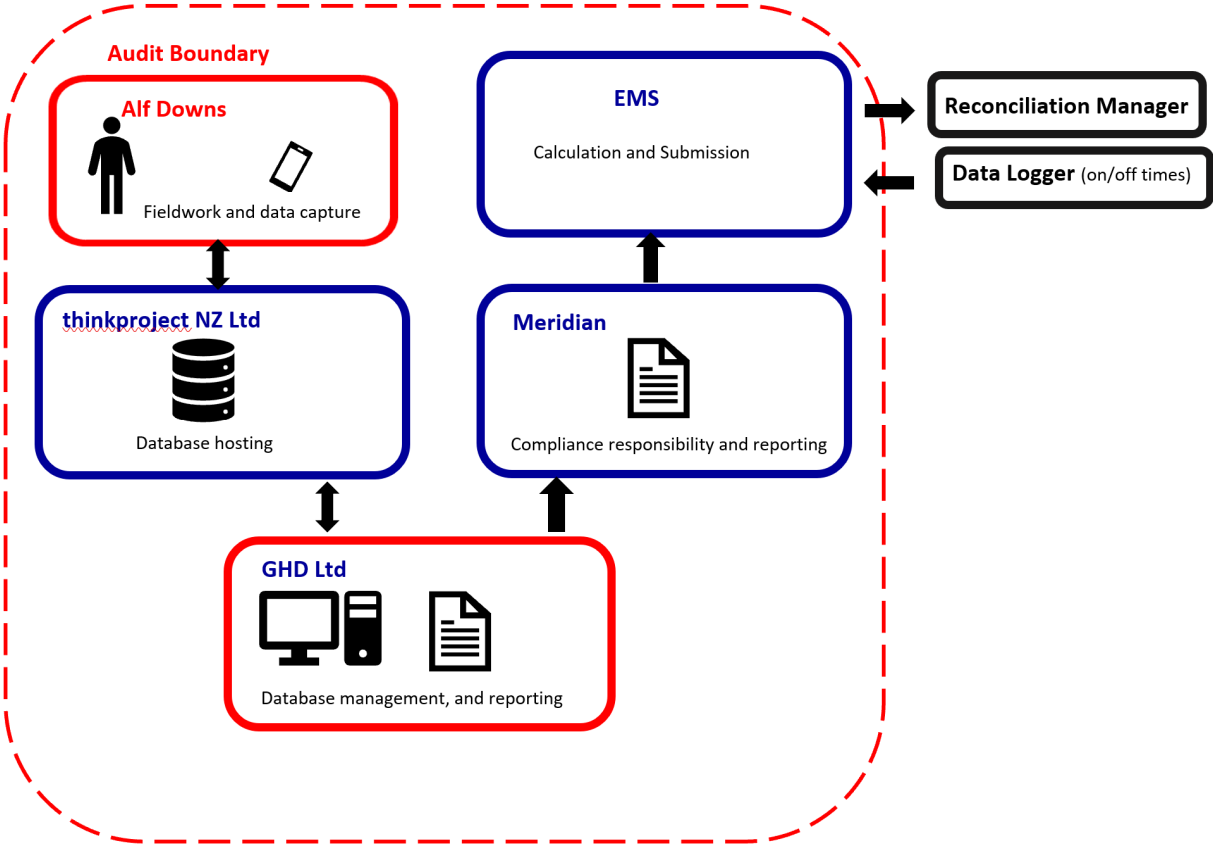
This audit of the RDC DUMML database and processes was conducted at the request of Meridian in accordance with clause 15.37B. The purpose of this audit is to verify that the volume information is being calculated accurately, and that profiles have been correctly applied.

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

A RAMM database is managed by GHD Limited and Alf Downs manages the fieldwork on behalf of RDC.

Meridian reconciles this DUMML load using the DST profile. The on and off times are derived from a data logger read by EMS and are 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.

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.



A field audit was undertaken of a statistical sample of 131 items of load on 15 November 2022.

## 1.10. Summary of previous audit

The previous audit of this database was undertaken by Rebecca Elliot of Veritek Limited in November 2021. Six non-compliances were identified, and three recommendations were made. The current statuses of the 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	A small number of festive lights are not recorded in the RAMM database resulting in a small amount of under submission.	Still existing
			16 items of load with no ICP or wattage recorded resulting in an estimated minor under submission of 656 kWh per annum.	Cleared
			28 lights with the incorrect wattage recorded resulting in an estimated over submission of 282 kWh per annum.	Still existing
			158 lights with the incorrect ballast wattage recorded resulting in an estimated under submission of 1,145.27 kWh per annum.	Still existing
			The monthly database extract provided does not track changes at a daily basis and is provided as a snapshot.	Still existing
The liveing date of new streetlights is not captured in the database.	Still existing			
ICP Identifier	2.2	11(2)(a) and (aa) of Schedule 15.3	16 items of load with no ICP or wattage recorded resulting in an estimated minor under submission of 656 kWh per annum.	Cleared
Description and capacity of load	2.4	11(2)(c) and (d) of Schedule 15.3	16 items of load with no ICP or wattage recorded resulting in an estimated minor under submission of 656 kWh per annum.	Cleared
All load recorded in the database	2.5	11(2A) of Schedule 15.3	Two additional items of load identified in the field from a sample of 237 lights examined.	Still existing
Database accuracy	3.1	15.2 and 15.37B(b)	16 items of load with no ICP or wattage recorded resulting in an estimated minor under submission of 656 kWh per annum.	Cleared
			28 lights with the incorrect wattage recorded resulting in an estimated over submission of 282 kWh per annum.	Still existing
			158 lights with the incorrect ballast wattage recorded resulting in an estimated under submission of 1,145.27 kWh per annum.	Still existing
			A small number of festive lights are not recorded in the RAMM database resulting in a small amount of under submission.	Still existing

Subject	Section	Clause	Non-compliance	Status
Volume information accuracy	3.2	15.2 and 15.37B(c)	A small number of festive lights are not recorded in the RAMM database resulting in a small amount of under submission.	Still existing
			16 items of load with no ICP or wattage recorded resulting in an estimated minor under submission of 656 kWh per annum.	Cleared
			28 lights with the incorrect wattage recorded resulting in an estimated over submission of 282 kWh per annum.	Still existing
			158 lights with the incorrect ballast wattage recorded resulting in an estimated under submission of 1,145.27 kWh per annum.	Still existing
			The monthly database extract provided does not track changes at a daily basis and is provided as a snapshot.	Still existing
			The livening date of new streetlights is not captured in the database.	Still existing

## Recommendations

Section	Subject	Description	Status
2.2	Private streetlights – The Lines Company depot	Confirm whether pole IDs 539 and 1687 are metered or unmetered and update the database details accordingly.	Cleared
2.2	Private streetlights – DoC lights near Chateau Tongariro	Complete the investigation into the DoC lights at the Chateau and confirm whether they should be part of the RDC DUMML load.  Work with the Whakapapa Village DoC DUMML database owner to ensure that lights in the area are recorded and assigned to the correct ICP in either the Whakapapa Village – DoC DUMML database or the RDC DUMML database.	Cleared - items of load are being reconciled in the relevant DOC DUMML database.
2.5	SH 4 (TAUMARUNUI) BRDG 100KM/H lights	Investigate the lights at this location to confirm the correct wattages and whether they are unmetered and update the database accordingly.	Cleared
3.1	Confirm light wattages	Confirm the correct wattages for the three poles with models which did not match the specifications I located, or I could not locate specifications for.  Update the wattages in RAMM as necessary.	Cleared
3.1	Decorative lights on Hakiha Street, Taumaranui	Confirm whether the decorative lights on Hakiha Street, Taumaranui are ever connected.  If they are, include them in the database with the correct ICP numbers and develop procedures to provide on and off dates to Trustpower for submission.	Still existing- updated findings are discussed in section 3.1.

## 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 Lines Company network. 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 2022 were checked and confirmed to be the same as the database.

The field audit found that the database was accurate to within +/-5%, compliance is confirmed.

Sources of database inaccuracy are as follows:

Issue	Estimated volume information impact (annual kWh)
Two items of load with the incorrect wattage recorded	Under submission of 1,034 kWh p.a.
158 items of load with the incorrect ballast wattage recorded	Under submission of 1,145.27 kWh p.a.
Up to 24 items of load recorded in both the Waka Kotahi database and the RDC database	Up to 12,484 kWh p.a. of potential over submission.

As reported in the last audit, there are decorative lights connected to some streetlight poles on Hakiha Street, Taumarānui. The lights have been confirmed to belong to RDC but are not recorded in the database. These lights are managed by another area in the Council. I have repeated the last audits recommendation that Meridian liaise with RDC to ensure that these are managed within the database in **section 3.1**. This will be resulting in a small amount of under submission but as I have no details of the lights, I cannot calculate the kWh impact. This is recorded as non-compliance below.

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 monthly report is provided as a snapshot and this practice is non-compliant. When a wattage is changed in the database due to a physical change or a correction, only the record present at the time the report is run is recorded, not the historical information showing dates of changes. Meridian has not updated their processes to be consistent with the Authority's memo.

Changes to the database are managed by GHD Ltd. For maintenance work and upgrade work, RAMM is updated at the time the work is completed and the date is expected to be correct.

As reported in the last audit, for new connections, The Lines Company electrically connect the new streetlight circuits, but this date is not provided to RDC, so the actual date of livening cannot be recorded accurately and the RAMM database records light installation date, which defaults to the date which the data is collected. I recommend in **section 3.1**, that Meridian work with all parties to ensure that livening dates are captured in the database. The impact is assessed to be low in relation to this as only a small number of new lights are being added on an annual basis.

#### **Audit outcome**

Non-compliant

Non-compliance	Description		
<p>Audit Ref: 2.1 With: Clause 11(1) of Schedule 15.3</p> <p>From: 01-Dec-21 To: 30-Nov-22</p>	<p>Two lights with the incorrect wattage recorded resulting in an estimated under submission of 1,034 kWh per annum.</p> <p>158 lights with the incorrect ballast wattage recorded resulting in an estimated under submission of 1,145.27 kWh per annum.</p> <p>A small number of decorative lights are not recorded in the RAMM database resulting in a small amount of under submission.</p> <p>Up to 24 Waka Kotahi items of load being reconciled in both the Waka Kotahi database and RDC resulting in a potential over submission of up to 12,484kWh per annum.</p> <p>The monthly database extract provided does not track changes at a daily basis and is provided as a snapshot.</p> <p>The livening date of new streetlights is not captured in the database.</p> <p>Potential impact: Low Actual impact: Low Audit history: Twice previously Controls: Moderate Breach risk rating: 2</p>		
Audit risk rating	Rationale for audit risk rating		
<p><b>Low</b></p>	<p>The controls over the database are rated as moderate. Processes in place to manage changes are generally robust but there is room for improvement in relation to the recording of new streetlights.</p> <p>The audit risk rating is low based on the volume differences identified.</p>		
Actions taken to resolve the issue		Completion date	Remedial action status
<p>Meridian has advised RDC of the inaccuracies identified. There had been staffing issues at the council that have impacted the progress on remedial work to the RAMM database.</p>		<p>01/09/2023</p>	<p>Identified</p>
Preventative actions taken to ensure no further issues will occur		Completion date	
<p>Meridian will continue to work with RDC and GHD on resolving the inaccuracies and ongoing issues that have been identified.</p> <p>We have assessed our processes and tools to account for historic lamp installations and changes to the database at a daily level. There are checks in place comparing month to month data to identify any material changes and confirm details for these. These are accounted for in monthly submission</p>		<p>01/09/2023</p> <p>Ongoing</p>	

## 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 an ICP was recorded against each item of load.

### Audit commentary

The ICP number is recorded in the ICP group field in the database.

### 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 fields for road name, displacement, GPS coordinates, and pole numbers.

All items of load are locatable and have GPS coordinates and road names recorded. No inaccurate locations were identified during the audit.

### 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 light type and wattage capacity,
- wattage capacities include any ballast or gear wattage, and
- each item of load has a light type, light wattage, and gear wattage recorded.

### Audit commentary

A description of each light is recorded in the lamp model field, and wattages are recorded in the lamp wattage and gear wattage fields.

The accuracy of the recorded wattages 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

A field audit was undertaken of a statistical sample of 131 items of load on 15 November 2022. The sample was selected from three strata, as follows:

1. Ruapehu DC street names A – L,
2. Ruapehu DC street names M-R, and
3. Ruapehu DC street names S – Z

### Audit commentary

The field audit discrepancies are detailed in the table below:

Street	Database count	Field count	Light count difference	Wattage recorded incorrectly	Comments
WACKROW STREET	3	4	+1	-	1x additional 70W HPS found in the field.
<b>Grand total</b>	<b>131</b>	<b>132</b>	<b>+1</b>		

One additional light was found in the field. This is recorded as non-compliance below. The accuracy of the database 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: 01-Dec-21 To: 30-Nov-22	One additional items of load identified in the field from a sample of 131 lights examined. Potential impact: Low Actual impact: Low Audit history: Once previously Controls: Strong Breach risk rating: 1		
Audit risk rating	Rationale for audit risk rating		
<b>Low</b>	The controls are rated as strong the change process is managed well and the database accuracy was confirmed to be within the +/-5% threshold.  The audit risk rating is low as the overall database accuracy is confirmed to be compliant.		
Actions taken to resolve the issue		Completion date	Remedial action status
Meridian has advised RDC of the inaccuracies identified. There had been staffing issues at the council that have impacted the progress on remedial work to the RAMM database.		01/09/2023	Identified
Preventative actions taken to ensure no further issues will occur		Completion date	
Meridian will continue to work with RDC and GHD on resolving the inaccuracies and ongoing issues that have been identified.		01/09/2023	

## 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.

### 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 database has a complete audit trail.

### 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

Meridian's submissions are based on a monthly extract from the RAMM database.

A RAMM database extract was provided in November 2022, 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	Ruapehu District Council streetlights
Strata	The database contains the RDC items of load for the DUML ICPs in the Ruapehu region and excludes NZTA lighting.  The processes for the management of all RDC items of load are the same, but I decided to place the items of load into three strata: <ol style="list-style-type: none"> <li>1. Ruapehu DC street names A – L,</li> <li>2. Ruapehu DC street names M – R, and</li> <li>3. Ruapehu DC street names S – Z.</li> </ol>
Area units	I created a pivot table of the roads, and I used a random number generator in a spreadsheet to select a total of 41 sub-units.
Total items of load	131 items of load making up 10% of the total 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 131 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	100.8	Wattage from survey is higher than the database wattage by 0.8%.
R <sub>L</sub>	100.0	With a 95% level of confidence, it can be concluded that the error could be accurate to +4.5%.
R <sub>H</sub>	104.5	

The variability of the sample results across the strata means that the true wattage (installed in the field) could be accurate to +4.5% higher than the wattage recorded in the DUML database.

These results were categorised in accordance with the “Distributed Unmetered Load Statistical Sampling Audit Guideline”, effective from 1 February 2019. The table below shows that Scenario A (detailed below) applies, and the database is confirmed to be accurate to within the +/-5% threshold.

In absolute terms the installed capacity is estimated to be 1kW higher than the database indicates.

There is a 95% level of confidence that the installed capacity is the same as the database to 6 kW higher than the database.

In absolute terms, total annual consumption is estimated to be 3,900 kWh higher than the DUML database indicates.

There is a 95% level of confidence that the annual consumption is the same as the database to 23,500 kWh p.a. higher than the database indicates.

Scenario	Description
<b>A - Good accuracy, good precision</b>	<p>This scenario applies if:</p> <ul style="list-style-type: none"> <li>(a) <math>R_H</math> is less than 1.05; and</li> <li>(b) <math>R_L</math> is greater than 0.95</li> </ul> <p>The conclusion from this scenario is that:</p> <ul style="list-style-type: none"> <li>(a) the best available estimate indicates that the database is accurate within +/- 5 %; and</li> <li>(b) this is the best outcome.</li> </ul>
<b>B - Poor accuracy, demonstrated with statistical significance</b>	<p>This scenario applies if:</p> <ul style="list-style-type: none"> <li>(a) the point estimate of R is less than 0.95 or greater than 1.05</li> <li>(b) as a result, either <math>R_L</math> is less than 0.95 or <math>R_H</math> is greater than 1.05.</li> </ul> <p>There is evidence to support this finding. In statistical terms, the inaccuracy is statistically significant at the 95% level</p>
<b>C - Poor precision</b>	<p>This scenario applies if:</p> <ul style="list-style-type: none"> <li>(a) the point estimate of R is between 0.95 and 1.05</li> <li>(b) <math>R_L</math> is less than 0.95 and/or <math>R_H</math> is greater than 1.05</li> </ul> <p>The conclusion from this scenario is that the best available estimate is not precise enough to conclude that the database is accurate within +/- 5 %</p>

#### Light description and capacity accuracy

The accuracy of the light wattage has improved since the last audit with only two items of load found to be recorded incorrectly:

Lamp Model	Recorded wattage	Correct wattage	Quantity	Wattage difference
LED144PCS	23	144	2	242

This will be resulting in an estimated under submission of 1,034 kWh per annum. These have been passed to RDC to be corrected.

Gear wattages were checked for alignment with the published standardised wattage table produced by the Electricity Authority. All were confirmed to be correct except for:

Lamp Model	Recorded ballast	Correct ballast	Quantity	Wattage difference
20W ES Compact Florescent	0	Est 2.6	2	5.2
28watt 2d Fluorescent	0	Est 7.8	7	54.95
36w Twin Fluorescent	18	20	141	282
TOTAL			158	342

This will be resulting in an estimated under submission of 1,461 kWh per annum. These have been passed to RDC to be corrected.

### ICP number and owner accuracy

All items of load had an ICP recorded. There are 24 items of load in the database with NZTA recorded as the light owner but are assigned to an RDC ICP. I checked these against the items of load in the Waka Kotahi RAMM database and found some, but not all, are in that database as well. I recommend that Meridian work with RDC and Waka Kotahi's trader to confirm which database these items of load should be recorded in. This will could be resulting in up to 12,484 kWh per annum of over submission.

Recommendation	Description	Audited party comment	Remedial action
Duplicated load	Liaise with Waka Kotahi trader and RDC to determine ownership and therefore which database the 24 items of load should be reconciled to.	Meridian has advised RDC of the recommendation and has suggested to perform a field visit to confirm who the is the light owner.	Investigating

### Change management process findings

The RAMM database is managed by GHD Limited with Alf Downs carrying out the field maintenance on behalf of RDC.

I reviewed the process for new connections. New subdivisions are rare and only a small number of new lights are added per annum.

All new connections require an application for service to The Lines Company. Once approved the work is carried out in the field. The Lines Company electrically connect the new streetlight circuits but this date is not provided to RDC or their agents, so the actual date of livening cannot be recorded accurately and the RAMM database records light installation date, which defaults to the date which the data is collected. I repeat the last audit's recommendation, that Meridian work with all parties to ensure that livening dates are captured in the database.

Recommendation	Description	Audited party comment	Remedial action
New streetlight connections	Review the new streetlight new connection process with RDC, GHD and the Lines Company to ensure that the livening date for new streetlights is captured in RAMM.	Meridian has advised RDC of the recommendation.	Investigating

Monthly “outage patrols” are conducted by Alf Downs and the process is used to identify any incorrect wattage and location issues that may exist.

### Decorative lights

As reported in the last audit, there are decorative lights connected to some streetlight poles on Hakiha Street, Taumaranui at Christmas and Matariki. As reported in the last audit, these lights are not recorded in the database and are managed by another area in the Council. I have recommended the Meridian liaison with RDC to ensure that these are managed within the database.

Description	Recommendation	Audited party comment	Remedial action
Decorative lights on Hakiha Street, Taumaranui	Liaise with RDC to get the decorative lights recorded in the database.	Meridian has advised RDC of the recommendation. There had been staffing issues at the council that have impacted the progress on remedial work to the RAMM database.  Meridian will continue to work with RDC and GHD on resolving the inaccuracies and ongoing issues that have been identified.	Investigating

### Private lights

There are 21 private lights recorded in the database which are excluded from submission information (of which two are metered). RDC have investigated these and have confirmed that none of these are council assets. I will be following these up with The Lines Company to confirm that these are being reconciled against the relevant ICPS.

### Audit outcome

Non-compliant

Non-compliance	Description		
<p>Audit Ref: 3.1 With: Clause 15.2 and 15.37B(b)</p> <p>From: 01-Dec-21 To: 30-Nov-22</p>	<p>Two lights with the incorrect wattage recorded resulting in an estimated under submission of 1,034 kWh per annum.</p> <p>158 lights with the incorrect ballast wattage recorded resulting in an estimated under submission of 1,145.27 kWh per annum.</p> <p>Up to 24 Waka Kotahi items of load being reconciled in both the Waka Kotahi database and RDC resulting in a potential over submission of up to 12,484kWh per annum.</p> <p>A small number of decorative lights are not recorded in the RAMM database resulting in a small amount of under submission.</p> <p>Potential impact: Low Actual impact: Low Audit history: Once Controls: Moderate Breach risk rating: 2</p>		
Audit risk rating	Rationale for audit risk rating		
<b>Low</b>	<p>The controls over the database are rated as moderate. There is room for improvement in the new connection and decorative light management processes.</p> <p>The audit risk rating is low based on the volume differences identified.</p>		
Actions taken to resolve the issue		Completion date	Remedial action status
Meridian has advised RDC of the inaccuracies identified. There had been staffing issues at the council that have impacted the progress on remedial work to the RAMM database.		01/09/2023	Identified
Preventative actions taken to ensure no further issues will occur		Completion date	
Meridian will continue to work with RDC and GHD on resolving the inaccuracies and ongoing issues that have been identified.		01/09/2023	

### 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 on 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 Lines Company network. 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 2022 were checked and confirmed to be the same as the database.

The field audit found that the database was accurate to within +/-5%, compliance is confirmed.

Sources of database inaccuracy are as follows:

Issue	Estimated volume information impact (annual kWh)
Two items of load with the incorrect wattage recorded	Under submission of 1,034 kWh p.a.
158 items of load with the incorrect ballast wattage recorded	Under submission of 1,145.27 kWh p.a.
Up to 24 items of load recorded in both the Waka Kotahi database and the RDC database	Up to 12,484 kWh p.a. of potential over submission.

As reported in the last audit, there are decorative lights connected to some streetlight poles on Hakiaha Street, Taumaranui. The lights have been confirmed to belong to RDC but are not recorded in the database. These lights are managed by another area in the Council. I have repeated the last audits recommendation that Meridian liaise with RDC to ensure that these are managed within the database in **section 3.1**. This will be resulting in a small amount of under submission but as I have no details of the lights, I cannot calculate the kWh impact. This is recorded as non-compliance below.

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 monthly report is provided as a snapshot and this practice is non-compliant. When a wattage is changed in the database due to a physical change or a correction, only the record present at the time the report is run is recorded, not the historical information showing dates of changes. Meridian has not updated their processes to be consistent with the Authority’s memo.

Changes to the database are managed by GHD Ltd. For maintenance work and upgrade work, RAMM is updated at the time the work is completed and the date is expected to be correct.

As reported in the last audit, for new connections, The Lines Company electrically connect the new streetlight circuits, but this date is not provided to RDC, so the actual date of livening cannot be recorded accurately and the RAMM database records light installation date, which defaults to the date which the data is collected. I recommend in **section 3.1**, that Meridian work with all parties to ensure that livening dates are captured in the database. The impact is assessed to be low in relation to this as only a small number of new lights are being added on an annual basis.

**Audit outcome**

Non-compliant

Non-compliance	Description	
Audit Ref: 3.2 With: Clause 15.2 and 15.37B(c)  From: 01-Dec-21 To: 30-Nov-22	Two lights with the incorrect wattage recorded resulting in an estimated under submission of 1,034 kWh per annum.  158 lights with the incorrect ballast wattage recorded resulting in an estimated under submission of 1,145.27 kWh per annum.  A small number of decorative lights are not recorded in the RAMM database resulting in a small amount of under submission.  Up to 24 Waka Kotahi items of load being reconciled in both the Waka Kotahi database and RDC resulting in a potential over submission of up to 12,484kWh per annum.  The livening date of new streetlights is not captured in the database.  Potential impact: Low Actual impact: Low Audit history: Twice previously Controls: Moderate Breach risk rating: 2	
Audit risk rating	Rationale for audit risk rating	
<b>Low</b>	The controls over the database are rated as moderate. Processes in place to manage changes are generally robust but there is room for improvement in relation to the recording of new streetlights.  The audit risk rating is low based on the volume differences identified.	
Actions taken to resolve the issue	Completion date	Remedial action status
Meridian has advised RDC of the inaccuracies identified. There had been staffing issues at the council that have impacted the progress on remedial work to the RAMM database.	01/09/2023	Identified
Preventative actions taken to ensure no further issues will occur	Completion date	
Meridian will continue to work with RDC and GHD on resolving the inaccuracies and ongoing issues that have been identified.	01/09/2023	

## CONCLUSION

Meridian reconciles this DUML load using the DST profile. The on and off times are derived from a data logger read by EMS and are 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. I compared the RDC database provided to the capacity information Meridian supplied to EMS for the month of October 2022 and I confirm it matches.

RDC has had some changes to staff and the agents managing the RAMM database during the audit period. Some roles are still to be filled. GHD Limited now manage the database and Alf Downs Streetlighting Limited (Alf Downs) continues to manage the field work on behalf of RDC.

Overall, the accuracy and processes in place to manage the database are robust. This is supported by the field audit confirming that the database is within the accuracy threshold of +/-5%.

I identified three opportunities for improvement and found four non-compliances. The future risk rating of seven indicates that the next audit be completed in 18 months. I have considered this along with Meridian's comments, that the field audit found the database is within the accuracy threshold and I recommend that the next audit be in 24 months.

## PARTICIPANT RESPONSE

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