# ELECTRICITY INDUSTRY PARTICIPATION CODE DISTRIBUTED UNMETERED LOAD AUDIT REPORT



For

# PORIRUA CITY COUNCIL AND MERIDIAN ENERGY LIMITED

Prepared by: Bernie Cross Date audit commenced: 6 June 2023 Date audit report completed: 27 July 2023 Audit report due date: 31 July 2023

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# **EXECUTIVE SUMMARY**

This audit of the **Porirua City Council (PCC)** 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.

A RAMM database is managed by PCC in relation to this load. The database is remotely hosted by thinkproject New Zealand Ltd.

Field work and new light installations are carried out by Fulton Hogan, who update the database using Pocket RAMM. Park lights are maintained in the RAMM database by the parks team.

PCC have made good progress in resolving a number of issues during this audit period:

- all parks and property lights are now accounted for in the database,
- all active and connected lights have non-zero-watt capacity recorded and checks are now in place to capture these prior to providing Meridian the monthly database snapshot, and
- all of the previous audit exceptions have been investigated and most have corrections applied to the database and a few of the remaining corrections are pending a system upgrade scheduled for September 2023.

This audit found the accuracy of the database has improved during this audit period reflecting the progress PCC has made around the day-to-day management of this database.

Result	Percentage	Comments
The point estimate of R	111.0	Wattage from survey is higher than the database wattage by 11%
RL	101.7	With a 95% level of confidence, it can be concluded that the error
R <sub>H</sub>	127.0	

Database accuracy is described as follows:

In absolute terms, total annual consumption is estimated to be 109,400 kWh higher than the DUML database indicates. This is an improvement from the 192,300 kWh of over submission reported in the last audit.

The audit found six non-compliances and makes four recommendations.

The future risk rating of 28 indicates that the next audit be completed in three months. This is an improvement from the last audit's risk rating of 34. PCC have made good progress in addressing a number of the issues identified from the previous audit and also the field audit discrepancies identified in this audit. I recommend that the next audit date is nine months (30 April 2024).

The matters raised are detailed in the table 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	Database is not confirmed as accurate with a 95% level of confidence resulting in an estimated under submission of 109,400 kWh p.a.	Moderate	High	6	Identified
			Eight items of load are not readily locatable.				
			One item of load with the incorrect ballast applied resulting in an estimated under submission of 8.542 kWh.				
			208 private lights not recorded against an ICP or included in submission resulting in an annual under submission of approximately 61,000 kWh.				
			Livening dates not recorded for new connections.				
			The monthly database extract provided does not track changes at a daily basis and is provided as a snapshot.				
ICP identifier and items of load	2.2	11(2)(a) and (aa) of Schedule	ICP assignment is not correct for all items of load resulting in incorrect allocation of submission volumes to the respective NSP.	Moderate	High	6	Identified
		15.3	208 private lights not recorded against an ICP or included in submission resulting in an annual under submission of approximately 61,000 kWh.				
Location of each item of load	2.3	11(2)(b) of Schedule 15.3	Eight items of load do not have sufficient location information to enable them to be readily locatable.	Moderate	Low	2	Identified
All load recorded in database	2.5	11(2A) of Schedule 15.3	11 additional lamps (4%) in the field were not recorded in the database from a sample of 261 items of load.	Moderate	Low	2	Cleared

Subject	Section	Clause	Non-Compliance	Controls	Audit Risk Rating	Breach Risk Rating	Remedial Action
Database accuracy	3.1	15.2 and 15.37B(b)	Database is not confirmed as accurate with a 95% level of confidence resulting in an estimated under submission of 109,400 kWh p.a. Eight items of load are not readily locatable. ICP assignment is not correct for all items of load resulting in incorrect allocation of submission	Moderate	High	6	Identified
			208 private lights not recorded against an ICP or included in submission resulting in an annual under submission of approximately 61,000 kWh.				
			One item of load with the incorrect ballast applied resulting in an estimated under submission of 8.542 kWh.				
			Livening dates not recorded for new connections.				
			The monthly database extract provided does not track changes at a daily basis and is provided as a snapshot.				
Volume information accuracy	3.2	15.2 and 15.37B(c)	Database is not confirmed as accurate with a 95% level of confidence resulting in an estimated under submission of 109,400 kWh p.a.	Moderate	High	6	Identified
			Eight items of load are not readily locatable.				
			208 private lights not recorded against an ICP or included in submission resulting in an annual under submission of approximately 61,000 kWh.				
			One item of load with the incorrect ballast applied resulting in an estimated under submission of 8.542 kWh.				
			Livening dates not recorded for new connections.				
				Future Ris	k Rating		28

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

# RECOMMENDATIONS

Subject	Section	Recommendation	Description
ICP identifier and items of load	2.2	Improve notification to PCC when new lights have been connected.	Meridian and PCC to work collectively to develop a more efficient mechanism to ensure PCC is notified as soon as practicable when new lights are connected.
ICP identifier and items of load	2.2	Improve accuracy of ICP assignment to each item of load.	Meridian to work with Wellington Electricity to clearly define the boundaries between lights supplied by TKR0331 and PNI0331 NSPs and ensure the database then correctly reflects these boundaries.
All load recorded in database	2.5	Review process to award/ manage redevelopment projects to ensure the lighting is correctly recorded within RAMM in a timely manner.	PCC to review their process to award/manage redevelopment projects to ensure any lighting changes or additions are correctly recorded within RAMM in a timely manner.
Description and capacity of load	3.1	Improve ability to accurately identify all light types, attributes, and input wattages.	Improve the level of detail captured as part of the lamp model description to ensure the input wattages can accurately be determined and ensure all light specification sheets are held centrally and easily available for reference for all lights within the PCC 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 organisational structure.



# 1.3. Persons involved in this audit

Auditor:

**Bernie Cross** 

# Veritek Limited

# **Electricity Authority Approved Auditor**

Other personnel assisting in this audit were:

Name	Title	Company
Amy Cooper	Compliance Officer	Meridian
Melanie Matthews	Quality and Compliance Advisor	Meridian
Shivam Patel	Operations Engineer Assistant - Transport	Porirua City Council
Rosemarie Ramos	Data & Insights Analyst - Transport	Porirua City Council

# 1.4. Hardware and Software

The SQL database used for the management of DUML is remotely hosted by thinkproject New Zealand Limited. The database is commonly known as "RAMM" which stands for "Road Assessment and Maintenance Management". The specific data used for DUML is held in the Streetlight tables. thinkproject New Zealand Limited backs up the database and assists with disaster recovery as part of their hosting service.

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	Registry profile	Number of items of load	Database wattage May 2022 (watts)
0000023024WE5D5	PCC Property – TKR0331	DST	9	1,341
0001255308UN5C4	MASTER ICP PCC Streetlight – TKR0331	DST	3,972	163,329
0001256873UNFA3	MASTER ICP PCC Streetlight – PNI0331	DST	1,395	54,445
0000161078CKA46	MASTER ICP PCC PARKS # PNI0331	DST	146	7,877
0000161079CK603	PCC PARKS #TKR0331 TOTAL ASSETS	DST	67	4,650
Total			5,589	231,642

# 1.7. Authorisation Received

All information was provided directly by Meridian or PCC.

# 1.8. Scope of Audit

This audit of the PCC DUML 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 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.

A RAMM database is managed by PCC in relation to this load. The database is remotely hosted by thinkproject New Zealand Limited.

Field work and new light installations are carried out by Fulton Hogan. Pocket RAMM is used to update the database.

Park lights are maintained in the RAMM database by the parks team.

The diagram below shows the audit boundary for clarity.



The field audit was undertaken of a statistical sample of 261 items of load on 21 and 22 June 2023.

# 1.9. Summary of previous audit

The previous audit was completed in January 2023 by Bernie Cross of Veritek Limited. Seven noncompliances were identified, and three recommendations were made. The current statuses of the findings are detailed below.

Subject	Section	Clause	Non-compliance	Status
Deriving submission information	2.1	11(1) of Schedule 15.3	Database is not confirmed as accurate with a 95% level of confidence resulting in an estimated under submission of 192,300 kWh p.a.	Still existing Still
			Eight items of load are not readily locatable.	existing
			20 items of load without an ICP being assigned and therefore the load associated with these lights is not being included in the monthly capacities report to EMS resulting in an annual under submission of approximately 2,075 kWh.	Still existing
			Three lights recorded in the database as zero watts capacity were confirmed during the field audit as being 20W LED lights, resulting in an estimated under submission of 256 kWh.	Cleared
			One item of load with the incorrect ballast applied resulting in an estimated under submission of 8.542 kWh.	
			Some Italo 35.5W lamps are incorrectly recorded in the database as 36W.	Cleared
			Some Italo 19.5W lamps are incorrectly recorded in the database as 20W.	Cleared
			Livening dates not recorded for new connections.	Still existing
			Under submission of 58,460 kWh due to inaccurate park lighting records in RAMM.	Cleared
			The monthly database extract provided does not track changes at a daily basis and is provided as a snapshot.	Still existing
ICP identifier and items of load	2.2	11(2)(a) and (aa) of Schedule	20 items of load without an ICP being assigned and therefore the load associated with these lights is not being included in the monthly capacities report to EMS resulting in an annual under submission of approximately 2,075 kWh.	Still existing
		15.3	Seven items of load are incorrectly assigned to GWRC and should be associated with ICP 0001256873UNFA3 resulting in an annual under submission of approximately 1,249 kWh.	Cleared
			ICP assignment is not correct for all items of load resulting in incorrect allocation of submission volumes to the respective NSP.	Still existing
Location of each item of load	2.3	11(2)(b) of Schedule 15.3	Eight items of load do not have sufficient location information to enable them to be readily locatable.	Still existing

Subject	Section	Clause	Non-compliance	Status
Description and capacity of load	2.4	11(2)(c) and (d) of Schedule 15.3	Three lights recorded in the database as zero watts capacity were confirmed during the field audit as being 20W LED lights, resulting in an estimated under submission of 256 kWh.	Cleared
All load recorded in database	2.5	11(2A) of Schedule 15.3	64 additional lamps (15%) in the field were not recorded in the database from a sample of 431 items of load.	Still existing
Database accuracy	3.1	15.2 and 15.37B(b )	Database is not confirmed as accurate with a 95% level of confidence resulting in an estimated under submission of 192,300 kWh p.a.	Still existing
			Eight items of load are not readily locatable.	Still existing
			20 items of load without an ICP being assigned and therefore the load associated with these lights is not being included in the monthly capacities report to EMS resulting in an annual under submission of approximately 2,075 kWh.	Still existing
			Seven items of load are incorrectly assigned to GWRC but should be associated with the ICP 0001256873UNFA3 resulting in an annual under submission of approximately 1,249 kWh.	Cleared
			ICP assignment is not correct for all items of load resulting in incorrect allocation of submission volumes to the respective NSP.	Still Existing
			Three lights recorded in the database as zero watts capacity were confirmed during the field audit as being 20W LED lights, resulting in an estimated under submission of 256 kWh.	Cleared
			Some Italo 35.5W lamps are incorrectly recorded in the database as 36W.	Cleared
			Some Italo 19.5W lamps are incorrectly recorded in the database as 20W.	Cleared
			One item of load with the incorrect ballast applied resulting in an estimated under submission of 8.542 kWh.	Still existing
			Livening dates not recorded for new connections.	Still existing
			Under submission of 58,460 kWh due to missing park lighting records in RAMM.	Cleared
			The monthly database extract provided does not track changes at a daily basis and is provided as a snapshot.	Still existing

Subject	Section	Clause	Non-compliance	Status
Volume information accuracy	3.2	15.2 and 15.37B(c)	Database is not confirmed as accurate with a 95% level of confidence resulting in an estimated under submission of 192,300 kWh p.a. Eight items of load are not readily locatable. 20 items of load without an ICP being assigned and therefore the load associated with these lights is not being included in the monthly capacities report to EMS resulting in an annual under submission of engravitmentaly 2 037. LWh	Still existing Still existing Still existing
			Three lights recorded in the database as zero watts capacity were confirmed during the field audit as being 20W LED lights, resulting in an estimated under submission of 256 kWh. One item of load with the incorrect ballast applied resulting in an estimated under submission of 8.542 kWh. Livening dates not recorded for new connections.	Cleared Still existing Still
			Under submission of 58,460 kWh due to missing park lighting records in RAMM.	existing Cleared

# 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

The audit was completed 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. 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 the EMS agent audit.

The capacities supplied to EMS for May 2023 were checked and confirmed to be the same as the database.

The field audit found that the database accuracy was not confirmed as accurate with a 95% level of confidence resulting in an estimated annual under submission of 109,400 kWh. This is detailed in **section 3.1**.

Some database inaccuracies were found as detailed in **section 3.1** and summarised below:

Description	Items of load	Estimated annual kWh impact
Incorrect ballasts applied	1	+8.542

The database contains 208 private lights which are not recorded against an ICP. They are recorded in the database for completeness so that if a fault is logged for a private light the caller can be advised that the end user needs to arrange the repair.

Little progress has been made in ensuring these private lights are being accounted for in the market settlement process. These private lights are not part of the monthly capacity report provided to Meridian resulting in an annual under submission of approximately 61,000 kWh. PCC is reviewing their policy around the recording of private streetlights within their RAMM database with a view to including these lights for the capture of load for submission purposes, but reflecting these lights are privately owned for maintenance and replacement purposes. This is discussed further in **section 2.2**, and I have recorded non-compliance below and in **sections 2.2**, **3.1** and **3.2**.

The location information is incomplete for eight items of load where an ICP is recorded by no address information is present to identify where this load located; therefore, these are unable to be confirmed as genuine and requiring inclusion in the calculation of connected load. This is recorded as non-compliance below and in **section 2.3**.

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. The database contains a "light install date" and a "lamp install date" but there is not a field for "livening date" for newly connected lights to reflect when these lights are physically connected. When PCC are retrospectively made aware that lights have been connected the respective ICP Number is assigned to the light so that it is included in the next report provided to Meridian. 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.

# Audit outcome

Non-compliance	Description						
Audit Ref: 2.1 With: Clause 11(1) of	Database is not confirmed as accurate w estimated under submission of 109,400	confidence resulting in an					
Schedule 15.3	Eight items of load are not readily locata	ble.					
	One item of load with the incorrect ball submission of 8.542 kWh.	ing in an estimated under					
	208 private lights not recorded against a an annual under submission of approxim	an ICP or included nately 61,000 kWh	in submission resulting in n.				
	Livening dates not recorded for new con	nections.					
	The monthly database extract provided is provided as a snapshot.	does not track cha	anges at a daily basis and				
	Potential impact: High						
	Actual impact: High						
	Audit history: Multiple times						
From: 01-Feb-23	Controls: Moderate	Controls: Moderate					
To: 30-Jun-23	Breach risk rating: 6						
Audit risk rating	Rationale for audit risk rating						
High	The controls are rated as moderate as improvements have been undertaken to capture and maintain the database attributes and PCC is investigating developing a policy around the management of private lights.						
	The audit risk rating is high based on kW	h variances.					
Actions ta	aken to resolve the issue	Completion date	Remedial action status				
Eight items of load – PC the AMDS migration as disabled.	CC will update this information once Road allocation in RAMM is	31/10 2023	Identified				

One item of load with the incorrect ballast – PCC has now corrected.	24/7/2023
208 private lights – PCC met with WE and are collaborating on a solution to fix this issue.	31/10/2023
Livening dates not recorded for new connections – Meridian and PCC are currently reviewing the new connections process for improvement on notifications and updates.	31/10/2023
Preventative actions taken to ensure no further issues will occur	Completion date
Preventative actions taken to ensure no further issues will occur Meridian will continue to follow up and work with PCC in amending the inaccuracies in the database.	Completion date 31/10/2023

# 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

16 items of load without an ICP being assigned were found in the database extract:

- two lights are currently disconnected due to a large residential development being undertaken; this section of road is part of the construction site and there is no public access requiring lighting, and
- 14 items of load relate to new lights where the lamp install dates are prior to 2022 and PCC have not yet received confirmation that the lights have been connected; PCC does not assign an ICP until confirmation that the lights have been physically connected has been received.

PCC does not have a relationship with the livening agent within the Wellington Electricity network so relies on either outage patrols or a retailer notification to inform them that lights are now connected, and this can lead to delays in reflecting the status of these lights in the DUML database. I recommend that Meridian and PCC work collectively to develop a more efficient mechanism to ensure PCC is notified as soon as practicable when new lights are connected.

Recommendation	Description	Audited party comment	Remedial action
Improve notification to PCC when new lights have been connected.	Meridian and PCC to work collectively to develop a more efficient mechanism to ensure PCC is notified as soon as practicable when new lights are connected.	Meridian and PCC are currently reviewing the new connections process for improvement on notifications and updates.	Identified

All items of load were plotted to ensure the correct network supply point (NSP) was allocated through the ICP assignment. In the map below the red plots are for NSP TKR0331 and the black plots are for PNI0331.



The map shows that the ICP/NSP assignment to the lights is not consistently applied resulting in some load being incorrectly assigned to ICPs and the associated NSP for reconciliation purposes. I repeat the previous audits recommendation that Meridian works with Wellington Electricity to clearly define the boundaries between lights supplied by TKR0331 and PNI0331 NSPs.

Recommendation	Description	Audited party comment	Remedial action
Improve accuracy of ICP assignment to each item of load.	Meridian to work with Wellington Electricity to clearly define the boundaries between lights supplied by TKR0331 and PNI0331 NSPs and ensure the database then correctly reflects these boundaries.	Meridian is currently working with WE to assign the items of load to the correct NSP's	Identified

The database contains 208 private lights which are not recorded against an ICP. They are recorded in the database for completeness so that if a fault is logged for a private light the caller can be advised that the end user needs to arrange the repair. These lights have been provided to Wellington Electricity to check and Wellington Electricity have confirmed that they are not being accounted for under another ICP as either standard unmetered load or shared unmetered load. PCC's DUML new connection process enables private lights to be listed in the communication between developer, PCC and the reconciliation participant which meant these private lights were included in the instruction to liven from PCC's reconciliation participant at the time.

The reconciliation participant is responsible for ensuring that any load changes to the ICP are reflected in the DUML database and that additional load items were authorised to be livened by the reconciliation participant at the time. In this case it is likely that a blanket agreement was made in the past that current reconciliation participant was not aware of.

As no progress has been made in ensuring these private lights are being accounted for in the market settlement process. These private lights are submission resulting in an annual under submission of approximately 61,000 kWh. PCC is reviewing their policy around the recording of private streetlights within their RAMM database with a view to including these lights for the capture of load for submission purposes, but reflecting these lights are privately owned for maintenance and replacement purposes. I have recorded non-compliance below and in **sections 2.1, 3.1 and 3.2**.

PCC is reviewing their policy around the recording of private streetlights within their RAMM database with a view to including these lights for the capture of load for submission purposes, but reflecting these lights are privately owned for maintenance and replacement purposes.

All lights which are the responsibility of the PCC have an ICP recorded.

# Audit outcome

Non-compliance	Description						
Audit Ref: 2.2 With: Clause 11(2)(a) and (aa) of Schedule 15.3	ICP assignment is not correct for all item submission volumes to the respective NS 208 private lights not recorded against a an annual under submission of approxim Potential impact: High	s of load resulting SP. n ICP or included nately 61,000 kWh	; in incorrect allocation of in submission resulting in 1.				
	Actual impact: High Audit history: None						
From: 01-Feb-23	Controls: Moderate						
To: 30-Jun-23	Breach risk rating: 6	Breach risk rating: 6					
Audit risk rating	Rationale for audit risk rating						
High	The controls are recorded as moderate as most lights are assigned an ICP on entry to the database. The impact is rated as high as the volume impacted is large due to the missing						
	private lights from submission.						
Actions ta	aken to resolve the issue	Completion date	Remedial action status				

Meridian is currently working with WE to assign the items of load to the correct NSP's.	31/10/2023	Identified
PCC met with WE and are collaborating on a solution to fix this issue.		
Preventative actions taken to ensure no further issues will occur	Completion date	

# 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 databases were checked to confirm the location is recorded for all items of load.

#### **Audit commentary**

The database contains fields for the street address and also GPS coordinates.

Eight items of load do not have GPS coordinates or sufficient other information to enable them to be located such as the house number, road, suburb or pole number. These eight items of load were added to the database, with pole and lamp install dates of 3 December 2021. These were the same records as identified in the last three audits. PCC have advised that the issue of not completing the location information is due to RAMM requiring a carriageway (Road) ID to be assigned. These lights are associated with a mall courtyard which is not defined by PCC as a road. PCC are working on a solution to create a virtual road which will then allow these lights to be correctly reflected and located in the RAMM database.

#### Audit outcome

Non-compliance	Description
Audit Ref: 2.3 With: Clause 11(2)(b) of	Eight items of load do not have sufficient location information to enable them to be readily locatable.
Schedule 13.5	Actual impact: Low Audit history: Multiple times
From: 01-Feb-23	Controls: Moderate
To: 30-Jun-23	Breach risk rating: 2
Audit risk rating	Rationale for audit risk rating

Low	The controls are recorded as moderate as while no new lights have been added without sufficient location information being provided, there has been no progress to resolve the exceptions identified from previous audits. PCC are working on a solution to create a virtual road which will then allow these lights to be correctly reflected and located in the RAMM database. The impact is rated as low as there are only eight items of load that are not readily locatable.					
Actions ta	Completion date	Remedial action status				
PCC will update this inf as Road allocation in RA	ormation once the AMDS migration AMM is disabled.	31/10/2023	Identified			
Preventative actions take	en to ensure no further issues will occur	Completion date				
Meridian will continue amending the inaccura	to follow up and work with PCC in cies in the database.	31/10/2023				

# 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 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 fields for lamp make and model. There are three fields which record lamp wattage, gear wattage and total wattage. The fields were populated for all items of load.

The accuracy of lamp descriptions, wattages and ballasts is recorded 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 261 items of load on 21 and 22 June 2023. The sample was selected from five strata, as follows:

- roads A-F,
- roads G-L,
- roads M-Pa,
- roads Pe-Th, and
- roads Ti-Z.

# **Audit commentary**

The field audit discrepancies are detailed below:

Street	Database count	Field count	Light count differences	Wattage recorded incorrectly	Comments
BAYVIEW ROAD	9	9	0	2	1 x 35.5W (L35.5) light recorded as 36W. 1 x 70W HPS light recorded as 40W LED.
EXCELLENCY TERRACE	7	7	0	1	1 x 26W (L26) light recorded as 36W.
FERRY PLACE	10	16	+6	0	<ol> <li>additional 117W (L117) LED light found in the field.</li> <li>x additional 98W LED floodlights found in the field.</li> <li>x estimated 50 LED light string found in the field.</li> </ol>
KINLOCH PLACE	7	7	0	1	1 x 70W HPS light recorded as 26W LED.
LAMBLEY ROAD	10	10	0	1	1 x 36W recorded as 35.5W.
LIVET PLACE	3	4	+1	0	1 additional 100W MH floodlight found in the field.
MILLFORD ST	4	4	0	4	4 x 36W (L36A) LED lights recorded as 35.5W.
MURI ROAD	26	26	0	14	14 x 36W (L36A) LED lights recorded as 35.5W.
PA ROAD	5	5	0	4	4 x 36W (L36A) LED lights recorded as 35.5W.
PAPAROA CRES	10	10	0	4	4 x 36W (L36A) LED lights recorded as 35.5W.
RESOLUTION DRIVE	20	21	1	0	1 additional 28.4W (L117) LED light found in the field.
SEA VISTA DRIVE	16	16	0	10	10 x 36W (L36A) LED lights recorded as 35.5W.
THE SOUNDING	5	5	0	2	1 x 28W (L28) LED lights recorded as 36W. 1 x 28W (L28) LED light recorded as 35.5W.
WARSPITE AVENUE – Mungavin Ave to Driver Cres	42	44	+3, -1	3	<ol> <li>x 99W light not found in the field.</li> <li>x 99W (L99A) LED lights recorded as 35.5W.</li> <li>x 149W (L149) LED lights recorded as 35.5W.</li> <li>x 36W (L36A) recorded as 99W.</li> <li>x additional 98W LED floodlight found in the field.</li> </ol>

Street	Database count	Field count	Light count differences	Wattage recorded incorrectly	Comments
					1 additional 36W (L36A) LED light found in the field. 1 additional estimated 40W LED light found in the field.
Grand Total	261	271	12 (+11-1)	46	

The field audit found 11 additional lights and could not find one light listed in the database.

This is recorded as non-compliance below.

The database accuracy has improved slightly during the audit period across a similar sample size as detailed in the table below:

Street	May 2021	December 2021	June 2022	December 2022	June 2023
Incorrect wattages	51	19	37	40	46
Additional lights	5	2	13	64	11
Missing lights	11	2	3	1	1

This is discussed further in **section 3.1**.

There has also been some redevelopment work within the Porirua CBD with the pedestrian courtyards for Cobham Court, Serlby Place and Hartham Place including an upgrade of the lighting. As these development activities were undertaken as individual projects the streetlight contractor for PCC was not involved in the installation of these new lights resulting in these lights not yet being recorded within RAMM. I recommend that PCC reviews their process to award/manage redevelopment projects to ensure the lighting is correctly recorded within RAMM in a timely manner.

Recommendation	Description	Audited party comment	Remedial action
Review process to award/manage redevelopment projects to ensure the lighting is correctly recorded within RAMM in a timely manner.	PCC to review their process to award manage redevelopment projects to ensure any lighting changes or additions are correctly recorded within RAMM in a timely manner	Meridian has advised PCC of the recommendation. Once migration to AMDS is complete, this should minimise discrepancies.	Identified

The field audit discrepancies identified from the previous audit were also reviewed and 100 of the 105 exceptions have been investigated and either resolved or confirmed as being metered lights and not the responsibility of PCC.

# Audit outcome

Non-compliance	Description
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Audit Ref: 2.5 With: Clause 11(2A) of Schedule 15.3 From: 01-Feb-23 To: 30-Jun-23	11 additional lamps (4%) in the field wer sample of 261 items of load. Potential impact: Low Actual impact: Low Audit history: Multiple times Controls: Moderate Breach risk rating: 2	e not recorded in	the database from a
Audit risk rating	Rationale for audit risk rating		
Low	The controls are rated as moderate as the recent field activity of light installations and changes do not appear to have been reflected in the database since the last audit. The audit risk rating is low based on the small volume of lights affected in relation to the sample examined.		
Actions taken to resolve the issue		Completion date	Remedial action status
PCC had been advised of the inaccuracies during a meeting. PCC has since confirmed correction of the inaccuracies.		24/7/2023	Cleared
Preventative actions taken to ensure no further issues will occur		Completion date	

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

# **Code reference**

Clause 11(3) of Schedule 15.3

# **Code related audit information**

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

# Audit observation

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

#### **Audit commentary**

The RAMM database functionality achieves compliance with the code.

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

# Audit outcome

Compliant

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

**Code reference** 

# Clause 11(4) of Schedule 15.3

### **Code related audit information**

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

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

#### Audit observation

The database was checked for audit trails.

Audit commentary

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

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	PCC streetlights in the Porirua area
Strata	The database contains 5,561 items of load in the PCC area. The processes for the management of all PCC items of load is the same. I selected the following strata: • roads A-F, • roads G-L, • roads M-Pa, • roads Pe-Th, and • roads Ti-Z.
Area units	I created a pivot table of the roads in each database and used a random number generator in each spreadsheet to select a total of 44 sub-units.
Total items of load	261 items of load were checked.

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

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

# **Audit commentary**

A field audit was conducted of a statistical sample of 261 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	111.0	Wattage from survey is higher than the database wattage by 11%
RL	101.7	With a 95% level of confidence, it can be concluded that the e
R <sub>H</sub>	127.0	

These results were categorised in accordance with the "Distributed Unmetered Load Statistical Sampling Audit Guideline", effective from 1 February 2019 and the table below shows that Scenario B (detailed below) applies.

The conclusion from Scenario B is that the variability of the sample results across the strata means that the true wattage (installed in the field) could be between 1.7% and 27.0% 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 26 kW higher than the database indicates.

There is a 95% level of confidence that the installed capacity is between 4 kW to 63 kW higher than the database.

In absolute terms, total annual consumption is estimated to be 109,400 kWh higher than the DUML database indicates.

There is a 95% level of confidence that the annual consumption is between 16,500 kWh p.a. to 267,500 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∟ 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 RL is less than 0.95 or RH 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	<ul> <li>This scenario applies if:</li> <li>(a) the point estimate of R is between 0.95 and 1.05</li> <li>(b) RL is less than 0.95 and/or RH is greater than 1.05</li> <li>The conclusion from this scenario is that the best available estimate is not precise enough to conclude that the database is accurate within +/- 5 %</li> </ul>

# Lamp description and capacity accuracy

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

Lamp Туре	Database Total Lamp Wattage	EA Standardised Total Wattage	Variance (watts)	Database Quantity	Estimated Annual kWh effect on consumption
250W MV	268	270	-2	1	+8.542
Total estimated annual effect on submission				1	+8.542 kWh

I was unable to confirm the wattage of six models of LED lamps which amount to 2,540 lamps due to incomplete lamp model descriptions being populated, or the light specifications being unable to be reviewed before the audit is due. This issue was highlighted in the last two audits and no progress has been achieved to date. I have repeated this recommendation.

Recommendation	Description	Audited party comment	Remedial action
Improve ability to accurately identify all light types, attributes and input wattages.	Improve the level of detail captured as part of the lamp model description to ensure the input wattages can accurately be determined and ensure all light specification sheets are held centrally and easily available for reference for all lights within the PCC database.	Meridian has advised PCC of the recommendation.	Identified

# Address accuracy

The location information is incomplete for eight items of load. This is recorded as non-compliance below and in **section 2.3**.

# ICP number and owner accuracy

16 items of load without an ICP being assigned were found in the database extract. PCC does not assign an ICP until confirmation that the lights have been physically connected has been received. Two lights are currently disconnected due to a large residential development being undertaken and this section of road is part of the construction site and there is no public access requiring lighting. 14 items of load relate to new lights where the lamp installation date is prior to 2022 and where PCC have not yet received confirmation that the lights have been connected. PCC does not have a relationship with the livening agent within the Wellington Electricity network so relies on either outage patrols or a retailer notification to inform them that lights are now connected, and this can lead to delays in reflecting the status of these lights in the DUML database. A recommendation is recorded in **section 2.2** to improve the livening notification process to PCC.

As discussed in **section 2.2**, a plot of all items of load shows that the ICP/NSP assignment to the lights is not consistently applied resulting in some load being incorrectly assigned to ICPs and the associated NSP for reconciliation purposes.

The database contains 208 private lights which are not recorded against an ICP. They are recorded in the database for completeness so that if a fault is logged for a private light the caller can be advised that the end user needs to arrange the repair.

Little progress has been made in ensuring these private lights are being accounted for in the market settlement process. PCC is reviewing their policy around the recording of private streetlights within their RAMM database with a view to including these lights for the capture of load for submission purposes, but reflecting these lights are privately owned for maintenance and replacement purposes.

These private lights are not part of the monthly capacity report provided to Meridian resulting in an annual under submission of approximately 61,000 kWh. This is discussed further in **section 2.2**, and I have recorded non-compliance below and in **sections 2.1**, **2.2** and **3.2**.

# **Change management process findings**

The RAMM database used for submission is managed by PCC. The streetlight contractors update the database using Pocket RAMM.

The new connection process remains unchanged. The lights are recorded in RAMM when an "as built" plan is provided to Fulton Hogan.

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. The database contains a "light install date" and a "lamp install date" but there is not a field for "livening date" for newly connected lights to reflect when these lights are physically connected. When PCC are retrospectively made aware that lights have been connected the respective ICP Number is assigned to the light so that it is included in the next report provided to Meridian. 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.

Festive lighting is no longer connected.

Outage patrols are conducted at night over a 4-month cycle.

# **Parks Lighting**

During a previous audit in 2020, PCC provided the results of a full field survey of Parks and Property lights. Investigations undertaken during this audit by comparing the 2020 field survey against the RAMM database and also the Electricity registry has confirmed that all lights identified in the field survey are now accounted for in either the RAMM database or standard UML ICPs. PCC roading team who are responsible for the RAMM database are also working with the Parks team to consolidate all lighting asset information into a single source of truth being the RAMM database to ensure updates to the data used for submission purposes remains accurate and complete.

# Audit outcome

Non-compliance	Description			
Audit Ref: 3.1	Database is not confirmed as accurate with a 95% level of confidence resulting in an estimated under submission of 109,400 kWh p.a.			
15.37B(b)	Eight items of load are not readily locatable.			
	ICP assignment is not correct for all item submission volumes to the respective NS	ns of load resultin SP.	g in incorrect allocation of	
	208 private lights not recorded against a an annual under submission of approxim	an ICP or included nately 61,000 kWh	in submission resulting in n.	
	One item of load with the incorrect ball submission of 8.542 kWh.	ast applied result	ing in an estimated under	
	Livening dates not recorded for new con	nections.		
	The monthly database extract provided of is provided as a snapshot.	does not track cha	anges at a daily basis and	
	Potential impact: High			
	Actual impact: High			
	Audit history: Multiple times			
From: 01-Feb-23	Controls: Moderate			
To: 30-Jun-23	Breach risk rating: 6			
Audit risk rating	Rationale for audit risk rating			
High	The controls are rated as moderate as improvements have been undertaken to capture and maintain the database attributes and PCC is investigating developing a policy around the management of private lights.			
	The audit risk rating is high based on kWh variances.			
Actions ta	aken to resolve the issue	Completion date	Remedial action status	
Eight items of load – PCC will update this information once the AMDS migration as Road allocation in RAMM is disabled.		31/10/2023	Identified	
ICP Assignment for incorrect NSP - Meridian is currently working with WE to assign the items of load to the correct NSP's.		31/10/2023		
One item of load with the incorrect ballast – PCC has now corrected.		24/7/2023		
208 private lights – PCC met with WE and are collaborating on a solution to fix this issue.		31/10/2023		
Livening dates not recorded for new connections – Meridian and PCC are currently reviewing the new connections process for improvement on notifications and updates.		31/10/2023		

Preventative actions taken to ensure no further issues will occur	Completion date
Meridian will continue to follow up and work with PCC in amending the inaccuracies in the database.	31/10/2023
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.	Ongoing

# 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. 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 the EMS agent audit.

The field audit found that the database accuracy was not confirmed as accurate with a 95% level of confidence resulting in an estimated annual under submission of 109,400 kWh. This is detailed in **section 3.1**.

The database contains 208 private lights which are not recorded against an ICP. They are recorded in the database for completeness so that if a fault is logged for a private light the caller can be advised that the end user needs to arrange the repair.

Little progress has been made in ensuring these private lights are being accounted for in the market settlement process. PCC is reviewing their policy around the recording of private streetlights within their RAMM database with a view to including these lights for the capture of load for submission purposes, but reflecting these lights are privately owned for maintenance and replacement purposes.

These private lights are not part of the monthly capacity report provided to Meridian resulting in an annual under submission of approximately 61,000 kWh. This is discussed further in **section 2.2**, and I have recorded non-compliance below and in **sections 2.1**, **2.2** and **3.1**.

The location information is incomplete for eight items of load where an ICP is recorded by no address information is present to identify where this load located; therefore, these are unable to be confirmed as genuine and requiring inclusion in the calculation of connected load. This is recorded as non-compliance below and in **section 2.3**.

Some database inaccuracies were found as detailed in **section 3.1** and summarised below:

Description	Items of load	Estimated annual kWh impact
Incorrect ballasts applied	1	+8.542

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. The database contains a "light install date" and a "lamp install date" but there is not a field for "livening date" for newly connected lights to reflect when these lights are physically connected. When PCC are retrospectively made aware that lights have been connected the respective ICP Number is assigned to the light so that it is included in the next report provided to Meridian. 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.

# Audit outcome

Non-compliance	Description
Audit Ref: 3.2 With: Clause 15.2 and	Database is not confirmed as accurate with a 95% level of confidence resulting in an estimated under submission of 109,400 kWh p.a.
15.37B(c)	Eight items of load are not readily locatable.
	208 private lights not recorded against an ICP or included in submission resulting in an annual under submission of approximately 61,000 kWh.
	One item of load with the incorrect ballast applied resulting in an estimated under submission of 8.542 kWh.
	Livening dates not recorded for new connections.
	Potential impact: High
	Actual impact: High
	Audit history: Multiple times
From: 01-Feb-23	Controls: Moderate
To: 30-Jun-23	Breach risk rating: 6

Audit risk rating	Rationale for audit risk rating		
High	The controls are rated as moderate as improvements have been undertaken to capture and maintain the database attributes and PCC is investigating developing a policy around the management of private lights.		
The audit risk rating is high based on kwn variances.			
Actions taken to resolve the issue		Completion date	Remedial action status
Eight items of load – PCC will update this information once the AMDS migration as Road allocation in RAMM is disabled.		31/10/2023	Identified
One item of load with the incorrect ballast – PCC has now corrected.		24/7/2023	
208 private lights – PCC met with WE and are collaborating on a solution to fix this issue.		31/10/2023	
Livening dates not recorded for new connections – Meridian and PCC are currently reviewing the new connections process for improvement on notifications and updates.		31/10/2023	
Preventative actions taken to ensure no further issues will occur		Completion date	
Meridian will continue to follow up and work with PCC in amending the inaccuracies in the database.		31/10/2023	

# CONCLUSION

A RAMM database is managed by PCC in relation to this load. The database is remotely hosted by thinkproject New Zealand Ltd.

Field work and new light installations are carried out by Fulton Hogan, who update the database using Pocket RAMM. Field work and new light installations are carried out by Fulton Hogan, who update the database using Pocket RAMM. Park lights are maintained in the RAMM database by the parks team.

PCC have made good progress in resolving a number of issues during this audit period:

- all parks and property lights are now accounted for in the database,
- all active and connected lights have non-zero-watt capacity recorded and checks are now in place to capture these prior to providing Meridian the monthly database snapshot, and
- all of the previous audit exceptions have been investigated and most have corrections applied to the database and a few of the remaining corrections are pending a system upgrade scheduled for September 2023.

This audit found the accuracy of the database has improved during this audit period reflecting the progress PCC has made around the day-to-day management of this database.

Result	Percentage	Comments	
The point estimate of R	111.0	Wattage from survey is higher than the database wattage by 11%	
RL	101.7	With a 95% level of confidence, it can be concluded that the error could be between +1.7% and +27.0%	
R <sub>H</sub>	127.0		

Database accuracy is described as follows:

In absolute terms, total annual consumption is estimated to be 109,400 kWh higher than the DUML database indicates. This is an improvement from the 192,300 kWh of over submission reported in the last audit.

The audit found six non-compliances and makes four recommendations.

The future risk rating of 28 indicates that the next audit be completed in three months. This is an improvement from the last audit's risk rating of 34. PCC have made good progress in addressing a number of the issues identified from the previous audit and also the field audit discrepancies identified in this audit. I recommend that the next audit date is nine months (1 April 2024).

# PARTICIPANT RESPONSE