ELECTRICITY INDUSTRY PARTICIPATION CODE
DISTRIBUTED UNMETERED LOAD AUDIT REPORT

VERITEK

For

PORIRUA CITY COUNCIL
AND MERIDIAN ENERGY LIMITED

Prepared by: Steve Woods

Date audit commenced: 31 May 2022

Date audit report completed: 29 July 2022

Audit report due date: 31 July 2022

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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 managed by the parks team.

PCC have worked to improve the database accuracy during the audit period. This audit found the accuracy has improved overall. There is still a way to go to get the database to the required accuracy level.

Database accuracy is described as follows:

Result	Percentage	Comments
The point estimate of R	109.4	Wattage from survey is higher than the database wattage by 9.4%
R_L	102.4	With a 95% level of confidence, it can be concluded that the error could be between +2.4% and +26.7%
R_H	126.7	

In absolute terms, total annual consumption is estimated to be 92,800 kWh higher than the DUML database indicates. This is a decline from the 14,600 kWh of under submission reported in the last audit.

PCC have now added 206 of the 440 parks and property lights discussed in the last audit. The remaining 234 items of load are still to be added. I used the average wattage of the Parks and Property lights that are in RAMM (62 watts) and estimate that there is under submission of 62,860 kWh per annum. This is a decline from the estimated annual under submission of 54,549 kwh recorded in the last audit.

The future risk rating of 23 indicates that the next audit be completed in three months. This is a decline from the last audit's risk rating of 22. I recommend that the next audit date is January 2023 and expect this will show further improvement as database management processes are bedded in.

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 92,800 kWh p.a. 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. Livening dates not recorded for new connections. Under submission of 61,963 kWh due to inaccurate park lighting records in RAMM. The monthly database extract provided does not track changes at a daily basis and is provided as a snapshot.	Moderate	High	6	Identified
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.	Weak	Low	3	Identified
All load recorded in database	2.5	11(2A) of Schedule 15.3	Thirteen additional lamps in the field were not recorded in the database from a sample of 366 items of load.	Moderate	Low	2	Identified
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 92,800 kWh p.a. 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.	Moderate	High	6	Identified

Subject	Section	Clause	Non-Compliance	Controls	Audit Risk Rating	Breach Risk Rating	Remedial Action
			Livening dates not recorded for new connections. Under submission of 61,963 kWh due to inaccurate park lighting records in RAMM. 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 92,800 kWh p.a. One item of load with the incorrect ballast applied resulting in an estimated under submission of 8.542 kWh. Under submission of 61,963 kWh due to inaccurate park lighting records in RAMM. The monthly database extract provided does not track changes at a daily basis and is provided as a snapshot. Livening dates not recorded for new connections.	Moderate	High	6	Identified
					Future Risk Rating		**23**

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

RECOMMENDATIONS

Subject	Section	Description	Recommendation
Description and capacity of load	2.4	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
ICP identifier and items of load	2.2	Mechanism to ensure identified private streetlights from DUML audits are accounted in the market settlement process.	Where private lights are identified as part of a DUML audit, the process to ensure these lights are investigated by the distributor as potential standard unmetered or shared unmetered is not well understood including the ownership or responsibility for following up with the distributor.

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

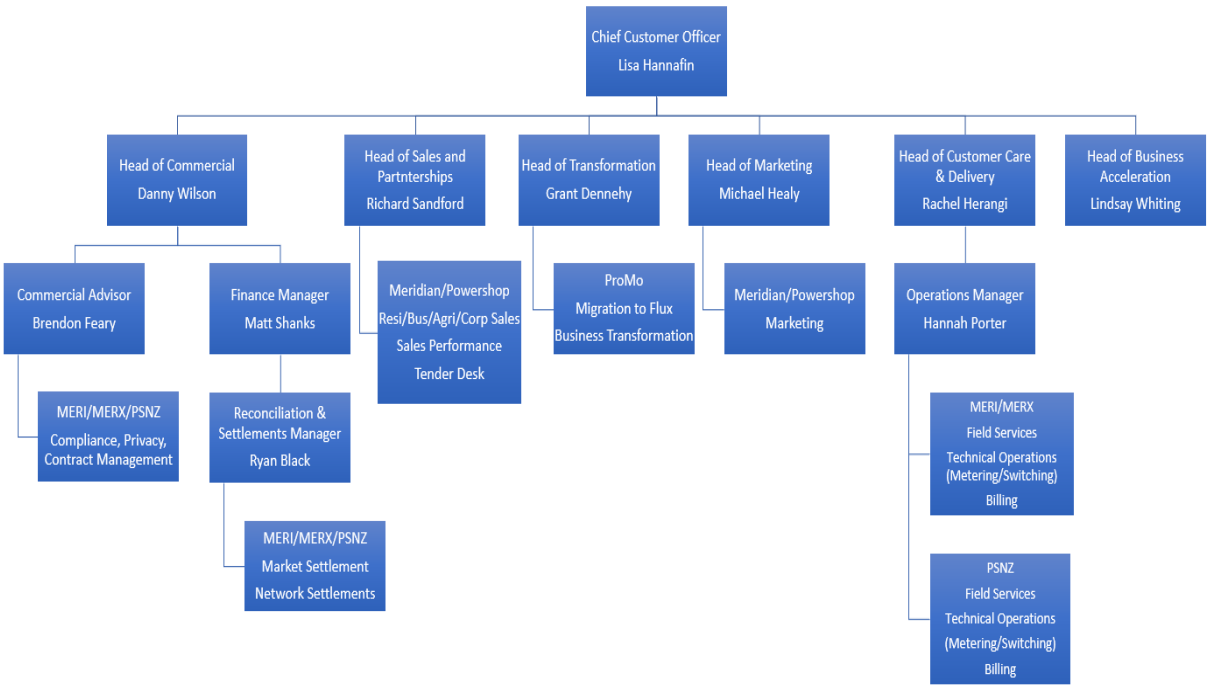
The Electricity Authority's website was reviewed to identify any exemptions relevant to the scope of this audit.

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

Auditors:

Name	Company	Role
Steve Woods	Veritek Limited	Lead Auditor
Bernie Cross	Veritek Limited	Supporting Auditor

Other personnel assisting in this audit were:

Name	Title	Company
Amy Cooper	Compliance Officer	Meridian
Shivam Patel	Operations Engineer Assistant - 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.

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

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

1.5. Breaches or Breach Allegations

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

1.6. ICP Data

ICP Number	Description	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	3,906	163,289
0001256873UNFA3	MASTER ICP PCC Streetlight – PNI0331	DST	1,391	55,244
0000161078CKA46	MASTER ICP PCC PARKS # PNI0331	DST	140	7,564
0000161079CK603	PCC PARKS #TKR0331 TOTAL ASSETS	DST	59	4,061
Total			**5,503**	**231,531**

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.

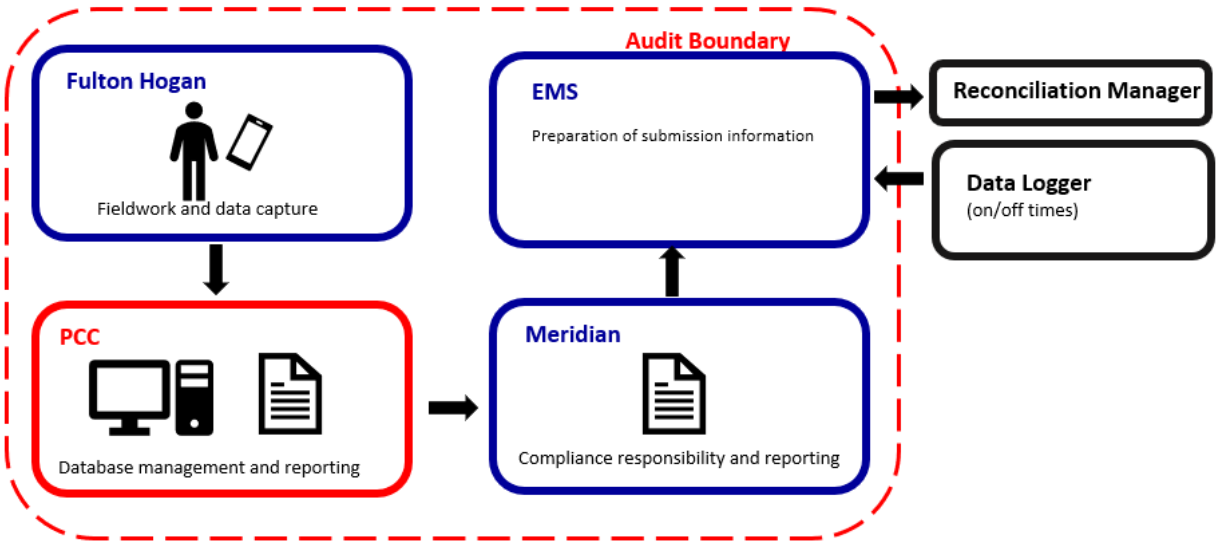
The scope of the audit encompasses the collection, security and accuracy of the data, including the preparation of submission information.

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 managed by the parks team.

The diagram below shows the audit boundary for clarity.



The field audit was undertaken of a statistical sample of 366 items of load on 23 June 2022.

1.9. Summary of previous audit

The previous audit was completed in December 2021 by Rebecca Elliot of Veritek Limited. Five non-compliances were identified, and no 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	Under submission of 14,600 kWh due to: • inaccurate parks lighting records in RAMM, • 257 items of load with the incorrect ballast applied, and • 2,026 LED lights recorded with the incorrect wattage. The monthly database extract provided does not track changes at a daily basis and is provided as a snapshot. Under submission of 54,549 kWh due to inaccurate parks lighting records in RAMM. Livening dates not recorded for new connections. Database is not confirmed as accurate with a 95% level of confidence as recorded in section 3.1.	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
All load recorded in database	2.5	11(2A) of Schedule 15.3	Two additional lamps in the field were not recorded in the database from a sample of 302 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 14,600 kWh p.a. • eight items of load are not readily locatable, • 257 items of load with the incorrect ballast applied resulting in an estimated over submission of 610.75 kWh, • 2,026 LED lights recorded with the incorrect wattage resulting in an estimated over submission of 8,798kWh per annum, • livening dates not recorded for new connections, and • under submission of 54,549 kWh due to inaccurate parks lighting records in RAMM.	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 14,600 kWh p.a. • 257 items of load with the incorrect ballast applied resulting in an estimated over submission of 610.75 kWh, • 2,026 LED lights recorded with the incorrect wattage resulting in an estimated over submission of 8,798kWh per annum, • under submission of 54,549 kWh due to inaccurate parks lighting records in RAMM, • the monthly database extract provided does not track changes at a daily basis and is provided as a snapshot, and • livening dates not recorded for new connections.	Still existing

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

Code reference

Clause 16A.26 and 17.295F

Code related audit information

Retailers must ensure that DUML database audits are completed:

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

Audit observation

Meridian have requested Veritek to undertake this streetlight audit.

Audit commentary

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 EMS' agent audit.

The capacities supplied to EMS for May 2022 were checked and I identified that there are some variances when compared to the provided DUML database for May 2022. I reviewed both datasets further in detail and confirmed that the total lamps and wattages were consistent between these datasets, therefore no overall impact to submission volumes. The cause of the discrepancy was identified as a change in allocation of lamps between the Master PCC PNI0331 and PCC Parks PNI0331 ICPs that was performed in the time between the Audit dataset extract and the month end submission extract. The table below details the lamp counts and wattage differences between ICPs.

This change in lamp counts between PCC and Parks is detailed in **Section 3.1**.

ICP	Description	Source	Count of Lamps	Sum of total wattage	Capacity (kW)
0000023024WE5D5	PCC Property – TKR0331	RAMM	9	1341	1.341
		May Extract	9	1341	1.341
0000161078CKA46	MASTER ICP PCC PARKS # PNI0331	RAMM	140	7596	7.596
		May Extract	141	7608	7.608
0000161079CK603	PCC PARKS #TKR0331 TOTAL ASSETS	RAMM	59	4061	4.061
		May Extract	67	4661	4.661
0001255308UN5C4	MASTER ICP PCC Streetlight – TKR0331	RAMM	3904	163288.8	163.289
		May Extract	3895	162678.8	162.679
0001256873UNFA3	MASTER ICP PCC Streetlight – PNI0331	RAMM	1391	55244	55.244
		May Extract	1391	55244	55.244
Grand Total		**RAMM**	**5503**	**231530.8**	**231.531**
		May Extract	**5503**	**231532.8**	**231.533**

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 92,800 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
Inaccurate parks lighting information in RAMM	234	+61,963

The location information is incomplete for eight items of load therefore these are unable to be confirmed as 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. 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-compliant

Non-compliance	Description
Audit Ref: 2.1 With: Clause 11(1) of Schedule 15.3 From: 02-Dec-21 To: 31-May-22	Database is not confirmed as accurate with a 95% level of confidence resulting in an estimated under submission of 92,800 kWh p.a. 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. Livening dates not recorded for new connections. Under submission of 61,963 kWh due to inaccurate park lighting records in RAMM. The monthly database extract provided does not track changes at a daily basis and is provided as a snapshot. Potential impact: High Actual impact: High Audit history: Multiple times Controls: Moderate Breach risk rating: 6
Audit risk rating	**Rationale for audit risk rating**
High	The controls over the database are rated as moderate as PCC are working to improve the database accuracy but there is still room for improvement. The audit risk rating is high based on kWh variances detailed above.

Actions taken to resolve the issue	Completion date	Remedial action status
Meridian has met with the council to discuss the inaccuracies identified. There have been a number of staff changes at the council that have impacted progress on remedial work to the RAMM database. There is now a new staff member assigned to look after the database and they intend to work on resolving the inaccuracies and ongoing issues that have been identified.	30/04/2023	Identified
Preventative actions taken to ensure no further issues will occur	**Completion date**	
Meridian will continue to follow up with PCC to complete the required corrections and to maintain the installed updates and changes to the database. We have also strongly recommended a full field audit be completed to fully resolve all existing inaccuracies	Ongoing	

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 database contains 216 private lights which are not recorded against an ICP, it has been confirmed that these are not the responsibility of Porirua CC. These lights have been provided on multiple occasions to Wellington Electricity to check that these are being reconciled as either standard unmetered load or shared unmetered load against the relevant ICPs. No progress has been made in ensuring these private lights are being accounted for in the market settlement process. These private lights are contributing approximately 77,000 kWh of UFE annually and I have recorded the lack of progress in ensuring these lights are included in the market settlement process as an issue.

Issue	Section	Clause	Description
Mechanism to ensure identified private streetlights from DUML audits are accounted in the market settlement process.	2.2	Clause 11(3)(e) Part 11	Where private lights are identified as part of a DUML audit, the process to ensure these lights are investigated by the distributor as potential standard unmetered or shared unmetered is not well understood including the ownership or responsibility for following up with the distributor.

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

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 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.

28 items of load do not have GPS coordinates. Of these, eight items of load do not have sufficient other information to enable them to be located. The house number, road, suburb and pole number fields are not populated for these eight items of load. These eight items of load were recently added to the database, with pole and lamp install dates of 3 December 2021. These were the same records as identified in the last audit.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 2.3 With: Clause 11(2)(b) of Schedule 15.3 From: 03-Dec-21 To: 31-May-22	Eight items of load do not have sufficient location information to enable them to be readily locatable. Potential impact: Low Actual impact: Low Audit history: Multiple times Controls: Weak Breach risk rating: 3
Audit risk rating	**Rationale for audit risk rating**
Low	The controls are recorded as weak because no progress has been achieved from previous audits. The impact is rated as low as there are only eight items of load that are not readily locatable.

Actions taken to resolve the issue	Completion date	Remedial action status
Meridian has met with the council to discuss the inaccuracies identified. There have been a number of staff changes at the council that have impacted progress on remedial work to the RAMM database. There is now a new staff member assigned to look after the database and they intend to work on resolving the inaccuracies and ongoing issues that have been identified.	31/01/2023	Identified
Preventative actions taken to ensure no further issues will occur	**Completion date**	
Meridian will continue to follow up with PCC to complete the required corrections and to maintain the installed updates and changes to the database. We have also strongly recommended a full field audit be completed to fully resolve all existing inaccuracies.	Ongoing	

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.

I checked LED lamp wattages against available specification sheets and found that some Italo 35.5W lamps are incorrectly recorded in the database as 36W. This will be resulting in an over submission of volume.

I was unable to confirm the wattage of 25 models of LED lamps which amount to 1,202 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 audit and no progress has been achieved to date. I have recorded this as a 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.	Veritek arranged for a meeting with the Council and Meridian to discuss the inaccuracies. There is now a new staff member that in now assigned to the role. They will work on resolving the inaccuracies and ongoing issues that have been identified. Meridian will continue to follow up with PCC to complete the required corrections and to maintain the installed updates and changes to the database.	Identified

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 302 items of load. The sample was selected from five strata, as follows:

- roads A-D,
- roads E-K,
- roads L-O,

- roads P-S, and
- roads T-Z.

Audit commentary

The field audit discrepancies are detailed below:

Street	Database count	Field count	Light count differences	Wattage recorded incorrectly	Comments
APPLE TERRACE	8	8		1	1 x 23W LED recorded as 26W LED
ASTROLABE ST	22	21	-1	4	2 x L36 mislabelled as L26, 1 x L16 mislabelled as L26, 1 x L10? Mislabelled as L26, 1 x L26 not found
BODMIN TERRACE	11	11		1	1 x 50 HPS? Mislabelled as L36 in walkway to Padstow
CHAPEL STREET EAST	2	2		1	1x L26 mislabelled as L36
DISCOVERY DRIVE	55	54	-1	1	2 x L50? Mislabelled as MV50w, 2 x L50? Mislabelled as L27. 1 x 70 HPS not found,
GRAPNEL LANE	2	2		1	1 x L16 mislabelled as L28.4
HICKS CLOSE	7	7		1	1 x L23 mislabelled as L36
KEN DOUGLAS DRIVE	14	14		1	1 x L30 mislabelled as L36
LAKE LOOKOUT	7	18	11	7	6 x L35.5 mislabelled as L36, 2 x L98 missing, 6 x twin Fluro missing, 3 x L50? missing
MCKILLOP STREET	30	31	+1	4	3 x L26 mislabelled as L36, L28 mislabelled as L36, Dual L99 mislabelled as single L36
OKOWAI ROAD	4	4		2	2 x L28A mislabelled as L36
ST AUSTELL CLOSE	5	4	-1		Coordinates place 1 lamp in St Ives Dr
TAVERN LANE	6	7	+1	6	6 x L35.5 mislabelled as L36, 1 x L200? Missing
WALTON LEIGH AVENUE	14	14	-	1	One L28 mislabelled as L36
WHANGA CRESCENT	14	14	-	6	5 x L36 mislabelled as L26, L16 mislabelled as L26
Grand Total	**366**	**376**	**16 (+13/-3)**	**37**	

The field audit found thirteen additional lights and could not find three lights listed in the database. This is recorded as non-compliance below.

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

Street	May 2021	December 2021	Jun 2022
Incorrect wattages	51	19	37
Additional lights	5	2	13
Missing lights	11	2	3

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

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 2.5 With: Clause 11(2A) of Schedule 15.3 From: 02-Dec-21 To: 31-May-22	Thirteen additional lamps in the field were not recorded in the database from a sample of 366 items of load. Potential impact: Low Actual impact: Low Audit history: Multiple times Controls: Moderate Breach risk rating: 2
Audit risk rating	**Rationale for audit risk rating**
Low	The controls are rated as moderate as PCC have strengthened their database accuracy by committing to undertaking a field audit and data capture is expected to be more accurate going forward. Most of the missing lamps relate to a single street. 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
Meridian has met with the council to discuss the inaccuracies identified. There have been a number of staff changes at the council that have impacted progress on remedial work to the RAMM database. There is now a new staff member assigned to look after the database and they intend to work on resolving the inaccuracies and ongoing issues that have been identified.	30/01/2023	Identified
Preventative actions taken to ensure no further issues will occur	**Completion date**	
Meridian will continue to follow up with PCC to complete the required corrections and to maintain the installed updates and changes to the database.	Ongoing	

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 5,303 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-D, • roads E-K, • roads L-O, • roads P-S, and • roads T-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 40 sub-units.
Total items of load	366 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 366 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	109.4	Wattage from survey is higher than the database wattage by 1.5%
R_L	102.4	With a 95% level of confidence, it can be concluded that the error could be between +2.4% and +26.7%
R_H	126.7	

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 2.4% and 26.7% 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 22 kW higher than the database indicates.

There is a 95% level of confidence that the installed capacity is between 6 kW to 62 kW higher than the database.

In absolute terms, total annual consumption is estimated to be 92,800 kWh higher than the DUML database indicates.

There is a 95% level of confidence that the annual consumption is between 24,000 kWh p.a. to 264,500 kWh p.a. higher than the database indicates.

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

Lamp description and capacity accuracy

I checked the 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 Type	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 checked LED lamp wattages against available specification sheets and found that some Italo 35.5W lamps are incorrectly recorded in the database as 36W. This will be resulting in an over submission of volume.

I was unable to confirm the wattage of 25 models of LED lamps which amount to 1,202 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 audit and no progress has been achieved to date. I have recorded this as a recommendation in **section 2.2.**

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

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

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.

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. Lights can be livened prior to “vesting” and PCC will not take responsibility for the consumption until “vesting” occurs. The new connections process will need to be revised and it’s possible separate ICPs may be required for the developer in situations where lighting is livened but is not the responsibility of PCC. 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 the previous audit, PCC provided the results of a full field survey of Parks and Property lights. This audit found that there were 440 lights. 206 are now within the RAMM database – a decline from 220

from the last due to some lights being reassigned to PCC. The remaining 234 items of load are still to be added. I used the average wattage of the Parks and Property lights that are in RAMM (62 watts) and estimate that there is under submission of 61,963 kWh per annum. This is a decline in accuracy from the estimated annual under submission 54,000 kwh recorded in the last audit due to the reassignment of lights between Parks and Property and the main PCC account.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 3.1 With: Clause 15.2 and 15.37B(b) From: 02-Dec-21 To: 31-May-22	Database is not confirmed as accurate with a 95% level of confidence resulting in an estimated under submission of 92,800 kWh p.a. 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. Livening dates not recorded for new connections. Under submission of 61,963 kWh due to inaccurate park lighting records in RAMM. The monthly database extract provided does not track changes at a daily basis and is provided as a snapshot. Potential impact: High Actual impact: High Audit history: Multiple times Controls: Moderate Breach risk rating: 6
Audit risk rating	**Rationale for audit risk rating**
High	The controls over the database are rated as moderate as PCC are working to improve the database accuracy but there is still room for improvement. The audit risk rating is high based on kWh variances.

Actions taken to resolve the issue	Completion date	Remedial action status
Meridian has met with the council to discuss the inaccuracies identified. There have been a number of staff changes at the council that have impacted progress on remedial work to the RAMM database. There is now a new staff member assigned to look after the database and they intend to work on resolving the inaccuracies and ongoing issues that have been identified.	30/04/2023	Identified
Preventative actions taken to ensure no further issues will occur	**Completion date**	
Meridian will continue to follow up with PCC to complete the required corrections and to maintain the installed updates and changes to the database. We have also strongly recommended a full field audit be completed to fully resolve all existing inaccuracies.	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 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 92,800 kWh. This is detailed in **section 3.1**.

The location information is incomplete for eight items of load therefore these are unable to be confirmed as 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
Inaccurate parks lighting information in RAMM	234	+62,860

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. 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-compliant

Non-compliance	Description
Audit Ref: 3.2 With: Clause 15.2 and 15.37B(c) From: 02-Dec-21 To: 31-May-22	Database is not confirmed as accurate with a 95% level of confidence resulting in an estimated under submission of 92,800 kWh p.a. 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. Livening dates not recorded for new connections. Under submission of 61,963 kWh due to inaccurate park lighting records in RAMM. Potential impact: High Actual impact: High Audit history: Multiple times Controls: Moderate Breach risk rating: 6
Audit risk rating	**Rationale for audit risk rating**
High	The controls over the database are rated as moderate as PCC are working to improve the database accuracy but there is still room for improvement. The audit risk rating is high based on kWh variances.

Actions taken to resolve the issue	Completion date	Remedial action status
Meridian has met with the council to discuss the inaccuracies identified. There have been a number of staff changes at the council that have impacted progress on remedial work to the RAMM database. There is now a new staff member assigned to look after the database and they intend to work on resolving the inaccuracies and ongoing issues that have been identified.	30/04/2023	Identified
Preventative actions taken to ensure no further issues will occur	**Completion date**	
Meridian will continue to follow up with PCC to complete the required corrections and to maintain the installed updates and changes to the database. We have also strongly recommended a full field audit be completed to fully resolve all existing inaccuracies.	Ongoing	

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. Park lights are managed by the parks team.

PCC have worked to improve the database accuracy during the audit period. This audit found the accuracy has improved overall. There is still a way to go to get the database to the required accuracy level.

Database accuracy is described as follows:

Result	Percentage	Comments
The point estimate of R	109.4	Wattage from survey is higher than the database wattage by 9.4%
R_L	102.4	With a 95% level of confidence, it can be concluded that the error could be between -2.4% and +26.7%
R_H	126.7	

In absolute terms, total annual consumption is estimated to be 92,800 kWh higher than the DUML database indicates. This is a decline from the 14,600 kWh of under submission reported in the last audit.

PCC have now added 206 of the 440 parks and property lights discussed in the last audit. The remaining 234 items of load are still to added. I used the average wattage of the Parks and Property lights that are in RAMM (62 watts) and estimate that there is under submission of 61,963 kWh per annum. This is a decline from the estimated annual under submission of 14,600 kwh recorded in the last audit.

The future risk rating of 23 indicates that the next audit be completed in three months. This is a slight decline from the last audit's risk rating of 22. I recommend that the next audit date is January 2023 and expect this will show further improvement as database management processes are bedded in.

PARTICIPANT RESPONSE