ELECTRICITY INDUSTRY PARTICIPATION CODE
DISTRIBUTED UNMETERED LOAD AUDIT REPORT

VERITEK

For

THAMES COROMANDEL DISTRICT COUNCIL AND MERIDIAN ENERGY

Prepared by: Steve Woods

Date audit commenced: 19 October 2020

Date audit report completed: 30 November 2020

Audit report due date: 01-Dec-20

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EXECUTIVE SUMMARY

This audit of the **Thames Coromandel District Council Unmetered Streetlights (TCDC)** DUML database and processes was conducted at the request of **Meridian Energy** (**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 statistical field audit undertaken as part of this audit confirmed that the database is within the acceptable accuracy threshold of +/- 5%.

Power Solutions continue to manage the database on behalf of the TCDC. McKay Electrical are the field contractor.

I note the TCDC ICP is still recorded against the NZTA lights, but these items of load are being reconciled by Genesis against ICP 0001425637UN339. There is no impact on reconciliation, but the ICP identifier should be updated.

There were a small number of incorrect ballasts applied resulting in a very minor under submission. Overall, the database accuracy is high with robust processes to manage the load.

This audit found four non-compliances and makes no recommendations. The future risk rating of eight indicates that the next audit be completed in 18 months. I have considered this in conjunction with Meridian's comments and I agree with the 18 month audit period.

The matters raised are detailed below:

AUDIT SUMMARY

NON-COMPLIANCES

Subject	Section	Clause	Non-Compliance	Controls	Audit Risk Rating	Breach Risk Rating	Remedial Action
Deriving submission information	2.1	11(1) of Schedule 15.3	61 incorrect ballasts are recorded in the RAMM database resulting in a minor under submission of 355 kWh per annum. Submission is based on a snapshot and does not consider historic adjustments.	Moderate	Low	2	Identified
All load recorded in the database	2.5	11(2A) of Schedule 15.3	Six items of load are missing from the database.	Moderate	Low	2	Identified
Database accuracy	3.1	15.2 and 15.37B(b)	61 incorrect ballasts are recorded in the RAMM database resulting in a minor under submission of 355 kWh per annum. 394 NZTA items of load with the incorrect ICP identifier applied.	Moderate	Low	2	Identified
Volume information accuracy	3.2	15.2 and 15.37B(c)	61 incorrect ballasts are recorded in the RAMM database resulting in a minor under submission of 355 kWh per annum. The data used for submission does not track changes at a daily basis and is provided as a snapshot.	Moderate	Low	2	Identified
Future Risk Rating						8	

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

RECOMMENDATIONS

Subject	Section	Description	Action
		Nil	

ISSUES

Subject	Section	Description	Issue
		Nil	

1. ADMINISTRATIVE

1.1. Exemptions from Obligations to Comply with Code

Code reference

Section 11 of Electricity Industry Act 2010.

Code related audit information

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

Audit observation

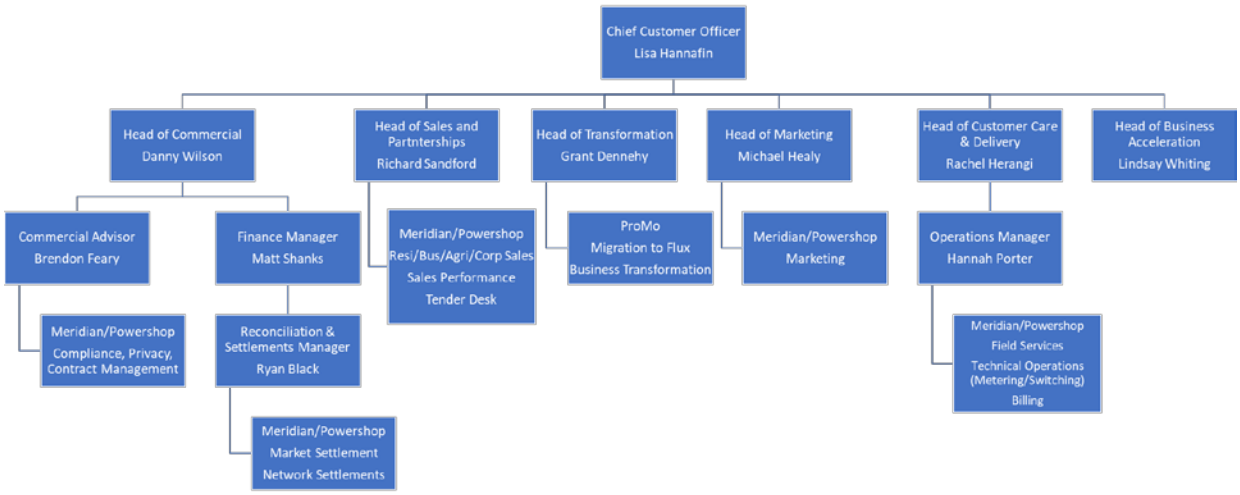
Section 11 of the Electricity Industry Act provides for the Electricity Authority to exempt any participant from compliance with all or any of the clauses.

Audit commentary

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:

Name	Company	Role
Steve Woods	Veritek Limited	Lead Auditor
Claire Stanley	Veritek Limited	Supporting Auditor

Other personnel assisting in this audit were:

Name	**Title**	**Company**
Helen Youngman	Energy Data Analyst	Meridian Energy
Amy Cooper	Compliance Officer	Meridian Energy
Edwin de Beun	Projects Engineer	Power Solutions
Miriam Odlin	Electrical Engineer	Power Solutions

1.4. Hardware and Software

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

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

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

1.5. Breaches or Breach Allegations

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

1.6. ICP Data

ICP Number	**Description**	**NSP**	**Profile**	**Number of items of load**	**Database wattage (watts)**
0001425630UNEF3	Thames Coromandel District Council	KPU0661	DST	3,587	180,646

1.7. Authorisation Received

All information was provided directly by Meridian or Power Solutions.

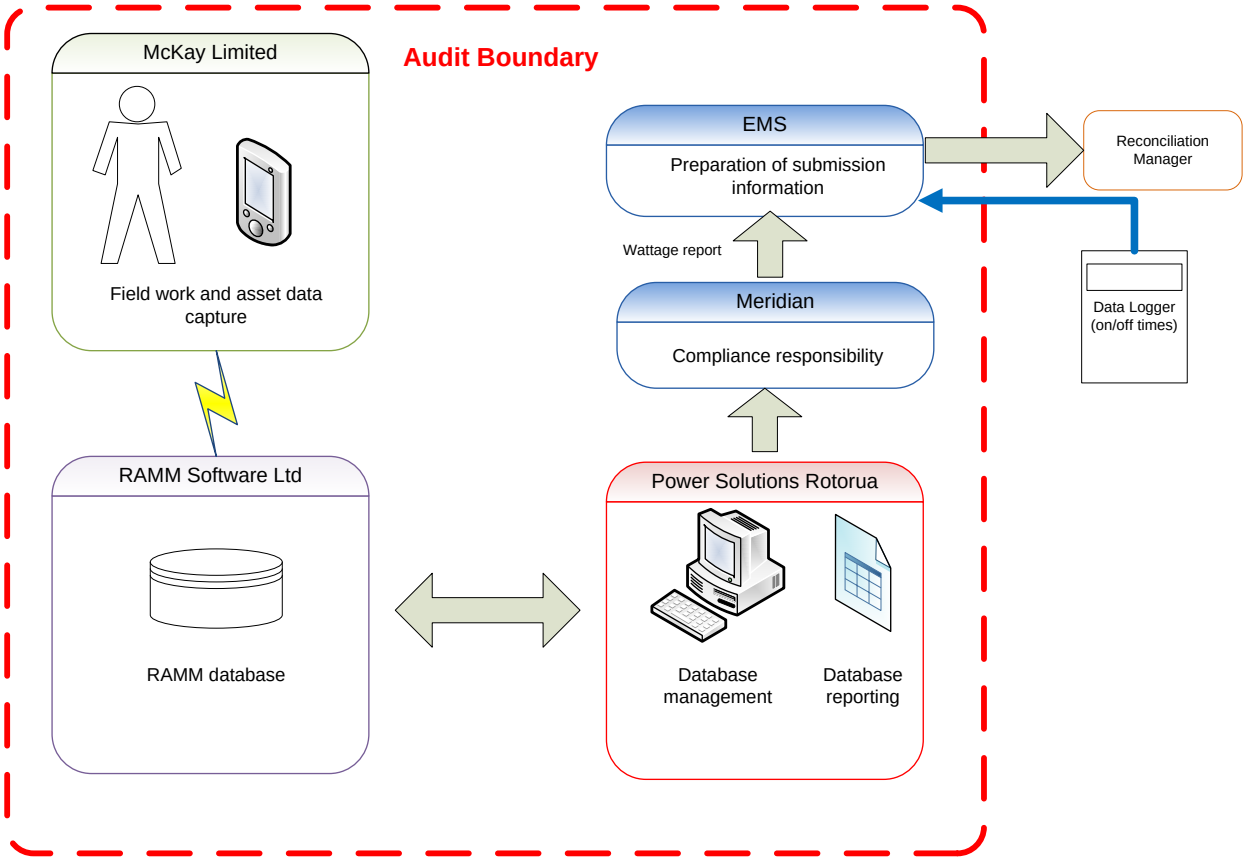
1.8. Scope of Audit

This audit of the **Thames Coromandel District Council Unmetered Streetlights (TCDC**) DUML database and processes was conducted at the request of **Meridian Energy (Meridian**), in accordance with clause 15.37B. The purpose of this audit is to verify that the volume information is being calculated accurately, and that profiles have been correctly applied.

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

The database is remotely hosted by RAMM Software Ltd and is managed by PSL, on behalf of TCDC, who is Meridian's customer. The fieldwork and asset data capture are conducted by McKay Electrical.

The scope of the audit encompasses the collection, security and accuracy of the data, including the preparation of submission information based on the database reporting. The diagram below shows the audit boundary for clarity.



The field audit was undertaken of a statistical sample of 280 items of load on 19th and 20th October 2020.

1.9. Summary of previous audit

The last audit report was undertaken by Rebecca Elliot of Veritek Limited in November 2019. The current status of those audit's findings is detailed below:

Table of Non-Compliance

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. 17 incorrect LED wattages resulting in a minor over submission of 354.49kWh per annum. The data used for submission does not track changes at a daily basis and is provided as a snapshot.	Cleared Cleared Still existing
All load recorded in the database	2.5	11(2A) of Schedule 15.3	Items of load are missing from the database.	Still exisiting
Database accuracy	3.1	15.2 and 15.37B(b)	Database is not confirmed as accurate with a 95% level of confidence. 31 incorrect ballasts are recorded in the RAMM database. 17 incorrect LED wattages resulting in a minor over submission of 354.49kWh per annum.	Cleared Still existing Cleared
Volume information accuracy	3.2	15.2 and 15.37B(c)	Database is not confirmed as accurate with a 95% level of confidence. 17 incorrect LED wattages resulting in a minor over submission of 354.49kWh per annum. The data used for submission does not track changes at a daily basis and is provided as a snapshot.	Cleared Cleared Still existing

Table of Recommendations

Subject	Section	Recommendation for Improvement	Status
Database Accuracy	3.1	LED light specifications to be provided for next audit to confirm the correct wattage is recorded in the database.	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

This audit report confirms that the requirement to conduct an audit has been met for this database within the required timeframe.

Audit outcome

Compliant

2. DUML DATABASE REQUIREMENTS

2.1. Deriving submission information (Clause 11(1) of Schedule 15.3)

Code reference

Clause 11(1) of Schedule 15.3

Code related audit information

The retailer must ensure the:

- *DUML database is up to date*
- *methodology for deriving submission information complies with Schedule 15.5.*

Audit observation

The process for calculation of consumption was examined and the application of profiles was checked. The database was checked for accuracy.

Audit commentary

Meridian reconciles this DUML load using the DST profile. The total volume submitted to the Reconciliation Manager is based on a monthly database report derived from RAMM and the "burn time" which is sourced from data loggers installed on the Powerco networks. Meridian supplies EMS with the capacity information and EMS calculates the kWh figure for the 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 indicated that the database was within the allowable +/-5% variance threshold and is therefore deemed to be accurate.

I checked the submission values for August 2020 and found a small difference:

ICP	kW value submitted	Calculated kW value from database	kWh Differences
0001425630UNEF3	112.61	180.646	-68.036

This relates to the NZTA lights that are being reconciled by Genesis Energy against ICP 0001425637UN339. Therefore, with these confirmed as excluded from submission, the submission was confirmed to be accurate. The incorrect ICP recorded against the NZTA is recorded as non-compliance in **section 3.1**.

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

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 2.1 With: Clause 11(1) of Schedule 15.3 From: 23-Nov-19 To: 08-Sep-20	61 incorrect ballasts are recorded in the RAMM database resulting in a minor under submission of 355 kWh per annum. Submission is based on a snapshot and does not consider historic adjustments. Potential impact: Low Actual impact: Low Audit history: Three times previously Controls: Moderate Breach risk rating: 2
Audit risk rating	**Rationale for audit risk rating**
Low	The controls are rated as moderate, because they are sufficient to ensure that changes to the database are correctly recorded most of the time. The impact is assessed to be low as the number of changes is minimal therefore the impact of using a snapshot will be low to none.

Actions taken to resolve the issue	Completion date	Remedial action status
Audit findings will be provided to TCDC to be addressed with PSL	Dec 2020	Identified
Preventative actions taken to ensure no further issue will occur	**Completion date**	

2.2. ICP identifier and items of load (Clause 11(2)(a) and (aa) of Schedule 15.3)

Code reference

Clause 11(2)(a) and (aa) of Schedule 15.3

Code related audit information

The DUML database must contain:

- *each ICP identifier for which the retailer is responsible for the DUML*
- *the items of load associated with the ICP identifier.*

Audit observation

The database was checked to confirm the correct ICP was recorded against each item of load.

Audit commentary

All items of load in RAMM have an ICP number recorded. The accuracy of the ICP applied is discussed in **section 3.1**.

Audit outcome

Compliant

2.3. Location of each item of load (Clause 11(2)(b) of Schedule 15.3)

Code reference

Clause 11(2)(b) of Schedule 15.3

Code related audit information

The DUML database must contain the location of each DUML item.

Audit observation

The database was checked to confirm the location is recorded for all items of load.

Audit commentary

The database contains the nearest street address for all items of load and most have a GPS location recorded.

Audit outcome

Compliant

2.4. Description and capacity of load (Clause 11(2)(c) and (d) of Schedule 15.3)

Code reference

Clause 11(2)(c) and (d) of Schedule 15.3

Code related audit information

The DUML database must contain:

- *a description of load type for each item of load and any assumptions regarding the capacity*
- *the capacity of each item in watts.*

Audit observation

The database was checked to confirm that it contained a field for lamp type and wattage capacity and included any ballast or gear wattage and that each item of load had a value recorded in these fields.

Audit commentary

The database contains two records for wattage, firstly the lamp wattage and secondly the gear wattage, which represents ballast losses. The lamp description is recorded in the database which meets the requirements of this clause. The database was examined and found one item with an incorrect Lamp Model description. The accuracy of the recorded wattage information is discussed in **section 3.1**.

Audit outcome

Compliant

2.5. All load recorded in database (Clause 11(2A) of Schedule 15.3)

Code reference

Clause 11(2A) of Schedule 15.3

Code related audit information

The retailer must ensure that each item of DUML for which it is responsible is recorded in this database.

Audit observation

The field audit was undertaken of a statistical sample of 280 items of load on 19th and 20th October 2020.

Audit commentary

The field audit findings are detailed in the table below:

Street	Database count	Field count	Light count differences	Wattage recorded incorrectly	Comments
THE ESPLANADE (WHITIANGA)	31	37	+6		6 x 15W additional LED lamps found in the field
Grand Total	**280**	**286**	**+6**		

The field audit found six more lamps in the field than were recorded in the database. This is recorded as non-compliance below.

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

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 2.5 With: Clause 11(2A) of Schedule 15.3 From: 30-Sep-19 To: 08-Sep-20	Six items of load are missing from the database. Potential impact: Low Actual impact: Low Audit history: Three times previously Controls: Moderate Breach risk rating: 2
Audit risk rating	**Rationale for audit risk rating**
Low	The controls are rated as moderate, because they are sufficient to ensure that changes to the database are correctly recorded most of the time. The impact is assessed to be low as the database was found to be within the allowable accuracy threshold as detailed in **section 3.**1.

Actions taken to resolve the issue	Completion date	Remedial action status

Audit findings will be provided to TCDC to be addressed with PSL	Dec 2020	Identified
Preventative actions taken to ensure no further issue 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 RAMM database has a complete audit trail of all additions and changes to the database information.

Audit outcome

Compliant

3. ACCURACY OF DUML DATABASE

3.1. Database accuracy (Clause 15.2 and 15.37B(b))

Code reference

Clause 15.2 and 15.37B(b)

Code related audit information

Audit must verify that the information recorded in the retailer's DUML database is complete and accurate.

Audit observation

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

Plan Item	Comments
Area of interest	Thames Coromandel region
Strata	The database contains items of load in Thames Coromandel peninsular. The area has two distinct sub-groups. Urban and Rural. The processes for the management of TCDC items of load are the same, but I decided to place the items of load into three strata, as follows: 1. A-H 2. I-P 3. Q-Y
Area units	I created a pivot table of the roads in each area and I used a random number generator in a spreadsheet to select a total of 61 sub-units.
Total items of load	280 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.

Audit commentary

Field audit findings

A statistical sample of 280 items of load found that the field data was 104.8% of the database data for the sample checked.

Result	Percentage	Comments
The point estimate of R	101.0%	Wattage from survey is higher than the database wattage by 1.0%
R_L	100.0%	With a 95% level of confidence it can be concluded that the error could be between 0.0% to 3.3%
R_H	103.3%	

These results were categorised in accordance with the "Distributed Unmetered Load Statistical Sampling Audit Guideline", effective from 01/02/19. The table below shows that Scenario A (detailed below) applies, and the best available estimate indicates that the database is accurate within ± 5.0%.

- In absolute terms the installed capacity is estimated to be 2 kW higher than the database indicates.
- There is a 95% level of confidence that the installed capacity is between 0 and 6 kW higher than the database.
- In absolute terms, total annual consumption is estimated to be 7,500 kWh higher than the DUML database indicates.
- There is a 95% level of confidence that the annual consumption is between 0 to 25,200 kWh p.a. higher than the database indicates.

Scenario	**Description**
A - **Good accuracy, good precision**	This scenario applies if: (a) R_H is less than 1.05; and (b) R_L is greater than 0.95 The conclusion from this scenario is that: (a) the best available estimate indicates that the database is accurate within +/- 5 %; and (b) this is the best outcome.
B - **Poor accuracy, demonstrated with statistical significance**	This scenario applies if: (a) the point estimate of R is less than 0.95 or greater than 1.05 (b) as a result, either R_L is less than 0.95 or R_H is greater than 1.05. There is evidence to support this finding. In statistical terms, the inaccuracy is statistically significant at the 95% level
C - **Poor precision**	This scenario applies if: (a) the point estimate of R is between 0.95 and 1.05 (b) R_L is less than 0.95 and/or R_H is greater than 1.05 The conclusion from this scenario is that the best available estimate is not precise enough to conclude that the database is accurate within +/- 5 %

Lamp description and capacity accuracy

I checked the wattages being applied in the database and found:

Light Description	Ballast recorded in DB	Correct Ballast to be applied	Number of lights incorrect Ballast applied to:	Wattage difference
57W Compact Fluro	10	5	7	-35
60W CPO-T White (Cosmopolis)	10	6	5	-20
Fluorescent 2 x 30W	11	17	2	12
Mercury vapour 80W	0	10	2	20
Mercury vapour 80W	13	10	3	-9
Mercury vapour 80W	18	19	1	1
Metal Halide 35W	0	10	7	70
Metal Halide 70W	12	13	3	3
Sodium vapour SON 100W	12	14	7	14
Sodium vapour SON 100W, tubular	12	10	6	12
Sodium vapour SON 100W, tubular	18	10	2	-16
Sodium vapour SON 150W	12	18	1	6
Sodium vapour SON 150W	13	18	2	10
Sodium vapour SON 150W	28	18	3	-30
Sodium vapour SON 150W, tubular	13	18	1	5
Sodium vapour SON 250W	18	28	3	30
Sodium vapour SON 250W, tubular	18	28	1	10
Sodium vapour SON 50W, tubular	13	11	1	-2
Sodium vapour SON 70W	12	13	2	2
Grand Total			**61**	**83**

The incorrect ballasts applied will be resulting in an estimated minor under submission of 355 kWh per annum. This is recorded as non-compliance below.

The LED light specifications requested in the previous audit have been provided and confirmed that the correct wattage has been applied.

ICP accuracy

NZTA lighting is included in the database and is recorded against the TCDC ICP. This is the incorrect ICP as these lights are being reconciled against ICP 0001425637UN339. The NZTA ICP needs to be applied to the NZTA items of load. These are not included in the monthly wattage report to Meridian and therefore submission is being correctly calculated. The incorrect ICP is detailed as non-compliance below.

Change management process findings

McKay Electrical enters all field data via "Pocket RAMM" directly into RAMM Contractor. "As built" plans are also provided and PSL then conduct a field check to ensure the database has been populated accurately. The high level of accuracy found in the field audit confirms the process has robust controls.

The process for new connections was reviewed. As-built plans are provided to PSL. PSL then conduct a field check to ensure the database has been populated accurately. PSL are reliant on TCDC to advise of the connection dates for new or replaced items of load. TCDC are still working with Powerco to review the new connection process.

There are no festive lights used in the TCDC area.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 3.1 With: Clause 15.2 and 15.37B(b) From: 30-Nov-19 To: 08-Sep-20	61 incorrect ballasts are recorded in the RAMM database resulting in a minor under submission of 355 kWh per annum. 394 NZTA items of load with the incorrect ICP identifier applied. Potential impact: Low Actual impact: Low Audit history: Twice previously Controls: Moderate Breach risk rating: 2
Audit risk rating	**Rationale for audit risk rating**
Low	The controls are rated as moderate, because they are sufficient to ensure that changes to the database are correctly recorded most of the time. The impact is assessed to be low based on the database inaccuracies found.

Actions taken to resolve the issue	Completion date	Remedial action status
Audit findings will be provided to TCDC to be addressed with PSL	Dec 2020	Identified
Preventative actions taken to ensure no further issue will occur	**Completion date**	

3.2. Volume information accuracy (Clause 15.2 and 15.37B(c))

Code reference

Clause 15.2 and 15.37B(c)

Code related audit information

The audit must verify that:

- *volume information for the DUML is being calculated accurately*
- *profiles for DUML have been correctly applied.*

Audit observation

The submission was checked for accuracy for the month the database extract was supplied. This included:

- checking the registry to confirm that the ICP has the correct profile and submission flag, and
- checking the database extract combined with the burn hours against the submitted figure to confirm accuracy.

Audit commentary

Meridian reconciles this DUML load using the DST profile. The on and off times are derived from a data logger read by EMS and are used to create a shape file. Meridian supplies EMS with the capacity information and EMS calculates the kWh figure for each ICP and includes this in the relevant AV080 file. This process was audited during Meridian's reconciliation participant audit and EMS' agent audit. Compliance was confirmed for both parties.

I compared the RAMM database provided to the capacity information Meridian supplied to EMS for the month of August 2020 and confirmed this to be accurate.

The field audit indicated that the database was within the allowable +/-5% variance threshold and is therefore deemed to be accurate.

A check of the database found 61 lights with the incorrect ballast applied resulting in a very minor under submission of 355 kWh per annum.

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

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 3.2 With: Clause 15.2 and 15.37B(c) From: 30-Nov-19 To: 08-Sep-20	61 incorrect ballasts are recorded in the RAMM database resulting in a minor under submission of 355 kWh per annum. The data used for submission does not track changes at a daily basis and is provided as a snapshot. Potential impact: Low Actual impact: Low Audit history: Three times previously Controls: Moderate Breach risk rating: 2

Audit risk rating	Rationale for audit risk rating		
Low	The controls are rated as moderate, because they are sufficient to ensure that changes to the database are correctly recorded most of the time. The impact is assessed to be low based on the database inaccuracies found.		
Actions taken to resolve the issue		**Completion date**	**Remedial action status**
Audit findings will be provided to TCDC to be addressed with PSL		Dec 2020	Identified
Preventative actions taken to ensure no further issue will occur		**Completion date**	

CONCLUSION

The statistical field audit undertaken as part of this audit confirmed that the database is within the acceptable accuracy threshold of +/- 5%.

Power Solutions continue to manage the database on behalf of the TCDC. McKay Electrical are the field contractor.

I note the TCDC ICP is still recorded against the NZTA lights, but these items of load are being reconciled by Genesis against ICP 0001425637UN339. There is no impact on reconciliation, but the ICP identifier should be updated.

There were a small number of incorrect ballasts applied resulting in a very minor under submission. Overall, the database accuracy is high with robust processes to manage the load.

This audit found four non-compliances and makes no recommendations. The future risk rating of eight indicates that the next audit be completed in 18 months. I have considered this in conjunction with Meridian's comments and I agree with the 18 month audit period.

PARTICIPANT RESPONSE