ELECTRICITY INDUSTRY PARTICIPATION CODE

DISTRIBUTED UNMETERED LOAD AUDIT REPORT

Meridian Energy Limited - Nelson CC DUML - 22 November 2023 Compliance plan

NELSON CITY COUNCIL AND MERIDIAN ENERGY LIMITED

NZBN: 9429037696863

Prepared by: Tara Gannon

Date audit commenced: 15 August 2023

Date audit report completed: 20 September 2023

Audit report due date: 26 November 2023

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EXECUTIVE SUMMARY

This audit of the **Nelson City Council (NCC)** 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.

The RAMM database used for submission is managed by NCC. New connection, fault, and maintenance work is completed by **Powertech Nelson New Zealand Limited (Powertech)**. Powertech record changes in the field on a tablet including the date that the change is made. The changes are reviewed and updated in RAMM at the end of each month.

EMS produces DUML submission information as Meridian's agent using the DST profile. NCC provides Meridian with a database extract snapshot, which includes light install dates. Meridian matches this extract to the previous one to identify any changes during the month, and check whether the lights should be included in the wattage total. This step is designed to validate changes to the load for each pole ID and remove lights added after the submission period, rather than ensure that all changes are accounted for on a daily basis. On hours are derived from data logger information.

The field audit found that the best available estimate is not precise enough to conclude that the database is accurate within ±5%. There were a very small number of differences, with one extra light and seven wattage differences found for the sample of 381 lights (a 2% error rate). Unfortunately the difference at one location (the St Vincent Street roundabout) was significant, with all four lights at the location having half the wattage recorded in the database, which caused R_L to be estimated below 95.

Result	Percentage	Comments
The point estimate of R	98.8	Wattage from survey is lower than the database wattage by 1.2%
R_L	90.6	With a 95% level of confidence, it can be concluded that the error could be between -9.4% and +2.0%
R_H	102.0	

- In absolute terms the installed capacity is estimated to be 3 kW lower than the database indicates.
- There is a 95% level of confidence that the installed capacity is between 26 kW lower to 5 kW higher than the database.
- In absolute terms, total annual consumption is estimated to be 14,100 kWh lower than the DUML database indicates.
- There is a 95% level of confidence that the annual consumption is consumption is between 112,100 kWh p.a. lower to 23,500 kWh p.a. higher than the database indicates.

Most database information was confirmed to be accurate, and NCC and Powertech intend to investigate and resolve the exceptions found.

The audit found four non-compliances and makes no recommendations. The future risk rating of 13 indicates that the next audit be completed in 12 months. I have considered this in conjunction with the comments provided by Meridian and recommend that the next audit be in 12 months on 1 December 2024.

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	The best available estimate is not precise enough to conclude that the database is accurate within ±5 %, resulting in potential over submission of 14,100 kWh p.a. Ten items of load have a missing lamp make, lamp model, lamp wattage and gear wattage in the database extract. All of the affected items of load are metered so there is no impact on submission. 36 LED items of load have a missing gear wattage. NCC confirmed that the items of load are metered, and therefore the 3,527 W of load should be completely excluded from the database extracts for submission. Over submission of 15,064 kWh has occurred. The database extract is provided as a snapshot and does not account for daily load changes. The impact of this is reduced because Meridian completes a comparison to the previous month to validate changes and remove any lights added after the end of the month from the wattage total.	Moderate	Medium	4	Identified
All loaded recorded in database	2.5	11(2A) of Schedule 15.3	One additional light was found in the field.	Strong	Low	1	Identified
Database accuracy	3.1	15.2 and 15.37B(b)	The best available estimate is not precise enough to conclude that the database is accurate within ±5 %, resulting in potential over submission of 14,100 kWh p.a. Ten items of load have a missing lamp make, lamp model, lamp wattage and gear wattage in the database extract. All of the affected items of load are metered so there is no impact on submission.	Moderate	Medium	4	Identified

Subject	Section	Clause	Non-Compliance	Controls	Audit Risk Rating	Breach Risk Rating	Remedial Action
			36 LED items of load have a missing gear wattage. NCC confirmed that the items of load are metered, and therefore the 3,527 W of load should be completely excluded from the database extracts for submission. Over submission of 15,064 kWh has occurred.				
Volume information accuracy	3.2	15.2 and 15.37B(c)	The best available estimate is not precise enough to conclude that the database is accurate within ±5 %, resulting in potential over submission of 14,100 kWh p.a. Ten items of load have a missing lamp make, lamp model, lamp wattage and gear wattage in the database extract. All of the affected items of load are metered so there is no impact on submission. 36 LED items of load have a missing gear wattage. NCC confirmed that the items of load are metered, and therefore the 3,527 W of load should be completely excluded from the database extracts for submission. Over submission of 15,064 kWh has occurred. The database extract is provided as a snapshot and does not account for daily load changes. The impact of this is reduced because Meridian completes a comparison to the previous month to validate changes and remove any lights added after the end of the month from the wattage total.	Moderate	Medium	4	Identified
Future Risk Rating						**13**	

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
		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

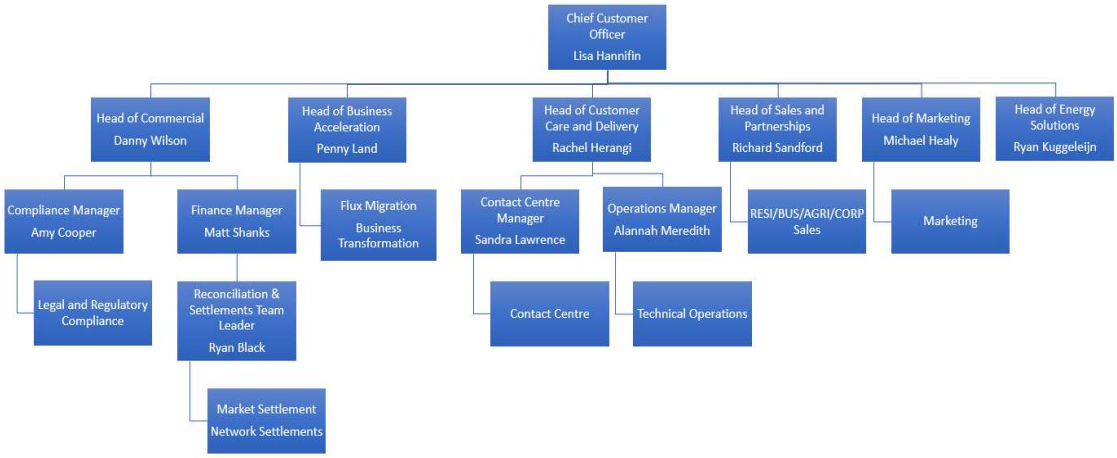
The Electricity Authority's website was reviewed to identify any exemptions relevant to the scope of this audit.

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:

Name	Role	Company
Tara Gannon	Auditor	Provera

Other personnel assisting in this audit were:

Name	Title	Company
Gillian Dancey	Contract Supervisor - Roading	Nelson City Council
Shan Thomas	Technical Engineer	Powertech
Danial Lau	Energy Data Analyst	Meridian Energy
Melanie Matthews	Quality and Compliance Advisor	Meridian Energy

1.4. Hardware and Software

RAMM

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.

Meridian systems

Systems used by the trader are assessed as part of their reconciliation participant audit.

EMS

Systems used by EMS to calculate submission information are assessed as part of their agent audit.

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)
0000090001NTBEF	NCC STREETLIGHTING STOKE	STK0331	DST	3,117	145,656.7
0000200190CTC63	NELSON STREETLIGHTS	STK0331	DST	2,402	133,738.7
Total				**5,519**	**279,395.4**

1.7. Authorisation Received

All information was provided directly by Meridian and NCC.

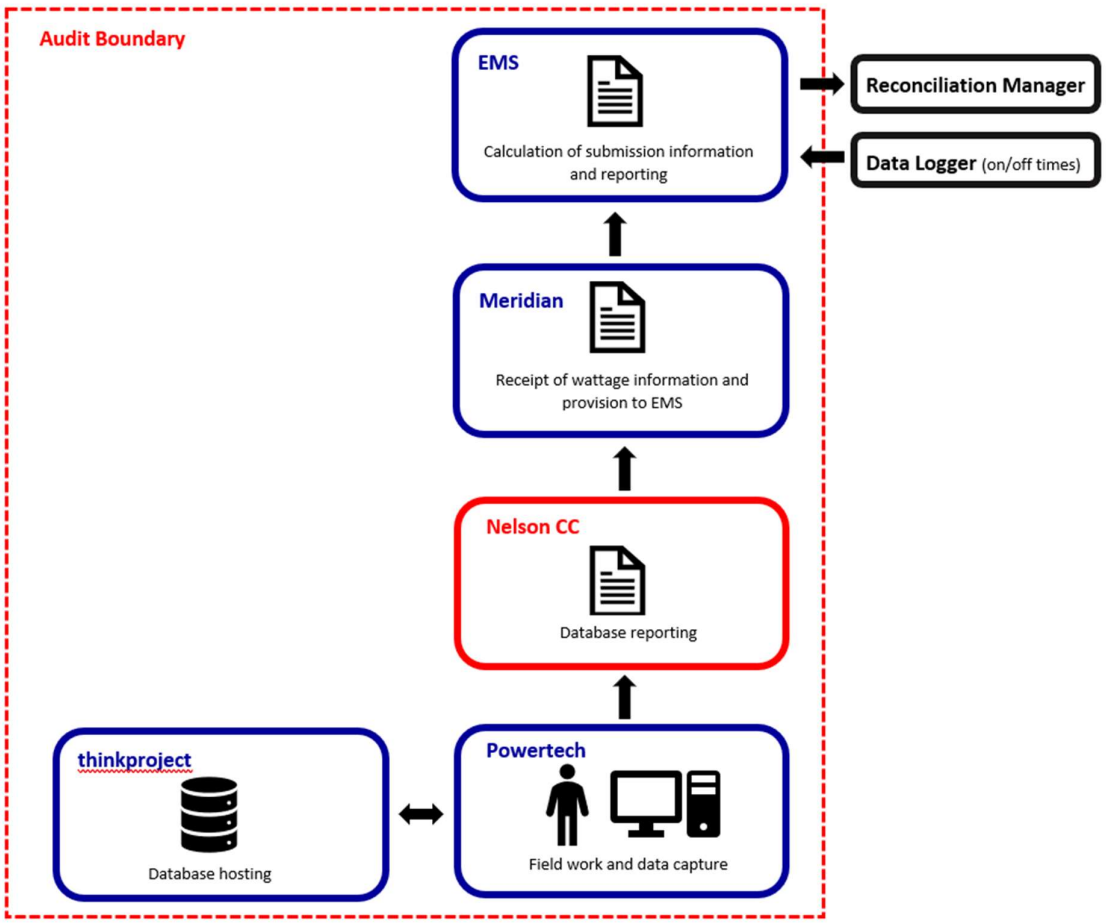
1.8. Scope of Audit

This audit of the NCC 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 RAMM database used for submission is managed by NCC. New connection, fault, and maintenance work is completed by Powertech. Powertech record changes in the field on a tablet including the date that the change is made. The changes are reviewed and updated in RAMM at the end of each month.

EMS produces DUML submission information as Meridian's agent using the DST profile. NCC provides Meridian with a database extract snapshot, which includes light install dates. Meridian matches this extract to the previous one to identify any changes during the month, and check whether the lights should be included in the wattage total. This step is designed to validate changes to the load for each pole ID and remove lights added after the submission period, rather than ensure that all changes are accounted for on a daily basis. On hours are derived from data logger information.

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



A field audit was undertaken of 381 items of load on 15 and 16 August 2023.

1.9. Summary of previous audit

The previous audit was completed in April 2022 by Steve Woods of Veritek Limited. Five non-compliances were identified, and one recommendation was made. The statuses of the non-compliances and recommendation are described below. Further comment is made in the relevant sections of this report.

Subject	Section	Clause	Non-compliance	Status
Deriving submission information	2.1	11(1) of Schedule 15.3	Variance between database extract and volume submitted for ICP 0000090001NTBEF and ICP 0000200190CTC63 of 1,313 kW for the month of February 2022. Nine items of load have zero wattage with an estimated annual under submission of 3,189.69 kWh. 41 items of load with the incorrect ballast applied resulting in an estimated annual under submission of 593 kWh.	Cleared, the wattage difference is believed to be caused by Meridian adjusting for changes during the month. Some database inaccuracies still existing.
Description and capacity of load	2.4	11(2)(c) and (d) of Schedule 15.3	Nine items of load have zero wattage with an estimated annual under submission of 3,189.69 kWh.	Still existing
All loaded recorded in database	2.5	11(2A) of Schedule 15.3	Two additional lights found in the field of the 313 items of load sampled.	Still existing.
Database accuracy	3.1	15.2 and 15.37B(b)	Nine items of load have zero wattage with an estimated annual under submission of 3,189.69 kWh. 41 items of load with the incorrect ballast applied resulting in an estimated annual under submission of 593 kWh.	Some database inaccuracies still existing.
Volume information accuracy	3.2	15.2 and 15.37B(c)	Variance between database extract and volume submitted for ICP 0000090001NTBEF and ICP 0000200190CTC63 of 1,313 kW for the month of February 2022. Nine items of load have zero wattage with an estimated annual under submission of 3,189.69 kWh. 41 items of load with the incorrect ballast applied resulting in an estimated annual under submission of 593 kWh.	Cleared, the wattage difference is believed to be caused by Meridian adjusting for changes during the month. Some database inaccuracies still existing.

Subject	Section	Recommendation	Status
Deriving submission information	2.1	Meridian to investigate the discrepancy identified for ICP 0000090001NTBEF and ICP 0000200190CTC63. The kW value for February 2022 is 1,313 kW higher than the database value indicates.	Cleared, the wattage difference is believed to be caused by Meridian adjusting for changes during the month.

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 Provera 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 the DUML load using the DST profile. NCC provides Meridian with a database extract snapshot which includes light install dates. Meridian matches this extract to the previous one to identify any changes during the month, and check whether the lights should be included in the wattage total. For instance lights added after the end of the month are excluded, and lights present during the month are included in the total wattage. This step is designed to validate changes to the load for each pole ID and remove lights added after the submission period, rather than ensure that all changes are accounted for on a daily basis.

Meridian supplies EMS with the capacity information and EMS calculates the kWh figure from the wattage provided by Meridian and the on hours from the data logger, 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 July 2023 were checked and confirmed to be correctly calculated based on the database extract (adjusted for lights added after the end of the month discussed above) and the on hours.

Volume inaccuracy is present in the database as follows, and is described in more detail in **section 3.1**:

Issue	Estimated volume information impact (annual kWh)
The best available estimate is not precise enough to conclude that the database is accurate within ±5 %.	Over submission of 14,100 kWh p.a.
Ten items of load have a missing lamp make, lamp model, lamp wattage and gear wattage in the database extract.	No impact because the lights were confirmed to be metered.
36 LED items of load have a missing gear wattage, and were expected to have a zero gear wattage. NCC confirmed that the items of load are metered, and therefore the 3,527 W of load should be completely excluded from the database extracts for submission.	Over submission of 15,064 kWh.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 2.1 With: Clause 11(1) of Schedule 15.3 From: 24-Jul-23 To: 31-Jul-23	The best available estimate is not precise enough to conclude that the database is accurate within ±5 %, resulting in potential over submission of 14,100 kWh p.a. Ten items of load have a missing lamp make, lamp model, lamp wattage and gear wattage in the database extract. All of the affected items of load are metered so there is no impact on submission. 36 LED items of load have a missing gear wattage. NCC confirmed that the items of load are metered, and therefore the 3,527 W of load should be completely excluded from the database extracts for submission. Over submission of 15,064 kWh has occurred. The database extract is provided as a snapshot and does not account for daily load changes. The impact of this is reduced because Meridian completes a comparison to the previous month to validate changes and remove any lights added after the end of the month from the wattage total. Potential impact: Actual impact: Medium Audit history: Multiple times previously Controls: Moderate Breach risk rating: 4

Audit risk rating	Rationale for audit risk rating
Medium	The controls are rated as moderate, as the controls will mitigate the risk of inaccuracy most of the time, but there is room for improvement. The impact is assessed to be medium based on the kWh impact.

Actions taken to resolve the issue	Completion date	Remedial action status
10 items of load – Nelson CC has investigated and have found these to be metered lights, therefore no impact. 36 LED items – Nelson CC Has investigated and have these lights to be metered, therefore no impact.	Completed	Identified
Preventative actions taken to ensure no further issues will occur	**Completion date**	
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	

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 that an ICP is recorded for each item of load.

Audit commentary

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

Audit commentary

The database contains fields for the road name, location number, offset, side, house number, pole number and GPS coordinates.

15 items of load do not have GPS coordinates recorded, and all have sufficient other location information to enable them to be located.

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 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, lamp model, lamp wattage and gear wattage.

In the database extract provided for 24 July 2023, all items of load have the lamp make, lamp model, lamp wattage and gear wattage populated except:

- Ten items of load with missing lamp make, lamp model, lamp wattage and gear wattage, listed in **Appendix 4.1**. NCC confirmed that the lights were recorded in RAMM but the details were not visible in certain database views or in extracts. Upon further investigation it was confirmed these lights were metered and expected to be excluded from reported wattages.
- A further 36 LED items of load with a missing gear wattage only, and are listed in **Appendix 4.2.** NCC confirmed that the items of load are metered, and therefore the 3,527 W of load should be completely excluded from the database extracts for submission.

Because these lights are metered and should be excluded from database extracts, compliance is recorded in this section.

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 381 items of load on 15 and 16 August 2023.

Audit commentary

The field audit discrepancies found are detailed in the table below:

Address	Database Count	Field Count	Count differences	Wattage differences	Comments
LASSEN PLACE	6	7	+1	1	One L24 outside 18 Lassen Pl was missing from the database. One 17W Kendalier light (pole ID 5771) was recorded in the database as LED 24W.
LOCKING STREET	13	13		1	One SON 100W (Pole ID 1259) was recorded in the database as LED 24W.
ROBINSON ROAD	8	8		1	One 70W SON (Pole ID 853) is recorded in the database with a 24W LED. The light was partially obscured by a tree.
ST VINCENT STREET ROUNDABOUT (TOI TOI)	4	4		4	Four unlabelled LEDs which appear to be 86W are recorded in the database as four HPS 150W.
Total	**381**	**382**	**+1**	**7**	

The field audit found one more lamp in the field than was 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: 24-Jul-23 To: 16-Aug-23	One additional light was found in the field. Potential impact: Low Actual impact: Low Audit history: Twice Controls: Strong Breach risk rating: 1
Audit risk rating	**Rationale for audit risk rating**
Low	The controls are rated as strong as NCC have robust processes to ensure that changes are tracked, and this is reflected in the high level of accuracy found in the database. The impact is assessed to be low because the missing light is an L24, resulting in under submission of 102.5 kWh per annum.

Actions taken to resolve the issue	Completion date	Remedial action status
Nelson CC has investigated and RAMM has been updated	Completed	Identified
Preventative actions taken to ensure no further issues will occur	**Completion date**	

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

Code reference

Clause 11(3) of Schedule 15.3

Code related audit information

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

Audit observation

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

Audit commentary

The 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 contains a complete audit trail. Reporting is provided to Meridian from the RAMM database.

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

Audit observation

Meridian's submissions are based on a monthly extract from the database. A database extract was provided for 24 July 2023, and I assessed the accuracy of this by using the DUML Statistical Sampling Guideline. The table below shows the survey plan.

Plan Item	Comments
Area of interest	NCC region
Strata	The database contains items of load in Nelson area. The processes for the management of all NCC items of load are the same. The total population was divided into two strata: • ICP 0000090001NTBEF, and • ICP 0000200190CTC63.
Area units	I created a pivot table of the roads, and I used a random number generator in a spreadsheet to select a total of 49 sub-units.
Total items of load	381 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 and timeliness of database updates was evaluated.

Audit commentary

A field audit was conducted of a statistical sample of 381 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	98.8	Wattage from survey is lower than the database wattage by 1.2%
R_L	90.6	With a 95% level of confidence, it can be concluded that the error could be between -9.4% and +2.0%
R_H	102.0	

These results were categorised in accordance with the "Distributed Unmetered Load Statistical Sampling Audit Guideline", effective from 1 February 2019. The table below shows that Scenario C (detailed below) applies, and the best available estimate is not precise enough to conclude that the database is

accurate within ±5%. I note that the error rate was low 8/381 (2%) but because one location with four lights (the St Vincent Street roundabout) had a large wattage percentage difference, it had a dramatic impact on the overall accuracy assessment when the results were extrapolated across the whole database.

- In absolute terms the installed capacity is estimated to be 3 kW lower than the database indicates.
- There is a 95% level of confidence that the installed capacity is between 26 kW lower to 5 kW higher than the database.
- In absolute terms, total annual consumption is estimated to be 14,100 kWh lower than the DUML database indicates.
- There is a 95% level of confidence that the annual consumption is consumption is between 112,100 kWh p.a. lower to 23,500 kWh p.a. higher than the database indicates.

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

Lamp description and capacity accuracy

The database contains fields for lamp make, lamp model, lamp wattage and gear wattage.

- Ten items of load with missing lamp make, lamp model, lamp wattage and gear wattage, listed in **Appendix 4.1**. NCC confirmed that the lights were recorded in RAMM but the details were not visible in certain database views or in extracts. Upon further investigation it was confirmed these lights were metered and expected to be excluded from reported wattages.
- A further 36 LED items of load with a missing gear wattage only, and are listed in **Appendix 4.2.** NCC confirmed that the items of load are metered, and therefore the 3,527 W of load should be completely excluded from the database extracts for submission.

Populated wattages for all items of load were checked against the published standardised wattage tables produced by the Electricity Authority, and the manufacturer's specifications. One item of load appears to be a compact fluorescent but seems to have a high gear wattage. CFLs usually have gear wattages close to zero. Powertech intends to validate the gear wattage and will update the database if a correction is required.

Light ID	Pole ID	Gear Wattage	Lamp Model	Wattage	Lamp Make
41866	4411	9	CF18	18	Philips

Change management process findings

The RAMM database used for submission is managed by NCC. New connection, fault, and maintenance work is completed by Powertech. Powertech record changes in the field on a tablet including the date that the change is made. The changes are reviewed and updated in RAMM at the end of each month.

Meridian reconciles the DUML load using the DST profile. NCC provides Meridian with a database extract snapshot, which includes light install dates. Meridian matches this extract to the previous one to identify any changes during the month, and check whether the lights should be included in the wattage total. For instance lights added after the end of the month are excluded, and lights present during the month are included in the total wattage. This step is designed to validate changes to the load for each pole ID and remove lights added after the submission period, rather than ensure that all changes are accounted for on a daily basis.

For new connections, NCC receive a request for a new connection, this is passed onto Powertech. Powertech arrange connection and provide notification to Network Tasman or NEL. When the work has been completed, Powertech update RAMM with all the required details.

For new subdivisions, the NCC subdivision team pass information to the Contract Supervisor – Roading, and this is passed onto Powertech. If Powertech is the contractor, the new connection process is followed as above. If other contractors have completed the work, the developer arranges connection with the network and provides 'as built' plans to NCC. NCC passes the information to Powertech, who check the information and update RAMM.

If the road is yet to be loaded in RAMM the lights are pegged to the nearest available load until such time that the road is created in RAMM. The lights are then reassigned to the new road. The light install date is used as the date of physical change.

Random outage patrols are completed once a month by Powertech, a job is raised in RAMM if an issue is identified, and the light is fixed.

LED upgrade

Most lights in the database have been upgraded to LED. The remaining lights will be upgraded as needed during the maintenance process and as budgets allow. NCC has no plans to use dimming.

Festive lights

All festive lights are metered and outside of the scope of this audit.

Private lights

Private lights are recorded in the database so that they can be identified if faults are reported. There are currently 11 lights with a private owner recorded against DUML ICPs. These are included in the database extracts to Meridian, and NCC bills the affected rate payers for the usage annually.

Some of the private lights have missing lamp model, lamp wattage and gear wattage information in the database as shown in **Appendix 4.1**.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 3.1 With: Clause 15.2 and 15.37B(b) From: 24-Jul-23 To: 16-Aug-23	The best available estimate is not precise enough to conclude that the database is accurate within ±5 %, resulting in potential over submission of 14,100 kWh p.a. Ten items of load have a missing lamp make, lamp model, lamp wattage and gear wattage in the database extract. All of the affected items of load are metered so there is no impact on submission. 36 LED items of load have a missing gear wattage. NCC confirmed that the items of load are metered, and therefore the 3,527 W of load should be completely excluded from the database extracts for submission. Over submission of 15,064 kWh has occurred. Potential impact: Medium Actual impact: Medium Audit history: Multiple times previously Controls: Moderate Breach risk rating: 4
Audit risk rating	**Rationale for audit risk rating**
Medium	The controls are rated as moderate, as the controls will mitigate the risk of inaccuracy most of the time, but there is room for improvement. The impact is assessed to be medium based on the kWh impact.

Actions taken to resolve the issue	Completion date	Remedial action status
Nelson CC has investigated and have these lights to be metered, therefore no impact.	Completed	Identified
Preventative actions taken to ensure no further issues will occur	**Completion date**	

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

Code reference

Clause 15.2 and 15.37B(c)

Code related audit information

The audit must verify that:

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

Audit observation

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

- checking the registry to confirm that all ICPs have 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 the DUML load using the DST profile, and the correct submission type and profile are recorded on the registry. NCC provides Meridian with a database extract snapshot which includes light install dates. Meridian matches this extract to the previous one to identify any changes during the month, and check whether the lights should be included in the wattage total. For instance lights added after the end of the month are excluded, and lights present during the month are included in the total wattage. This step is designed to validate changes to the load for each pole ID and remove lights added after the submission period, rather than ensure that all changes are accounted for on a daily basis.

Meridian supplies EMS with the capacity information and EMS calculates the kWh figure from the wattage provided by Meridian and the on hours from the data logger, 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 July 2023 were checked and confirmed to be correctly calculated based on the database extract (adjusted for lights added after the end of the month discussed above) and the on hours.

Volume inaccuracy is present in the database as follows, and is described in more detail in **section 3.1**:

Issue	Estimated volume information impact (annual kWh)
The best available estimate is not precise enough to conclude that the database is accurate within ±5 %.	Over submission of 14,100 kWh p.a.
Ten items of load have a missing lamp make, lamp model, lamp wattage and gear wattage in the database extract.	No impact because the lights were confirmed to be metered.
36 LED items of load have a missing gear wattage, and were expected to have a zero gear wattage. NCC confirmed that the items of load are metered, and therefore the 3,527 W of load should be completely excluded from the database extracts for submission.	Over submission of 15,064 kWh.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 3.2 With: Clause 15.2 and 15.37B(c)	The best available estimate is not precise enough to conclude that the database is accurate within ±5 %, resulting in potential over submission of 14,100 kWh p.a. Ten items of load have a missing lamp make, lamp model, lamp wattage and gear wattage in the database extract. All of the affected items of load are metered so there is no impact on submission. 36 LED items of load have a missing gear wattage. NCC confirmed that the items of load are metered, and therefore the 3,527 W of load should be completely excluded from the database extracts for submission. Over submission of 15,064 kWh has occurred. The database extract is provided as a snapshot and does not account for daily load changes. The impact of this is reduced because Meridian completes a comparison to the previous month to validate changes and remove any lights added after the end of the month from the wattage total.

From: 24-Jul-23 To: 31-Jul-23	Potential impact: Medium Actual impact: Medium Audit history: Multiple times previously Controls: Moderate Breach risk rating: 4
Audit risk rating	**Rationale for audit risk rating**
Medium	The controls are rated as moderate, as the controls will mitigate the risk of inaccuracy most of the time, but there is room for improvement. The impact is assessed to be medium based on the kWh impact.

Actions taken to resolve the issue	**Completion date**	**Remedial action status**
10 items of load – Nelson CC has investigated and have found these to be metered lights, therefore no impact.	Completed	Identified
36 LED items – Nelson CC Has investigated and have these lights to be metered, therefore no impact.	Completed	
Preventative actions taken to ensure no further issues will occur	**Completion date**	
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	

CONCLUSION

The field audit found that the best available estimate is not precise enough to conclude that the database is accurate within ±5%. There were a very small number of differences, with one extra light and seven wattage differences found for the sample of 381 lights (a 2% error rate). Unfortunately the difference at one location (the St Vincent Street roundabout) was significant, with all four lights at the location having half the wattage recorded in the database, which caused R_L to be estimated below 95.

Most database information was confirmed to be accurate, and NCC and Powertech intend to investigate and resolve the exceptions found.

The audit found four non-compliances and makes no recommendations. The future risk rating of 13 indicates that the next audit be completed in 12 months. I have considered this in conjunction with the comments provided by Meridian and recommend that the next audit be in 12 months on 1 December 2024.

PARTICIPANT RESPONSE

Meridian have reviewed this report and their comments are contained within its body.

4. APPENDIX

4.1. Missing lamp model, lamp wattage and gear wattage

These items of load had no lamp make, lamp model, lamp wattage and gear wattage in the database extract provided. There is one 10W and one 12W light at Rosa Christina Way, and the other lights are expected to be Philips 18W.

NCC advised there have been some issues with information recorded within RAMM not being visible using certain database views or in database extracts, particularly for Philips 18W LED lights. Upon further investigation it was confirmed these lights were metered and expected to be excluded from reported wattages.

Pole ID	Light ID	Road	**Light Owner**
5989	41584	PARK_QUEENS GARDENS_BRIDGE	NCC UNSUB Parks and Facilities
5990	41585	PARK_QUEENS GARDENS_BRIDGE	NCC UNSUB Parks and Facilities
6456	40900	PLUMTREE LANE	NCC UNSUB walkways
5711	41370	ROSA CRISTINA WAY	Private
5713	41369	ROSA CRISTINA WAY	Private
5221	41575	SHARED RAILWAY RTE 01 BISHOPDALE	NCC SUB shared paths
5222	41576	SHARED RAILWAY RTE 01 BISHOPDALE	NCC SUB shared paths
8277	41199	SHARED RAILWAY RTE 01 BISHOPDALE	NCC SUB shared paths
8278	41201	SHARED RAILWAY RTE 01 BISHOPDALE	NCC SUB shared paths
8279	41202	SHARED RAILWAY RTE 01 BISHOPDALE	NCC SUB shared paths

4.2. Missing gear wattages

36 LED items of load with a missing gear wattage in the database extract provided. NCC confirmed that the items of load are metered, and therefore the 3,527 W of load should be completely excluded from the database extracts for submission.

Pole ID	Light ID	Road	Lamp Make	Lamp Model	Lamp Wattage	Gear Wattage
4877	41570	TRAFALGAR STREET (NORTH)	BETACOM	SCH	31	
5634	31137	ALBION SQUARE	Osram	CF65	65	
5641	33923	CITY HEIGHTS	Philips	LED1	18	
5642	33922	CITY HEIGHTS	Philips	LED1	18	
5643	33921	CITY HEIGHTS	Philips	LED1	18	

Pole ID	Light ID	Road	Lamp Make	Lamp Model	Lamp Wattage	Gear Wattage
5644	33920	CITY HEIGHTS	Philips	LED1	18	
5645	33919	CITY HEIGHTS	Philips	LED1	18	
5646	33918	CITY HEIGHTS	Philips	LED1	18	
5679	31262	HIGHGROVE WAY	Philips	CF18	18	
5680	31261	HIGHGROVE WAY	Philips	CF18	18	
6016	34029	PARK_QUEENS GARDENS_BRIDGE	Superlight LED	NAUT	27	
7296	31252	BRIDGE STREET	WE-EF LED	2448	48	
7304	31292	HALSTEAD STREET	Thorn LED lights	OLY1	46	
7669	33983	SH 6 ROCKS ROAD	Osram	SIRU	330	
8116	41104	VILLAGE LANE	Windsor Urban LED	L33W	33	
8117	41105	VILLAGE LANE	Windsor Urban LED	L33W	33	
8118	41106	VILLAGE LANE	Windsor Urban LED	L33W	33	
8119	41107	VILLAGE LANE	Windsor Urban LED	L33W	33	
8120	41108	VILLAGE LANE	Windsor Urban LED	L33W	33	
8121	41109	VILLAGE LANE	Windsor Urban LED	L33W	33	
8122	41110	WATERSON LANE	Windsor Urban LED	L33W	33	
8123	41111	WATERSON LANE	Windsor Urban LED	L33W	33	
8124	41112	WATERSON LANE	Windsor Urban LED	L33W	33	
8125	41113	WATERSON LANE	Windsor Urban LED	L33W	33	
8185	41153	STANSELL AVENUE	Hunza LED	ARCH	26	
8238	41172	MAIN ROAD STOKE	AEC ILLUMINAZIONE LED	I245	127	
8239	41173	MAIN ROAD STOKE	AEC ILLUMINAZIONE LED	I245	127	
8240	41174	MAIN ROAD STOKE	AEC ILLUMINAZIONE LED	I245	127	
8241	41175	MAIN ROAD STOKE	AEC ILLUMINAZIONE LED	I245	127	
8243	41177	HALIFAX STREET	AEC ILLUMINAZIONE LED	I112	112	

Pole ID	Light ID	Road	Lamp Make	Lamp Model	Lamp Wattage	Gear Wattage
8404	41483	PARK_CHURCH HILL_TRAFALGAR	LUMENPULSE	LSG	100	
8406	41487	TRAFALGAR STREET (NORTH)	Telfers Nelson	NTB	790	
8406	41488	TRAFALGAR STREET (NORTH)	Telfers Nelson	NTB	790	
8561	41643	COLLINGWOOD STREET	AEC ILLUMINAZIONE LED	3M	60	
8562	41644	COLLINGWOOD STREET	AEC ILLUMINAZIONE LED	3M	60	
8563	41645	BROUGHAM STREET	AEC ILLUMINAZIONE LED	3M	60	