ELECTRICITY INDUSTRY PARTICIPATION CODE
DISTRIBUTED UNMETERED LOAD AUDIT REPORT

VERITEK

For

SOUTH WAIRARAPA DISTRICT COUNCIL AND MERCURY NZ LIMITED

Prepared by: Steve Woods

Date audit commenced: 22 September 2021

Date audit report completed: 7 October 2021

Audit report due date: 1 October 2021

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EXECUTIVE SUMMARY

This audit of the **South Wairarapa District Council (SWDC)** DUML database and processes was conducted at the request of **Mercury NZ Limited (Mercury)** 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 continues to be maintained by Fulton Hogan. PSW complete all fieldwork for the SWDC streetlights, with assistance from Fulton Hogan as required. Additions, removals, and changes to lights are communicated to Fulton Hogan. The information is provided in a spreadsheet and manually keyed into RAMM.

Mercury reconciles the SWDC DUML load using the HHR profile in accordance with exemption 233. Wattages are derived from a RAMM database extract. On and off times are derived from a data logger.

The accuracy of the database extract provided to Mercury was assessed:

Result	Percentage	Comments
The point estimate of R	93.5	Wattage from the survey is higher than the database wattage by 6.5%
R_L	81.7	With a 95% level of confidence, it can be concluded that the error could be between -18.7% and +10.4%
R_H	110.4	

These results were categorised in accordance with the "Distributed Unmetered Load Statistical Sampling Audit Guideline", effective from 01/02/19.

- The conclusion is that the database has poor accuracy, because the point estimate of R is outside +/- 5% and the error could be between -18.3% and + 10.4%.
- In absolute terms the installed capacity is estimated to be 4 kW lower than the database indicates.
- There is a 95% level of confidence that the installed capacity is between 10 kW lower and 6 kW higher than the database.
- In absolute terms, total annual consumption is estimated to be 15,800 kWh lower than the DUML database indicates.
- There is a 95% level of confidence that the annual consumption is between 44,600 kWh p.a. lower to 25,400 kWh p.a. higher than the database indicates.

The previous audit identified a discrepancy between the monthly report provided to Mercury and the content of the database. The cause of this issue was identified after the last audit and the monthly report is now accurate. The table below shows that the submitted kWh up until June 2021 was incorrect, resulting in under submission of 30,359 kWh for the nine-month period from September 2020 to May 2021. Mercury will need to conduct revisions for the full 14-month period to correct this error.

0020906000WRDFA	Sep-20	Oct-20	Nov-20	Dec-20	Jan-21	Feb-21	Mar-21	Apr-21	May-21	Jun-21	Jul-21	Aug-21
On hours	370.66	330.23	300.38	283.88	290.02	292.15	366.71	394.83	444.73	443.88	446.66	426.03
kWh submitted	17484	15567	14169	13390	13680	13781	17298	18624	20978	25320	25479	24303
kW value	47.17	47.141	47.17	47.17	47.17	47.17	47.17	47.17	47.17	57.044	57.044	57.044
Fnumber of fittings	948	948	948	948	948	948	948	948	948	1041	1041	1041

Four non-compliances were identified, and three recommendations were made. The future risk rating of 16 indicates that the next audit be completed in six months. I have considered this in conjunction with Mercury's comments and recommend that the next audit period be in nine months. This gives sufficient time to resolve the issues raised and by this time it's likely the NZTA lights will have been moved into

NZTA's database. The submission revisions can be checked during Mercury's next Certified Reconciliation Participant audit in early 2022.

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 database accuracy is assessed to be 93.5% of the database for the sample checked indicating a potential under submission of approximately 15,800 kWh per annum. 11 items of load have incorrect gear wattage resulting in an estimated minor under submission of 329 kWh p.a. based on 4,271 burn hours. Changes are not always recorded in the database extract from the date which they became effective.	Moderate	Medium	4	Identified
Description and capacity of load	2.4	11(2)(c) and (d) of Schedule 15.3	Two items of load with blank wattages.	Moderate	Low	2	Identified
All load recorded in database	2.5	11(2A) of Schedule 15.3	10 items of load missing from the database.	Moderate	Low	2	Identified
Database accuracy	3.1	15.2 and 15.37B (b)	The database accuracy is assessed to be 93.5% of the database for the sample checked indicating a potential over submission of approximately 15,800 kWh per annum. Two items of load have blank lamp wattage and 11 have incorrect gear wattage resulting in an estimated minor under submission of 329 kWh p.a. based on 4,271 burn hours. Changes are not always recorded in the database extract from the date which they became effective.	Moderate	Medium	4	Identified
Volume information accuracy	3.2	15.2 and 15.37B (c)	Variance in light volumes reported to Mercury vs what is recorded in the database has resulted in under submission of 30,359 kWh for a nine-month period.	Moderate	Medium	4	Identified

Subject	Section	Clause	Non-Compliance	Controls	Audit Risk Rating	Breach Risk Rating	Remedial Action
			The database accuracy is assessed to be 93.5% of the database for the sample checked indicating a potential under submission of approximately 15,800 kWh per annum. 11 items of load have incorrect gear wattage resulting in an estimated minor under submission of 329 kWh p.a. based on 4,271 burn hours. Changes are not always recorded in the database extract from the date which they became effective.				
Future Risk Rating						16	

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
Database accuracy	3.1	Correct the 146 items of load that have transposed GPS coordinates, with the northing value recorded in the easting field and vice versa. Correct the street addresses for the two items of load with the correct GPS coordinates. The street names should be updated from Esther St to Tuscan Lane and Burgundy Drive. Correct the GPS coordinates for pole ID 1880 on Birdie Way.

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

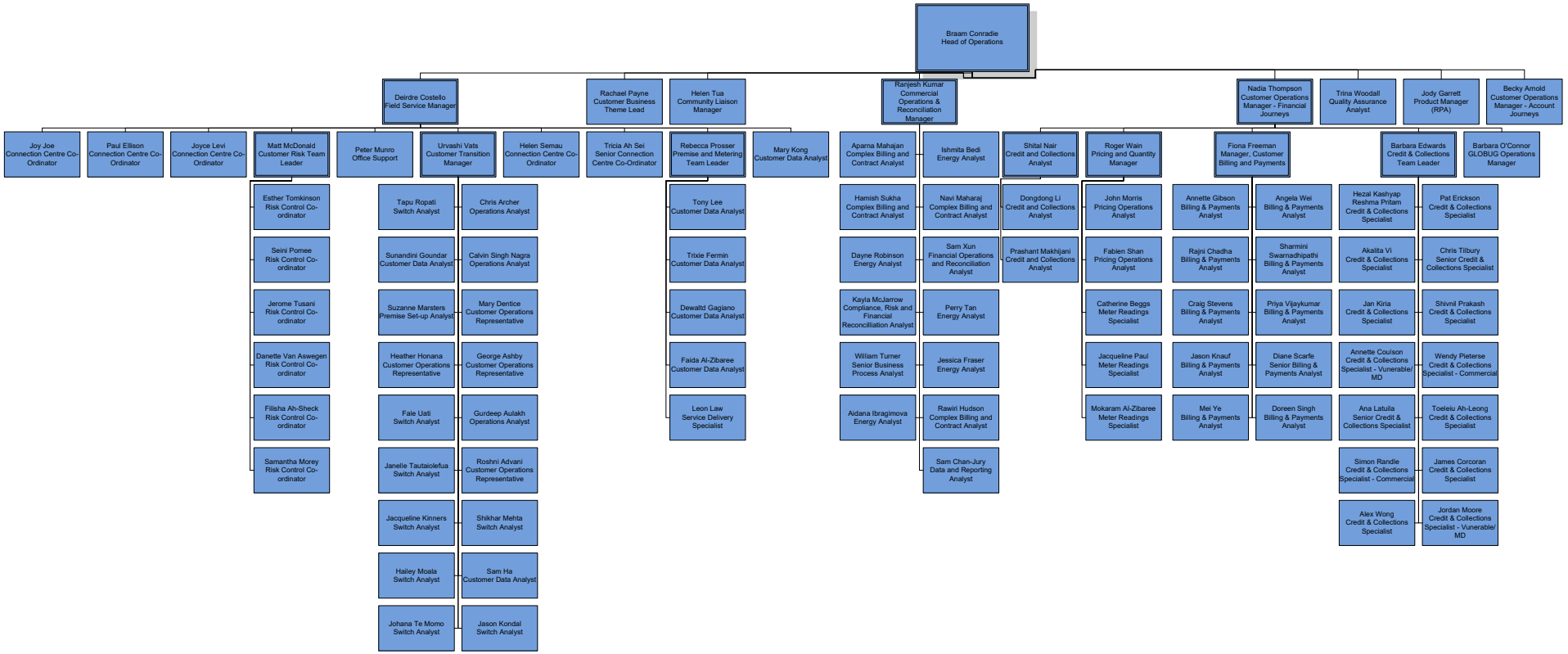
Current code exemptions were reviewed on the Electricity Authority website.

Audit commentary

Mercury has been granted exemption No. 233. This allows them to provide half-hour ("HHR") submission information instead of non-half-hour ("NHH") submission information for distributed unmetered load ("DUML"). This exemption expires on 31 October 2023.

1.2. Structure of Organisation

Mercury provided their current organisational structure:



1.3. Persons involved in this audit

Auditor:

Name	Title	
Steve Woods	Auditor	Veritek Ltd

Other personnel assisting in this audit were:

Name	Title	Company
Tim Langley	Roading Manager	South Wairarapa District Council
Kayla McJarrow	Compliance, Risk & Financial Reconciliation Analyst	Mercury NZ Ltd

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.

Trader systems

Systems used by Mercury to calculate submissions are assessed as part of their reconciliation participant 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)
0020906000WRDFA	STREET LIGHTING FEATHERSTON	GYT0331	HHR	1,041	57,044
Total				**1,041**	**57,044**

1.7. Authorisation Received

All information was provided directly by Mercury and SWDC.

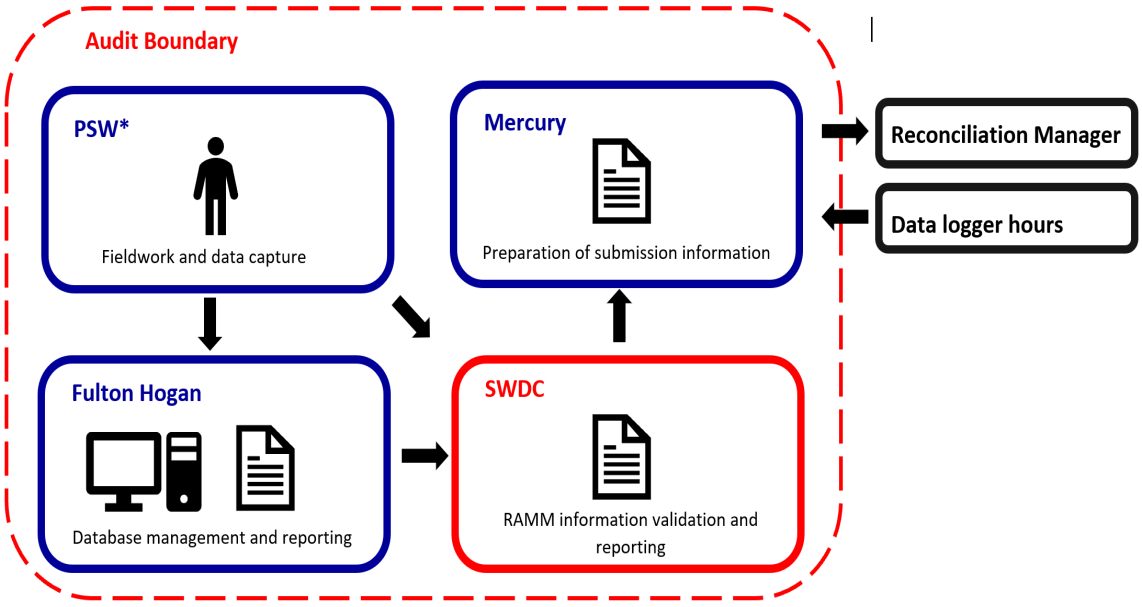
1.8. Scope of Audit

This audit of the SWDC DUML database and processes was conducted at the request of Mercury 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 is maintained by Fulton Hogan. Power Services Wairarapa (PSW) complete all fieldwork for the SWDC streetlights, with assistance from Fulton Hogan as required. Additions, removals, and changes to lights are communicated to Fulton Hogan. The information is provided in a spreadsheet and manually keyed into RAMM.

Mercury reconciles the SWDC DUML load using the HHR profile in accordance with exemption 233. Wattages are derived from a RAMM database extract. On and off times are derived from a data logger.

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 boundaries for clarity.



*with assistance from Fulton Hogan as required

The field audit was undertaken of a statistical sample of 224 items of load on 22 September 2021.

1.9. Summary of previous audit

The previous audit of this database was undertaken by Rebecca Elliot of Veritek Limited in May 2021. The summary table below shows the statuses of the non-compliances raised in the previous audit. 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 in light volumes reported to Mercury vs what is recorded in the database is likely to be resulting in an estimated 48,756 kWh per annum of under submission.	Cleared
			The database accuracy is assessed to be 95.4% of the database for the sample checked indicating a potential under submission of approximately 14,400 kWh per annum.	Still existing
			14 items of load have incorrect lamp wattage resulting in an estimated minor over submission of 222 kWh p.a. based on 4,271 burn hours.	Still existing
			12 items of load have incorrect gear wattage resulting in an estimated minor under submission of 406 kWh p.a. based on 4,271 burn hours.	Still existing
			Changes are not always recorded in the database extract from the date which they became effective.	Still existing
ICP identifier and items of load	2.2	11(2)(a) and (aa) of Schedule 15.3	Blank or incorrect ICP number recorded in the database for 861 items of load.	Cleared
Database accuracy	3.1	15.2 and 15.37B (b)	The database accuracy is assessed to be 95.4% of the database for the sample checked indicating a potential under submission of approximately 14,400 kWh per annum.	Still existing
			14 items of load have incorrect lamp wattage resulting in an estimated minor over submission of 222 kWh p.a. based on 4,271 burn hours.	Still existing
			12 items of load have incorrect gear wattage resulting in an estimated minor under submission of 406 kWh p.a. based on 4,271 burn hours.	Still existing
			Blank or incorrect ICP number recorded in the database for 861 items of load.	Cleared
			Changes are not always recorded in the database extract from the date which they became effective.	Still existing
Volume information accuracy	3.2	15.2 and 15.37B (c)	Variance in light volumes reported to Mercury vs what is recorded in the database is likely to be resulting in an estimated 48,756 kWh per annum of under submission.	Cleared
			The database accuracy is assessed to be 95.4% of the database for the sample checked indicating a potential under submission of approximately 14,400 kWh per annum.	Still existing

Subject	Section	Clause	Non-compliance	Status
			14 items of load have incorrect lamp wattage resulting in an estimated minor over submission of 222 kWh p.a. based on 4,271 burn hours. 12 items of load have incorrect gear wattage resulting in an estimated minor under submission of 406 kWh p.a. based on 4,271 burn hours. Changes are not always recorded in the database extract from the date which they became effective.	Still existing Still existing 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

Mercury 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

Mercury reconciles this DUML load using the HHR profile in accordance with exemption 233. On and off times are derived from a data logger.

I reviewed the submission information for August 2021 and confirmed that the calculation methodology was correct.

As detailed in **section 3.1** the database accuracy is assessed to be 93.5% of the database for the sample checked indicating a potential under submission of approximately 15,800 kWh per annum. Examination of the RAMM database found a total of 11 lights with the incorrect ballast values applied. This will be resulting in a minor estimated under submission of 329 kWh per annum.

The current monthly report is compliant, but

The RAMM 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 changes are processed in the database extract used for submission, they are applied from the first day of the month, rather than the date that the change took effect. There is also the issue that livening can occur prior to "vesting" and items of load are not entered into the database until "vesting" occurs. I didn't find any specific examples during this audit, but I've recorded that the process is not compliant.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 2.1 With: Clause 11(1) of Schedule 15.3 From: 18-May-21 To: 23-Sep-21	The database accuracy is assessed to be 93.5% of the database for the sample checked indicating a potential under submission of approximately 15,800 kWh per annum. 11 items of load have incorrect gear wattage resulting in an estimated minor under submission of 329 kWh p.a. based on 4,271 burn hours. Changes are not always recorded in the database extract from the date which they became effective. Potential impact: Medium Actual impact: Medium Audit history: Three times Controls: Moderate Breach risk rating: 4
Audit risk rating	**Rationale for audit risk rating**
Medium	The controls are rated as moderate as controls will mitigate risk most of the time, but there is room for improvement. The audit risk rating is assessed to be medium based on the potential submission inaccuracies.

Actions taken to resolve the issue	Completion date	Remedial action status
SWDC are aware of the audit findings and we will be following up to ensure the database is updated accordingly.	Nov21	Identified
Preventative actions taken to ensure no further issues will occur	**Completion date**	
We will continue to work with SWDC to resolve discrepancies in a timely manner.	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 the correct ICP was recorded against each item of load.

Audit commentary

All DUML load is connected to ICP 0020906000WRDFA and is being reconciled against this ICP. All items of load have this ICP recorded in the database.

Audit outcome

Compliant

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

Code reference

Clause 11(2)(b) of Schedule 15.3

Code related audit information

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

Audit observation

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

Audit commentary

All items of load have a road name and location recorded. All items of load also have GPS co-ordinates recorded to assist with the location of the items. Most items of load have a pole number recorded.

The accuracy of the recorded address information is discussed in **section 3.1**.

Audit outcome

Compliant

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

Code reference

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

Code related audit information

The DUML database must contain:

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

Audit observation

The database was checked to confirm that:

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

Audit commentary

A description of each light is recorded in the lamp model field, and there is a field for lamp wattage and gear wattage. Two items of load have blank lamp wattages. Pole IDs 1576 and 1914.

The accuracy of the recorded wattages is discussed in **section 3.1**.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 2.4 With: Clause 11(2)(c) and (d) of Schedule 15.3 From: 18-May-21 To: 23-Sep-21	Two items of load with blank wattages Potential impact: Low Actual impact: Low Audit history: None Controls: Moderate Breach risk rating: 2
Audit risk rating	**Rationale for audit risk rating**
Low	The controls are recorded as moderate because they mitigate risk most of the time but there is room for improvement. The impact on settlement and participants is minor; therefore the audit risk rating is low.

Actions taken to resolve the issue	Completion date	Remedial action status
SWDC are aware of the audit findings and we will be following up to ensure the database is updated accordingly.	Nov21	Identified
Preventative actions taken to ensure no further issues will occur	**Completion date**	
We will continue to work with SWDC to resolve discrepancies in a timely manner.	Ongoing	

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 224 items of load on 22 September 2021.

Audit commentary

The field audit discrepancies are detailed in the table below. The details have been provided to South Wairarapa DC and Mercury.

Description	Quantity
Items of load in the field not in the database	10
Items of load in the database not in the field	18

Incorrect location	3
Incorrect wattages recorded in the database	9

The field audit found 10 items of load missing from the database, which is recorded as non-compliant. 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: 18-May-21 To: 23-Sep-21	10 items of load missing from the database. Potential impact: Low Actual impact: Low Audit history: None Controls: Moderate Breach risk rating: 2		
Audit risk rating	**Rationale for audit risk rating**		
Low	The controls are recorded as moderate because they mitigate risk most of the time but there is room for improvement. The impact on settlement and participants is minor; therefore the audit risk rating is low.		
Actions taken to resolve the issue		**Completion date**	**Remedial action status**
SWDC are aware of the audit findings and we will be following up to ensure the database is updated accordingly.		Nov21	Identified
Preventative actions taken to ensure no further issues will occur		**Completion date**	
We will continue to work with SWDC to resolve discrepancies in a timely manner.		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.

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

RAMM records audit trail information of changes made.

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	South Wairarapa DC streetlights
Strata	The database contains 1,041 items of load in the South Wairarapa DC region. The management process is the same for all lights. I created three strata: 1. NZTA , 2. Roading street names A-M, and 3. Roading street names N-Z.
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 35 sub-units.
Total items of load	224 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

Field audit findings

A field audit was conducted of a statistical sample of 224 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	93.5	Wattage from the survey is higher than the database wattage by 6.5%
R_L	81.7	With a 95% level of confidence, it can be concluded that the error could be between -18.7% and +10.4%
R_H	110.4	

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 B (detailed below) applies.

The conclusion from Scenario B is that the database has poor accuracy, because the point estimate of R is outside +/- 5% and the error could be between -18.3% and + 10.4%.

In absolute terms the installed capacity is estimated to be 4 kW lower than the database indicates.

There is a 95% level of confidence that the installed capacity is between 10 kW lower and 6 kW higher than the database.

In absolute terms, total annual consumption is estimated to be 15,800 kWh lower than the DUML database indicates.

There is a 95% level of confidence that the annual consumption is between 44,600 kWh p.a. lower to 25,400 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 %

Light description and capacity accuracy

Wattages for all items of load were checked against the published standardised wattage tables produced by the Electricity Authority, and the manufacturer's specifications. Examination of the database extract found two have a blank lamp wattage recorded and 11 have an incorrect gear wattage recorded. The detailed records have been supplied to South Wairarapa DC and Mercury,

The incorrect wattages being applied will be resulting in a minor estimated under submission of 329 kWh per annum.

ICP number accuracy

As detailed in **section 2.2**. All DUML load is connected to ICP 0020906000WRDFA and all items are being reconciled to this ICP. Each item of load has the correct ICP recorded.

Address location accuracy

As discussed in **section 2.3** all items of load have a road name and location recorded. All items of load also have GPS co-ordinates recorded to assist with the location of the items. Most items of load have a pole number recorded; all items of load are locatable.

146 items of load had transposed GPS coordinates, with the northing value recorded in the easting field and vice versa. This was also identified in the last audit, where 147 were identified. The GPS co-ordinates should be updated in RAMM.

One item of load had the correct GPS coordinates, but incorrectly recorded street address. Two items of load had incorrect GPS coordinates, but the street was recorded correctly.

One item of load has the correct street address of Birdie Way but has the incorrect GPS co-ordinates in the database. This was existing in the last audit.

The previous audit report recorded that nine items of load had incorrect street addresses of Esther St when they should be Tuscan Lane and Burgundy Drive. Most of these have been done, but pole IDs 1911 and 1988 both still have the incorrect street recorded.

Subject	Section	Recommendation
Address location accuracy	3.1	Correct the 146 items of load that have transposed GPS coordinates, with the northing value recorded in the easting field and vice versa. Correct the street addresses for the two items of load with the correct GPS coordinates. The street names should be updated from Esther St to Tuscan Lane and Burgundy Drive. Correct the GPS coordinates for pole ID 1880 on Birdie Way.

Change management process findings

A RAMM database is maintained by Fulton Hogan. PSW complete all fieldwork for the SWDC streetlights, with assistance from Fulton Hogan as required. Additions, removals, and changes to lights are communicated to Fulton Hogan. The information is provided in a spreadsheet and manually keyed into RAMM.

For new connections, lights are loaded into RAMM once the lights are vested in council. SWDC has requested developers not connect lights until this process is complete and working to improve communications between developers and the council. SWDC monitors new subdivisions and keeps in close contact with Powerco to ensure that they are aware quickly when the lights are connected.

Fulton Hogan have a maintenance contract with SWDC and complete outage patrols in one town per month, so each town is patrolled every four months. Any outages identified during patrols are passed to PSW, who complete the repairs and provide any resulting database changes back to Fulton Hogan. SWDC are currently in discussion with Fulton Hogan to ensure all changes are updated in RAMM.

SWDC's LED upgrade project is complete.

The RAMM 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 changes are processed in the database extract used for submission, they are applied from the first day of the month, rather than the date that the change took effect.

Festive and private lights

There are no festive or private lights in use in the SWDC region.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 3.1 With: Clause 15.2 and 15.37B(b) From: 18-May-21 To: 23-Sep-21	The database accuracy is assessed to be 93.5% of the database for the sample checked indicating a potential over submission of approximately 15,800 kWh per annum. Two items of load have blank lamp wattage and 11 have incorrect gear wattage resulting in an estimated minor under submission of 329 kWh p.a. based on 4,271 burn hours. Changes are not always recorded in the database extract from the date which they became effective. Potential impact: Medium Actual impact: Medium Audit history: Three times Controls: Moderate Breach risk rating: 4
Audit risk rating	**Rationale for audit risk rating**
Medium	The controls are rated as moderate as controls will mitigate risk most of the time, but there is room for improvement. The audit risk rating is assessed to be medium based on the potential submission inaccuracies.

Actions taken to resolve the issue	Completion date	Remedial action status
SWDC are aware of the audit findings and we will be following up to ensure the database is updated accordingly.	Nov21	Identified
Preventative actions taken to ensure no further issues will occur	**Completion date**	
We will continue to work with SWDC to resolve discrepancies in a timely manner.	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

I reviewed the submission information for the August 2021 submissions and confirmed that the calculation methodology was correct, and that wattages were based on the extract and on hours were based on data logger information.

The previous audit identified a discrepancy between the monthly report provided to Mercury and the content of the database. The cause of this issue was identified after the last audit and the monthly report is now accurate. The table below shows that the submitted kWh up until June 2021 was incorrect, resulting in under submission of 30,359 kWh for the nine-month period from September 2020 to May 2021. Mercury will need to conduct revisions for the full 14-month period to correct this error.

0020906000WRDFA	Sep-20	Oct-20	Nov-20	Dec-20	Jan-21	Feb-21	Mar-21	Apr-21	May-21	Jun-21	Jul-21	Aug-21
On hours	370.66	330.23	300.38	283.88	290.02	292.15	366.71	394.83	444.73	443.88	446.66	426.03
kWh submitted	17484	15567	14169	13390	13680	13781	17298	18624	20978	25320	25479	24303
kW value	47.17	47.141	47.17	47.17	47.17	47.17	47.17	47.17	47.17	57.044	57.044	57.044
Fnumber of fittings	948	948	948	948	948	948	948	948	948	1041	1041	1041

As detailed in **section 3.1** the database accuracy is assessed to be 93.5% of the database for the sample checked indicating a potential under submission of approximately 15,800 kWh per annum. Examination of the RAMM database found a total of 11 lights with the incorrect ballast values applied. This will be resulting in a minor estimated under submission of 329 kWh per annum.

The current monthly report is compliant, but

The RAMM 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 changes are processed in the database extract used for submission, they are applied from the first day of the month, rather than the date that the change took effect. There is also the issue that livening can occur prior to “vesting” and items of load are not entered into the database until “vesting” occurs. I didn’t find any specific examples during this audit, but I’ve recorded that the process is not compliant.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 3.2 With: Clause 15.2 and 15.37B(c) From: 18-May-21 To: 23-Sep-21	Variance in light volumes reported to Mercury vs what is recorded in the database has resulted in under submission of 30,359 kWh for a nine-month period. The database accuracy is assessed to be 93.5% of the database for the sample checked indicating a potential under submission of approximately 15,800 kWh per annum. 11 items of load have incorrect gear wattage resulting in an estimated minor under submission of 329 kWh p.a. based on 4,271 burn hours. Changes are not always recorded in the database extract from the date which they became effective. Potential impact: Medium Actual impact: Medium Audit history: Three times Controls: Moderate Breach risk rating: 4
Audit risk rating	**Rationale for audit risk rating**
Medium	The controls are rated as moderate as controls will mitigate risk most of the time, but there is room for improvement. The potential impact could be low as the issue will have a minor impact on settlement.

Actions taken to resolve the issue	Completion date	Remedial action status
SWDC are aware of the audit findings and we will be following up to ensure the database is updated accordingly.	Nov21	Identified
Preventative actions taken to ensure no further issues will occur	**Completion date**	
We will continue to work with SWDC to resolve discrepancies in a timely manner.	Ongoing	

CONCLUSION

The RAMM database continues to be maintained by Fulton Hogan. PSW complete all fieldwork for the SWDC streetlights, with assistance from Fulton Hogan as required. Additions, removals, and changes to lights are communicated to Fulton Hogan. The information is provided in a spreadsheet and manually keyed into RAMM.

Mercury reconciles the SWDC DUML load using the HHR profile in accordance with exemption 233. Wattages are derived from a RAMM database extract. On and off times are derived from a data logger.

The accuracy of the database extract provided to Mercury was assessed:

Result	Percentage	Comments
The point estimate of R	93.5	Wattage from the survey is higher than the database wattage by 6.5%
R_L	81.7	With a 95% level of confidence, it can be concluded that the error could be between -18.7% and +10.4%
R_H	110.4	

These results were categorised in accordance with the "Distributed Unmetered Load Statistical Sampling Audit Guideline", effective from 01/02/19.

- The conclusion is that the database has poor accuracy, because the point estimate of R is outside +/- 5% and the error could be between -18.3% and + 10.4%.
- In absolute terms the installed capacity is estimated to be 4 kW lower than the database indicates.
- There is a 95% level of confidence that the installed capacity is between 10 kW lower and 6 kW higher than the database.
- In absolute terms, total annual consumption is estimated to be 15,800 kWh lower than the DUML database indicates.
- There is a 95% level of confidence that the annual consumption is between 44,600 kWh p.a. lower to 25,400 kWh p.a. higher than the database indicates.

The previous audit identified a discrepancy between the monthly report provided to Mercury and the content of the database. The cause of this issue was identified after the last audit and the monthly report is now accurate. The table below shows that the submitted kWh up until June 2021 was incorrect, resulting in under submission of 30,359 kWh for the nine-month period from September 2020 to May 2021. Mercury will need to conduct revisions for the full 14-month period to correct this error.

0020906000WRDFA	Sep-20	Oct-20	Nov-20	Dec-20	Jan-21	Feb-21	Mar-21	Apr-21	May-21	Jun-21	Jul-21	Aug-21
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Fnumber of fittings	948	948	948	948	948	948	948	948	948	1041	1041	1041

Four non-compliances were identified, and three recommendations were made. The future risk rating of 16 indicates that the next audit be completed in six months. I have considered this in conjunction with Mercury's comments and recommend that the next audit period be in nine months. This gives sufficient time to resolve the issues raised and by this time it's likely the NZTA lights will have been moved into NZTA's database. The submission revisions can be checked during Mercury's next Certified Reconciliation Participant audit in early 2022.

PARTICIPANT RESPONSE

SWDC are aware of the audit findings and we will be ensuring the database is updated accordingly. We will be looking into what submission revisions are required for the consumption prior to Jun21.