ELECTRICITY INDUSTRY PARTICIPATION CODE
DISTRIBUTED UNMETERED LOAD AUDIT REPORT

VERITEK

For

SELWYN DISTRICT COUNCIL AND MERCURY NZ LIMITED

Prepared by: Rebecca Elliot

Date audit commenced: 2 November 2020

Date audit report completed: 8 December 2020

Audit report due date: 31 December 2020

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EXECUTIVE SUMMARY

This audit of the **Selwyn District Council (SDC)** 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, which became effective on 1 June 2017.

A Streetlighting/DUML database is managed by Orion on behalf of SDC, who is Mercury's customer. Fault, maintenance, new connection and upgrade work is completed by Orion's approved contractors. The contractors provide paperwork to Orion confirming that work is complete, and Orion uses this information to update the database.

The field audit of a statistical sample of 426 items of load recorded in the database was undertaken on 3rd and 4th November 2020. This found the database is not confirmed to be accurate within ±5%. In absolute terms, total annual consumption is estimated to be 317,100 kWh lower than the DUML database indicates.

The LED upgrade project is 75% complete. Each month a report is provided in spreadsheet form from the contractor to Orion. The IT team load the information to update the database for all the changes completed for the month. The field audit identified a large number of LED lights in the field that have not been updated in the database, this is due to delays in the changes made in the field being updated in the database. It is expected that when the roll-out is complete that the database will be more accurate.

The audit found four non-compliances and one recommendation was made. The future risk rating of 20 indicates that the next audit be completed in three months. I have considered this in conjunction with Mercury's comments and I recommend the Authority considers an audit period of at least nine months.

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	Database is not confirmed as accurate with a 95% level of confidence resulting in an estimated over submission of 317,100 kWh per annum. Submissions calculations do not take into account changes in lamp wattages during the month.	Moderate	High	6	
All load recorded in database	2.5	11(2A) of Schedule 15.3	11 additional items of load found in the field of the sample examined.	Moderate	Low	2	
Database accuracy	3.1	15.2 and 15.37B(b)	In absolute terms, total annual consumption is estimated to be 317,100 kWh lower than the DUML database indicates.	Moderate	High	6	
Volume information accuracy	3.2	15.2 and 15.37B(c)	Database is not confirmed as accurate with a 95% level of confidence resulting in an estimated over submission of 317,100 kWh per annum. Submissions calculations do not take into account changes in lamp wattages during the month.	Moderate	High	6	
Future Risk Rating						20	

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
Deriving submission information	2.1	Calculate submission based on changes to the kW value in the database rather than the overall light count.

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

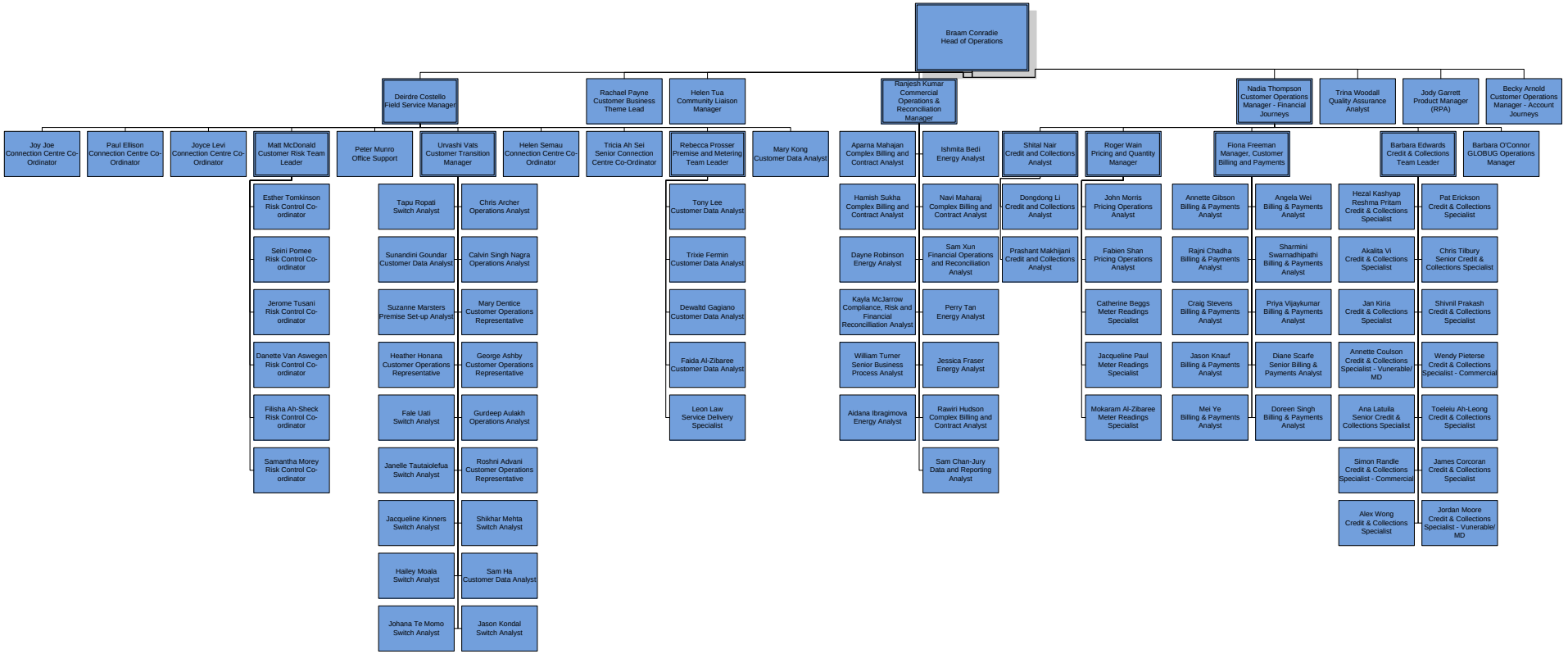
Current code exemptions were reviewed on the Electricity Authority website.

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

Auditors:

Name	Company	Role
Rebecca Elliot	Veritek Limited	Lead Auditor
Claire Stanley	Veritek Limited	Supporting Auditor

Other personnel assisting in this audit were:

Name	Title	Company
Penny Lawrence	Operations Services	Orion
Kayla McJarrow	Compliance, Risk & Financial Reconciliation Analyst	Mercury Energy

1.4. Hardware and Software

Orion use a purpose-built Oracle Streetlighting/DUML database for the management of the DUML information. Backup and restoration procedures are in place, and access to the Orion network (including the database) is restricted using logins and passwords.

Systems used by the trader 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)
0007131640RN99E	Ref Orion_SDC GXP streetlight ICP - ISL0661 GXP SDC Street Lights	ISL0661	HHR	5,892	380,117,10
0007111135RN743	Ref Orion_SDC GXP streetlight ICP - Isl0331 Gxp Sdc Street Lights	ISL0331	HHR	741	54719
0007111134RNB06	Ref Orion_SDC GXP streetlight ICP - Hor0331 Gxp Sdc Street Lights	HOR0331	HHR	545	51,201
0007152475RN996	Ref Orion_SDC GXP streetlight ICP Kimberley - West Coast Road	KBY0661	HHR	132	14,280
0007111132RNA89	Ref Orion_SDC GXP streetlight ICP - Gxpclh 0111 Sdc Street Lights	CLH0111	HHR	56	2011

ICP Number	Description	NSP	Profile	Number of items of load	Database wattage (watts)
0007111131RN649	Ref Orion_SDC GXP streetlight ICP - Aps0111 Gxp Sdc Street Lights	APS0111	HHR	34	5040
0007111133RN6CC	Ref Orion_SDC GXP streetlight ICP - Col0111 Cxp Sdc Street Lights	COL0111	HHR	40	1735
0007131637RN109	Ref Orion_SDC GXP streetlight ICP - HOR0661 GXP SDC Street Lights	HOR0661	HHR	9	697
Total				7,449	509,800.1

1.7. Authorisation Received

All information was provided directly by Mercury or Orion.

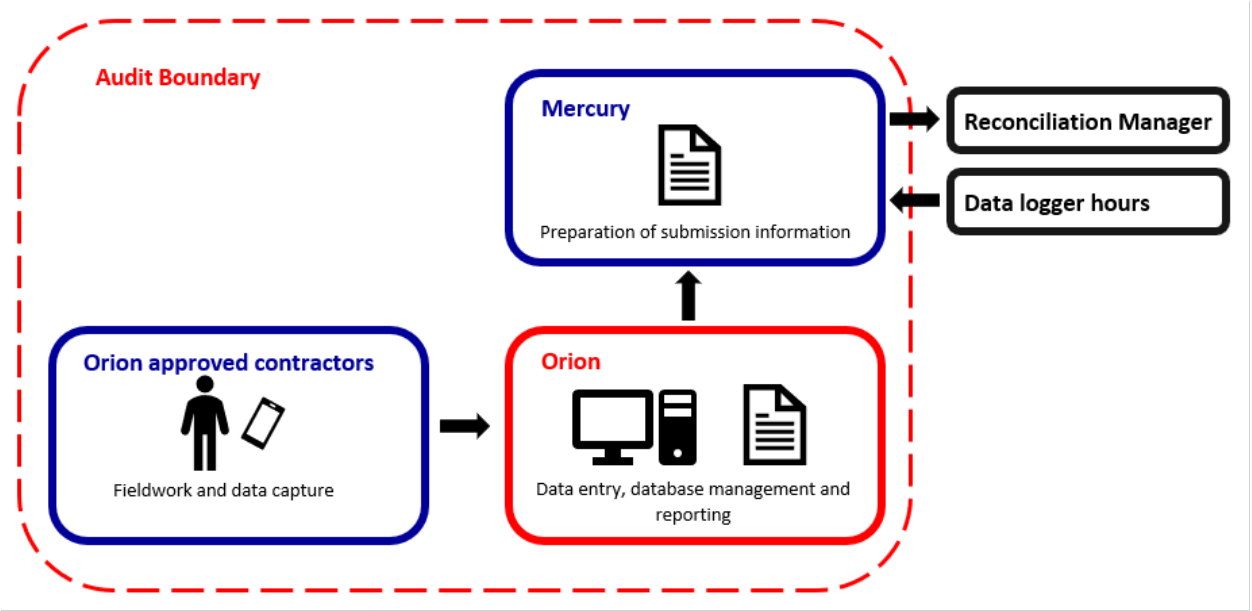
1.8. Scope of Audit

This audit of the SDC 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.

A Streetlighting/DUML database is managed by Orion on behalf of SDC, who is Mercury's customer.

Orion's fault, maintenance, new connection and upgrade work is completed by Orion's approved contractors. The contractors provide paperwork to Orion confirming that work is complete, and Orion uses this information to update the database. A monthly report from the database is provided to Mercury and used to calculate submissions. Mercury submits the DUML load as HHR using the HHR profile. On hours are derived using 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 boundaries for clarity.



The field audit was undertaken of a statistical sample of 426 items of load on 3rd and 4th December 2020.

1.9. Summary of previous audit

The previous audit of this database was undertaken by Tara Gannon of Veritek Limited in February 2020. 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	The database contains some inaccurate data. The database accuracy is assessed to be 91.5% indicating an estimated over submission of 202,000 kWh per annum (based on annual burn hours of 4,271 as detailed in the DUML database auditing tool). 69 lamps have incorrect total wattages, resulting in estimated over submission of 110W or 470 kWh p.a. based on 4,271 burn hours. Submissions are calculated based on a snapshot at the end of the month.	Still existing
All load recorded in database	2.5	11(2A) of Schedule 15.3	One item of load was missing from the database.	Existing for different lights
Database accuracy	3.1	15.2 and 15.37B(b)	The database contains some inaccurate data. The database accuracy is assessed to be 91.5% indicating an estimated over submission of 202,000 kWh per annum (based on annual burn	Still existing

Subject	Section	Clause	Non-compliance	Status
			hours of 4,271 as detailed in the DUML database auditing tool). 69 lamps have incorrect total wattages, resulting in estimated over submission of 110W or 470 kWh p.a. based on 4,271 burn hours. Some addresses and GPS coordinates do not reflect the physical location of the item of load, particularly where the light is installed beyond the customer's boundary.	
Volume information accuracy	3.2	15.2 and 15.37B(c)	The database contains some inaccurate data. The database accuracy is assessed to be 91.5% indicating an estimated over submission of 202,000 kWh per annum (based on annual burn hours of 4,271 as detailed in the DUML database auditing tool). 69 lamps have incorrect total wattages, resulting in estimated over submission of 110W or 470 kWh p.a. based on 4,271 burn hours. Submissions are calculated based on a snapshot at the end of the month.	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.

- Wattages are derived from an extract provided by Orion each month. The database is not confirmed to be accurate within ±5% as recorded in **section 3.1**.
- On and off times are derived from a data logger.

I reviewed the submission information for October 2020 and confirmed that the calculation methodology was correct and note that Mercury adjusts submission volumes if the volume of light changes e.g.

ICP 0007131640RN99E	
Light count	Date range
5706	1-11/10/20
5712	12-18/10/20
5730	19-31/10/20

Therefore, they are no longer using a snapshot of the database to calculate submission, however this will not capture any changes in wattages made to the existing streetlights. This is recorded as non-compliance below. I recommend that changes to the kW value are used and this will take into account all changes made in the database and meet the code requirement to take into account when each item of load was physically installed or removed.

Recommendation	Description	Audited party comment	Remedial action
Deriving submission information	Calculate submission based on changes to the kW value in the database rather than the overall light count.	Mercury will work with Orion to ensure all required information is made available for Mercury to calculate accurate submission.	Investigating

Mercury completes revision submissions where corrections are required.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 2.1 With: Clause 11(1) of Schedule 15.3 From: 06-Feb-20 To: 11-Nov-20	Database is not confirmed as accurate with a 95% level of confidence resulting in an estimated over submission of 317,100 kWh per annum. Submissions calculations do not take into account changes in lamp wattages during the month. Potential impact: High Actual impact: High Audit history: Multiple Controls: Moderate Breach risk rating: 6
Audit risk rating	**Rationale for audit risk rating**
High	Controls are rated as moderate. Most of the field audit differences relate to LED upgrades, where there is sometimes a delay between the light being installed and paperwork being received to update the database. The impact is assessed to be high, based on the kWh differences described above.

Actions taken to resolve the issue	Completion date	Remedial action status
Mercury will work with Orion to ensure all required information is made available for Mercury to calculate accurate submission. We have been in touch with Orion regarding the LED project and will continue to follow up to ensure the database is updated accordingly following the completion of the LED rollout project.	Ongoing	Investigating
Preventative actions taken to ensure no further issues will occur	**Completion date**	
As above	As above	

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 have an ICP recorded against them.

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 street name, number, and GPS coordinates. All items of load have GPS coordinates and are locatable.

Where lighting is installed beyond the customer's property boundary, such as in parks, reserves, and community housing properties, a single GPS and address location which reflects the point of connection to the streetlight circuit is recorded for all lights at that address.

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

The database contains a lamp type, which corresponds to a lamp total wattage including ballast wattage. All items of load have a lamp type and total wattage recorded. The accuracy of the recorded wattages 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 426 items of load on 3rd and 4th December 2020.

Audit commentary

The field audit discrepancies are detailed in the table below:

Light model	Database count	Field count	Light count difference	Wattage recorded incorrectly	Comments
Adelaide St	1	2	+1	1	1 x L20W recorded in the database as 2*30W FF
Broadland Dr	12	12		12	3 x L24W recorded in the database as 100W HPS 9 x L24W recorded in the database as 70W HPS
Bronte Way	14	14		14	14 x L24W recorded in the database as 70W HPS
Bronx Pl (street sign and Google maps has John Morton Place)	4	5	+1		1 x L28W located in the field
Container Dr	2	3	+1		1 x L42W located in the field
Duggan Drive	3	3		3	3 x L24W recorded in the database as 2 x 70W HPS, 1 x 100W HPS
Feredays Rd	5	4	-1	3	3 x L76W recorded in the database as 1 x 100W HPS, 2 1 x 150W HPS 1 x 100W HPS not found in the field
Rattletrack Drive	1	1		1	1 x L29W, recorded in the database 1 x 70 HPS
Retford Common	2	5	+3		3 x L18W located in the field
St John St	3	5	+2		2 x L18W located in the field

Light model	Database count	Field count	Light count difference	Wattage recorded incorrectly	Comments
Stanford Way opp Reserve	1	1		1	1 x L20W, recorded in the database 1 x 100 HPS
Stanford Way Rosamond Way intersection	1	1		1	1 x L29W, recorded in the database 1 x 70 HPS
Todd Pl	3	3		3	1 x L18W, 1 x L29W and 1 x L24W, recorded in the database as 3 x 70W HPS
Wilfield Dr	9	9		4	4 x L18W, recorded in the database as 4 x 70W HPS
Woodleigh Lane	4	4		1	1 x L35W, recorded in the database 1 x L27W
Jackson St	4	4		2	1 x L18W, recorded in the database as 1 x 70W HPS
Johnsons Rd	2	2		2	2 x L29W, recorded in the database as 2 x 70W HPS
Leeston and Lake Rd	7	7		1	1 x L60W, recorded in the database as 1 x 70W HPS
Leeston Rd	22	22		5	2 x L117W, recorded in the database as 2 x 150W HPS 3 x L76W, recorded in the database as 1 x 110W HPS, 1 x 100W HPS and 1 x 150W HPS
Lowes Rd	10	10		10	9 x L51W and 1 x L57W, recorded in the database as 10 x 70HPS
Manna Pl	1	1		1	1 x L29W, recorded in the database as 1 x 70W HPS
McLenaghan Rd/East Maddisons Rd	1	1		1	1 x L29W, recorded in the database as 1 x 70W HPS
Nestling Pl	3	4	+1		1 x L20W located in the field, not recorded in the database
North Belt	11	10	-1		1 x 70 HPS not located in the field, recorded in the database
Perrin Pl	0	2	+2		2 x L19W located in the field, not recorded in the database

Light model	Database count	Field count	Light count difference	Wattage recorded incorrectly	Comments
Grand Total	**426**	**435**	**13**	**66**	

The field audit found 11 additional items of load in the field. This is recorded as non-compliance below. Other light count and wattage differences identified during the field audit are recorded as non-compliance in **section 3.1**.

Audit outcome

Non-compliant

Non-compliance	Description	
Audit Ref: 2.5 With: Clause 11(2A) of Schedule 15.3 From: 06-Feb-20 To: 11-Nov-20	11 additional items of load found in the field of the sample examined. Potential impact: Low Actual impact: Low Audit history: Twice Controls: Moderate Breach risk rating: 2	
Audit risk rating	**Rationale for audit risk rating**	
Low	Controls are rated as moderate. Most of the differences relate to LED upgrades, where there is sometimes a delay between the light being installed and paperwork being received to update the database. The impact is assessed to be low, based on the kWh differences indicated in **section 3.1.**	
Actions taken to resolve the issue	**Completion date**	**Remedial action status**
We have been in touch with Orion regarding the LED project and will continue to follow up to ensure the database is updated accordingly following the completion of the LED rollout project.	Ongoing	Investigating
Preventative actions taken to ensure no further issues will occur	**Completion date**	
As above.	As above.	

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 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

Orion demonstrated a complete audit trail of all additions and changes to the database information. The user who processed the change is stored in the back end of the 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

Mercury's submissions are based on a monthly extract from the Orion database. A database extract was provided in November 2020 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	Selwyn DC streetlights
Strata	The database contains 7,449 items of load in the Selwyn DC region. The management process is the same for all lights. I created three strata: 1. Street names A-G, 2. Street names H to P, and 3. Street names Q to 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 103 sub-units.
Total items of load	426 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

Database accuracy based on the field audit

A field audit was conducted of a statistical sample of 426 items of load. The "database auditing tool" was used to analyse the results, which are shown in the table below. I found a number of roads where the LED lights had been installed, however the database recorded these as HPS.

Result	Percentage	Comments
The point estimate of R	85.4	Wattage from the survey is lower than the database wattage by 14.6%
R_L	78.3	With a 95% level of confidence, it can be concluded that the error could be between -21.7% and -7.7%
R_H	92.3	

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 C (detailed below) applies, and there is evidence that the database is not accurate within ±5%.

- In absolute terms the installed capacity is estimated to be 74 kW lower than the database indicates.
- There is a 95% level of confidence that the installed capacity is between 111 kW and 39 kW lower than the database.
- In absolute terms, total annual consumption is estimated to be 317,100 kWh lower than the DUML database indicates.
- There is a 95% level of confidence that the annual consumption is between -472,500 and 167,400 kWh lower 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 Veritek, or the manufacturer's specifications.

As discussed in **section 2.4**, all lights have a lamp and gear wattage recorded.

ICP number accuracy

All items of load have the correct ICP recorded.

Address location accuracy

As discussed in **section 2.3**, all lights have an address recorded.

Where Orion is aware that lights are installed but SDC has not provided roading information, Orion records the GPS locations of the lights and a placeholder for road name such as "Road 1", "Unknown" or "Unnamed". Once the street details are provided by SDC the road names are updated.

Change management process findings

Processes to track changes to the database were reviewed.

Fault, maintenance, new connection and upgrade work is completed by Orion's approved contractors. The contractors provide paperwork to Orion confirming that work is complete, and Orion uses this information to update the Streetlighting/DUML database and GIS. For new subdivisions, this paperwork includes "as built" plans.

Upon receipt, paperwork is checked for completeness and accuracy and any issues are followed up with the contractor. The information is sent to the GIS team so that the GIS can be updated, and then returned to the connections team to update the Streetlighting/DUML database from the date the change or new connection was effective. Once data entry is complete, the values loaded are checked against the paperwork provided, and some spot checks in the field are completed. Paperwork is normally promptly provided electronically and processed within two to three business days of receipt. The LED rollout paperwork is discussed below.

All jobs are tracked using job numbers by the connections team as part of the works management process. Late paperwork from contractors, and late updates by the GIS team are followed up. A checklist is followed to ensure that all steps in the process are completed.

Orion's approved contractors have access to a web-based version of the Streetlighting/DUML database in the field and advise Orion's connections team if they notice any discrepancies in the data recorded. Orion's operation team acts on these notifications and checks and updates the data where necessary.

The LED upgrade project is underway, each month a report is provided in spreadsheet form from the contractor to Orion. The IT team load the information into to update the database for all the changes completed for the month.

The project is approximately 75% complete. The field audit identified a large number of LED lights in the field that have not been updated in the database, this is due to timing of the field work and updating the database. It is expected when the roll-out is complete the database will be more accurate.

Six monthly outage patrols are completed by Orion's contractors as part of the Selwyn maintenance programme. Outages are also reported by residents within the Selwyn region and work orders are raised with contractors as required.

Festive lights

No festive lights are used in the Selwyn DC region.

Private lights

New private lights are not accepted, and where existing private lights are identified Orion arranges for standard or shared unmetered load to be created. In the meantime, private unmetered lights are recorded in the database against the appropriate ICP number and reported to Mercury in the monthly extracts for submission. I viewed an example of a private streetlight in the database to confirm this.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 3.1 With: Clause 15.2 and 15.37B(b) From: 06-Feb-20 To: 11-Nov-20	In absolute terms, total annual consumption is estimated to be 317,100 kWh lower than the DUML database indicates. Potential impact: High Actual impact: High Audit history: Multiple times Controls: Moderate Breach risk rating: 6
Audit risk rating	**Rationale for audit risk rating**
High	Controls are rated as moderate. Almost all the field audit differences relate to LED upgrades, where there is sometimes a delay between the light being installed and paperwork being received to update the database The impact is assessed to be high, based on the kWh differences described above.

Actions taken to resolve the issue	Completion date	Remedial action status
We have been in touch with Orion regarding the LED project and will continue to follow up to ensure the database is updated accordingly following the completion of the LED rollout project.	Ongoing	Investigating
Preventative actions taken to ensure no further issues will occur	**Completion date**	
As above	As above	

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

Mercury reconciles this DUML load using the HHR profile in accordance with exemption 233.

- Wattages are derived from an extract provided by Orion each month. The database is not confirmed to be accurate within ±5% as recorded in **section 3.1**.
- On and off times are derived from a data logger.

I reviewed the submission information for October 2020 and confirmed that the calculation methodology was correct and note that Mercury adjusts submission volumes if the volume of light changes e.g.

ICP 0007131640RN99E	
Light count	Date range
5706	1-11/10/20
5712	12-18/10/20
5730	19-31/10/20

Therefore, they are no longer using a snapshot of the database to calculate submission, however this will not capture any changes in wattages made to the existing streetlights. This is recorded as non-compliance below. I recommend in **section 2.1** that changes to the kW value are used and this will take into account all changes made in the database.

Mercury completes revision submissions where corrections are required.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 3.2 With: Clause 15.2 and 15.37B(c) From: 06-Feb-20 To: 11-Dec-20	Database is not confirmed as accurate with a 95% level of confidence resulting in an estimated over submission of 317,100 kWh per annum. Submissions calculations do not take into account changes in lamp wattages during the month. Potential impact: High Actual impact: Unknown Audit history: Mutiple Controls: Moderate Breach risk rating: 6
Audit risk rating	**Rationale for audit risk rating**
High	Controls are rated as moderate. Most of the field audit differences relate to LED upgrades, where there is sometimes a delay between the light being installed and paperwork being received to update the database. The impact is assessed to be high, based on the kWh differences described above.

Actions taken to resolve the issue	Completion date	Remedial action status

Mercury will work with Orion to ensure all required information is made available for Mercury to calculate accurate submission. We have been in touch with Orion regarding the LED project and will continue to follow up to ensure the database is updated accordingly following the completion of the LED rollout project.	Ongoing	Investigating
Preventative actions taken to ensure no further issues will occur	**Completion date**	
As above	As above	

CONCLUSION

The field audit was undertaken of a statistical sample of 426 items of load recorded in the database was undertaken on 3rd and 4th November 2020. This found the database is not confirmed to be accurate within ±5%. In absolute terms, total annual consumption is estimated to be 317,100 kWh lower than the DUML database indicates.

The LED upgrade project is 75% complete. Each month a report is provided in spreadsheet form from the contractor to Orion. The IT team load the information into to update the database for all the changes completed for the month. The field audit identified a large number of LED lights in the field that have not been updated in the database, this is due to delays in the changes made in the field being updated in the database. It is expected that when the roll-out is complete that the database will be more accurate.

The audit found four non-compliances and one recommendation was made. The future risk rating of 20 indicates that the next audit be completed in three months. I have considered this in conjunction with Mercury's comments and I recommend the Authority considers an audit period of at least nine months.

PARTICIPANT RESPONSE

Mercury will work with Orion to ensure submission calculations account for wattage changes on a daily basis. As most of the database discrepancies are due to delays from the LED rollout, we would expect database accuracy to increase following the completion of the project. We will be in regular contact with Orion to ensure the database is updated accordingly following the project completion.