

ELECTRICITY INDUSTRY PARTICIPATION CODE
DISTRIBUTED UNMETERED LOAD AUDIT REPORT



For

WAKA KOTAHI LOWER NORTH ISLAND
AND GENESIS ENERGY LIMITED

Prepared by: Rebecca Elliot

Date audit commenced: 1 August 2023

Date audit report completed: 1 March 2024

Audit report due date: 13 October 2023

TABLE OF CONTENTS

Executive summary	3
Audit summary	4
Non-compliances	4
Recommendations	5
Issues 5	
1. Administrative.....	6
1.1. Exemptions from Obligations to Comply with Code	6
1.2. Structure of Organisation	6
1.3. Persons involved in this audit.....	7
1.4. Hardware and Software	7
1.5. Breaches or Breach Allegations.....	7
1.6. ICP Data	7
1.7. Authorisation Received	8
1.8. Scope of Audit	9
1.9. Summary of previous audit	10
1.10. Distributed unmetered load audits (Clause 16A.26 and 17.295F).....	11
2. DUML database requirements.....	13
2.1. Deriving submission information (Clause 11(1) of Schedule 15.3)	13
2.2. ICP identifier and items of load (Clause 11(2)(a) and (aa) of Schedule 15.3)	15
2.3. Location of each item of load (Clause 11(2)(b) of Schedule 15.3)	16
2.4. Description and capacity of load (Clause 11(2)(c) and (d) of Schedule 15.3)	16
2.5. All load recorded in database (Clause 11(2A) of Schedule 15.3)	18
2.6. Tracking of load changes (Clause 11(3) of Schedule 15.3)	19
2.7. Audit trail (Clause 11(4) of Schedule 15.3).....	20
3. Accuracy of DUML database	21
3.1. Database accuracy (Clause 15.2 and 15.37B(b))	21
3.2. Volume information accuracy (Clause 15.2 and 15.37B(c))	25
Conclusion	28
Participant response	29

EXECUTIVE SUMMARY

This audit of the **Waka Kotahi Lower North Island** DUML database and processes was conducted at the request of **Genesis Energy (Genesis)** 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.

This database was created by taking the items of load out of several District and City Council databases and loading them to the Waka Kotahi RAMM database. Maintenance continues to be carried out by the local council within the 70 kmh speed zones. The council is expected to update the assets in their database and provide an update of changes to Waka Kotahi to update in RAMM. Outside of the 70 kmh speed zones Waka Kotahi engages the contractors directly. Any maintenance carried out is expected to be updated by the contractor directly into RAMM.

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 field audit was undertaken of 478 items of load and the database accuracy is described as follows:

Result	Percentage	Comments
The point estimate of R	96.7	Wattage from survey is lower than the database wattage by 3.3%
R _L	90.7	With a 95% level of confidence, it can be concluded that the error could be between -9.3% and + 1.5%
R _H	101.5	

In absolute terms, total annual consumption is estimated to be 62,900 kWh lower than the DUML database indicates.

As was found in the last two audits, a large number of database accuracy issues (33% incorrect) were identified, and I repeat the recommendation that a 100% field audit is conducted to address these and to ensure the database is accurate and that submission information is accurate. I also recommend that Genesis engage with the Waka Kotahi Maintenance managers to review the change management processes as this audit found an LED rollout has occurred on SH3 heading into New Plymouth and has not been updated in the RAMM database.

The errors identified in the database from the last audit have been corrected.

This audit identified six non-compliances, and four recommendations were raised. The future risk rating of 36 indicates that the next audit be completed in three months. I have considered this in conjunction with Genesis's response and the progress that NZ Streetlighting has made in updating the database from the field audit results. This audit found no improvement to the database accuracy and that the change management process is not working as expected. The audit has not been completed on time resulting in a continued over submission to the market. I have repeated the recommendation to conduct a full field audit. I have recommended that Genesis engage with the Waka Kotahi Maintenance Managers to review and improve the updating process. Given these factors I recommend that the next audit of this database be completed no more than six months from the audit report submission date, this should allow enough time for Genesis to make progress with Waka Kotahi to address the matters raised in the audit.

The matters raised are detailed below:

AUDIT SUMMARY

NON-COMPLIANCES

Subject	Section	Clause	Non-Compliance	Controls	Audit Risk Rating	Breach Risk Rating	Remedial Action
Audit	1.10	16A.26	Audit not submitted by the due date.	Moderate	Low	2	Identified
Deriving submission information	2.1	11(1) of Schedule 15.3	Database assessed as having poor precision therefore the potential error is greater than 5.0% resulting in an estimated over submission of 62,900 kWh per annum but could be as high as 189,500 kWh per annum.	Weak	High	9	Investigating
Description and capacity of load	2.4	11(4) of Schedule 15.3	77 items of load have no lamp description. Two items have an unknown light make and model.	Weak	Low	3	Investigating
All load recorded in database	2.5	11(2A) of Schedule 15.3	40 items of load in the field not recorded in the database from a sample of 478 items of load checked. This represents an 8% error. This discrepancy is included in the total field audit discrepancy recorded in section 3.1 .	Weak	Low	3	Investigating
Database accuracy	3.1	15.2 and 15.37B(b)	Database assessed as having poor precision therefore the potential error is greater than 5.0% resulting in an estimated over submission of 62,900 kWh per annum but could be as high as 189,500 kWh per annum. 77 items of load with no lamp model details recorded. Two items with unknown light model recorded. Change management processes are ineffective with 33% of the sample found to be incorrect.	Weak	High	9	Investigating
Volume information accuracy	3.2	15.2 and 15.37B(c)	Corrections not carried out within the 14-month revision period resulting in an under submission of 9,262 kWh for June 2022 due to the incorrect burn hours being used.	Weak	High	9	

Subject	Section	Clause	Non-Compliance	Controls	Audit Risk Rating	Breach Risk Rating	Remedial Action
			Database assessed as having poor precision therefore the potential error is greater than 5.0% resulting in an estimated over submission of 62,900 kWh per annum but could be as high as 189,500 kWh per annum.				
Future Risk Rating						35	

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
Light make and model	2.4	Conduct at least a check of all 77 items of load with "Schreder" recorded and no lamp model details recorded.
Consolidate all Waka Kotahi unmetered streetlights	2.5	Genesis identifies all Standard UML ICPs related to Waka Kotahi Lower North Island and working with both Waka Kotahi and the respective distributor to transition these lights into the DUML database to ensure all Kotahi Lower North Island unmetered lights are accounted for and can be appropriately audited
Database accuracy	3.1	Conduct a full field audit to bring the database up to date.
		Genesis to engage with the Waka Kotahi Maintenance Managers to review the change management processes and ensure that changes made in the field are updated in the RAMM database in a timely manner.

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

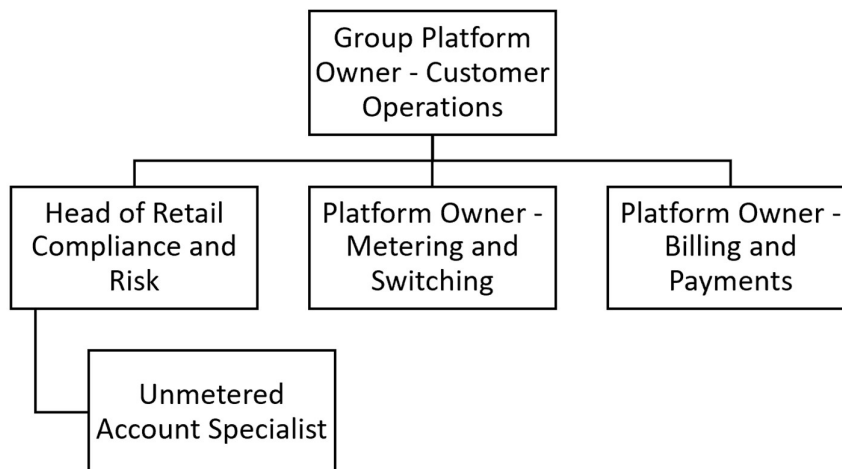
Current code exemptions were reviewed on the Electricity Authority website.

Audit commentary

There are no exemptions relevant to the scope of this audit.

1.2. Structure of Organisation

Genesis provided a copy of their organisational structure:



1.3. Persons involved in this audit

Auditor:

Name	Company	Role
Rebecca Elliot	Veritek Limited	Auditor
Steve Woods	Veritek Limited	Supporting Auditor

Other personnel assisting in this audit were:

Name	Title	Company
Alysha Majury	Unmetered Account Specialist	Genesis Energy
Kara Atkinson	Director	NZ Streetlighting

1.4. Hardware and Software

The SQL database used for the management of DUML is remotely hosted by thinkproject New Zealand Limited. The database is commonly known as “RAMM” which stands for “Road Assessment and Maintenance Management”. The specific module used for DUML is called RAMM Contractor.

The database is backed up in accordance with standard industry procedures. Access to the database is secure by way of password protection.

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

The Waka Kotahi Lower North Island DUML database contains the ICPs in the table below.

ICP Number	Description	NSP	Profile	Number of items of load	Database wattage (watts)
0001113593WM404	Streetlights (Central Taranaki UM - ONG0331)	ONG0331	CST	100	17,153
0001113594WM9CE	Streetlights (Western Taranaki UM - HTI0331)	HTI0331	NST	5	656
0009104000CAB5C	Transit - SH2 & SH3 Flag Lighting	DVK0111	CST	130	17,970
0009109000CA17C	NZTA Highway Lighting Woodville	WDV0111	CST	69	12,858

ICP Number	Description	NSP	Profile	Number of items of load	Database wattage (watts)
0036810007PCADE	Streetlights - cnr of SH54 (Vinegar Hill) & State Highway 54	MTN0331	CST	2	556
0110012428ELECC	NZTA Streetlights	MHO0331	CST	278	43,203
0110012429EL289	NZTA Streetlights	MHO0331	CST	10	1,143
1000592735PCC2D	NZTA Streetlights BPE0331	BPE0331	CST	631	104,296
1000592736PC0ED	NZTA Streetlights CST0331	CST0331	NST	864	131,233
1000592737PCCA8	NZTA Streetlights HWA0331	HWA0331	NST	329	36,432
1000592738PC376	NZTA Streetlights HUI0331	HUI0331	NST	197	30,626
1000592739PCF33	NZTA Streetlights LTN0331	LTN0331	CST	141	22,523
1000592741PC87A	NZTA Streetlights OPK0331	OPK0331	NST	121	14,560
1000592743PC8FF	NZTA Streetlights SFD0331	SFD0331	NST	244	34,475
1000592782PC355	NZTA Streetlights WVY0111	WVY0111	NST	37	4,580
1000592858PC389	NZTA Streetlights MST0331	MST0331	CST	403	37,826
0666002555PC35F	NZTA Streetlights GYT0331	GYT0331	CST	195	17,928
Total				3,771	529,938

1.7. Authorisation Received

All information was provided directly by Genesis and NZ Streetlighting.

1.8. Scope of Audit

This audit of the Waka Kotahi Lower North Island DUML database and processes was conducted at the request of Genesis Energy (Genesis) 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.

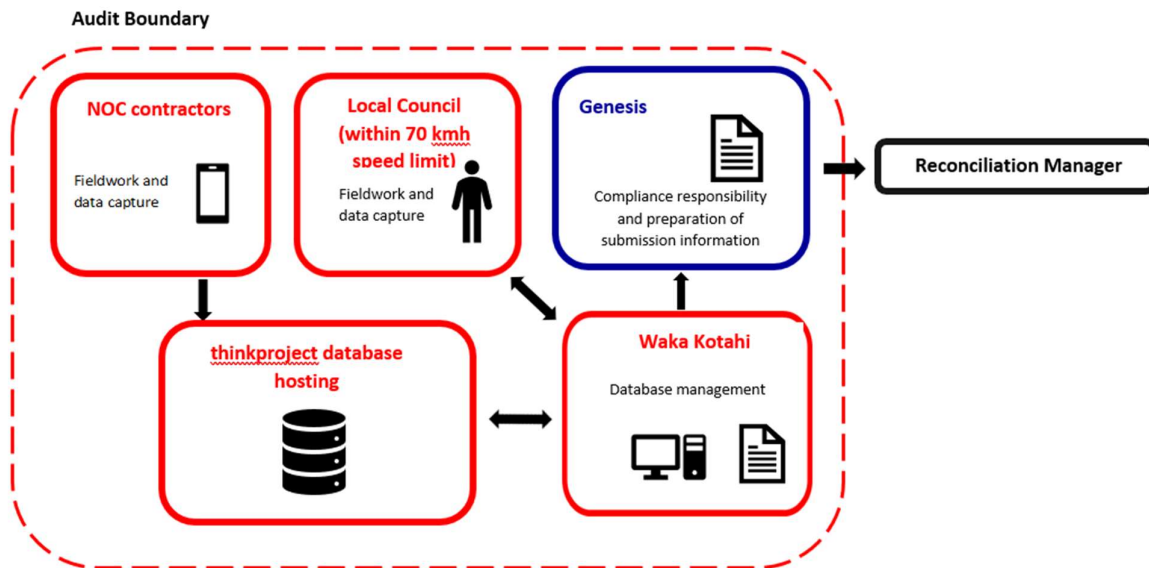
This database was created by taking the items of load out of several District and City Council databases.

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 the local council within the 70 kmh speed zone with all maintenance and updating of the database carried out by the local council. Outside of the 70kmh speed zones, Waka Kotahi engages contractors by region (NOC).

Genesis reconciles the DUML load using the NST and CST profiles. The kW figures are derived from the monthly wattage report. Changes made in the field are updated directly into the Waka Kotahi RAMM database for the contractors that are engaged directly by Waka Kotahi. Maintenance carried out by the local council is expected to be updated within their own database and then passed to Waka Kotahi to update in their database. The on/off times are derived from three loggers within the overall region.

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.



A field audit was conducted of 478 items of load on February 15, 19 and 20, 2024.

1.9. Summary of previous audit

The previous audit was completed in December 2022 by Steve Woods of Veritek Limited. Five non-compliances were identified, and three recommendations were made. The current statuses of the non-compliance clauses recorded, and the recommendation are detailed below:

Table of Non-compliance

Subject	Section	Clause	Non-Compliance	Status
Deriving submission information	2.1	11(1) of Schedule 15.3	<p>Under submission of 9,262 kWh for June 2022 due to the incorrect burn hours being used.</p> <p>Database assessed as having poor precision therefore the potential error is greater than 5.0% resulting in an estimated over submission of 35,600 kWh per annum.</p> <p>Database discrepancies are as follows:</p> <ul style="list-style-type: none"> 13 incorrect gear wattages, four items have invalid combinations of lamp and gear wattages where either could be incorrect. <p>90 incorrect or missing light model descriptions.</p>	<p>Still existing</p> <p>Still existing</p> <p>Cleared</p> <p>Still existing for a smaller number of lights</p>
Description and capacity of load	2.4	11(4) of Schedule 15.3	<p>84 items of load have a blank or unknown light model description.</p> <p>Six items have incorrect light make and model</p> <p>Four items have invalid combinations of lamp and gear wattages where either could be incorrect</p> <p>Nine items of load have incorrect gear wattages</p>	<p>Still existing for a smaller number of lights</p> <p>Cleared</p> <p>Cleared</p> <p>Cleared</p>
All load recorded in database	2.5	11(2A) of Schedule 15.3	<p>40 items of load in the field not recorded in the database. This discrepancy is included in the total field audit discrepancy recorded in section 3.1.</p>	<p>Still existing for the sample examined in this audit</p>
Database accuracy	3.1	15.2 and 15.37B(b)	<p>Database assessed as having poor precision therefore the potential error is greater than 5.0% resulting in an estimated over submission of 35,600 kWh per annum.</p> <p>Database discrepancies are as follows:</p> <ul style="list-style-type: none"> 13 incorrect gear wattages, four items have invalid combinations of lamp and gear wattages where either could be incorrect. <p>90 incorrect or missing light model descriptions</p>	<p>Still existing</p> <p>Cleared</p> <p>Still existing for a smaller number of lights</p>

Subject	Section	Clause	Non-Compliance	Status
Volume information accuracy	3.2	15.2 and 15.37B(c)	<p>Under submission of 9,262 kWh for June 2022 due to the incorrect burn hours being used.</p> <p>Database assessed as having poor precision therefore the potential error is greater than 5.0% resulting in an estimated over submission of 35,600 kWh per annum.</p> <p>Database discrepancies are as follows:</p> <ul style="list-style-type: none"> 13 incorrect gear wattages, four items have invalid combinations of lamp and gear wattages where either could be incorrect. <p>90 incorrect or missing light model descriptions.</p>	<p>Still existing</p> <p>Still existing</p> <p>Cleared</p> <p>Still existing for a smaller number of lights</p>

Table of Recommendations

Subject	Section	Recommendation	Status
GPS coordinates	2.3	Populate GPS coordinates for Pole IDs 53584, 53481 and 66710	Cleared
Consolidate all Waka Kotahi unmetered streetlights	2.5	Genesis identifies all Standard UML ICPs related to Waka Kotahi Lower North Island and working with both Waka Kotahi and the respective distributor to transition these lights into the DUML database to ensure all Kotahi Lower North Island unmetered lights are accounted for and can be appropriately audited	Repeated
Database accuracy	3.1	Prioritise LED roll out that would enable the database to be updated at the earliest opportunity or conduct a full field audit of all items of load to ensure database accuracy.	Not adopted

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:

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

Audit observation

Genesis have requested Veritek to undertake this streetlight audit.

Audit commentary

This audit report confirms that the requirement to conduct an audit has been met but was not completed by the due date of 23rd October, 2023 as the database was not provided to be able to undertake the audit. This is recorded as non-compliance.

Audit outcome

Non-compliant

Non-compliance	Description		
Audit Ref: 1.10 With: Clause 16A.26 From: 13-Oct-23 To: 01-Mar-24	Audit not submitted by the due date. Potential impact: Medium Actual impact: Low Audit history: None Controls: Moderate Breach risk rating: 2		
Audit risk rating	Rationale for audit risk rating		
Low	<p>The controls are recorded as moderate as Genesis has robust processes in place to ensure DUML audits are completed within the required timeframe, but a database extract was not provided within the required timeframe for this audit causing it to be late.</p> <p>The audit risk rating is assessed to be low overall, but I note that the delay in completing the audit in this case caused five months of inaccurate submissions that could have been avoided had the audit been completed on time and corrections made.</p>		
Actions taken to resolve the issue		Completion date	Remedial action status
Genesis is now receiving regular monthly data extracts		Completed	Identified
Preventative actions taken to ensure no further issues will occur		Completion date	
Genesis is now receiving regular monthly data extracts		Completed	

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

The NST and CST profiles are used for submission depending on the location of the GXP. On/off times are derived from three data loggers recording on and off signals from ripple control systems.

I compared the submitted volumes for January 2024 and confirmed they were all accurate.

The last audit report recorded that the incorrect burn hours were applied resulting in an inaccuracy of between 2.9% and 4.9% across 16 ICPs (as detailed below) and an under submission of 9,262 kWh for the month of June 2022.

ICP	June 2022 kW	Burn hours	Calculated kWh	June 2022 kWh submitted	Difference
0001113593WM404	17.14	441.10	7,558.20	17.14	314.65
0001113594WM9CE	0.83	441.10	366.99	0.83	15.70
0009104000CAB5C	19.28	442.46	8,529.35	19.28	327.74
0009109000CA17C	28.34	442.46	12,540.28	28.34	482.22
0036810007PCADE	0.56	440.80	245.08	0.56	11.85
0110012428ELECC	43.55	440.80	19,198.04	43.55	933.85
0110012429EL289	1.23	440.80	542.62	1.23	25.85
1000592735PCC2D	107.72	440.80	47,481.80	107.72	2310.51
1000592736PC0ED	129.67	426.20	55,263.15	129.67	1632.83
1000592737PCCA8	31.83	426.20	13,564.22	31.83	400.99
1000592738PC376	27.15	426.20	11,572.17	27.15	341.52
1000592739PCF33	23.84	440.80	10,507.28	23.84	510.51
1000592741PC87A	14.86	426.20	6,332.47	14.86	187.31

ICP	June 2022 kW	Burn hours	Calculated kWh	June 2022 kWh submitted	Difference
1000592743PC8FF	29.82	426.20	12,710.97	29.82	375.16
1000592782PC355	3.72	426.20	1,585.46	3.72	46.75
1000592858PC389	62.74	440.80	2,7653.41	62.74	1344.38
TOTAL					9,261.84

I reviewed the revision files and found this was not corrected and the 14-month revision has now passed. This is recorded as non-compliance in **section 3.2**.

The field audit found that the database is not confirmed as accurate with a 95% level of confidence resulting in an estimated over submission of 62,900 kWh per annum and could potentially be between 189,500 kWh p.a. over submission to 38,300 kWh p.a. under submission. This is recorded as non-compliance below and in **sections 3.1** and **3.2**.

Genesis confirmed they calculate the submission at a daily level as required by the code. To do this they import the data into a database and uses asset install dates to calculate active days for each item of load.

Audit outcome

Non-compliant

Non-compliance	Description	
Audit Ref: 2.1 With: Clause 11(1) of Schedule 15.3 From: 01-Jul-22 To: 31-Jan-24	Database assessed as having poor precision therefore the potential error is greater than 5.0% resulting in an estimated over submission of 62,900 kWh per annum but could be as high as 189,500 kWh per annum. Potential impact: High Actual impact: High Audit history: Twice previously Controls: Weak Breach risk rating: 9	
Audit risk rating	Rationale for audit risk rating	
High	The controls are recorded as weak as the processes to keep the database up to date do not mitigate risk to an acceptable level. The impact on settlement and participants is high based on the kWh error; therefore, the audit risk rating is high.	
Actions taken to resolve the issue	Completion date	Remedial action status
Genesis has recently reviewed the loggers and made submission corrections dating back from November 2022 onwards.	On-going	Investigating
Preventative actions taken to ensure no further issues will occur	Completion date	
Genesis has corrected the loggers. Genesis continues to work with Waka Kotahi to ensure accuracy of their database.	On-going	

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 DUMML database must contain:

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

Audit observation

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

Audit commentary

Each item of load has the 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, and GPS coordinates. All items of load apart from one item of load have GPS coordinates populated. The one item of load without GPS coordinates has a road name, location and a pole number and is locatable.

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 fields for lamp make model description, lamp wattage and gear wattage. The errors identified in the last audit have been corrected. Analysis of the database found:

- two have an unknown lamp model description, and
- 77 items of load had no lamp description other than "Schreder" recorded as the light make; I note 12 of these were selected in the field audit and all were found to be incorrect:
 - 11 were HPS lights, and
 - one was an LED, but the wattage was different to that recorded in the database.

I recommend that all 77 items of load be checked in the field to confirm if they are present, and record the lamp make and model if they are Schreder.

Recommendation	Description	Audited party comment	Remedial action
Schreder light with no lamp description	Conduct at least a check of all 77 items of load with "Schreder" recorded and no lamp model details recorded.	Genesis continues to work with Waka Kotahi to increase the accuracy of their database. Corrections have started to be made based on the audit findings and the customer is aware of this recommendation.	Investigating

The accuracy of the lamp and gear 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: 01-Oct-21 To: 30-Jun-22	77 items of load have no lamp description. Two items have an unknown light make and model. Potential impact: Low Actual impact: Low Audit history: Twice previously Controls: Weak Breach risk rating: 3		
Audit risk rating	Rationale for audit risk rating		
Low	The controls are recorded as weak as the processes to keep the database up to date do not mitigate risk to an acceptable level. The impact is assessed to be low based on the number of items of load impacted.		
Actions taken to resolve the issue		Completion date	Remedial action status
Genesis continues to work with Waka Kotahi to increase the accuracy of their database. Corrections have started to be made based on the audit findings and the customer is aware of this recommendation.		On-Going	Investigating
Preventative actions taken to ensure no further issues will occur		Completion date	
Genesis continues to work with Waka Kotahi to increase the accuracy of their database. Corrections have started to be made based on the audit findings and the customer is aware of this recommendation.		On-Going	

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

A field audit was conducted of 478 items of load.

Audit commentary

The errors identified in the last audit have been corrected.

The field audit identified the following:

- 40 items (8%) of load in the field not in the database,
- 6 items (1%) of load in the database but not in the field, and
- 113 items (24%) with the incorrect wattages.

This equates to 33% of the sample found to be incorrect. The detailed results have been provided to Genesis and NZ Streetlighting.

As reported in the last audit, I found a mix of both relay and photocell operated lights. Given that most relay operated streetlight circuits are operated by a photocell at the local zone substation, there is little difference between a relay operated light and a photocell operated light. I recommend that Genesis identifies all Standard UML ICPs related to Waka Kotahi Lower North Island and working with both Waka Kotahi and the respective distributor to transition these lights into the DUML database to ensure all Kotahi Lower North Island unmetered lights are accounted for and can be appropriately audited.

Recommendation	Description	Audited party comment	Remedial action
Consolidate all Waka Kotahi unmetered streetlights	Genesis identifies all standard UML ICPs related to Waka Kotahi Lower North Island and working with both Waka Kotahi and the respective distributor to transition these lights into the DUML database to ensure all Kotahi Lower North Island unmetered lights are accounted for and can be appropriately audited.	Genesis will work with Waka Kotahi to carry out this work to clear this. Waka Kotahi are also aware of this recommendation.	Investigating

The accuracy of the database 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: 01-Jul-22 To: 31-Jan-24	40 items of load in the field not recorded in the database from a sample of 478 items of load checked. This represents an 8% error. This discrepancy is included in the total field audit discrepancy recorded in section 3.1 . Potential impact: Medium Actual impact: Low Audit history: Twice previously Controls: Weak Breach risk rating: 3		
Audit risk rating	Rationale for audit risk rating		
Low	The controls are recorded as weak as the processes to keep the database up to date do not mitigate risk to an acceptable level. 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
Genesis continues to work with Waka Kotahi to increase the accuracy of their database. Corrections have started to be made based on the audit findings and the customer is aware of this finding.		Continuous	Investigating
Preventative actions taken to ensure no further issues will occur		Completion date	
Genesis continues to work with Waka Kotahi to increase the accuracy of their database. Corrections have started to be made based on the audit findings and the customer is aware of this finding.		Continuous	

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 DUMML 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 compliant audit trail.

Audit outcome

Compliant

3. ACCURACY OF DUML DATABASE

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

Code reference

Clause 15.2 and 15.37B(b)

Code related audit information

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

Audit observation

A field audit was undertaken of 478 items of load. 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	Lower North Island Waka Kotahi lighting
Strata	The database contains Waka Kotahi lighting in the Manawatu, Taranaki and Wairarapa regions. The processes for the management of all Waka Kotahi items of load are the same, but I decided to place the items of load into four strata based on NSPs: <ol style="list-style-type: none"> 1. BPE-LTN-ONG-GYT 2. CST 3. DVK-HTI-HUI-HWA-MGM-MHO-MTN 4. MST-OPK-SFD-WDV-WVY
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 22 sub-units.
Total items of load	478 items of load were checked, making up 12% of the database load.

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 478 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	96.7	Wattage from survey is lower than the database wattage by 3.3%
R _L	90.7	With a 95% level of confidence, it can be concluded that the error could be between -9.3% and + 1.5%
R _H	101.5	

These results were categorised in accordance with the “Distributed Unmetered Load Statistical Sampling Audit Guideline”, effective from 1 February 2019 and the table below shows that Scenario B (detailed below) applies.

The conclusion from Scenario B, demonstrated with statistical significance, is that the variability of the sample results across the strata means that the true wattage (installed in the field) could be between 9.1% lower and 1.6% higher than the wattage recorded in the DUML database. Non-compliance is recorded because the potential error is greater than 5.0%.

- In absolute terms the installed capacity is estimated to be 15 kW lower than the database indicates.
- There is a 95% level of confidence that the installed capacity is between 44 kW lower and 9 kW higher than the database.
- In absolute terms, total annual consumption is estimated to be 62,900 kWh lower than the DUML database indicates.
- There is a 95% level of confidence that the annual consumption is between 189,500 kWh p.a. lower to 38,300 kWh p.a. higher than the database indicates.

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

Light description and capacity accuracy

As discussed in **section 2.4**:

- two have an unknown lamp model description, and
- 77 items of load no lamp description other than “Schreder” recorded as the light make; I note 12 of these were selected in the field audit and all were found to be incorrect:
 - 11 were HPS lights, and
 - one was an LED, but the wattage was different to that recorded in the database.

I recommended in **section 2.4**, that all 77 items of load be checked in the field to confirm if they are present, and

The quantity of errors identified in the field audit represents an error rate of 33%. This is similar to that found in the last audit. Whilst the “overs” and “unders” cancel themselves out to a certain extent, it’s possible the database could be approximately 10% too high or 10% too low.

It was recommended in the previous two audits to conduct a full field audit of all items of load to ensure the database is accurate and in the last audit the recommendation was made to prioritise the LED rollout and the database be updated as the LED lights were rolled out. This field audit found an LED rollout that has been completed on SH3 coming into New Plymouth, but this has not been updated in the database. I have repeated the recommendation for a full field audit again.

Recommendation	Description	Audited party comment	Remedial action
Database accuracy	Conduct a full field audit to bring the database up to date.	Genesis continues to work with Waka Kotahi to increase the accuracy of their database. Waka Kotahi are aware of these findings and also the recommendations.	Investigating

ICP number accuracy

All ICPs are correctly recorded.

Location information

The database contains fields for the road name, location number, and GPS coordinates. All items of load apart from one have GPS coordinates populated. The one item of load without GPS coordinates has a road name, location and a pole number and is locatable.

Change management process findings

Changes made in the field are updated directly into the Waka Kotahi RAMM database for the contractors that are engaged directly by Waka Kotahi in the different regions (NOCs). Maintenance carried out by the local council is expected to be updated within their own database and then passed to Waka Kotahi to update in their database. As detailed above the field audit identified an LED rollout that has been carried out on SH3 heading into New Plymouth which has not been updated in RAMM. I recommend that Genesis engage with the Waka Kotahi maintenance managers to review the change management processes for both the contractors engaged directly and the Local Council maintained assets. Improving the updating processes will have the greatest impact to bring the database up to date.

Recommendation	Description	Audited party comment	Remedial action
Database accuracy	Genesis to engage with the Waka Kotahi Maintenance Managers to review the change management processes and ensure that changes made in the field are updated in the RAMM database in a timely manner.	Genesis will look to engage with the appropriate team/person to ensure this is being recorded to ensure accuracy of their database	Investigating

Festive and private lights

There are no private lights identified. The festive lights identified in the last audit in Masterton have been confirmed to have been disconnected by Masterton DC as detailed below:

The previous audit found that festive lights connected to Waka Kotahi street light poles along State Highway 2 (Chapel Street, Queen Street and Dixon Street) were removed from the MDC database when the Waka Kotahi streetlights were added to the Waka Kotahi Lower North Island database in 2021. MDC confirmed that when Waka Kotahi upgraded the lights to LEDs the streetlight circuit was changed, and MDC was no longer able to turn on the lights. The festive lights have not been used since and were not connected at all during the 2022-2023 festive period. These unused festive lights will be removed as work crews have time; the work is not considered urgent as it is not a safety issue.¶

In this audit, I identified some festive lights in Eketahuna fitted on Waka Kotahi poles along SH2. These festive lights are not currently included in the local council DUMML database, and this has been passed to the auditor of Tararua DC to be investigated.

Audit outcome

Non-compliant

Non-compliance	Description		
Audit Ref: 3.1 With: Clause 15.2 and 15.37B(b) From: 01-Jun-22 To: 31-Jan-24	Database assessed as having poor precision therefore the potential error is greater than 5.0% resulting in an estimated over submission of 62,900 kWh per annum but could be as high as 189,500 kWh per annum. 77 items of load with no lamp model details recorded. Two items with unknown light model recorded. Change management processes are ineffective with 33% of the sample found to be incorrect. Potential impact: High Actual impact: High Audit history: Twice previously Controls: Weak Breach risk rating: 9		
Audit risk rating	Rationale for audit risk rating		
High	The controls are recorded as weak as the processes to keep the database up to date do not mitigate risk to an acceptable level. The impact on settlement and participants is moderate based on the kWh error; therefore, the audit risk rating is high.		
Actions taken to resolve the issue		Completion date	Remedial action status
Genesis continues to work with Waka Kotahi to increase the accuracy of their database. Waka Kotahi are also aware of the findings.		Continuous	Investigating
Preventative actions taken to ensure no further issues will occur		Completion date	
Genesis continues to work with Waka Kotahi to increase the accuracy of their database. Waka Kotahi are also aware of the findings.		Continuous	

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.

Any expected corrections were confirmed to have been made.

Audit commentary

The NST and CST profiles are used for submission depending on the location of the GXP. On/off times are derived from four data loggers recording on and off signals from ripple control systems.

I compared the submitted volumes for January 2024 and confirmed they were all accurate.

As detailed in **section 2.1**, the last audit report recorded that the incorrect burn hours were applied resulting in an inaccuracy of between 2.9% and 4.9% across 16 ICPs with an under submission of 9,262 kWh for the month of June 2022. I reviewed the revision files and found this was not corrected and the 14-month revision has now passed. This is recorded as non-compliance in below.

As recorded in **section 3.1**, the field audit found that the database is not confirmed as accurate with a 95% level of confidence resulting in an estimated over submission of 62,900 kWh per annum and could potentially be between 189,500 kWh p.a. over submission to 38,300 kWh p.a. under submission. This is recorded as non-compliance below and in **sections 2.1** and **3.1**.

Genesis confirmed they calculate the submission at a daily level as required by the code. To do this they import the data into a database and uses asset install dates to calculate active days for each item of load.

Audit outcome

Non-compliant

Non-compliance	Description		
<p>Audit Ref: 3.2 With: Clause 15.2 and 15.37B(c)</p> <p>From: 01-Jul-22 To: 31-Jan-24</p>	<p>Corrections not carried out within the 14-month revision period resulting in an under submission of 9,262 kWh for June 2022 due to the incorrect burn hours being used.</p> <p>Database assessed as having poor precision therefore the potential error is greater than 5.0% resulting in an estimated over submission of 62,900 kWh per annum but could be as high as 189,500 kWh per annum.</p> <p>Potential impact: High Actual impact: High</p> <p>Audit history: Twice previously Controls: Weak Breach risk rating: 9</p>		
Audit risk rating	Rationale for audit risk rating		
<p>High</p>	<p>The controls are recorded as weak as the processes to keep the database up to date do not mitigate risk to an acceptable level.</p> <p>The impact on settlement and participants is high based on the kWh error; therefore, the audit risk rating is high.</p>		
Actions taken to resolve the issue		Completion date	Remedial action status
<p>Genesis has recently reviewed the loggers and made submission corrections dating back from November 2022 onwards.</p>		<p>Completed</p>	<p>Investigating</p>
Preventative actions taken to ensure no further issues will occur		Completion date	
<p>Genesis has recently reviewed the loggers and made submission corrections dating back from November 2022 onwards.</p>		<p>Completed</p>	

CONCLUSION

This database was created by taking the items of load out of several District and City Council databases and loading them to the Waka Kotahi RAMM database. Maintenance continues to be carried out by the local council within the 70 kmh speed zones. The council is expected to update the assets in their database and provide an update of changes to Waka Kotahi to update in RAMM. Outside of the 70 kmh speed zones Waka Kotahi engages the contractors directly. Any maintenance carried out is expected to be updated by the contractor directly into RAMM.

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 field audit was undertaken of 478 items of load and the database accuracy is described as follows:

Result	Percentage	Comments
The point estimate of R	96.7	Wattage from survey is lower than the database wattage by 3.3%
R _L	90.7	With a 95% level of confidence, it can be concluded that the error could be between -9.3% and + 1.5%
R _H	101.5	

In absolute terms, total annual consumption is estimated to be 62,900 kWh lower than the DUML database indicates.

As was found in the last two audits, a large number of database accuracy issues (33% incorrect) were identified, and I repeat the recommendation that a 100% field audit is conducted to address these and to ensure the database is accurate and that submission information is accurate. I also recommend that Genesis engage with the Waka Kotahi Maintenance managers to review the change management processes as this audit found an LED rollout has occurred on SH3 heading into New Plymouth and has not been updated in the RAMM database.

The errors identified in the database from the last audit have been corrected.

This audit identified six non-compliances, and four recommendations were raised. The future risk rating of 36 indicates that the next audit be completed in three months. I have considered this in conjunction with Genesis's response and the progress that NZ Streetlighting has made in updating the database from the field audit results. This audit found no improvement to the database accuracy and that the change management process is not working as expected. The audit has not been completed on time resulting in a continued over submission to the market. I have repeated the recommendation to conduct a full field audit. I have recommended that Genesis engage with the Waka Kotahi Maintenance Managers to review and improve the updating process. Given these factors I recommend that the next audit of this database be completed no more than six months from the audit report submission date, this should allow enough time for Genesis to make progress with Waka Kotahi to address the matters raised in the audit.

PARTICIPANT RESPONSE

Genesis continues to work closely with Waka Kotahi to ensure accuracy of their database. Waka Kotahi are aware of the findings and have started to make corrections with errors identified in the field audit carried out.

Genesis will seek to communicate with the Waka Kotahi maintenance team/person to discuss the findings of changes/projects/rollouts flowing through to the database to ensure accuracy of their data.

Genesis has recently reviewed the loggers and were able to carry out corrections dating back to November 2022 (14 months).

Genesis agrees with the findings.