ELECTRICITY INDUSTRY PARTICIPATION CODE
DISTRIBUTED UNMETERED LOAD AUDIT REPORT

Provera

For

UPPER HUTT CITY COUNCIL
AND
GENESIS ENERGY LIMITED

Prepared by: Tara Gannon

Date audit commenced: 23 July 2023

Date audit report completed: 8 August 2023

Audit report due date: 1 October 2023

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EXECUTIVE SUMMARY

This audit of the **Upper Hutt City Council (UHCC)** 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.

The audit was conducted in accordance with the audit guidelines for DUML audits version 1.1. The scope of the audit encompasses the collection, security, and accuracy of the data, including the preparation of submission information.

Streetlight information is recorded in a RAMM database managed by UHCC. A snapshot extract from this database is provided to Genesis monthly, and used to determine the wattage for their submission calculations. Genesis settles the DUML load as NHH using the CST profile, and on hours are determined from data logger information.

During the audit period UHCC moved to using RAMM's AMDS, but found that that the reporting provided did not include gear wattages in the database extracts. UHCC now uses a SQL script to generate the snapshot database extract with all the required fields.

New connection, fault and maintenance work is completed by Fulton Hogan, who update the database using Pocket RAMM.

A field audit was undertaken of a statistical sample of 384 items of load on 23 to 25 July 2023. The field audit found that the best available estimate is not precise enough to conclude that the database is accurate within ±5.0%. In absolute terms, total annual consumption is estimated to be 11,000 kWh higher than the DUML database indicates.

The audit found five non-compliances and made three recommendations. The future risk rating of 16 indicates that the next audit be completed in six months. I recommend that the next audit is completed in nine months, as accuracy improvement has occurred during the audit period and further improvement is expected.

AUDIT SUMMARY

NON-COMPLIANCES

Subject	Section	Clause	Non-Compliance	Controls	Audit Risk Rating	Breach Risk Rating	Remedial Action
Deriving submission information	2.1	11(1) of Schedule 15.3	The best available estimate is not precise enough to conclude that the database is accurate within ±5.0% which could result in under submission of 11,000 kWh p.a. The April 2023 submission was estimated based on the March 2023 database extract because the April 2023 extract excluded gear wattages. Three items of load (luminaire_ids 12850, 12851 and 12852) with blank ICP numbers were confirmed not to be present in the field but have a gear wattage recorded which could result in over submission of 179.4 kWh p.a. 84 of the 4,242 items of load did not have a valid zero (for LED) or non-zero gear wattage. The incorrect data resulted in potential over submission of 666.3 kWh p.a. and all errors resulting in a wattage difference have been corrected. 20 lamps with inconsistent model and wattage information were checked and updated during the audit, and the incorrect data resulted in potential under submission of 4,313.7 kWh p.a. The monthly database extract provided does not track changes at a daily basis and is provided as a snapshot.	Moderate	Medium	4	Identified
Description and capacity of load	2.4	Clause 11(2)(c) and (d) of Schedule 15.3	81 of the 4,242 items of load with a DUML ICP number had a blank or invalid zero gear wattage. 78 are recorded as LED lamps and expected to have a zero year wattage, and UHCC intends to correct the gear wattages to zero. The other three lights were checked, and their lamp models, lamp wattages and gear wattages were corrected during the audit.	Moderate	Low	2	Identified
All load recorded in database	2.5	11(2A) of Schedule 15.3	Four additional lights found in the field.	Moderate	Low	2	Identified
Database accuracy	3.1	15.2 and 15.37B(b)	The best available estimate is not precise enough to conclude that the database is accurate within ±5.0%	Moderate	Medium	4	Identified

Subject	Section	Clause	Non-Compliance	Controls	Audit Risk Rating	Breach Risk Rating	Remedial Action
			which could result in under submission of 11,000 kWh p.a. Three items of load (luminaire_ids 12850, 12851 and 12852) with blank ICP numbers were confirmed not to be present in the field but have a gear wattage recorded which could result in over submission of 179.4 kWh p.a. 84 of the 4,242 items of load did not have a valid zero (for LED) or non-zero gear wattage. The incorrect data resulted in potential over submission of 666.3 kWh p.a. and all errors resulting in a wattage difference have been corrected. 20 lamps with inconsistent model and wattage information were checked and updated during the audit, and the incorrect data resulted in potential under submission of 1,010 W or 4,313.7 kWh p.a.				
Volume information accuracy	3.2	15.2 and 15.37B(c)	The best available estimate is not precise enough to conclude that the database is accurate within ±5.0% which could result in under submission of 11,000 kWh p.a. The April 2023 submission was estimated based on the March 2023 database extract because the April 2023 extract excluded gear wattages. Three items of load (luminaire_ids 12850, 12851 and 12852) with blank ICP numbers were confirmed not to be present in the field but have a gear wattage recorded which could result in over submission of 179.4 kWh p.a. 84 of the 4,242 items of load did not have a valid zero (for LED) or non-zero gear wattage. The incorrect data resulted in potential over submission of 666.3 kWh p.a. and all errors resulting in a wattage difference have been corrected. 20 lamps with inconsistent model and wattage information were checked and updated during the audit, and the incorrect data resulted in potential under submission of 4,313.7 kWh p.a. The monthly database extract provided does not track changes at a daily basis and is provided as a snapshot.	Moderate	Medium	4	Identified

Subject	Section	Clause	Non-Compliance	Controls	Audit Risk Rating	Breach Risk Rating	Remedial Action
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

Section	Subject	Description	Participant comment
2.2	Responsibility for private lights	Advise developers that where private lights are to be connected, developers are required to arrange the connection with their own retailer and Wellington Electricity to ensure that an ICP number is created. Remind the developer responsible for Wallaceville Estate that they are required to arrange for ICPs to be created for private lights.	Upper Hutt CC will continue to pay for the power of these private lights, and these will be reconciled under their ICP's. However, the maintenance of these lights will not be the responsibility of the Council and they will work with developers to establish this process.
3.1	Check and update lamp information	Populate zero lamp wattages for the 78 LED lights which have a blank gear wattage recorded. Check and update the lamp information for the remaining 14 lights are listed as 22WLED - CREE - XSP1-IP66 with 27W. Check and update the lamp information for luminaire ID 9101 on Kiln St.	These have been investigated and resolved.
3.1	Confirm the ownership and operation of carpark lights to ensure this load is accounted for	Confirm the ownership and operation of the carpark lights at Trentham Memorial Park and Maidstone Park to ensure this load is accounted for.	These assets have been investigated. There are some lights in the database from these locations and also some that are not connected to the streetlight circuit which are metered lights, also owned by the Upper Hutt CC.

ISSUES

Subject	Section	Description	Issue
			Nil

1. ADMINISTRATIVE

1.1. Exemptions from Obligations to Comply with Code

Code reference

Section 11 of Electricity Industry Act 2010.

Code related audit information

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

Audit observation

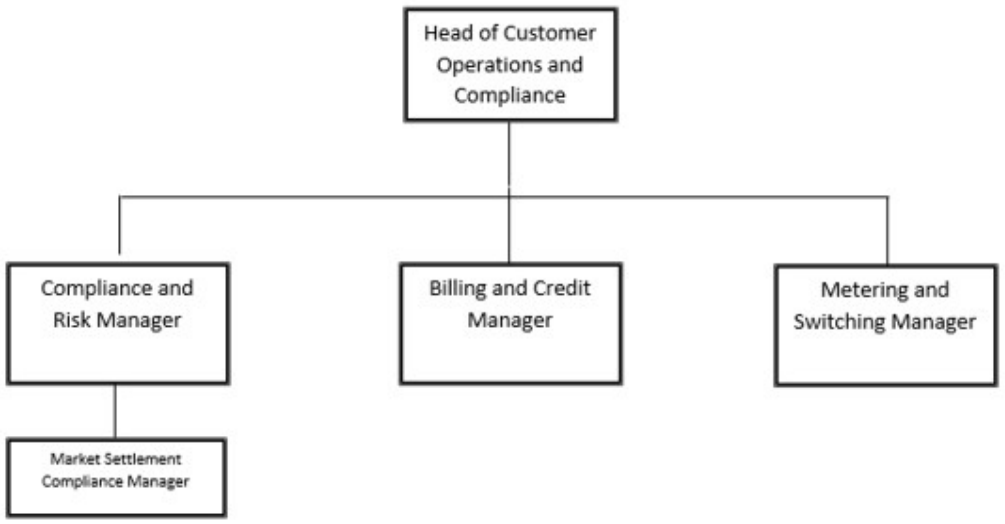
The Electricity Authority's website was reviewed to identify any exemptions relevant to the scope of this audit.

Audit commentary

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

1.2. Structure of Organisation

Genesis provided a copy of their organisational structure.



1.3. Persons involved in this audit

Auditor:

Name	Title	Company
Tara Gannon	Auditor	Provera

Other personnel assisting in this audit were:

Name	Title	Company
Nir Kumar	Senior Roading Engineer - Operations	Upper Hutt City Council
Charles Kingsford	Principal Traffic Engineer Team Leader Operations	Upper Hutt City Council
Patrick Hanaray	Roading Manager	Upper Hutt City Council
Shantelle Comer	Customer Operations Data and Systems Specialist	Genesis Energy
Johan van Staden	Risk & Compliance Specialist	Genesis Energy

1.4. Hardware and Software

RAMM

The SQL database used for the management of DUML is remotely hosted by thinkproject New Zealand Limited. The database is commonly known as "RAMM" which stands for "Road Assessment and Maintenance Management". The specific data used for DUML is held in the Streetlight tables. thinkproject New Zealand Limited backs up the database and assists with disaster recovery as part of their hosting service.

Genesis Energy Systems

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)
0001255307UNA1A	MASTER ICP UHCC UHT0331	UHT0331	CST	2,406	151,614.00
0001256870UN363	MASTER ICP UHCC STREETLIGHT HAY0111	HAY0111	CST	385	13,466.00
0001256872UN3E6	MASTER STREETLIGHT ICP UHCC HAY0331	HAY0331	CST	1,445	77,383.00
Blank				6	42.00
Total				**4,248**	**252,547.00**

Six items of load have a blank ICP number, luminaire_make, luminaire_model, and a zero lamp wattage, and an unknown lamp_make and lamp_model. UHCC checked the affected lights and confirmed that no lights are installed and they validly have no ICP number and model information. Non-compliance is recorded in **sections 2.1**, **3.1** and **3.2** for the incorrect gear wattages.

1.7. Authorisation Received

All information was provided directly by Genesis and UHCC.

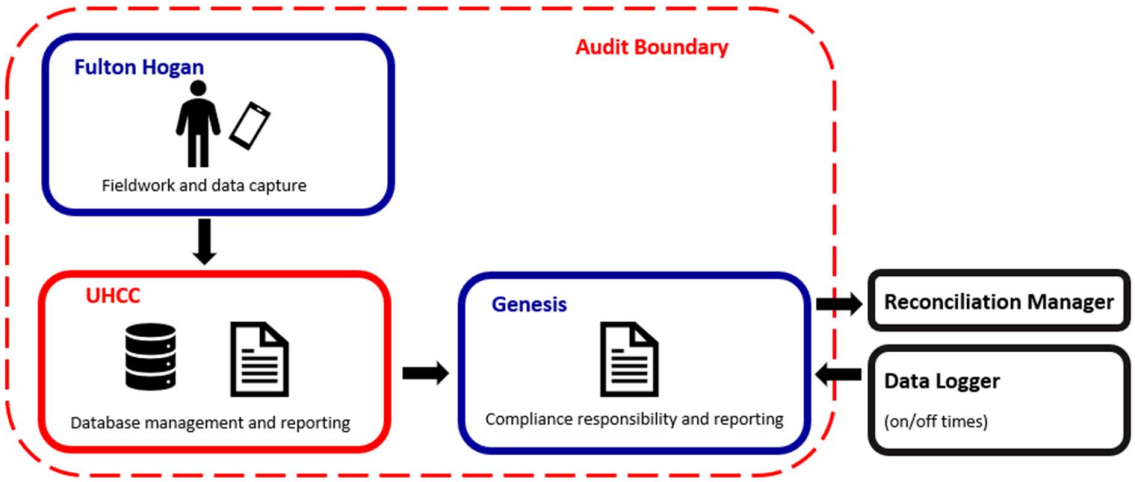
1.8. Scope of Audit

This audit of the UHCC DUML database and processes was conducted at the request of 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. The audit was conducted in accordance with the audit guidelines for DUML audits version 1.1.

Streetlight information is recorded in a RAMM database managed by UHCC. A snapshot extract from this database is provided to Genesis monthly, and used to determine the wattage for their submission calculations. Genesis settles the DUML load as NHH using the CST profile, and on hours are determined from data logger information.

New connection, fault and maintenance work is completed by Fulton Hogan, who update the database using Pocket RAMM.

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



The field audit was undertaken of a statistical sample of 384 items of load on 23 to 25 July 2023.

1.9. Summary of previous audit

The previous audit was completed in April 2023 by Steve Woods of Veritek Limited. Six non-compliances, three recommendations, and one issue were identified. The statuses of the non-compliances, recommendations, and issue are described below.

Table of Non-compliance

Subject	Section	Clause	Non-compliance	Status
Deriving submission information	2.1	11(1) of Schedule 15.3	Under submission of 1,856 kWh for August 2022 due to the incorrect calculation of volume for submission. Database is not confirmed as accurate with a 95% level of confidence resulting in an estimated under submission of 120,500 kWh p.a. The monthly database extract provided does not track changes at a daily basis and is provided as a snapshot.	Still existing
Location of each item of load	2.3	11(2)(a) and (d) of Schedule 15.3	502 (12%) items of load do not have sufficient information in the database to be locatable.	Cleared. All items of load have GPS coordinates recorded.
Description and capacity of load	2.4	Clause 11(2)(c) and (d) of Schedule 15.3	136 items of load with insufficient information to enable the light model to be identified.	Still existing

Subject	Section	Clause	Non-compliance	Status
All load recorded in database	2.5	11(2A) of Schedule 15.3	23 items of load not recorded in the database of the sample of 314 items of load checked.	Still existing
Database accuracy	3.1	15.2 and 15.37B(b)	Database is not confirmed as accurate with a 95% level of confidence resulting in an estimated under submission of 120,500 kWh p.a.	Still existing
Volume information accuracy	3.2	15.2 and 15.37B(c)	Under submission of 1,856 kWh for August 2022 due to the incorrect calculation of volume for submission. Database is not confirmed as accurate with a 95% level of confidence resulting in an estimated under submission of 120,500 kWh p.a. The monthly database extract provided does not track changes at a daily basis and is provided as a snapshot.	Still existing

Table of Recommendations

Subject	Section	Recommendation	Status
Database Accuracy – lights associated with private roads within Wallaceville Estate subdivision.	3.1	Genesis works with UHCC, the developer for Wallaceville Estate and Wellington Electricity to ensure ICPs are requested and created to enable this unmetered load to be accounted for retrospectively and to review the current UHCC new connection process to ensure it is clear around who is responsible for private lights, so these are not connected in error prior to appropriate ICPs being created and a responsible retailer is identified.	Not adopted, repeated
Database Accuracy – confirm the ownership and operation of these carpark lights to ensure this load is accounted for.	3.1	Genesis works with UHCC to confirm the ownership and operation of the carpark lights at Trentham Memorial Park and Maidstone Park to ensure this load is accounted for.	Not adopted, repeated.
Database Accuracy – Include Belisha Beacons in the database.	3.1	Genesis works with UHCC to add Belihsa beacon lights into the database.	Cleared. Many Belisha Beacons are recorded, but as 18W LED rather than being specifically named Belisha Beacons.

Table of Issues

Subject	Section	Issue	Status
ICP identifier and items of load - Mechanism to ensure identified private streetlights from DUML audits are accounted in the market settlement process.	2.2	Where private lights are identified as part of a DUML audit, the process to ensure these lights are investigated by the distributor as potential standard unmetered or shared unmetered is not well understood including the ownership or responsibility for following up with the distributor	No update received

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

Genesis have requested Provera to undertake this streetlight audit.

Audit commentary

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

Audit outcome

Compliant

2. DUML DATABASE REQUIREMENTS

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

Code reference

Clause 11(1) of Schedule 15.3

Code related audit information

The retailer must ensure the:

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

Audit observation

The process for calculation of consumption was examined.

Audit commentary

Submission process and accuracy

Genesis reconciles the DUML load as NHH using the CST profile.

- Wattages are derived from a snapshot extract from the database provided by UHCC monthly.
- On and off times are derived from data logger information.

As recorded in previous audits, a monthly snapshot is not sufficient to calculate submission from. The code requires that submissions must account for when each item of load was physically installed or removed, and wash up volumes must account for historical corrections.

I reviewed the submission information for April 2023 and confirmed that it the calculation methodology was correct, with wattages based on database extract totals and on hours based on data logger information.

The database extract provided for April 2023 was in AMDS format, and did not include gear wattages. Because of this, Genesis used the March 2023 extract values which included gear wattages to estimate submission. No revised database information including gear wattages has been provided for the April 2023 period, and the estimate will continue to be reported for revision submissions for April 2023. UHCC now uses a SQL script to generate the snapshot database extract with all the required fields including gear wattage.

The previous audit found the calculation for August 2022 to be different to the information provided by UHCC for ICP 0001255307UNA1A by 114 items of load and 1,856 kWh. I confirmed that a correction was processed after revision 7 was submitted, and corrected data will be submitted for revision 14.

Database accuracy

Examination of the database found:

Issue	Estimated volume information impact (annual kWh)
The best available estimate is not precise enough to conclude that the database is accurate within ±5.0%.	Under submission of 11,000 kWh p.a.
Three items of load (luminaire_ids 12850, 12851 and 12852) with blank ICP numbers were confirmed not to be present in the field but have a gear wattage recorded.	Over submission of 179.4 kWh p.a.

Issue	Estimated volume information impact (annual kWh)
84 of the 4,242 items of load did not have a valid zero (for LED) or non-zero gear wattage and were updated during the audit.	Over submission of 666.3 kWh p.a. *The errors resulting in a wattage difference have been corrected.*
20 lamps with inconsistent model and wattage information were checked and updated during the audit.	Under submission of 4,313.7 kWh p.a. *The errors have been corrected.*

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 2.1 With: Clause 11(1) of Schedule 15.3 From: 01-Apr-23 To: 27-Jul-23	The best available estimate is not precise enough to conclude that the database is accurate within ±5.0% which could result in under submission of 11,000 kWh p.a. The April 2023 submission was estimated based on the March 2023 database extract because the April 2023 extract excluded gear wattages. Three items of load (luminaire_ids 12850, 12851 and 12852) with blank ICP numbers were confirmed not to be present in the field but have a gear wattage recorded which could result in over submission of 179.4 kWh p.a. 84 of the 4,242 items of load did not have a valid zero (for LED) or non-zero gear wattage. The incorrect data resulted in potential over submission of 666.3 kWh p.a. and all errors resulting in a wattage difference have been corrected. 20 lamps with inconsistent model and wattage information were checked and updated during the audit, and the incorrect data resulted in potential under submission of 4,313.7 kWh p.a. The monthly database extract provided does not track changes at a daily basis and is provided as a snapshot. Potential impact: Medium Actual impact: Medium Audit history: Multiple times Controls: Moderate Breach risk rating: 4
Audit risk rating	**Rationale for audit risk rating**
Medium	The controls are recorded as moderate as they will mitigate risk most of the time, and there are workarounds in place to resolve the AMDS upgrade issues relating to gear wattages. The audit risk rating is medium based on kWh variances, and most errors resulting in a potential wattage difference have already been corrected.

Actions taken to resolve the issue	Completion date	Remedial action status
A data migration took place to transfer the database to the new system, this resulted in several data inaccuracies which have been resolved during the audit period.	1/9/23	Identified
Preventative actions taken to ensure no further issues will occur	**Completion date**	
Upper Hutt CC currently conduct a monthly review when carrying out the data extract before submission to Genesis. This will continue in the new database.	1/10/23	

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 an ICP is recorded for each item of load.

Audit commentary

Six items of load have a blank ICP number, luminaire_make, luminaire_model, and a zero lamp wattage, and an unknown lamp_make and lamp_model. Three of the six have a gear wattage recorded. UHCC checked the affected lights and confirmed that no lights are installed and they validly have no ICP number and model information. Non-compliance is recorded in **sections 2.1**, **3.1** and **3.2** for the incorrect gear wattages.

Where new private lights are connected, developers are required to arrange the connection with their own retailer and Wellington Electricity to ensure that an ICP number is created. The previous audit found that some private lights associated with private roads in the Wallaceville Estate had been connected as part of the overall subdivision lighting connection without separate ICPs being created for the private lights, or the lights being added to the DUML database. I checked ICPs with Wallaceville Estate street addresses on the registry and found there was still no unmetered load recorded against ICP addresses in Kindergarten Lane, Gloaming Lane, Le Mer Lane or Desert Gold Lane, and no lights were recorded in the DUML database against these addresses. Private lights will continue to continue to contribute towards network UFE until action is taken by the responsible participants.

Recommendation	Description	Audited party comment	Remedial action
Responsibility for private lights	Advise developers that where private lights are to be connected, developers are required to arrange the connection with their own retailer and Wellington Electricity to ensure that an ICP number is created. Remind the developer responsible for Wallaceville Estate that they are required to arrange for ICPs to be created for private lights.	Upper Hutt CC will continue to pay for the power of these private lights, and these will be reconciled under their ICP's. However, the maintenance of these lights will not be the responsibility of the Council and they will work with developers to establish this process.	Investigating

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 road name, location number, road side and GPC coordinates. All items of load have GPS coordinates and a road name recorded, and are 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 lamp type and wattage capacity and included any ballast or gear wattage.

Audit commentary

The database contains fields for luminaire_make, luminaire_model, lamp_make , lamp_model, lamp wattage and gear wattage.

Six items of load have a blank ICP number, luminaire_make, luminaire_model, and a zero lamp wattage, and an unknown lamp_make and lamp_model. Three of the six have a gear wattage recorded. UHCC checked the affected lights and confirmed that no lights are installed and they validly have no ICP number and model information. Non-compliance is recorded in **sections 2.1**, **3.1** and **3.2** for the incorrect gear wattages.

81 of the 4,242 items of load with a DUML ICP number had a blank or invalid zero gear wattage. 78 are recorded as LED lamps and expected to have a zero year wattage, and UHCC intends to correct the gear wattages to zero (**appendix 4.1**). The other three lights were checked, and their lamp models, lamp wattages and gear wattages were corrected during the audit.

Luminaire ID	Original details	Updated to	Wattage difference + = over submission - = under submission
12853	70WSON Lamp = 70 W Gear = 0 W Total = 70 W	**L27 LED** **Lamp = 27 W** **Gear = 0 W** **Total = 27 W**	+ 43 W
12867	TECEO 1 - 150WSON Lamp = 150 W Gear = 0 W Total = 150 W	**73WLED** **Lamp = 73 W** **Gear = 0 W** **Total = 73 W**	+ 77 W
12891	150WSON Lamp = 150 W Gear = 0 W Total = 150 W	150WSON Lamp = 150 W **Gear = 18 W** **Total = 168 W**	- 18W
Total		Over submission of 102 W or 435.6 kWh p.a.	

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

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 2.4 With: 11(2)(c) and (d) of Schedule 15.3 From: 31-May-23 To: 31-May-23	81 of the 4,242 items of load with a DUML ICP number had a blank or invalid zero gear wattage. 78 are recorded as LED lamps and expected to have a zero year wattage, and UHCC intends to correct the gear wattages to zero. The other three lights were checked, and their lamp models, lamp wattages and gear wattages were corrected during the audit. Potential impact: Low Actual impact: Low Audit history: Once 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 is low, with estimated over submission of 435.6 kWh per annum.

Actions taken to resolve the issue	Completion date	Remedial action status
A data migration took place to transfer the database to the new system, this resulted in several data inaccuracies which have been resolved during the audit period.	1/9/23	Identified
Preventative actions taken to ensure no further issues will occur	**Completion date**	
Upper Hutt CC currently conduct a monthly review when carrying out the data extract before submission to Genesis. This will continue in the new database.	1/10/23	

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 384 items of load on 25 to 27 July 2023. The sample was selected from four strata, as follows:

- road names A to Fergusson Dr East,
- road names Fergusson Dr to Hector Gr,
- road names Henry St to Oak St, and
- road names Oaklands Gr to Z.

Audit commentary

The field audit discrepancies are detailed in the table below.

Address	Database Count	Field Count	Count differences	Wattage differences	Comments
Road names A to Fergusson Dr East					
BUDDLE ROAD	14	13	-1	-	Luminare 12844 27WLED - CREE was not located on the street.
ELM STREET	3	5	+2	-	One 24WLED - Orangetek outside 14 Elm St, and one 27WLED - Orangetek outside 2 Elm Street were missing from the database.

Address	Database Count	Field Count	Count differences	Wattage differences	Comments
Road names A to Fergusson Dr East					
Road names Oaklands Gr to Z					
PARKWOOD GROVE	3	5	+2	-	Two of the poles contained two 70WSON - Gough, but only one light per pole was recorded in the database.
SEDDUL BAHR ROAD	10	9	-1		Luminare 2197 50WMBF - Gough was not located on the street.
Total	**384**	**386**	**+2 (+4-2)**	**16**	

This clause relates to lights in the field not recorded in the database. Four additional items of load were found in the field. This is recorded as non-compliance below. The accuracy of the database is detailed in **section 3.1.**

Audit outcome

Non-compliant

Non-compliance	**Description**
Audit Ref: 2.5 With: Clause 11(2A) of Schedule 15.3 From: 31-May-23 To: 27-Jul-23	Four additional lights found in the field. Potential impact: Low Actual impact: Low Audit history: Twice Controls: Moderate Breach risk rating: 2
Audit risk rating	**Rationale for audit risk rating**
Low	The controls are recorded as moderate as they will mitigate risk most of the time. The impact is assessed to be low as there were four additional lamps found in the sample checked, leading to potential under submission of 217 W or 927 kWh per annum.

Actions taken to resolve the issue	**Completion date**	**Remedial action status**
These asset inaccuracies have been investigated and resolved in the database.	1/9/23	Identified
Preventative actions taken to ensure no further issues will occur	**Completion date**	
Upper Hutt CC will investigate the viability of carrying out in-field audits on a routines basis to identify their own inaccuracies, looking at key areas where the database has not been edited recently.	1/12/23	

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

UHCC demonstrated a complete audit trail of all additions and changes to the database information.

Audit outcome

Compliant

3. ACCURACY OF DUML DATABASE

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

Code reference

Clause 15.2 and 15.37B(b)

Code related audit information

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

Audit observation

The Genesis submissions are based on a monthly extract from the database. A database extract was provided for 31 May 2023, and I assessed the accuracy of this by using the DUML Statistical Sampling Guideline. The table below shows the survey plan.

Plan Item	Comments
Area of interest	UHCC region
Strata	The database contains items of load in Upper Hutt area. The processes for the management of all UHCC items of load are the same, and I decided to create four strata: • road names A to Fergusson Dr East, • road names Fergusson Dr to Hector Gr, • road names Henry St to Oak St, and • road names Oaklands Gr 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 46 sub-units.
Total items of load	384 items of load were checked.

Wattages were checked for alignment with the published standardised wattage table produced by the Electricity Authority.

Audit commentary

Field audit findings

A field audit was conducted of a statistical sample of 384 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	101.1	Wattage from survey is higher than the database wattage by 1.1%.
R_L	99.1	With a 95% level of confidence, it can be concluded that the error could be between -0.9% and +6.1%.
R_H	106.1	

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 C applies and the best available estimate is not precise enough to conclude that the database is accurate within ±5.0%.

- In absolute terms the installed capacity is estimated to be 3 kW higher than the database indicates.
- There is a 95% level of confidence that the installed capacity is between 2 kW lower to 15 kW higher than the database.
- In absolute terms, total annual consumption is estimated to be 11,000 kWh higher than the DUML database indicates.
- There is a 95% level of confidence that the annual consumption is between 9,200 kWh p.a. lower and 63,300 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 %

Wattage and gear accuracy findings

Wattages for all items of load were checked against the published standardised wattage table produced by the Electricity Authority, and the manufacturer's specifications where they were not included in the standardised wattage table.

Six items of load have a blank ICP number, luminaire_make, luminaire_model and a zero lamp wattage, and an unknown lamp_make and lamp_model. UHCC checked the affected lights and confirmed that no lights are installed and they validly have no ICP number. Three of the items of load (luminaire_ids 12850, 12851 and 12852) have a gear wattage recorded which could result in over submission of 42 W or 179.4 kWh p.a.

84 of the 4,242 items of load with a DUML ICP number did not have a valid zero (for LED) or non-zero gear wattage, including the three described in the paragraph above. The errors occurred because the gear wattage field was temporarily unavailable in RAMM due to the AMDS upgrade. 78 are recorded as LED lamps and expected to have a zero year wattage, which UHCC intends to correct (**appendix 4.1**). The other six lights were checked, and their lamp models, lamp wattages and gear wattages were corrected during the audit (**appendix 4.2**). The incorrect data resulted in potential over submission of 666.3 kWh p.a.

Lamp wattages were consistent with expected values except 34 lights (**appendix 4.3**). 20 were checked and updated during the audit. A further 14 lights are listed as 22WLED - CREE - XSP1-IP66 with 27W and will be checked and updated. The incorrect data resulted in potential over submission of 1,010 W or 4,313.7 kWh p.a.

The previous audit found luminaire ID 9101 was recorded with luminaire model XSP1IP66-SINGLE MODULE-52W but a lamp model of 25WLED and a wattage of 25. It is expected that all lights on Kiln St are 52W LEDs, and UHCC will check the light to confirm the correct wattage and update the database as necessary.

The previous audit suggested checking the correct wattage for LED signs supplied by a battery that charges off the streetlight circuit. I was unable to confirm if the current wattage recorded is incorrect, given the load required to be recorded within the database is for the process to charge the battery each day and not operate the LED sign, so I have recorded compliance.

Recommendation	Description	Audited party comment	Remedial action
Check and update lamp information	Populate zero lamp wattages for the 78 LED lights which have a blank gear wattage recorded. Check and update the lamp information for the remaining 14 lights are listed as 22WLED - CREE - XSP1-IP66 with 27W. Check and update the lamp information for luminaire ID 9101 on Kiln St.	These have been investigated and resolved.	Identified

Change management process findings

New connection, fault and maintenance work is completed by Fulton Hogan, who update the database using Pocket RAMM.

The new connection process was reviewed:

- a plan is prepared by the developer and approved by UHCC,
- the installation is completed,
- the developer or their electrician provides information on the installations including records of inspection and certificates of compliance, and the database is updated,
- UHCC notifies Genesis that livening is required and updates the database, and
- Genesis requests livening from Wellington Electricity.

UHCC is not always advised when the lights are connected, and it is possible that lights could be added to the database early.

Private lights

Where new private lights are connected, developers are required to arrange the connection with their own retailer and Wellington Electricity to ensure that an ICP number is created.

The previous audit found that some private lights associated with private roads in the Wallaceville Estate had been connected as part of the overall subdivision lighting connection without separate ICPs being created for the private lights, or the lights being added to the DUML database. I checked ICPs with Wallaceville Estate street addresses on the registry and found there was still no unmetered load recorded against ICP addresses in Kindergarten Lane, Gloaming Lane, Le Mer Lane or Desert Gold Lane,

and no lights were recorded in the DUML database against these addresses. A recommendation is raised in **section 2.2**.

Outage patrols occur at least monthly at night. The faults process is relied upon to identify issues with other lights.

LED upgrade

Most lights have been upgraded to LED. The remaining upgrades will be completed as funding becomes available, or where lights require replacement through the maintenance process.

UHCC is installing the Telensa central management system and there are plans to use static dimming in the future. Genesis will be working with UHCC to ensure that there is an appropriate profile used.

Festive lights

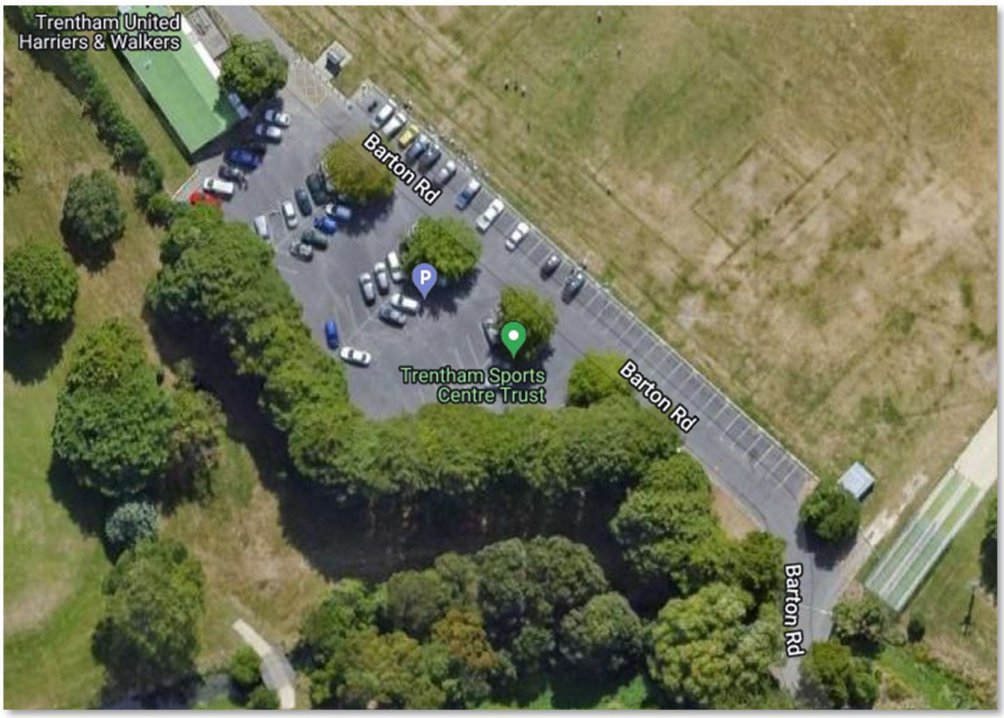
UHCC provides the dates the festive lights are connected to Genesis, and includes the lights in the extract when they are connected. I confirmed that festive lights were excluded from the extracts when they are not connected.

Parks Lighting

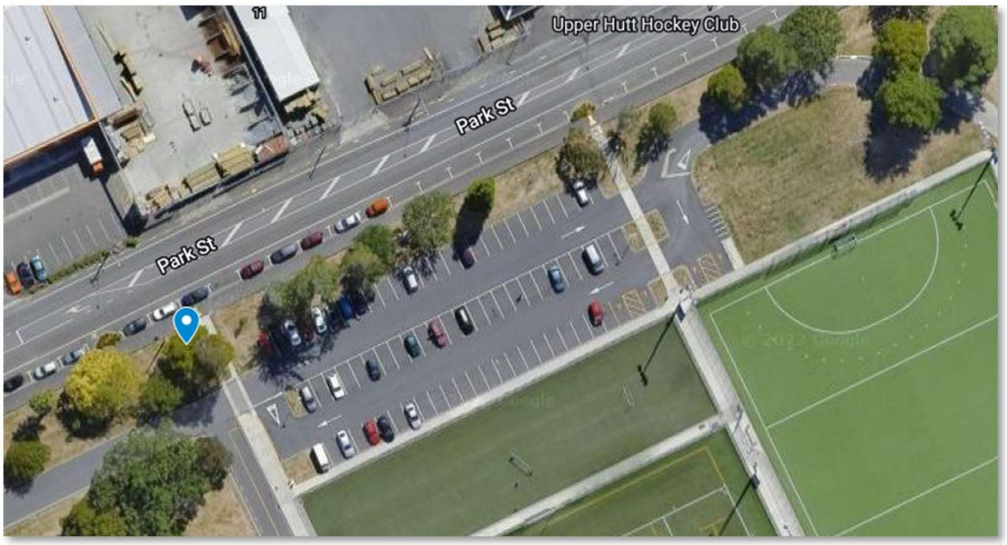
The previous audit identified some sports fields with car park lighting, and found that some of these car parks had lighting which appeared not to be recorded in the database. This was discussed with UHCC who confirmed that carpark lights are normally considered to be part of the DUML load and recorded in the database. I reviewed displacements and confirmed that lights not situated directly at the side of the road are included.

I plotted the GPS coordinates for all UHCC DUML lights, and checked the carparks which were listed as having lights missing from the database in the previous audit.

Trentham Memorial Park still has no lights with GPS locations in its carpark off Barton Road. The previous audit recorded that there were two floodlights aimed at the carpark.



Maidstone Park still has no lights with GPS coordinates within its carpark off Park Road. The previous audit recorded that there were seven Phillips HPS lights positioned around the carpark.



The previous audit recommended that Genesis works with UHCC to confirm the ownership and operation of these carpark lights to ensure this load is accounted for, and I have repeated this recommendation.

Recommendation	Description	Audited party comment	Remedial action
Confirm the ownership and operation of carpark lights to ensure this load is accounted for	Confirm the ownership and operation of the carpark lights at Trentham Memorial Park and Maidstone Park to ensure this load is accounted for.	These assets have been investigated. There are some lights in the database from these locations and also some that are not connected to the streetlight circuit which are metered lights, also owned by the Upper Hutt CC.	Investigating

Belisha Beacons at pedestrian crossings

The previous audit recorded that UHCC had some Belisha Beacons at pedestrian crossings which were not recorded within the database. I re-checked this and found that many Belisha Beacons are recorded, but as 18W LED rather than being specifically named Belisha Beacons.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 3.1 With: Clause 15.2 and 15.37B(b) From: 31-May-23 To: 27-Jul-23	The best available estimate is not precise enough to conclude that the database is accurate within ±5.0% which could result in under submission of 11,000 kWh p.a. Three items of load (luminaire_ids 12850, 12851 and 12852) with blank ICP numbers were confirmed not to be present in the field but have a gear wattage recorded which could result in over submission of 179.4 kWh p.a. 84 of the 4,242 items of load did not have a valid zero (for LED) or non-zero gear wattage. The incorrect data resulted in potential over submission of 666.3 kWh p.a. and all errors resulting in a wattage difference have been corrected. 20 lamps with inconsistent model and wattage information were checked and updated during the audit, and the incorrect data resulted in potential under submission of 1,010 W or 4,313.7 kWh p.a. Potential impact: High Actual impact: Medium Audit history: Multiple times Controls: Moderate Breach risk rating: 4
Audit risk rating	**Rationale for audit risk rating**
Medium	The controls are recorded as moderate as they will mitigate risk most of the time, and there are workarounds in place to resolve the AMDS upgrade issues relating to gear wattages. The audit risk rating is medium based on kWh variances, and most errors resulting in a potential wattage difference have already been corrected.

Actions taken to resolve the issue	Completion date	Remedial action status
A data migration took place to transfer the database to the new system, this resulted in several data inaccuracies which have been resolved during the audit period.	1/9/23	Identified
Preventative actions taken to ensure no further issues will occur	**Completion date**	
Upper Hutt CC currently conduct a monthly review when carrying out the data extract before submission to Genesis. This will continue in the new database.	1/10/23	

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

Code reference

Clause 15.2 and 15.37B(c)

Code related audit information

The audit must verify that:

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

Audit observation

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

- checking the registry to confirm that all ICPs have the correct profile and submission flag; and
- checking the database extract combined with the burn hours against the submitted figure to confirm accuracy.

Audit commentary

Submission process and accuracy

Genesis reconciles the DUML load as NHH using the CST profile. The correct submission types and profiles are recorded on the registry.

- Wattages are derived from a snapshot extract from the database provided by UHCC monthly.
- On and off times are derived from data logger information.

As recorded in previous audits, a monthly snapshot is not sufficient to calculate submission from. The code requires that submissions must account for when each item of load was physically installed or removed, and wash up volumes must account for historical corrections.

I reviewed the submission information for April 2023 and confirmed that it the calculation methodology was correct, with wattages based on database extract totals and on hours based on data logger information.

The database extract provided for April 2023 was in AMDS format, and did not include gear wattages. Because of this, Genesis used the March 2023 extract values which included gear wattages to estimate submission. No revised database information including gear wattages has been provided for the April 2023 period, and the estimate will continue to be reported for revision submissions for April 2023. UHCC now uses a SQL script to generate the snapshot database extract with all the required fields including gear wattage.

The previous audit found the calculation for August 2022 to be different to the information provided by UHCC for ICP 0001255307UNA1A by 114 items of load and 1,856 kWh. I confirmed that a correction was processed after revision 7 was submitted, and corrected data will be submitted for revision 14.

Database accuracy

Examination of the database found:

Issue	Estimated volume information impact (annual kWh)
The best available estimate is not precise enough to conclude that the database is accurate within ±5.0%.	Under submission of 11,000 kWh p.a.
Three items of load (luminaire_ids 12850, 12851 and 12852) with blank ICP numbers were confirmed not to be present in the field but have a gear wattage recorded.	Over submission of 179.4 kWh p.a.
84 of the 4,242 items of load did not have a valid zero (for LED) or non-zero gear wattage and were updated during the audit.	Over submission of 666.3 kWh p.a. *The errors resulting in a wattage difference have been corrected*
20 lamps with inconsistent model and wattage information were checked and updated during the audit.	Under submission of 4,313.7 kWh p.a. *The errors have been corrected*

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 3.2 With: Clause 15.2 and 15.37B(c) From: 01-Apr-23 To: 27-Jul-23	The best available estimate is not precise enough to conclude that the database is accurate within ±5.0% which could result in under submission of 11,000 kWh p.a. The April 2023 submission was estimated based on the March 2023 database extract because the April 2023 extract excluded gear wattages. Three items of load (luminaire_ids 12850, 12851 and 12852) with blank ICP numbers were confirmed not to be present in the field but have a gear wattage recorded which could result in over submission of 179.4 kWh p.a. 84 of the 4,242 items of load did not have a valid zero (for LED) or non-zero gear wattage. The incorrect data resulted in potential over submission of 666.3 kWh p.a. and all errors resulting in a wattage difference have been corrected. 20 lamps with inconsistent model and wattage information were checked and updated during the audit, and the incorrect data resulted in potential under submission of 4,313.7 kWh p.a. The monthly database extract provided does not track changes at a daily basis and is provided as a snapshot. Potential impact: Medium Actual impact: Medium Audit history: Multiple times Controls: Moderate Breach risk rating: 4
Audit risk rating	**Rationale for audit risk rating**
Medium	The controls are recorded as moderate as they will mitigate risk most of the time, and there are workarounds in place to resolve the AMDS upgrade issues relating to gear wattages. The audit risk rating is medium based on kWh variances, and most errors resulting in a potential wattage difference have already been corrected.

Actions taken to resolve the issue	Completion date	Remedial action status
A data migration took place to transfer the database to the new system, this resulted in several data inaccuracies which have been resolved during the audit period.	1/9/23	Identified
Preventative actions taken to ensure no further issues will occur	**Completion date**	
Upper Hutt CC currently conduct a monthly review when carrying out the data extract before submission to Genesis. This will continue in the new database.	1/10/23	

CONCLUSION

Streetlight information is recorded in a RAMM database managed by UHCC. A snapshot extract from this database is provided to Genesis monthly, and used to determine the wattage for their submission calculations. Genesis settles the DUML load as NHH using the CST profile, and on hours are determined from data logger information.

A field audit was undertaken of a statistical sample of 384 items of load on 23 to 25 July 2023. The field audit found that the best available estimate is not precise enough to conclude that the database is accurate within ±5.0%. In absolute terms, total annual consumption is estimated to be 11,000 kWh higher than the DUML database indicates.

The audit found five non-compliances and made three recommendations. The future risk rating of 16 indicates that the next audit be completed in six months. I recommend that the next audit is completed in nine months, as accuracy improvement has occurred during the audit period and further improvement is expected.

PARTICIPANT RESPONSE

Upper Hutt CC has migrated their database in the past few months. This has caused some data inaccuracies such as lamp wattages which have been resolved during the audit period.

Recommendations and specific inaccuracies from this audit have been taken under guidance from the auditor and improvements will be made off the back of these and the preventative actions mentioned against all non-compliances.

4. APPENDIX

4.1. Light models with blank gear wattages

78 LED lamps have blank gear wattages and are expected to have a zero year wattage, and UHCC intends to correct the gear wattages to zero.

LampModel, LumMake, LumModel	Quantity	Gear wattage	Expected gear wattage
149WLED - Schereder TECEO - TECEO 1	5	Blank	0
169WLED - CREE -	1	Blank	0
18WLED - Unknown - Unknown	5	Blank	0
22WLED - CREE - XSP1-IP66	15	Blank	0
24WLED - Betacom - GL520	4	Blank	0
24WLED - Orangetek - Terra LED	1	Blank	0
27WLED - Betacom - GL520	4	Blank	0
27WLED - CREE - XSP1-IP66	13	Blank	0
33WLED - Betacom - GL520	7	Blank	0
75WLED - Schereder TECEO - TECEO 1	6	Blank	0
67WLED - CREE - XSP1-IP66	1	Blank	0
84WLED - CREE - XSP1-IP66	10	Blank	0
94WLED - CREE - XSP1-IP66	6	Blank	0

4.2. Light models inconsistent with recorded gear wattages

Six lamps had populated gear wattages which appeared invalid for the light model description and were updated during the audit.

Luminaire ID	Original details	Updated to	Wattage difference + = over submission - = under submission
9730	18WLED Lamp = 18 W Gear = 18W Total = 36W	18WLED Lamp = 18 W **Gear = 0 W** **Total = 18W**	+ 18 W
8813	73WLED Lamp = 73 W Gear = 18 W Total = 91 W	73WLED Lamp = 73 W **Gear = 0 W** **Total = 73 W**	+ 18 W
8815	73WLED Lamp = 73 W Gear = 18 W Total = 91 W	73WLED Lamp = 73 W **Gear = 0 W** **Total = 73 W**	+ 18 W
12853	70WSON Lamp = 70 W Gear = 0 W	**L27 LED** **Lamp = 27 W** **Gear = 0 W**	+ 43 W

Luminaire ID	Original details	Updated to	Wattage difference + = over submission - = under submission
	Total = 70 W	**Total = 27 W**	
12867	TECEO 1 - 150WSON Lamp = 150 W Gear = 0 W Total = 150 W	**73WLED** **Lamp = 73 W** **Gear = 0 W** **Total = 73 W**	+ 77 W
12891	150WSON Lamp = 150 W Gear = 0 W Total = 150 W	150WSON Lamp = 150 W **Gear = 18 W** **Total = 168 W**	- 18W
Total		Over submission of 156 W or 666.3 kWh p.a.	

4.3. Light models inconsistent with recorded wattages

Lamp wattages were consistent with expected values except for the 34 lights listed below

LampModel, LumMake, LumModel	Quantity	Lamp wattage	Outcome	Wattage difference + = over submission - = under submission
22WLED - CREE - XSP1-IP66	15	27	One lamp corrected to 22W, the other 14 are under investigation.	+5
24WLED - Betacom - GL520	1	27	Model corrected to L27.	-
27WLED - Betacom - GL520	1	24	Lamp wattage corrected to 27.	-3
67WLED - CREE - XSP1-IP66	1	27	Lamp wattage corrected to 67.	-40
84WLED - CREE - XSP1-IP66	10	27	Lamp wattage corrected to 84.	-570
94WLED - CREE - XSP1-IP66	6	27	Lamp wattage corrected to 94.	-402
Total			Under submission of 1,010 W or 4,313.7 kWh p.a.	