ELECTRICITY INDUSTRY PARTICIPATION CODE
DISTRIBUTED UNMETERED LOAD AUDIT REPORT

VERITEK

For

HUTT CITY COUNCIL AND GENESIS ENERGY LIMITED

Prepared by: Rebecca Elliot

Date audit commenced: 15 July 2021

Date audit report completed: 6 September 2022

Audit report due date: 8 December 2021

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EXECUTIVE SUMMARY

This audit of the **Hutt City Council (HCC)** DUML database and processes was conducted at the request of **Genesis Energy Limited (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.

The four HCC DUML ICPs switched to Genesis from 1 September 2021.

Streetlight information is recorded in an ArcGIS database managed by HCC. There is a separate RAMM database and HCC intends to migrate from ArcGIS to RAMM as part of its programme of improvements to streetlight asset management processes. The project is still in the planning stage, and is tentatively expected to be completed by 31 August 2023.

New connection, fault and maintenance work is largely completed by Fulton Hogan, with some work completed by McKay's and City Electricians as subcontractors. Commercial Signals are responsible for festive lights, outage patrols, some complex work, and confirming new streetlight connections match to the as-builts. All of the contractors record the details of the work completed in the field, which is manually input into the database by their office staff on receipt. HCC completes audits to spot check data that the contractors have entered, and monitors activity to ensure that updates are occurring.

HCC usually provides a monthly report from the ArcGIS database to Genesis, but due to staffing changes this has not consistently been completed every month. The current monthly report is provided as a snapshot and is non-compliant, and Genesis completes revision submissions where corrections are required.

Genesis reconciles the DUML load as NHH using the CST profile, with wattages derived from the most recent database extract provided by HCC and on and off times derived from data logger information.

A field audit was conducted of a statistical sample of 384 items of load and results were analysed using the "database auditing tool". I found that the database had poor accuracy, demonstrated with statistical significance. The true wattage (installed in the field) could be between 3.8% and 21.5% lower than the wattage recorded in the DUML database. This is outside of the allowable +/- 5% threshold. There is a 95% level of confidence that the annual consumption is between 198,000 to 1,117,700 kWh p.a. lower than the database indicates.

The future risk rating of 43 indicates that the next audit be completed in three months. I recommend that the next audit be in no more than six months' time. This should allow sufficient time for the recommended actions to be in progress and check the database accuracy.

The matters raised are detailed in the table below:

AUDIT SUMMARY

NON-COMPLIANCES

Subject	Section	Clause	Non-Compliance	Controls	Audit Risk Rating	Breach Risk Rating	Remedial Action
Distributed unmetered load audits	1.10	16A.26 and 17.295F	The audit was not completed by the due date.	Weak	Low	3	Identified
Deriving submission information	2.1	11(1) of Schedule 15.3	The database is not accurate within ± 5%. There is a 95% level of confidence that the annual consumption is between 198,000 to 1,117,700 kWh p.a. lower than the database indicates. Database extracts have not consistently been provided to Genesis monthly; or included wattage information. Some submission volumes for September 2021 and July 2022 were not consistent with the expected values based on the database extract and logger hours. 44 items of load totalling 2,561 W have "Properties UrbanPlus" recorded in the ICP number field and are excluded from submissions. LED light descriptions do not contain lamp make and model so correct wattage cannot be verified. Where more than one light model field was populated, the lamp, gear and total wattage in most cases reflected the values for only one of the recorded light models and in some cases were inconsistent with the expected values for any of the models. Where only one light model field was populated, the recorded lamp and gear wattage did not always reflect the expected wattage. 85 items of load do not have information populated in the light model fields. 53 of these had some information populated in the "If Other Light Type Pls Specify" field, and I confirmed that 42 had a wattage consistent with that description. 35 had insufficient information to confirm the correct wattages, and eight had wattages inconsistent with the description. 22 poles had a zero-gear wattage when a non-zero value was expected. There is not a clear process to communicate festive light wattages and on and off dates to Genesis.	Weak	High	9	Identified

Subject	Section	Clause	Non-Compliance	Controls	Audit Risk Rating	Breach Risk Rating	Remedial Action
			Under submission is expected as festive lights wattages were not included in the January 2022 database extract provided to Genesis. The monthly database extract provided does not track changes at a daily basis and is provided as a snapshot. Change dates may not reflect the date the change is made and reflect the latest change for the pole rather than the light where more than one light is connected.				
ICP identifier and items of load	2.2	11(2)(a) and (aa) of Schedule 15.3	44 items of load totalling 2,561 W have "Properties UrbanPlus" recorded in the ICP number field.	Moderate	Medium	4	Investigating
Description and capacity of load	2.4	11(2)(c) and (d) of Schedule 15.3	LED make and model details are not recorded in the database. 85 items of load do not have information populated in the light model fields, and 32 of these also have no information populated in the "If Other Light Type Pls Specify" field. 22 poles had a zero-gear wattage when a non-zero value was expected.	Weak	Medium	6	Identified
All load recorded in database	2.5	11(2A) of Schedule 15.3	Two additional lights found in the field.	Weak	Low	3	Identified
Database accuracy	3.1	15.2 and 15.37B(b)	The database is not accurate within ± 5%. There is a 95% level of confidence that the annual consumption is between 198,000 to 1,117,700 kWh p.a. lower than the database indicates. Database extracts have not consistently been provided to Genesis monthly; or included wattage information. Some submission volumes for September 2021 and July 2022 were not consistent with the expected values based on the database extract and logger hours. 44 items of load totalling 2,561 W have "Properties UrbanPlus" recorded in the ICP number field and are excluded from submissions. LED light descriptions do not contain lamp make and model so correct wattage cannot be verified. Where more than one light model field was populated, the lamp, gear and total wattage in most cases reflected the values for only one of the recorded light models and in some cases were inconsistent with	Weak	High	9	Identified

Subject	Section	Clause	Non-Compliance	Controls	Audit Risk Rating	Breach Risk Rating	Remedial Action
			the expected values for any of the models. Where only one light model field was populated, the recorded lamp and gear wattage did not always reflect the expected wattage. 85 items of load do not have information populated in the light model fields. 53 of these had some information populated in the "If Other Light Type Pls Specify" field, and I confirmed that 42 had a wattage consistent with that description. 35 had insufficient information to confirm the correct wattages, and eight had wattages inconsistent with the description. 22 poles had a zero-gear wattage when a non-zero value was expected. There is not a clear process to communicate festive light wattages and on and off dates to Genesis. Under submission is expected as festive lights wattages were not included in the January 2022 database extract provided to Genesis. Change dates may not reflect the date the change is made and reflect the latest change for the pole rather than the light where more than one light is connected.				
Volume information accuracy	3.2	15.2 and 15.37B(c)	The database is not accurate within ± 5%. There is a 95% level of confidence that the annual consumption is between 198,000 to 1,117,700 kWh p.a. lower than the database indicates. Database extracts have not consistently been provided to Genesis monthly; or included wattage information. Some submission volumes for September 2021 and July 2022 were not consistent with the expected values based on the database extract and logger hours. 44 items of load totalling 2,561 W have "Properties UrbanPlus" recorded in the ICP number field and are excluded from submissions. LED light descriptions do not contain lamp make and model so correct wattage cannot be verified. Where more than one light model field was populated, the lamp, gear and total wattage in most cases reflected the values for only one of	Weak	High	9	Identified

Subject	Section	Clause	Non-Compliance	Controls	Audit Risk Rating	Breach Risk Rating	Remedial Action
			the recorded light models and in some cases were inconsistent with the expected values for any of the models. Where only one light model field was populated, the recorded lamp and gear wattage did not always reflect the expected wattage. 85 items of load do not have information populated in the light model fields. 53 of these had some information populated in the "If Other Light Type Pls Specify" field, and I confirmed that 42 had a wattage consistent with that description. 35 had insufficient information to confirm the correct wattages, and eight had wattages inconsistent with the description. 22 poles had a zero-gear wattage when a non-zero value was expected. There is not a clear process to communicate festive light wattages and on and off dates to Genesis. Under submission is expected as festive lights wattages were not included in the January 2022 database extract provided to Genesis. The monthly database extract provided does not track changes at a daily basis and is provided as a snapshot. Change dates may not reflect the date the change is made, and reflect the latest change for the pole rather than the light where more than one light is connected.				
Future Risk Rating						43	

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
ICP identifier and items of load	2.2	Liaise with Wellington Electricity and Property UrbanPlus to create separate ICPs for these items of load.
Database accuracy	3.1	Confirm processes to communicate festive light wattages and on and off dates to Genesis so that they can be included in submission data when connected.
Database accuracy	3.1	Liaise with HCC and Wellington Electricity to confirm correct owner of private lights.

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

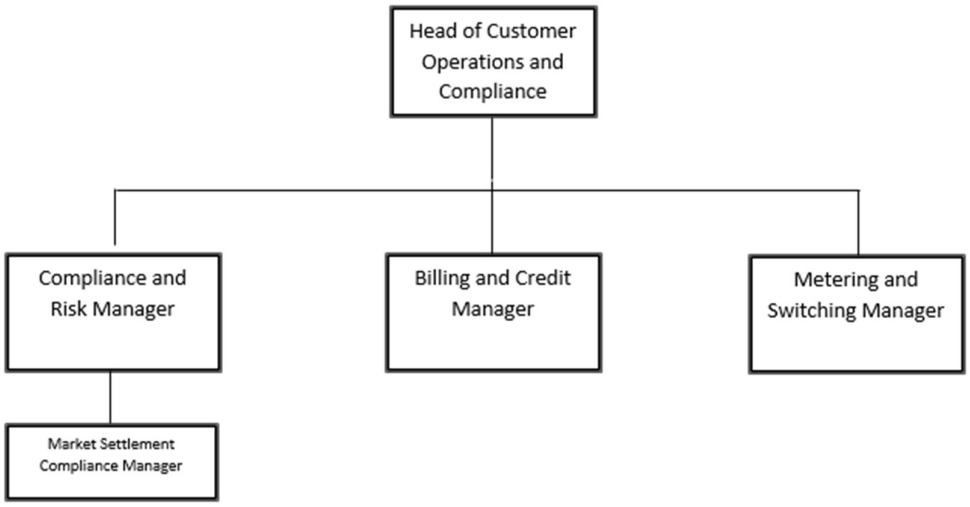
The Electricity Authority's website was reviewed to identify any exemptions relevant to the scope of this audit.

Audit commentary

There are no exemptions 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

Auditors:

Name	Title	Company
Rebecca Elliot	Lead Auditor	Veritek Limited
Tara Gannon	Supporting Auditor	Veritek Limited

Other personnel assisting in this audit were:

Name	Title	Company
Andrew Rowe	Traffic Asset Lead	Hutt City Council
Anna Smith	Transport Data Analyst	Hutt City Council
Bryan Mitchell	Director	Commercial Signals
Charles Agate	Senior Project / Contract Manager	Downer
Julia Jones	Rubiks SME – Retail Market Interaction	Genesis Energy
Nirav Teli	DUML Data & Stakeholder Lead	Genesis Energy

1.4. Hardware and Software

HCC's ArcGIS is used to record streetlight information. The database is backed up, and access 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

ICP Number	Description	NSP	Participant code	Profile	Number of items of load	Database wattage (watts)
0001255305UNA9F	MASTER ICP HCC STREETLIGHT MLG0111	MLG0111	GENE	CST	2,659	234,885.1
0001256863UN50E	MASTER ICP HCC STREETLIGHT MLG0331	MLG0331	GENE	CST	4,873	399,769.2
0001256864UN8C4	MASTER ICP HCC STREETLIGHT GFD0331	GFD0331	GENE	CST	4,971	451,018.9
0001256868UNBDA	MASTER ICP HCC STREETLIGHT HAY0111	HAY0111	GENE	CST	1,579	101,592
Total					**14,082**	**1,187,265.2**

44 items of load totalling 2,561 W have "Properties UrbanPlus" recorded in the ICP number field. The lights belong to an associated council organisation and are excluded from submission data. The lights are discussed further in **section 2.2**.

1.7. Authorisation Received

All information was provided directly by Genesis, Commercial Signals or HCC.

1.8. Scope of Audit

This audit of the HCC 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.

The four HCC DUML ICPs switched to Genesis from 1 September 2021.

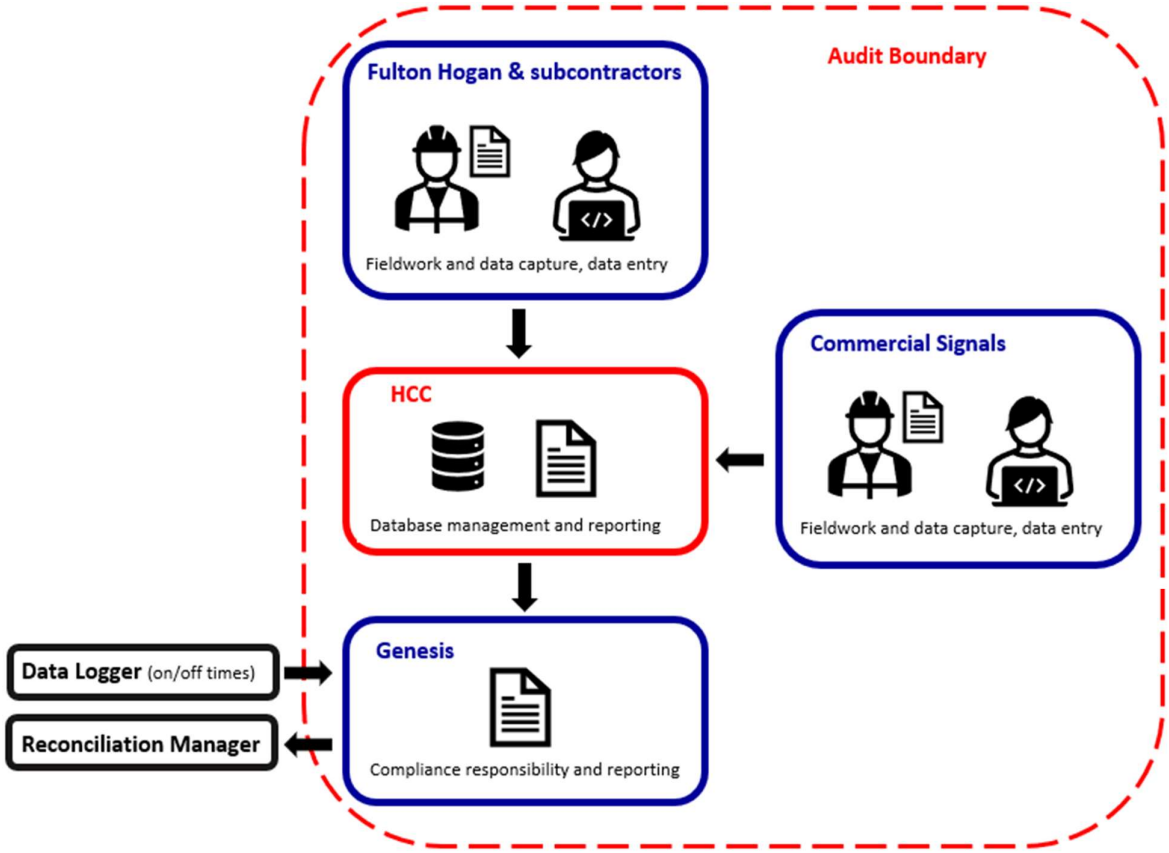
Streetlight information is recorded in an ArcGIS database managed by HCC. There is a separate RAMM database and HCC intends to migrate from ArcGIS to RAMM as part of its programme of improvements to streetlight asset management processes. The project is still in the planning stage and is tentatively expected to be completed by 31 August 2023.

New connection, fault and maintenance work is largely completed by Fulton Hogan, with some work completed by McKay's and City Electricians as subcontractors. Commercial Signals are responsible for festive lights, outage patrols, some complex work, and confirming new streetlight connections match to the as-builts. All of the contractors record the details of the work completed in the field, which is manually input into the database by their office staff on receipt. HCC completes audits to spot check data that the contractors have entered, and monitors activity to ensure that updates are occurring.

HCC usually provides a monthly report from the ArcGIS database to Genesis, but due to staffing changes this has not consistently been completed every month.

Genesis reconciles the DUML load as NHH using the CST profile, with wattages derived from the most recent database extract provided by HCC and on and off times derived from data logger information.

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



The field audit was undertaken of a statistical sample of 384 items of load on 9th & 10th November, 2021.

1.9. Summary of previous audit

The previous audit of this database was undertaken by Rebecca Elliot of Veritek Limited in April 2021. The summary table below shows the statuses of the non-compliances and recommendations raised in the previous audit. Further comment is made in the relevant sections of this report.

Table of Non-compliance

Subject	Section	Clause	Non-compliance	Status
Participant to give access	1.11	16A.4	Submission information not provided within 15 business days of being requested.	Cleared
Deriving submission information	2.1	11(1) of Schedule 15.3	Festive lights not submitted when connected resulting in an estimated minor under submission of 939 kWh for the month of December.	Still existing

Subject	Section	Clause	Non-compliance	Status
			The database is not confirmed as accurate with a 95% level of confidence resulting in an estimated annual over submission of 827,200 kWh as recorded in section 3.1. LED make and model details are not recorded in the database. Lamp wattage is recorded outside of the database. Four items of load do not have an ICP number recorded in the database resulting in an estimated under submission of 2,870 kWh. 16 items of load with no lamp type resulting in an estimated annual under submission of 4,169 kWh. 11 items of load have inaccurate wattages recorded resulting in an estimated annual under submission of 546 kWh. 46 items of load recorded with "Property Plus" in the ICP column not reconciled resulting in an estimated under submission of 11,472 kWh per annum. The monthly database extract provided does not track changes at a daily basis and is provided as a snapshot. Livening dates are not recorded for new connections and change dates may not reflect the date the change is made.	
ICP identifier and items of load	2.2	11(2)(a) and (aa) of Schedule 15.3	Four unmetered items of load do not have an ICP number assigned resulting in an estimated under submission of 2,870 kWh per annum. 46 items of load recorded with "Property Plus" in the ICP column not reconciled resulting in an estimated under submission of 11,472 kWh per annum.	Cleared Still existing
Description and capacity of load	2.4	11(2)(c) and (d) of Schedule 15.3	LED make and model details are not recorded in the database. Lamp wattage is recorded outside of the database. 16 items of load with no lamp description recorded.	Still existing
All load recorded in database	2.5	11(2A) of Schedule 15.3	One additional light found in the field.	Still existing
Database accuracy	3.1	15.2 and 15.37B(b)	The database is not confirmed as accurate with a 95% level of confidence resulting in an estimated annual over submission of 827,200 kWh. LED make and model details are not recorded in the database. Lamp wattage is recorded outside of the database. Four items of load do not have an ICP number recorded in the database resulting in an estimated under submission of 2,870 kWh.	Still existing

Subject	Section	Clause	Non-compliance	Status
			46 items of load recorded with "Property Plus" in the ICP column not reconciled resulting in an estimated under submission of 11,472 kWh per annum. 16 items of load with no lamp type resulting in an estimated annual under submission of 4,169 kWh. 11 items of load have inaccurate wattages recorded resulting in an estimated annual under submission of 546 kWh. Livening dates are not recorded for new connections and change dates may not reflect the date the change is made.	
Volume information accuracy	3.2	15.2 and 15.37B(c)	Festive lights not submitted when connected resulting in an estimated minor under submission of 939 kWh for the month of December. The database is not confirmed as accurate with a 95% level of confidence resulting in an estimated annual over submission of 827,200 kWh as recorded in section 3.1. LED make and model details are not recorded in the database. Lamp wattage is recorded outside of the database. Four items of load do not have an ICP number recorded in the database resulting in an estimated under submission of 2,870 kWh. 16 items of load with no lamp type resulting in an estimated annual under submission of 4,169 kWh. 11 items of load have inaccurate wattages recorded resulting in an estimated annual under submission of 546 kWh. 46 items of load recorded with "Property Plus" in the ICP column not reconciled resulting in an estimated under submission of 11,472 kWh per annum. The monthly database extract provided does not track changes at a daily basis and is provided as a snapshot. Livening dates are not recorded for new connections and change dates may not reflect the date the change is made.	Still existing

Table of Recommendations

Subject	Section	Recommendation	Status
ICP Identifier	2.2	Liaise with HCC and "Property UrbanPlus" to create separate ICPs for these items of load.	Not adopted
Database accuracy	3.1	Review change management process	Adopted, HCC check with contractors regarding

Subject	Section	Recommendation	Status
ICP Identifier	2.2	Liaise with HCC and "Property UrbanPlus" to create separate ICPs for these items of load.	Not adopted
			timeliness of updates
		Undertake 100% field audit to correct historic discrepancies.	In progress
		Liaise with HCC and Wellington Electricity to confirm correct owner of private lights	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:

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 Veritek to undertake this streetlight audit.

Audit commentary

The audit was due to be completed by 8 December 2021 but was not completed until 6 September 2022, primarily due to delays in obtaining the information required to complete the audit from HCC.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 1.10 With: Clause 16A.26 and 17.295F From: 08-Dec-21 To: 06-Sep-22	The audit was not completed by the due date. Potential impact: High Actual impact: Unknown Audit history: None Controls: Weak Breach risk rating: 3
Audit risk rating	**Rationale for audit risk rating**
Low	Controls are assessed to be weak as the audit was nine months overdue. The delays were caused by staffing changes in the HCC streetlight management area. The impact is assessed to be low, because completing the audit earlier was unlikely to impact on compliance.

Actions taken to resolve the issue	Completion date	Remedial action status
Genesis Energy has appointment a DUML Data & Stakeholder Lead to provide information	01/08/2022	Identified
Preventative actions taken to ensure no further issues will occur	**Completion date**	
Genesis Energy has appointment a DUML Data & Stakeholder Lead to provide information	01/08/2022	

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

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

- Wattages are derived from an extract from the ArcGIS database provided by HCC. Database extracts are intended to be supplied to Genesis monthly, but have sometimes been provided every two months and have not consistently included wattage information. The best available estimate indicates that the database is not accurate within ±5 % as discussed in **section 3.1**.
- On and off times are derived from data logger information.

I recalculated the submissions for September 2021 and July 2022 using the data logger and the database information. I confirmed that the calculation method was correct.

- The September 2021 submission information matched my manual recalculation based on the logger hours and database extract for ICPs 0001256864UN8C4, 0001256868UNBDA and 0001256863UN50E. For ICP 0001255305UNA9F there was under submission of 220.48 kWh.
- The July 2022 submission information matched my manual recalculation based on the logger hours and database extract for ICPs 0001256868UNBDA and 0001255305UNA9F. For ICP 0001256864UN8C4 there was over submission of 2,316.13 kWh and for ICP 0001256863UN50E there was over submission of 5,858.31 kWh.

Genesis advised that submission differences sometimes occur where database information is received late.

Examination of the database found:

Issue	Estimated volume information impact (annual kWh)
44 items of load totalling 2,561 W have "Properties UrbanPlus" recorded in the ICP number field, and are excluded from submissions.	Under submission of 10,938 kWh
LED light descriptions do not contain lamp make and model so correct wattage cannot be verified.	Unknown impact

Issue	Estimated volume information impact (annual kWh)
Where more than one light model field was populated, the lamp, gear and total wattage was expected to match the combined wattage for all light models recorded. I found that in most cases the wattages reflected the values for only one of the recorded light models and in some cases were inconsistent with the expected values for any of the models.	Unknown impact
Where only one light model field was populated, the recorded lamp and gear wattage did not always reflect the expected wattage.	Unknown impact
85 items of load do not have information populated in the light model fields. 53 of these had some information populated in the "If Other Light Type Pls Specify" field, and I confirmed that 42 had a wattage consistent with that description. 35 had insufficient information to confirm the correct wattages, and eight had wattages inconsistent with the description.	Over submission of 1,926.2 kWh for the eight items of load where wattages were inconsistent with the "If Other Light Type Pls Specify" field. Unknown impact for the 35 items of load which had insufficient information to confirm the correct load.
22 poles had a zero gear wattage when a non-zero value was expected.	Under submission of 1,998.8 kWh
Festive lights are recorded in the database, generally as secondary models connected to poles. Most affected poles have 15-25 3W festive lamps fitted on a lighting harness. Commercial Signals connects the festive lights during November and disconnects during January. HCC is notified of the connection and disconnection dates, but there is not a process to communicate this to Genesis.	Unknown impact, but under submission is expected as festive lights wattages were not included in the January 2022 database extract provided to Genesis.

The above discrepancies are discussed further in **sections 2.2, 2.4** and **3.1**.

As recorded in the last two audits, a monthly snapshot is not sufficient to calculate submission from, and the code requires that to calculate the correct monthly load the monthly wattage report must:

- take into account when each item of load was physically installed or removed, and
- wash up volumes must take into account where historical corrections have been made to the DUML load and volumes.

The current monthly report is provided as a snapshot and is non-compliant. Genesis completes revision submissions where corrections are required and is working to develop event-based calculations, which will enable accurate volume calculations where lamps change part way through a month.

The ArcGIS database records a created date, installed date, end date, last edited date, last serviced date, lamp installation date, and pole installation date. Created date, installed date, end date and last edited date are all consistently populated. The lamp installation date is only populated for a small number of lamps. The "edited date" is automatically populated with the date the change occurred, and the "last serviced date" indicates when the work was completed. Where there is a delay in entering a change, the change date may be incorrect. Because only one set of dates is recorded for each pole, where there is more than one light connected it may not reflect the correct dates for each light.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 2.1 With: Clause 11(1) of Schedule 15.3 From: 01-Jan-22 To: 31-Jul-22	The database is not accurate within ± 5%. There is a 95% level of confidence that the annual consumption is between 198,000 to 1,117,700 kWh p.a. lower than the database indicates. Database extracts have not consistently been provided to Genesis monthly; or included wattage information. Some submission volumes for September 2021 and July 2022 were not consistent with the expected values based on the database extract and logger hours. 44 items of load totalling 2,561 W have "Properties UrbanPlus" recorded in the ICP number field and are excluded from submissions. LED light descriptions do not contain lamp make and model so correct wattage cannot be verified. Where more than one light model field was populated, the lamp, gear and total wattage in most cases reflected the values for only one of the recorded light models and in some cases were inconsistent with the expected values for any of the models. Where only one light model field was populated, the recorded lamp and gear wattage did not always reflect the expected wattage. 85 items of load do not have information populated in the light model fields. 53 of these had some information populated in the "If Other Light Type Pls Specify" field, and I confirmed that 42 had a wattage consistent with that description. 35 had insufficient information to confirm the correct wattages, and eight had wattages inconsistent with the description. 22 poles had a zero gear wattage when a non-zero value was expected. There is not a clear process to communicate festive light wattages and on and off dates to Genesis. Under submission is expected as festive lights wattages were not included in the January 2022 database extract provided to Genesis. The monthly database extract provided does not track changes at a daily basis and is provided as a snapshot. Change dates may not reflect the date the change is made and reflect the latest change for the pole rather than the light where more than one light is connected. Potential impact: High Actual impact: High Audit history: Multiple times Controls: Weak Breach risk rating: 9

Audit risk rating	Rationale for audit risk rating
High	The controls over the database are rated as weak as the data quality is poor and incomplete. This is reflected by the field audit results. To reduce the impact of the non-compliance where the database information excluded wattages, Genesis calculated the expected wattage based on the lamp model information, and where database extracts were not provided monthly, Genesis used the most recent information available to calculate submissions. The audit risk rating is high based on kWh variances identified.

Actions taken to resolve the issue	Completion date	Remedial action status
Genesis has advised the Hutt CC of the audit outcome regarding the discrepancy between what is out in field and what has been recorded within the council data base; with the intent that council makes every effort to ensure the exceptions are rectified. Genesis has also advised Hutt CC that Genesis requires monthly extracts that track any changes within the month to meet the DUML regulations. In regard to festive lights Genesis has advised Hutt CC to notify when the festive lights have been turned on/off. Genesis will look to investigate submission volumes with the intent to correct were necessary.	Continuous improvement	Identified
Preventative actions taken to ensure no further issues will occur	**Completion date**	
Genesis continues to work with the council to raise database accuracy levels.	Continuous improvement	

2.2. ICP identifier and items of load (Clause 11(2)(a) and (aa) of Schedule 15.3)

Code reference

Clause 11(2)(a) and (aa) of Schedule 15.3

Code related audit information

The DUML database must contain:

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

Audit observation

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

Audit commentary

All items of load have a valid ICP number recorded except 44 items of load totalling 2,561 W with "Properties UrbanPlus" recorded in the ICP number field. The lights that belong to an associated council organisation and are excluded from submission data. I have repeated the previous audit recommendation to create a separate database and ICPs to reconcile this load.

HCC have advised that RAMM will allow a separate database to be created for this load. HCC intends to migrate from using the ArcGIS to RAMM as part of its programme of improvements to streetlight asset management processes. The project is still in the planning stage and is tentatively expected to be completed by 31 August 2023.

Description	Recommendation	Audited party comment	Remedial action
ICP Identifier	Liaise with Wellington Electricity and Property UrbanPlus to create separate ICPs for these items of load.	Genesis will investigate this further in regards to creating separate ICP's.	Investigating

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 2.2 With: Clause 11(2)(a) and (aa) of Schedule 15.3 From: 01-Jan-22 To: 31-Jan-22	44 items of load totalling 2,561 W have **"**Properties UrbanPlus" recorded in the ICP number field. Potential impact: Medium Actual impact: Medium Audit history: Three times Controls: Moderate Breach risk rating: 4
Audit risk rating	**Rationale for audit risk rating**
Medium	The controls over the database are rated as moderate. Once the data is moved to RAMM I expect that a separate database will be created for this load and the controls will improve to strong. The impact is assessed to be medium because lights with "Properties UrbanPlus" recorded as the ICP number are excluded from submissions and could result in under submission of 10,938 kWh per annum.

Actions taken to resolve the issue	Completion date	Remedial action status
Genesis will investigate this further in regard to creating separate ICP's.	Continuous improvement	Investigating
Preventative actions taken to ensure no further issues will occur	**Completion date**	

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

Global Positioning System (GPS) coordinates and location IDs are recorded for all items of load and users in the office and field can view these locations on a mapping system.

The database also contains the nearest property address for 13,352 of the 14,126 items of load in the database.

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 six light model fields to record each light model connected to the pole. 85 of the 6,911 poles did not have any light model information populated in any of the six fields. 53 of these had some information populated in the "If Other Light Type Pls Specify" field. The accuracy of this information is discussed in **section 3.1**, as this section only covers completeness of information.

LED light models are generally recorded with a light model of "LED XXXW – LED", and no lamp make, or model is recorded. This makes it difficult to determine whether the correct wattage is being applied.

All 6,911 poles had a lamp wattage, gear wattage and total wattage populated. No poles had a blank lamp or gear wattage, and no poles had a zero-lamp wattage. 22 poles had a zero-gear wattage when a non-zero value was expected resulting in under submission of 468 W or 1,998.8 kWh per annum:

Lamp model(s) recorded for pole	Count of Models	Expected gear wattage per pole (W)	Under reported gear wattage (W)
150W MH Ped. Flood and 12.5W LED Ped Beacon	4	18	72
150W MH Ped. Flood and 2x 12.5W LED Ped Beacon	2	18	36
150W SON	4	18	72
150W SON and Active Curve Advisory Sign	1	18	18
150W SON and Active Speed Advisory Sign	1	18	18
150W SON Ped. Flood and 12.5W LED Ped Beacon	2	18	36
250W SON x4, 40W LED x 2, and LED 33W - LED	1	28 x 4	112
250W SON and 40 kph School Speed Zone	1	28	28
50W SON	1	11	11
70W SON	5	13	65
Total	**22**		**468**

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

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 2.4 With: Clause 11(2)(c) and (d) of Schedule 15.3 From: 01-Jan-22 To: 31-Jan-22	LED make and model details are not recorded in the database. 85 items of load do not have information populated in the light model fields, and 32 of these also have no information populated in the "If Other Light Type Pls Specify" field. 22 poles had a zero-gear wattage when a non-zero value was expected. Potential impact: Unknown Actual impact: Medium Audit history: Multiple times Controls: Weak Breach risk rating: 6
Audit risk rating	**Rationale for audit risk rating**
Medium	The controls are rated as weak as wattages are not consistently populated, and there are no LED lamp makes and models recorded. The impact is assessed to be medium as the database does not have LED make and model recorded and the field audit indicates that the data is not accurate.

Actions taken to resolve the issue	Completion date	Remedial action status
Genesis has advised the Hutt CC of the audit outcome regarding the discrepancy between what is out in field and what has been recorded within the council data base; with the intent that council makes every effort to ensure the exceptions are rectified.	Continuous Improvement	Identified
Preventative actions taken to ensure no further issues will occur	**Completion date**	
Genesis continues to work with the council to raise database accuracy levels.	Continuous Improvement	

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 9th & 10th November, 2021. The sample was selected from five strata, as follows:

1. A-Go,
2. Gr-Kn,
3. Ku-N,
4. O-S, and
5. T-W.

Audit commentary

The field audit discrepancies are detailed in the table below:

Street	Field count	Database count	Light count difference	Wattage recorded incorrectly	Comments
A-Go					
Annabell Grove	1	1		1	1x LED 27W was recorded in the database as LED 22W.
Biddle Crescent	12	12		3	3x 23W LED were recorded in the database as 50W (33W).
Cherry Blossom Grove	3	3		2	2x 23W LED were recorded in the database as 50W HPS (61W).

Street	Field count	Database count	Light count difference	Wattage recorded incorrectly	Comments
Chilton Grove	5	5		3	1x LED 27W was recorded as 22W LED in the database. 1x LED 22W was recorded as 27W LED in the database. 1x LED 23W was recorded as 50W SON (61W) in the database.
Copeland Street	31	31		25	20x LED 23Ws were recorded in the database as 50W SON (61W). 3x LED 27Ws were recorded in the database as LED 22W. 1x LED 16W was recorded in the database as 50W SON (61W). 1x LED 22W was recorded in the database as 100W SON (114W).
Corrondella Grove	10	10		2	2x 23W LED were recorded in the database as 50W SON (61W).
Ferretti Grove	3	3		2	2x 23W LED were recorded in the database as 50W SON (61W).
Glenbrook Grove	2	2		2	1x LED 27W was recorded as 23W LED in the database. 1x LED 23W was recorded as 22W LED in the database.
Gr-Kn					
Guthrie Street	25	25		19	16x LED 23Ws were recorded in the database as 50W SON (61W). 1x LED 23W was recorded in the database as LED 22W. 2x LED 27Ws were recorded in the database as LED 22W.
Heretaunga Street	21	21		7	3x LED 23Ws were recorded in the database as 50W SON (61W). 1x LED 23Ws was recorded in the database as LED 22W. 2x LED 22Ws were recorded in the database as 50W SON (61W). 1x 50W SON (61W) was recorded in the database as LED 22W.

Street	Field count	Database count	Light count difference	Wattage recorded incorrectly	Comments
Horoeka Street	29	29		25	25x LED 23Ws were recorded in the database as 50W SON (61W).
Kapuranga Grove	3	3		1	1x LED 27W was recorded in the database as LED 22W.
Ku-N					
Manor Drive	11	11		10	10x LED 23Ws were recorded in the database as 50W SON (61W).
Moores Valley Road	26	4		4	1x LED 87.5W was recorded in the database as 150 SON (168W). 1x LED 87.5W was recorded in the database as LED 70W. 1x LED 93W was recorded in the database as LED 70W. 1x 50W SON was recorded in the database as LED 23W.
O-S					
Otamarau Grove	3	4	+1	1	1x LED 22W were recorded in the database as LED 27W. 1x extra 23W LED found in the field.
Pinny Avenue	1	1		2	2x LED 27W were recorded in the database as LED 22W.
Queen Street	29	30	+1	12	1x extra 23W LED found in the field. 2x extra 150W SON (168W each) found in the field, connected to poles with only one light recorded. 8x LED 226W were recorded in the database as LED 200W. 1x LED 129W recorded in the database as LED 127W. Pedestrian crossing lights total value 162.5W recorded in the database as 83W.
Rangiuru Road	3	3		1	1x LED 27W was recorded in the database as LED 22W.
Rintoul Grove	7	7		1	1x LED 23W was recorded in the database as 50W SON (61W).

Street	Field count	Database count	Light count difference	Wattage recorded incorrectly	Comments
Saulbrey Grove	3	3		3	1x LED 27W was recorded in the database as LED 22W. 2x LED 22Ws were recorded in the database as 50W SON (61W).
T-W					
Taine Street	19	18	-1	2	1x LED 22W not found in the field. 1x LED 23W was recorded in the database as LED 27W. 1x LED 22W was recorded in the database as 70W HPS (83W).
Waikare Avenue	14	14		7	4x LED 22Ws were recorded in the database as 50W SON (61W). 1x LED 23W was recorded in the database as 50W SON (61W). 1x LED 27W was recorded in the database as LED 22W. 1x LED 27W was recorded in the database as 50W SON (61W).
Willoughby Street	6	6		5	2x LED 22Ws were recorded in the database as 50W SON (61W). 2x LED 23W were recorded in the database as LED 22W. 1x LED 23W was recorded in the database as 50W SON (61W).
Wilson Grove	5	5		1	1x 50W HPS was recorded in the database as LED 27W.
Wood Street	35	35		4	1x LED 22W was recorded in the database as 50W SON (61W). 1x LED 27W was recorded in the database as LED 23W. 1x LED 22W was recorded in the database as LED 23W. 1x LED 23W was recorded in the database as LED 22W.
Grand Total	**384**	**384**	**3 (+2-1)**	**145**	

This clause relates to lights in the field that are not recorded in the database. The audit found two additional lights in the field. Database accuracy is discussed in **section 3.1**.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 2.5 With: Clause 11(2)(c) and (d) of Schedule 15.3 From: 09-Nov-21 To: 10-Nov-21	Two additional lights found in the field. Potential impact: Low Actual impact: Low Audit history: None Controls: Weak Breach risk rating: 3
Audit risk rating	**Rationale for audit risk rating**
Low	The controls are rated as weak as process to track changes is not capturing all changes made in the field. The impact is assessed to be low as there were only two additional lamps found in the sample checked.

Actions taken to resolve the issue	Completion date	Remedial action status
Genesis has advised the Hutt CC of the audit outcome regarding the discrepancy between what is out in field and what has been recorded within the council data base; with the intent that council makes every effort to ensure the exceptions are rectified.	Continuous Improvement	Identified
Preventative actions taken to ensure no further issues will occur	**Completion date**	
Genesis continues to work with the council to raise database accuracy levels.	Continuous Improvement	

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.

The change management process and the compliance of the database reporting provided to Genesis is detailed in **sections 3.1** and **3.2**.

Audit outcome

Compliant

2.7. Audit trail (Clause 11(4) of Schedule 15.3)

Code reference

Clause 11(4) of Schedule 15.3

Code related audit information

The DUML database must incorporate an audit trail of all additions and changes that identify:

- *the before and after values for changes*
- *the date and time of the change or addition*
- *the person who made the addition or change to the database.*

Audit observation

The database was checked for audit trails.

Audit commentary

The database has a complete audit trail, which was viewed during the audit.

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

Genesis' submissions are based on a monthly extract from the database. A database extract was provided for 9th & 10th November 2021 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	Hutt City Council Street Lights
Strata	The database contains the HCC items of load for DUML ICPs in the Hutt region. The processes for the management of all HCC items of load are the same, but I decided to place the items of load into five similar sized strata based on road name: 1. A-Go, 2. Gr-Kn, 3. Ku-N, 4. O-S, and 5. T-W.
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 41 sub-units.
Total items of load	384 items of load were checked, making up approximately 2% of the load recorded in the database.

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 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	87.1	Wattage from survey is lower than the database wattage by 12.9%
R_L	78.5	

Result	Percentage	Comments
R_H	96.2	With a 95% level of confidence, it can be concluded that the error could be between -21.5% and -3.8%

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) is the best fit.

The conclusion from Scenario B is that the variability of the sample results across the strata means that the true wattage (installed in the field) could be between 3.8% and 21.5% lower 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 158 kW lower than the database indicates.
- There is a 95% level of confidence that the installed capacity is between 46 kW to 262 kW lower than the database.
- In absolute terms, total annual consumption is estimated to be 673,000 kWh lower than the DUML database indicates.
- There is a 95% level of confidence that the annual consumption is between 198,000 to 1,117,700 kWh p.a. lower than the database indicates.

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

Light description and capacity accuracy

The database contains six light model fields to record each light model connected to the pole. I checked the lamp and gear wattages against the light model(s) installed and found:

- LED light models are generally recorded with a light model of "LED XXXW – LED", and no lamp make, or model is recorded, which makes it difficult to determine whether the correct wattage is being applied,
- where more than one light model field was populated, the lamp, gear and total wattage was expected to match the combined wattage for all light models recorded but I found that in most cases the wattages reflected the values for only one of the recorded light models and in some cases were inconsistent with the expected values for any of the models,
- where only one light model field was populated, the recorded lamp and gear wattage did not always reflect the expected wattage,
- 85 of the 6,911 poles did not have any light model information populated in any of the six light model fields:
    - 53 of these had some information populated in the "If Other Light Type Pls Specify" field, and I confirmed that 42 had a wattage consistent with that description,
    - 35 had insufficient information to confirm the correct wattages, and
    - eight had wattages inconsistent with the description and are detailed below:

"If Other Light Type Pls Specify"	Count	Applied lamp wattage	Expected lamp wattage	Over reported lamp wattage (W)
GL520 16w LED Pathlight	1	35	16	19
GL520 16w LED Pathlight	1	70	16	54
Italo-1 36w LED	3	70	36	162
Italo-1 36W-LED	4	70	36	216
Total	**8**			**451**

- all 6,911 poles had a lamp wattage, gear wattage and total wattage populated, no poles had a blank lamp or gear wattage, and no poles had a zero-lamp wattage, but 22 poles had a zero-gear wattage when a non-zero value was expected for the lamp model(s) recorded:

Lamp model(s) recorded for pole	Count	Expected gear wattage per pole (W)	Under reported gear wattage (W)
150W MH Ped. Flood and 12.5W LED Ped Beacon	4	18	72
150W MH Ped. Flood and 2x 12.5W LED Ped Beacon	2	18	36
150W SON	4	18	72
150W SON and Active Curve Advisory Sign	1	18	18
150W SON and Active Speed Advisory Sign	1	18	18
150W SON Ped. Flood and 12.5W LED Ped Beacon	2	18	36

Lamp model(s) recorded for pole	Count	Expected gear wattage per pole (W)	Under reported gear wattage (W)
250W SON x4, 40W LED x 2, and LED 33W - LED	1	28 x 4	112
250W SON and 40 kph School Speed Zone	1	28	28
50W SON	1	11	11
70W SON	5	13	65
Total	**22**		**468**

ICP number accuracy

As recorded in **section 2.2**, all items of load have a valid ICP number recorded except 44 items of load totalling 2,561 W with "Properties UrbanPlus" recorded in the ICP number field. The lights that belong to an associated council organisation and are excluded from submission data. I recommend in **section 2.2**, that a separate database and ICPs be created to reconcile these if the council are not going to be billed for them.

Change management process findings

New connection, fault and maintenance work is largely completed by Fulton Hogan, with some work completed by McKay's and City Electricians as subcontractors. Commercial Signals manage festive lights and completed some more complex work, and confirm new streetlight connections match to the as-builts. All of the contractors record the details of the work completed in the field, which is manually input into the database by their office staff on receipt. HCC completes audits to spot check data that the contractors have entered, and monitors activity to ensure that updates are occurring.

The accuracy of the field audit indicates this process is not working as expected with a high number of wattage discrepancies found. The previous audit recommended that a 100% field audit be completed, and this is underway as part of the LED upgrade process. WSP have been preparing a road map for HCC which provides details of lights installed and condition information which will be used to determine priorities for upgrades. This work was due to be completed in May-June 2022 but has been delayed.

The new connection process was reviewed:

- a plan is prepared by the developer and approved by HCC,
- 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,
- HCC completes a form and notifies Genesis that livening is required using the as-built information that has been checked in the field, and
- Genesis requests livening from Wellington Electricity.

This can result in some lights being included in the monthly report before they are livened. I did not come across any instances of this.

The ArcGIS database records a created date, installed date, end date, last edited date, last serviced date, lamp installation date, and pole installation date. Created date, installed date, end date and last edited date are all consistently populated. The lamp installation date is only populated for a small number of lamps. The "edited date" is automatically populated with the date the change occurred, and the "last serviced date" indicates when the work was completed. Where there is a delay in entering a change, the change date may be incorrect. Because only one set of dates is recorded for each pole, where there is more than one light connected it may not reflect the correct dates for each light.

Commercial Signals complete outage patrols in most of the Lower Hutt central business district and Jackson Street, Petone (including the HCC cark park off Jackson Street) each Monday. The faults process is relied upon to identify issues with other lights.

Festive lights

Festive lights are recorded in the database, generally as secondary models connected to poles. Most affected poles have 15-25 3W festive lamps fitted on a lighting harness. Commercial Signals connects the festive lights during November and disconnects during January. HCC is notified of the connection and disconnection dates, but there is not a process to communicate this to Genesis. Under submission is expected as festive lights wattages were not included in the January 2022 database extract provided to Genesis.

Description	Recommendation	Audited party comment	Remedial action
Festive lights	Confirm processes to communicate festive light wattages and on and off dates to Genesis so that they can be included in submission data when connected.	Genesis has advised Hutt CC to notify when the festive lights has been turned on and off.	Identified

Private lights

There are 50 private lights recorded in the database, and each has a council DUML ICP number assigned.

As reported in the last audit, HCC does not bill consumers for these lights and does not expect to be billed for them, but I confirmed these are being included in the monthly wattage report to Genesis and are being reconciled. They are only included in the database for completeness, and so that HCC is aware that they are private in the event that a fault is recorded. If the council does not want to pay for these then I recommend that the correct owner and associated ICP needs to be confirmed. I have repeated the previous audit recommendation that HCC liaise with Wellington Electricity to determine who is the light owner and correct as appropriate.

Description	Recommendation	Audited party comment	Remedial action
Private lights	Liaise with HCC and Wellington Electricity to confirm correct owner of private lights.	Genesis will investigate this further with the intent to work with the council and Wellington Electricity.	Investigating

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 3.1 With: Clause 15.2 and 15.37B(b) From: 01-Jan-22 To: 31-Jan-22	The database is not accurate within ± 5%. There is a 95% level of confidence that the annual consumption is between 198,000 to 1,117,700 kWh p.a. lower than the database indicates. 44 items of load totalling 2,561 W have "Properties UrbanPlus" recorded in the ICP number field and are excluded from submissions. LED light descriptions do not contain lamp make and model so correct wattage cannot be verified. Where more than one light model field was populated, the lamp, gear and total wattage in most cases reflected the values for only one of the recorded light models and in some cases were inconsistent with the expected values for any of the models. Where only one light model field was populated, the recorded lamp and gear wattage did not always reflect the expected wattage. 85 items of load do not have information populated in the light model fields. 53 of these had some information populated in the "If Other Light Type Pls Specify" field, and I confirmed that 42 had a wattage consistent with that description. 35 had insufficient information to confirm the correct wattages, and eight had wattages inconsistent with the description. 22 poles had a zero-gear wattage when a non-zero value was expected. There is not a clear process to communicate festive light wattages and on and off dates to Genesis. Under submission is expected as festive lights wattages were not included in the January 2022 database extract provided to Genesis. Change dates may not reflect the date the change is made and reflect the latest change for the pole rather than the light where more than one light is connected. Potential impact: High Actual impact: High Audit history: Multiple times Controls: Weak Breach risk rating: 9
Audit risk rating	**Rationale for audit risk rating**
High	The controls over the database are rated as weak as the data quality is poor and incomplete. This is reflected by the field audit results. To reduce the impact of the non-compliance where the database information excluded wattages, Genesis calculated the expected wattage based on the lamp model information, and where database extracts were not provided monthly, Genesis used the most recent information available to calculate submissions. The audit risk rating is high based on kWh variances identified.

Actions taken to resolve the issue	Completion date	Remedial action status
Genesis has advised the Hutt CC of the audit outcome regarding the discrepancy between what is out in field and what has been recorded within the council data base; with the intent that council makes every effort to ensure the exceptions are rectified. Genesis has also advised Hutt CC that Genesis requires monthly extracts that track any changes within the month to meet the DUML regulations. In regard to festive lights Genesis has advised Hutt CC to notify when the festive lights have been turned on/off. Genesis will look to investigate submission volumes with the intent to correct were necessary.	Continuous improvement	Identified
Preventative actions taken to ensure no further issues will occur	**Completion date**	
Genesis continues to work with the council to raise database accuracy levels.	Continuous improvement	

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

Code reference

Clause 15.2 and 15.37B(c)

Code related audit information

The audit must verify that:

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

Audit observation

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

- checking the registry to confirm that the ICP has the correct profile and submission flag, and
- checking the database extract combined with the on hours against the submitted figure to confirm accuracy.

Audit commentary

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

- Wattages are derived from an extract from the ArcGIS database provided by HCC. Database extracts are intended to be supplied to Genesis monthly, but have sometimes been provided every two months and have not consistently included wattage information. The best available estimate indicates that the database is not accurate within ±5 % as discussed in **section 3.1**.
- On and off times are derived from data logger information.

I recalculated the submissions for September 2021 and July 2022 using the data logger and the database information. I confirmed that the calculation method was correct.

- The September 2021 submission information matched my manual recalculation based on the logger hours and database extract for ICPs 0001256864UN8C4, 0001256868UNBDA and 0001256863UN50E. For ICP 0001255305UNA9F there was under submission of 220.48 kWh.
- The July 2022 submission information matched my manual recalculation based on the logger hours and database extract for ICPs 0001256868UNBDA and 0001255305UNA9F. For ICP 0001256864UN8C4 there was over submission of 2,316.13 kWh and for ICP 0001256863UN50E there was over submission of 5,858.31 kWh.

Genesis advised that submission differences sometimes occur where database information is received late.

Examination of the database found:

Issue	Estimated volume information impact (annual kWh)
44 items of load totalling 2,561 W have "Properties UrbanPlus" recorded in the ICP number field, and are excluded from submissions.	Under submission of 10,938 kWh
LED light descriptions do not contain lamp make and model so correct wattage cannot be verified.	Unknown impact
Where more than one light model field was populated, the lamp, gear and total wattage was expected to match the combined wattage for all light models recorded. I found that in most cases the wattages reflected the values for only one of the recorded light models and in some cases were inconsistent with the expected values for any of the models.	Unknown impact
Where only one light model field was populated, the recorded lamp and gear wattage did not always reflect the expected wattage.	Unknown impact
85 items of load do not have information populated in the light model fields. 53 of these had some information populated in the "If Other Light Type Pls Specify" field, and I confirmed that 42 had a wattage consistent with that description. 35 had insufficient information to confirm the correct wattages, and eight had wattages inconsistent with the description.	Over submission of 1,926.2 kWh for the eight items of load where wattages were inconsistent with the "If Other Light Type Pls Specify" field. Unknown impact for the 35 items of load which had insufficient information to confirm the correct load.
22 poles had a zero gear wattage when a non-zero value was expected.	Under submission of 1,998.8 kWh
Festive lights are recorded in the database, generally as secondary models connected to poles. Most affected poles have 15-25 3W festive lamps fitted on a lighting harness. Commercial Signals connects the festive lights during November and disconnects during January. HCC is notified of the connection and disconnection dates, but there is not a process to communicate this to Genesis.	Unknown impact, but under submission is expected as festive lights wattages were not included in the January 2022 database extract provided to Genesis.

The above discrepancies are discussed further in **sections 2.2, 2.4** and **3.1**.

As recorded in the last two audits, a monthly snapshot is not sufficient to calculate submission from, and the code requires that to calculate the correct monthly load the monthly wattage report must:

- take into account when each item of load was physically installed or removed, and
- wash up volumes must take into account where historical corrections have been made to the DUML load and volumes.

The current monthly report is provided as a snapshot and is non-compliant. Genesis completes revision submissions where corrections are required and is working to develop event-based calculations, which will enable accurate volume calculations where lamps change part way through a month.

The ArcGIS database records a created date, installed date, end date, last edited date, last serviced date, lamp installation date, and pole installation date. Created date, installed date, end date and last edited date are all consistently populated. The lamp installation date is only populated for a small number of lamps. The "edited date" is automatically populated with the date the change occurred, and the "last serviced date" indicates when the work was completed. Where there is a delay in entering a change, the change date may be incorrect. Because only one set of dates is recorded for each pole, where there is more than one light connected it may not reflect the correct dates for each light.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 3.2 With: Clause 15.2 and 15.37B(c)	The database is not accurate within ± 5%. There is a 95% level of confidence that the annual consumption is between 198,000 to 1,117,700 kWh p.a. lower than the database indicates. Database extracts have not consistently been provided to Genesis monthly, or included wattage information. Some submission volumes for September 2021 and July 2022 were not consistent with the expected values based on the database extract and logger hours. 44 items of load totalling 2,561 W have "Properties UrbanPlus" recorded in the ICP number field, and are excluded from submissions. LED light descriptions do not contain lamp make and model so correct wattage cannot be verified. Where more than one light model field was populated, the lamp, gear and total wattage in most cases reflected the values for only one of the recorded light models and in some cases were inconsistent with the expected values for any of the models. Where only one light model field was populated, the recorded lamp and gear wattage did not always reflect the expected wattage. 85 items of load do not have information populated in the light model fields. 53 of these had some information populated in the "If Other Light Type Pls Specify" field, and I confirmed that 42 had a wattage consistent with that description. 35 had insufficient information to confirm the correct wattages, and eight had wattages inconsistent with the description. 22 poles had a zero gear wattage when a non-zero value was expected.

From: 01-Jan-22 To: 31-Jul-22	There is not a clear process to communicate festive light wattages and on and off dates to Genesis. Under submission is expected as festive lights wattages were not included in the January 2022 database extract provided to Genesis. The monthly database extract provided does not track changes at a daily basis and is provided as a snapshot. Change dates may not reflect the date the change is made, and reflect the latest change for the pole rather than the light where more than one light is connected. Potential impact: High Actual impact: Unknown Audit history: Three times Controls: Weak Breach risk rating: 9

Audit risk rating	Rationale for audit risk rating
High	The controls over the database are rated as weak as the data quality is poor and incomplete. This is reflected by the field audit results. To reduce the impact of the non-compliance where the database information excluded wattages, Genesis calculated the expected wattage based on the lamp model information, and where database extracts were not provided monthly, Genesis used the most recent information available to calculate submissions. The audit risk rating is high based on kWh variances identified.

Actions taken to resolve the issue	Completion date	Remedial action status
Genesis has advised the Hutt CC of the audit outcome regarding the discrepancy between what is out in field and what has been recorded within the council data base; with the intent that council makes every effort to ensure the exceptions are rectified. Genesis has also advised Hutt CC that Genesis requires monthly extracts that track any changes within the month to meet the DUML regulations. In regard to festive lights Genesis has advised Hutt CC to notify when the festive lights have been turned on/off. Genesis will look to investigate submission volumes with the intent to correct were necessary.	Continuous improvement	Identified
Preventative actions taken to ensure no further issues will occur	**Completion date**	
Genesis continues to work with the council to raise database accuracy levels.	Continuous improvement	

CONCLUSION

The four HCC DUML ICPs switched to Genesis from 1 September 2021. Streetlight information is recorded in an ArcGIS database managed by HCC. There is a separate RAMM database and HCC intends to migrate from ArcGIS to RAMM as part of its programme of improvements to streetlight asset management processes. The project is still in the planning stage, and is tentatively expected to be completed by 31 August 2023.

New connection, fault and maintenance work is largely completed by Fulton Hogan, with some work completed by McKay's and City Electricians as subcontractors. Commercial Signals are responsible for festive lights, outage patrols, some complex work, and confirming new streetlight connections match to the as-builts. All of the contractors record the details of the work completed in the field, which is manually input into the database by their office staff on receipt. HCC completes audits to spot check data that the contractors have entered, and monitors activity to ensure that updates are occurring.

HCC usually provides a monthly report from the ArcGIS database to Genesis, but due to staffing changes this has not consistently been completed every month. The current monthly report is provided as a snapshot and is non-compliant, and Genesis completes revision submissions where corrections are required.

Genesis reconciles the DUML load as NHH using the CST profile, with wattages derived from the most recent database extract provided by HCC and on and off times derived from data logger information.

A field audit was conducted of a statistical sample of 384 items of load and results were analysed using the "database auditing tool". I found that the database had poor accuracy, demonstrated with statistical significance. The true wattage (installed in the field) could be between 3.8% and 21.5% lower than the wattage recorded in the DUML database. This is outside of the allowable +/- 5% threshold. There is a 95% level of confidence that the annual consumption is between 198,000 to 1,117,700 kWh p.a. lower than the database indicates.

The future risk rating of 43 indicates that the next audit be completed in three months. I recommend that the next audit be in no more than six months' time. This should allow sufficient time for the recommended actions to be in progress and check the database accuracy.

PARTICIPANT RESPONSE

Genesis has advised the Hutt CC of the audit outcome regarding the discrepancy between what is out in field and what has been recorded within the council data base; with the intent that council makes every effort to ensure the exceptions are rectified.

Genesis has also advised Hutt CC that Genesis requires monthly extracts that track any changes within the month to meet the DUML regulations.

In regard to festive lights Genesis has advised Hutt CC to notify when the festive lights have been turned on/off.

Genesis will look to investigate submission volumes with the intent to correct were necessary.