ELECTRICITY INDUSTRY PARTICIPATION CODE
DISTRIBUTED UNMETERED LOAD AUDIT REPORT

For

NELSON CITY COUNCIL AND
GENESIS ENERGY LIMITED

Prepared by: Rebecca Elliot

Date audit commenced: 4 March 2020

Date audit report completed: 30 March 2020

Audit report due date: 1 April 2020

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EXECUTIVE SUMMARY

This audit of the Nelson City Council (NCC) 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.

This DUML database switched to Genesis from 1/02/2020.

The RAMM database used for submission is managed by NCC. New connection, fault, and maintenance work is completed by Powertech Nelson New Zealand Limited (Powertech). Powertech record changes to the database on paper, which are then entered into a spreadsheet and updated in RAMM by Powertech's Electrical Contracts Manager.

The first monthly report provided to Genesis only contained data for ICP 0000090001NTBEF and therefore Genesis had to use the registry figure for ICP 0000200190CTC63 which resulted in under submission of 9.408 kWh. NCC have now sent the complete database so this is expected to be corrected in the next revision.

The database accuracy for the NCC lights is reasonably accurate but the accuracy of the NZTA and private lighting is poor. 43% of the database errors found in the sample checked related to these lights whilst they make up less than 10% of the database. NCC are not told of changes made in the field and I have recommended that Genesis work with NCC to review the management of these in the NCC database.

Database accuracy is described as follows:

Result	Percentage	Comments
The point estimate of R	95.3	Wattage from survey is lower than the database wattage by 4.7%
R_L	84.1	With a 95% level of confidence it can be concluded that the error could be between -15.9% and 2.6%
R_H	102.6	

The variability of the sample results across the strata means that the true wattage (installed in the field) could be between 15.9% lower and 2.6% higher than the wattage recorded in the DUML database. Non-compliance is recorded because the potential error is greater than 5.0%.

In absolute terms the installed capacity is estimated to be 14 kW lower than the database indicates.

There is a 95% level of confidence that the installed capacity is between 49 kW lower to 8 kW higher than the database.

In absolute terms, total annual consumption is estimated to be 61,400 kWh lower than the DUML database indicates.

There is a 95% level of confidence that the annual consumption is between 208,700kWh p.a. lower to 33,600 kWh p.a. higher than the database indicates.

The audit found five non-compliances and makes two recommendations. The future risk rating of 25 indicates that the next audit be completed in three months. I have considered this in conjunction with the comments provided by Genesis Energy and as Genesis Energy have only just gained this database and recommend that the next audit be in nine months to allow sufficient time to resolve the issues raised in this audit.

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	Under submission of 9,408 kWh for ICP 0000200190CTC63 due to lack of database information being provided to Genesis. The database accuracy is assessed to be 95.3% of the database for the sample checked indicating a potential over submission of approximately 61,400 kWh per annum. 3 items of load have zero wattage with an estimated annual under submission of 1,064 kWh. 31 items of load with the incorrect ballast applied resulting in an estimated minor annual under submission of 393 kWh. Submission is based on a snapshot and does not consider historic adjustments.	Moderate	High	6	Investigating
Description and capacity of load	2.4	11(2)(c) and (d) of Schedule 15.3	Three items of load have unknown or blank lamp model, and zero wattage.	Strong	Low	1	Identified
All load recorded in database	2.5	11(2A) of Schedule 15.3	Nine additional items of load found in the field.	Moderate	High	6	Investigating

Subject	Section	Clause	Non-Compliance	Controls	Audit Risk Rating	Breach Risk Rating	Remedial Action
Database accuracy	3.1	15.2 and 15.37B(b)	The database accuracy is assessed to be 95.3% of the database for the sample checked indicating a potential over submission of approximately 61,400 kWh per annum. 3 items of load have zero wattage with an estimated annual under submission of 1,064 kWh. 31 items of load with the incorrect ballast applied resulting in an estimated minor annual under submission of 393 kWh.	Moderate	High	6	Investigating
Volume information accuracy	3.2	15.2 and 15.37B(c)	Under submission of 9,408 kWh for ICP 0000200190CTC63 due to lack of database information being provided to Genesis. The database accuracy is assessed to be 95.3% of the database for the sample checked indicating a potential over submission of approximately 61,400 kWh per annum. 3 items of load have zero wattage with an estimated annual under submission of 1,064 kWh. 31 items of load with the incorrect ballast applied resulting in an estimated minor annual under submission of 393 kWh. Submission is based on a snapshot and does not consider historic adjustments.	Moderate	High	6	Investigating

Subject	Section	Clause	Non-Compliance	Controls	Audit Risk Rating	Breach Risk Rating	Remedial Action
Future Risk Rating						25	

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	2.2	Populate the ICP field in RAMM with the relevant ICP for all unmetered items of load.
Database Accuracy	3.1	Genesis liaise with NCC to review the management of the NZTA and private lights recorded in the NCC database.

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

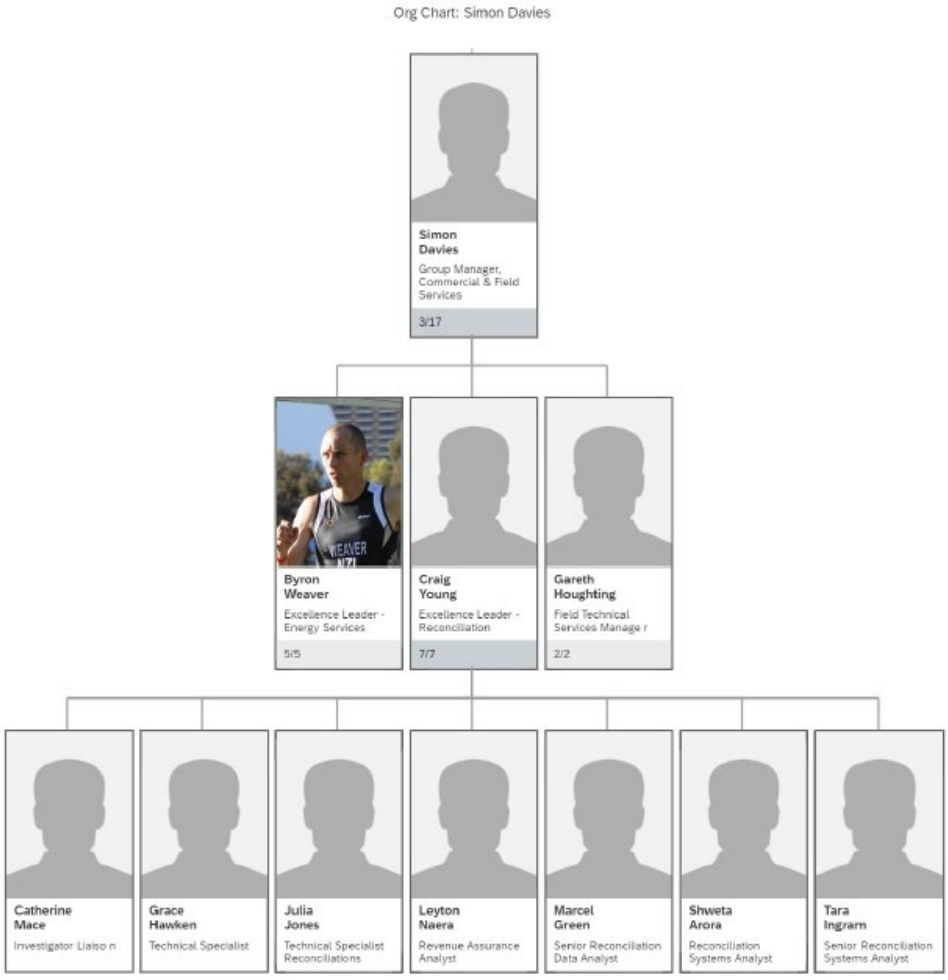
The Electricity Authority's website was reviewed to identify any exemptions relevant to the scope of this audit.

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:

Rebecca Elliot

Veritek Limited

Electricity Authority Approved Auditor

Other personnel assisting in this audit were:

Name	Title	Company
Craig Young	Excellence Leader - Reconciliation	Genesis Energy
Grace Hawken	Technical Specialist - Reconciliations Team	Genesis Energy
Roy Price	Electrical Contracts Manager	Powertech Nelson New Zealand Limited
Gillian Dancey	Contract Supervisor - Roading	Nelson City Council

1.4. Hardware and Software

The SQL database used for the management of DUML is remotely hosted by RAMM Software Ltd. The database is commonly known as "RAMM" which stands for "Roading Asset and Maintenance Management".

Database back-up is in accordance with standard industry procedures. Access to the database is secure by way of password protection.

Systems used by the trader to calculate submissions were 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)
0000090001NTBEF	NCC STREETLIGHTING STOKE	STK0331	STL	2,940	154,005
0000200190CTC63	NELSON STREETLIGHTS	STK0331	STL	2,487	152,865
			Total	**5,427**	**306,870**

I note in **section 3.1** that there are 192 items of metered load recorded with the unmetered ICP. These have been excluded from the totals above.

1.7. Authorisation Received

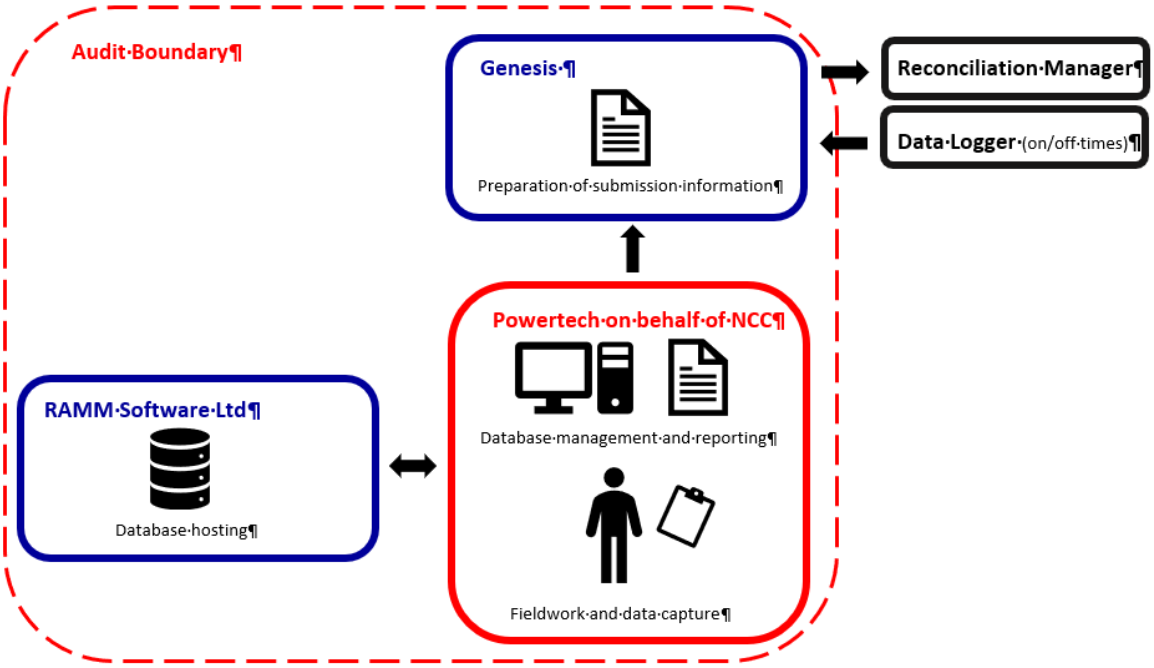
All information was provided directly by Genesis, NCC, and Powertech.

1.8. Scope of Audit

The RAMM database used for submission is managed by NCC. New connection, fault, and maintenance work is completed by Powertech Nelson New Zealand Limited (Powertech). Powertech record changes to the database on paper, which are then entered into a spreadsheet and updated in RAMM by Powertech's Electrical Contracts Manager.

Powertech provide Genesis a monthly report of changes to the database, and a full report from the database every three months.

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 audit was conducted in accordance with the audit guidelines for DUML audits version 1.1.

The field audit was undertaken of 272 items of load. The total population was divided into four strata:

- Nelson roads,
- Tasman roads,
- NZTA, and
- Parks and Reserves

1.9. Summary of previous audit

The previous audit was completed in August 2019 by Steve Woods of Veritek Limited for Trustpower. Five non-compliances were identified, and no recommendations were made. The statuses of the non-compliances and recommendations are described below.

Subject	Section	Clause	Non-compliance	Status
Deriving submission information	2.1	11(1) of Schedule 15.3	Annual under submission of approx. 121,186, due to lack of submission for NZTA lighting. The field audit finding is that the total annual consumption is estimated to be 25,800 kWh lower than the DUML database indicates, as recorded in section 3.1. Zero wattage for three lights. Two records without an ICP. Submission is based on a snapshot and does not consider historic adjustments.	Previous trader issue Still existing Still existing Cleared Still existing
ICP identifier and items of load	2.2	11(2)(a) and (aa) of Schedule 15.3	Two items of load did not have an ICP number recorded.	Cleared
Description and capacity of load	2.4	11(2)(c) and (d) of Schedule 15.3	Three items of load have unknown or blank lamp model, and zero wattage.	Still existing
Database accuracy	3.1	15.2 and 15.37B(b)	In absolute terms, total annual consumption is estimated to be 25,800 kWh lower than the DUML database indicates. 3 items of load have zero wattage. 2 items of load did not have ICP identifiers.	Still existing
Volume information accuracy	3.2	15.2 and 15.37B(c)	Annual under submission of approx. 121,186, due to lack of submission for NZTA lighting. The field audit finding is that the total annual consumption is estimated to be 25,800 kWh lower than the DUML database indicates, as recorded in section 3.1. Zero wattage for three lights. Two records without an ICP. Submission is based on a snapshot and does not consider historic adjustments.	Previous trader issue Still existing Still existing Cleared Still existing

1.10. Distributed unmetered load audits (Clause 16A.26 and 17.295F)

Code reference

Clause 16A.26 and 17.295F

Code related audit information

Retailers must ensure that DUML database audits are completed:

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

Audit observation

Genesis have requested Veritek to undertake this streetlight audit.

Audit commentary

This audit report confirms that the requirement to conduct an audit has been met 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

Genesis reconciles this DUML load using the CST profile. The first monthly report provided to Genesis only contained data for ICP 0000090001NTBEF and therefore Genesis had to use the registry figure for ICP 0000200190CTC63. They have since been provided with a full database extract and this will be corrected in the next revision. The on and off times were derived from data logger information only for ICP 0000090001NTBEF, because the registry figures were used for ICP 0000200190CTC63.

I recalculated the submissions for February 2020 and found that values were correct for ICP 0000090001NTBEF but due to the registry figures being used for ICP 0000200190CTC63 there is an estimated under submission of 9.408 kWh due. This will be corrected in subsequent revisions. This is recorded as non-compliance below.

The issue reported in the last audit of NZTA lighting being excluded from submission is no longer occurring since NCC switched to Genesis.

Some database inaccuracies have led to inaccurate volume information as detailed in **sections 2.4** and **3.1**.

On 18 June 2019, the Electricity Authority issued a memo confirming that the code requirement to calculate the correct monthly load 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 this practice is non-compliant. The database contains a “light install date” and a “lamp install date” but there is not a field for “livening date” for newly connected lights. When a wattage is changed in the database due to a physical change or a correction, only the record present at the time the report is run is recorded, not the historical information showing dates of changes. Genesis completes revision submissions where corrections are required and has not yet updated their processes to be compliant with the Authority’s memo.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 2.1 With: Clause 11(1) of Schedule 15.3 From: unknown To: 29-Feb-20	Under submission of 9,408 kWh for ICP 0000200190CTC63 due to lack of database information being provided to Genesis. The database accuracy is assessed to be 95.3% of the database for the sample checked indicating a potential over submission of approximately 61,400 kWh per annum. 3 items of load have zero wattage with an estimated annual under submission of 1,064 kWh. 31 items of load with the incorrect ballast applied resulting in an estimated minor annual under submission of 393 kWh. Submission is based on a snapshot and does not consider historic adjustments. Potential impact: High Actual impact: High Audit history: Twice previously Controls: Moderate Breach risk rating: 6
Audit risk rating	**Rationale for audit risk rating**
High	The controls are rated overall as moderate as Genesis have robust controls in place in relation to submission, but the assessment of the database indicates that the controls in place to provide an accurate database are weak for the NZTA and private lights. The impact is assessed to be high due to the level of submission inaccuracy.

Actions taken to resolve the issue	Completion date	Remedial action status
The internal notification issue has been addressed. The reporting of information has been established and will work with the council to address the historical issues within the database.	01/09/2020	Investigating
Preventative actions taken to ensure no further issues will occur	**Completion date**	
The team was unable to access the relevant information for settlement due to an internal issue. Genesis also has just inherited the database from the losing trader in its current state. Genesis will review the reported information as required.	01/04/2020	

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

All items of load had an ICP recorded but I note these are recorded in the "supply company" field and not the "ICP" field in RAMM. NCC advised this was recorded in the database to indicate which network the item of load is supplied from. The database has this field populated for all items of load regardless of whether they are metered or not. The metered items of load have zero wattage recorded so there is no impact on reconciliation. I recommend that the ICP field is populated with the relevant ICP in the database to ensure that only the unmetered items have the unmetered load ICPs recorded against them.

Recommendation	Description	Audited party comment	Remedial action
ICP identifier	Populate the ICP field in RAMM with the relevant ICP for all unmetered items of load.	Genesis will work with the council to address all database inaccuracies. Genesis has discussed the appropriate measures to ensure the metered items have the correct associated ICP.	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 nearest house address is recorded for all items of load and all but five had GPS coordinates. The GPS coordinates were immediately populated following the audit however the street address was sufficient to locate them.

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 has all details complete with the exception of the nine items of load recorded in the last audit which have the wattage recorded as zero. Seven of these have no lamp make or model description. Six of these records were confirmed as being disconnected, meaning that zero is the correct wattage, but three records should not be zero. The records are shown in the table below.

Location	House Address	Make	Model	Lamp Wattage
0	3 - 9 MAJESTIC WAY (Private)	Unknown		0
575	MOTUEKA STREET (OMAHU WAY - 1ST IN ROW)	Unknown	Unknown	0
551	MOTUEKA STREET (F3 OMAHU WAY)	Unknown	Unknown	0

The accuracy of the ballasts applied 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-May-18 To: 29-Feb-20	Three items of load have unknown or blank lamp model, and zero wattage. Potential impact: Low Actual impact: Low Audit history: Three times previously Controls: Strong Breach risk rating: 1
Audit risk rating	**Rationale for audit risk rating**
Low	The controls are strong because they mitigate risk to an acceptable level. The impact is low, because there only three items of load with incorrect data.

Actions taken to resolve the issue	Completion date	Remedial action status
Genesis has requested the description detail inaccuracies be addressed, completion date maybe impacted due to COVID-19.	01/09/2020	Identified
Preventative actions taken to ensure no further issues will occur	**Completion date**	
Genesis review data supplied and provide feed back on any exceptions found.	01/04/2020	

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 272 items of load. The total population was divided into four strata:

- Nelson roads,
- Tasman roads,
- NZTA, and
- Parks and Reserves.

Audit commentary

The field audit discrepancies are detailed in the table below.

Address	Database Count	Field Count	Count differences	Wattage differences	Comments
ATAWHAI DRIVE (27) NZTA	8	8		6	4 x incorrect LED wattages 2x LEDs found in the field recorded as 70W HPS in the database
BROADFIELD PLACE (7884) PRIVATE	1	1		1	1x incorrect wattage
BRONTE STREET (CENTRAL) (7838) PRIVATE	2	2		1	1x 38W LED found in the field recorded as 70W HPS in the database
CAMBELLDON CRESCENT (7789)	12	11	-1	6	1x 70W HPS not found in the field 6x 70W HPS lights with the incorrect ballast
EVERGREEN WAY (7878) PRIVATE	2	0	-2		No lights found in the field
HASTINGS STREET (142)	9	7	-2		2x 24W LED not found in the field
HAVEN ROAD (ARTERIAL, NORTHBOUND) (144)	5	6	+1		1x extra 83W LED found in the field
KAWAI STREET (NORTH) (168) PRIVATE- NELSON HOSPITAL	2	2		2	2x 150W HPS found in the field recorded as 400W HPS in the database
NEWPORT WAY (7864) PRIVATE	1	1		1	1x 70W HPS found in the field recorded as 13W LED in the database
NGAIRE PLACE (531)	2	2		1	1x 70W HPS found in the field recorded as 24W LED in the database
PARK_WAKEFIELD_WAKEFIELD (7907)	28	35	+7	4	3x extra bollards found in the field 8x lights recorded as 4 items of load with the incorrect wattage
QUARANTINE ROAD (EAST) (536)	6	6		1	1x 35W LED found in the field recorded as 51W LED in the database
RUSSELL STREET (313)	28	26	-2	1	2x 24W LED not found in the field

Address	Database Count	Field Count	Count differences	Wattage differences	Comments
					1x 150W LED recorded as 148W LED in the database
SH 6 HAVEN ROAD ROUNDABOUT (477) NZTA	3	3		3	3x 148W LEDs recorded as 150W LEDs in the database
SHARED ATAWHAI 05 CENTRAL (7934) NZTA	1	2	+1		1x extra 150W HPS found in the field
ST JOHN DRIVE (7935) PRIVATE	4	4		4	4x 27W LEDs recorded as 23W LEDs in the database
Total	**272**		**16**	**31**	

I found nine additional lamps in the field than were recorded in the database. This is recorded as non-compliance below.

The database accuracy is discussed in **section 3.1**.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 2.5 With: Clause 11(2A) of Schedule 15.3 From: 07-Sep-19 To: 29-Feb-20	Nine additional items of load found in the field. Potential impact: High Actual impact: High Audit history: None Controls: Moderate Breach risk rating: 6
Audit risk rating	**Rationale for audit risk rating**
High	The controls are rated as moderate overall as NCC have robust controls in place in relation to the NCC owned lights, but controls are weak/none for the 10% of NZTA and private lights recorded in the database. The impact is high as indicated by the database accuracy findings detailed in **section 3.1**.

Actions taken to resolve the issue	Completion date	Remedial action status
Genesis has requested the description detail inaccuracies be addressed, completion date maybe impacted due to COVID-19. The current NZTA arrangement will need to be outlined to highlight any discrepancies between the asset database and the field.	01/09/2020	Investigating
Preventative actions taken to ensure no further issues will occur	**Completion date**	
Genesis review data supplied and provide feedback on any exceptions found.	01/09/2020	

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.

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 RAMM database contains a complete audit trail. Reporting is provided to Genesis is from the RAMM database.

Audit outcome

Compliant

3. ACCURACY OF DUML DATABASE

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

Code reference

Clause 15.2 and 15.37B(b)

Code related audit information

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

Audit observation

The DUML Statistical Sampling Guideline was used to determine the database accuracy. The table below shows the survey plan.

Plan Item	Comments
Area of interest	NCC region
Strata	The database contains items of load in Nelson area. The processes for the management of all NCC items of load are the same. The total population was divided into four strata: • Nelson Roads, • NZTA, • Parks and Reserves, and • Tasman Roads.
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 64 sub-units.
Total items of load	272 items of load were checked.

Wattages were checked for alignment with the published standardised wattage table produced by the Electricity Authority against the database or in the case of LED lights against the LED light specification.

The change management process and timeliness of database updates was evaluated.

Audit commentary

A field audit was conducted of a statistical sample of 272 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	95.3	Wattage from survey is lower than the database wattage by 4.7%
R_L	84.1	With a 95% level of confidence it can be concluded that the error could be between -15.9% and 2.6%
R_H	102.6	

These results were categorised in accordance with the "Distributed Unmetered Load Statistical Sampling Audit Guideline", effective from 01/02/19 and the table below shows that Scenario C (detailed below) applies.

The conclusion from Scenario C is that the variability of the sample results across the strata means that the true wattage (installed in the field) could be between 15.9% lower and 2.6% higher than the wattage recorded in the DUML database. Non-compliance is recorded because the potential error is greater than 5.0%.

In absolute terms the installed capacity is estimated to be 14 kW lower than the database indicates.

There is a 95% level of confidence that the installed capacity is between 49 kW lower to 8 kW higher than the database.

In absolute terms, total annual consumption is estimated to be 61,400 kWh lower than the DUML database indicates.

There is a 95% level of confidence that the annual consumption is between 208,700kWh p.a. lower to 33,600 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 %.

The NCC database contains the council lights, NZTA lights and private lights for the NCC area. The errors found in the field in relation to these lights are detailed in **section 2.5**. NCC are not advised by NZTA of any changes they make to the lights and there is no mechanism to gather this information from the rate payers in relation to the private lights. 20 of the 46 errors found (combining both wattage and light count errors) relate to the NZTA and private items of load. These lights make up less than 10% of the database. I recommend that Genesis liaise with NCC to see how else these items of load can be reconciled.

Recommendation	Description	Audited party comment	Remedial action
ICP identifier	Genesis liaise with NCC to review the management of the NZTA and private lights recorded in the NCC database.	The current NZTA arrangement will need to be outlined to highlight any discrepancies between the asset database and the field. Private lighting needs to be confirmed and liaise with the distributor to action the necessary requirements. Genesis has discussed this in detail with the council as they currently administer the "private" lighting which is SUML. The distributor has stated that its unaware of any SUML on its network and has indicated that it needs to discuss this further. Genesis has made its intentions clear that they require these assets to be administered by the distributor as SUML.	Investigating

Lamp description and capacity accuracy

As reported in the previous audit, nine unmetered items of load have the wattage recorded as zero. Seven of these have no lamp make or model description. Six of these records were confirmed as being disconnected, meaning that zero is the correct wattage, but three records should not be zero. The records are shown in the table below. If it is assumed that these lights are 70W HPS then under submission of 1,064 kWh p.a. is estimated.

Location	House Address	Make	Model	Lamp Wattage
0	3 - 9 MAJESTIC WAY (Private)	Unknown		0
575	MOTUEKA STREET (OMAHU WAY - 1ST IN ROW)	Unknown	Unknown	0
551	MOTUEKA STREET (F3 OMAHU WAY)	Unknown	Unknown	0

Wattages for all items of load were checked against the published standardised wattage tables produced by the Electricity Authority, and the manufacturer's specifications. In relation to the LED lights I found there were no wattages that could not be supported by at least one specification sheet. I found 31 lights with incorrect gear wattage applied resulting in an estimated minor annual under submission of 393 kWh. These have been passed to NCC to correct.

Location accuracy

The field audit did not identify any location discrepancies.

ICP number and owner accuracy

324 items of metered load have the unmetered ICP recorded against them. They are excluded from reconciliation and I recommend in **section 2.2** that the ICP field is populated in RAMM and only unmetered items of load have the unmetered ICPs recorded against them.

Change management process findings

New connection, fault and maintenance work is completed by Powertech. Powertech record changes to the database on paper, which are then entered into a spreadsheet and updated in RAMM by Powertech's Electrical Contracts Manager. The database is usually updated within two business days of work being completed. If the road is yet to be loaded in RAMM the lights are pegged to the nearest available load until such time that the road is created in RAMM. The lights are then reassigned to the new road. I confirmed this by checking 12 lights that have been installed in the new Grampian Oaks subdivision. These are currently pegged to Campbell Road until the new roads are entered into RAMM. The light install date is used as the date of physical change.

For new connections, Powertech receives a request from NCC, arranges connection and loads the streetlight into RAMM including light type and wattage information, location, GPS coordinates and the date livened.

For new subdivisions:

- if Powertech is the contractor, the new connection process above is followed; and
- if another contractor is used, the developer arranges connection with the network and provides "as built" plans to NCC, then NCC passes the details to Powertech, who check the new lights and update the database.

There can be a delay in NCC being advised of new connections where Powertech is not the contractor. It is estimated that Powertech is the contractor for over half of recent new subdivisions. The light install date is used as the date of physical change, which provides an accurate start date, but the current reporting process is based on a snapshot and this practice is non-compliant.

There are 146 private lights recorded in the database. These are recorded against the two ICPs in the database, NCC pays for the consumption and on-charges this to the residents annually.

Christmas and festive lights are used by NCC. These lights are metered and excluded from the scope of this audit.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 3.1 With: Clause 15.2 and 15.37B(b) From: 07-Sep-19 To: 29-Feb-20	The database accuracy is assessed to be 95.3% of the database for the sample checked indicating a potential over submission of approximately 61,400 kWh per annum. 3 items of load have zero wattage with an estimated annual under submission of 1,064 kWh. 31 items of load with the incorrect ballast applied resulting in an estimated minor annual under submission of 393 kWh. Potential impact: High Actual impact: High Audit history: Twice previously Controls: Moderate Breach risk rating: 6
Audit risk rating	**Rationale for audit risk rating**
High	The controls are rated as moderate overall, because they are sufficient to ensure that database wattage is accurate for the bulk of lights which belong to NCC council lights but the controls for the accuracy of the NZTA and private lights are weak. The impact is assessed to be high, because over submission may be occurring of approx. 61,400 kWh per annum based on the database accuracy.

Actions taken to resolve the issue	Completion date	Remedial action status
Genesis has requested the description detail inaccuracies be addressed, Private lighting needs to be confirmed and liaise with the distributor to action the necessary requirements. Completion date maybe impacted due to COVID-19. Genesis has approached the distributor to administer the assets as SUML and assign the appropriate site to a distributor only ICP. Genesis is awaiting confirmation from the distributor as to their intentions.	01/09/2020	Investigating
Preventative actions taken to ensure no further issues will occur	**Completion date**	
Genesis review data supplied and provide feedback on any exceptions found.	01/04/2020	

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

Genesis reconciles this DUML load using the CST profile. The first monthly report provided to Genesis only contained data for ICP 0000090001NTBEF and therefore Genesis had to use the registry figure for ICP 0000200190CTC63. They have since been provided with a full database extract and this will be corrected in the next revision. The on and off times were derived from data logger information only for ICP 0000090001NTBEF, because the registry figures were used for ICP 0000200190CTC63.

I recalculated the submissions for February 2020 and found that values were correct for ICP 0000090001NTBEF but due to the registry figures being used for ICP 0000200190CTC63 there is an estimated under submission of 9.408 kWh due. This will be corrected in subsequent revisions. This is recorded as non-compliance below.

The issue reported in the last audit of NZTA lighting being excluded from submission is no longer occurring since NCC switched to Genesis.

Some database inaccuracies have led to inaccurate volume information as detailed in **sections 2.4** and **3.1**.

On 18 June 2019, the Electricity Authority issued a memo confirming that the code requirement to calculate the correct monthly load 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 this practice is non-compliant. The database contains a “light install date” and a “lamp install date” but there is not a field for “livening date” for newly connected lights. When a wattage is changed in the database due to a physical change or a correction, only the record present at the time the report is run is recorded, not the historical information showing dates of changes. Genesis completes revision submissions where corrections are required and has not yet updated their processes to be compliant with the Authority’s memo.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 3.2 With: Clause 15.2 and 15.37B(c) From: unknown To: 29-Feb-20	Under submission of 9,408 kWh for ICP 0000200190CTC63 due to lack of database information being provided to Genesis. The database accuracy is assessed to be 95.3% of the database for the sample checked indicating a potential over submission of approximately 61,400 kWh per annum. 3 items of load have zero wattage with an estimated annual under submission of 1,064 kWh. 31 items of load with the incorrect ballast applied resulting in an estimated minor annual under submission of 393 kWh. Submission is based on a snapshot and does not consider historic adjustments. Potential impact: High Actual impact: High Audit history: Twice previously Controls: Moderate Breach risk rating: 6
Audit risk rating	**Rationale for audit risk rating**
High	The controls are rated overall as moderate as Genesis have robust controls in place in relation to submission, but the assessment of the database indicates that the controls in place to provide an accurate database are weak for the NZTA and private lights. The impact is assessed to be high due to the level of submission inaccuracy.

Actions taken to resolve the issue	Completion date	Remedial action status
Genesis has requested the description detail inaccuracies be addressed. The current NZTA arrangement will need to be outlined to highlight any discrepancies between the asset database and the field. completion date maybe impacted due to COVID-19.	01/09/2020	Investigating
Preventative actions taken to ensure no further issues will occur	**Completion date**	
Genesis review data supplied and provide feedback on any exceptions found.	01/09/2020	

CONCLUSION

This DUML database switched to Genesis from 1/02/2020.

The RAMM database used for submission is managed by NCC. New connection, fault, and maintenance work is completed by Powertech Nelson New Zealand Limited (Powertech). Powertech record changes to the database on paper, which are then entered into a spreadsheet and updated in RAMM by Powertech's Electrical Contracts Manager.

The first monthly report provided to Genesis from NCC only contained data for ICP 0000090001NTBEF and therefore Genesis had to use the registry figure for ICP 0000200190CTC63 which resulted in under submission of 9.408 kWh. NCC have now sent the complete database so this is expected to be corrected in the next revision.

The database accuracy for the NCC lights is reasonably accurate but the accuracy of the NZTA and private lighting is poor. 43% of the database errors found relate to these lights whilst they make up less than 10% of the database. NCC are not told of changes made in the field and I have recommended that Genesis work with NCC to review the management of these in the NCC database.

Database accuracy is described as follows:

Result	Percentage	Comments
The point estimate of R	95.3	Wattage from survey is lower than the database wattage by 4.7%
R_L	84.1	With a 95% level of confidence it can be concluded that the error could be between -15.9% and 2.6%
R_H	102.6	

The variability of the sample results across the strata means that the true wattage (installed in the field) could be between 15.9% lower and 2.6% higher than the wattage recorded in the DUML database. Non-compliance is recorded because the potential error is greater than 5.0%.

In absolute terms the installed capacity is estimated to be 14 kW lower than the database indicates.

There is a 95% level of confidence that the installed capacity is between 49 kW lower to 8 kW higher than the database.

In absolute terms, total annual consumption is estimated to be 61,400 kWh lower than the DUML database indicates.

There is a 95% level of confidence that the annual consumption is between 208,700kWh p.a. lower to 33,600 kWh p.a. higher than the database indicates.

The audit found five non-compliances and makes two recommendations. The future risk rating of 25 indicates that the next audit be completed in three months. I have considered this in conjunction with the comments provided by Genesis Energy and as Genesis Energy have only just gained this database and recommend that the next audit be in nine to allow sufficient time to resolve the issues raised in this audit.

PARTICIPANT RESPONSE

Genesis would be requesting 9-12 month audit review. The current NCC data base accuracy levels are good with manor discrepancies. The NZTA assets need to be determined and under the current COVID-19 level 4 alert this may not be able to be addressed soon. Genesis will request where possible any information to be updated by the council. Genesis will contact NZTA to request any information they hold in relation to the assets in that region. Genesis has also approach the distributor in regards to the private lighting and requested that the distributor administer these asset as SUML.