ELECTRICITY INDUSTRY PARTICIPATION CODE
DISTRIBUTED UNMETERED LOAD AUDIT REPORT

VERITEK

For

TARARUA DISTRICT COUNCIL AND GENESIS ENERGY LIMITED

Prepared by: Rebecca Elliot

Date audit commenced: 17 May 2021

Date audit report completed: 28 May 2021

Audit report due date: 1 June 2021

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EXECUTIVE SUMMARY

This audit of the **Tararua District Council (TDC)** 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.

Streetlight load is determined by wattages held within TDC's RAMM database, which is managed by Tararua Alliance and TDC. New connection, fault, maintenance, and upgrade work is completed by Scanpower, Centralines and Powerco.

NZTA lights are recorded in the database. They do not provide information when lights are added or changed. The NZTA RAMM database is being updated and the NZTA lights currently recorded in the TDC RAMM database are expected to be transferred to the NZTA database. NZTA have not yet engaged with Tararua DC, therefore the timeframe for this to be completed by NZTA is unknown.

The outcome of the TCD tender process to appoint a new contractor resulted in three contractors being engaged to cover different areas of the region.

- Scanpower (Dannevirke, Woodville, Northwood, Ormondville),
- Powerco (Pahiatua, Eketahuna, Akitio, Pongaroa, and
- Central lines (Herbertville).

Database accuracy is described as follows:

Result	Percentage	Comments
The point estimate of R	110.5	Wattage from survey is higher than the database wattage by 10.5%
R_L	99.2	With a 95% level of confidence, it can be concluded that the error could be between -0.8% and +60.8%
R_H	160.8	

The variability of the sample results across the strata means that the true wattage (installed in the field) could be between 0.8% lower and 60.8% higher than the wattage recorded in the DUML database.

- In absolute terms the installed capacity is estimated to be 9 kW higher than the database indicates.
- There is a 95% level of confidence that the installed capacity is 1 kW lower to 53,000 higher than the database.
- In absolute terms, total annual consumption is estimated to be 39,100 kWh higher than the DUML database indicates.
- There is a 95% level of confidence that the annual consumption is between 3,100 kWh lower p.a. to 225,800 kWh p.a. higher than the database indicates.

The audit found five non-compliances and makes two recommendations. The future risk rating of 16 indicates that the next audit be completed in six months. I have considered this in conjunction with Genesis' comments and recommend that that the next audit period be in 12 months.

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
Deriving submission information	2.1	11(1) of Schedule 15.3	Database is not confirmed as accurate with a 95% level of confidence resulting in an estimated under submission of 39,100 kWh per annum. The monthly database extract provided does not track changes at a daily basis and is provided as a snapshot. 12 items of load have either missing or blank lamp model, lamp wattage or, gear wattage resulting in an estimated under submission of 927 kWh per annum. Festive lighting in Woodville and Dannevirke not recorded in the database.	Moderate	Medium	4	Investigating
Description and capacity of load	2.4	11(2)(c) and (d) of Schedule 15.3	12 items of load have either missing or blank lamp model, lamp wattage or, gear wattage. Resulting in an estimated under submission of 927 kWh per annum.	Moderate	Low	2	Identified
All load recorded in database	2.5	11(2A) of Schedule 15.3	One additional light in the field.	Moderate	Low	2	Investigating
Database accuracy	3.1	15.2 and 15.37B(b)	Database is not confirmed as accurate with a 95% level of confidence resulting in an estimated under submission of 39,100 kWh per annum. The monthly database extract provided does not track changes at a daily basis and is provided as a snapshot. 12 items of load have either missing or blank lamp model, lamp wattage or, gear wattage resulting in an estimated under submission of 927 kWh per annum. Festive lighting in Woodville and Dannevirke not recorded in the database. 28 items of load have the incorrect lamp description.	Moderate	Medium	4	Investigating

Subject	Section	Clause	Non-Compliance	Controls	Audit Risk Rating	Breach Risk Rating	Remedial Action
			15 lamps with incorrect gear wattages for their lamp model description resulting in estimated under submission of 3,463.77 kWh p.a. based on 4,271 burn hours p.a.				
Volume information accuracy	3.2	15.2 and 15.37B(c)	Database is not confirmed as accurate with a 95% level of confidence resulting in an estimated under submission of 39,100 kWh per annum. The monthly database extract provided does not track changes at a daily basis and is provided as a snapshot. 12 items of load have either missing or blank lamp model, lamp wattage or, gear wattage resulting in an estimated under submission of 927 kWh per annum. 28 items of load have the incorrect lamp description. 15 lamps with incorrect gear wattages for their lamp model description resulting in estimated under submission of 3,463.77 kWh p.a. Festive lighting in Woodville and Dannevirke not recorded in the database.	Moderate	Medium	4	Investigating
Future Risk Rating						16	

Future risk rating	0	1-4	5-8	9-15	16-18	19+
Indicative audit frequency	36 months	24 months	18 months	12 months	6 months	3 months

RECOMMENDATIONS

Subject	Section	Recommendation
ICP data	1.6	Work with TDC to either create a separate ICP for each point of connection, or switch ICP to Gene and settle the load as DUML.
All load recorded in the database	2.5	Check under the verandah lights in Pahiatua and add them to the database if they are unmetered.

ISSUES

Subject	Section	Description	Issue
		Nil	

1. ADMINISTRATIVE

1.1. Exemptions from Obligations to Comply with Code

Code reference

Section 11 of Electricity Industry Act 2010.

Code related audit information

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

Audit observation

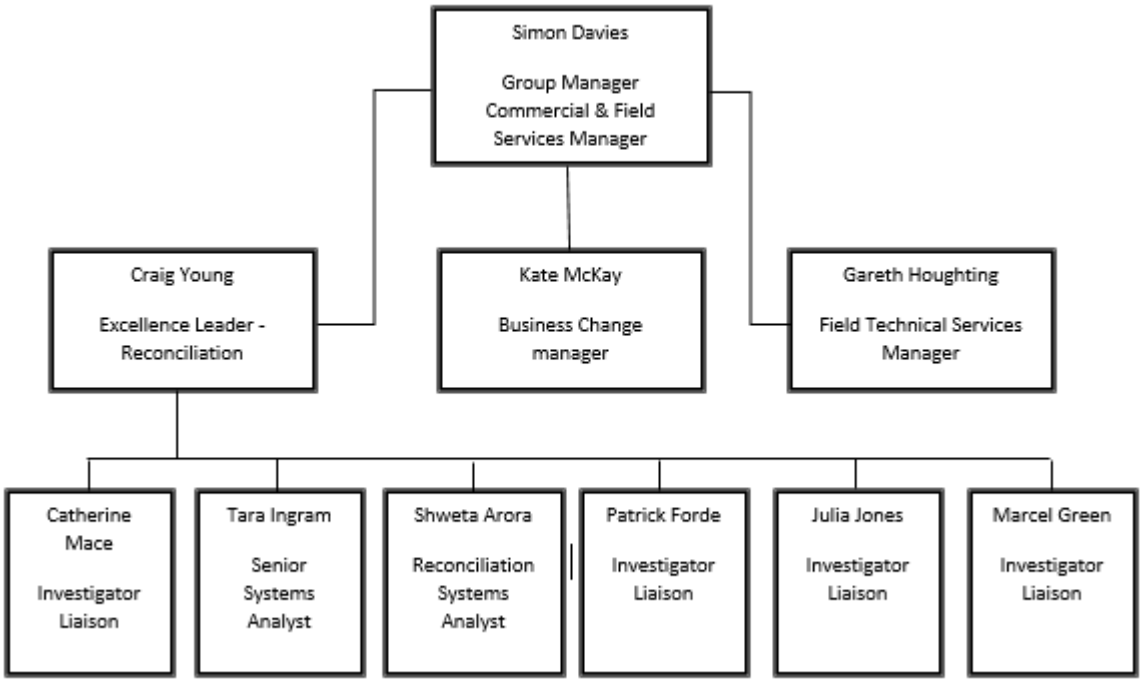
The Electricity Authority's website was reviewed to identify any exemptions relevant to the scope of this audit.

Audit commentary

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

1.2. Structure of Organisation

Genesis provided a copy of their organisational structure:



1.3. Persons involved in this audit

Auditor:

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

Other personnel assisting in this audit were:

Name	Title	Company
Nicky Campbell	Asset Information Technician	Tararua Alliance
Peter van der Wel	Asset Engineer	Tararua Alliance
Craig Young	Excellence Leader – Reconciliation Team	Genesis Energy
Julia Jones	Technical Specialist - Reconciliation Team	Genesis Energy

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". The specific module used for DUML is called RAMM Contractor.

RAMM Software Limited backs up the database and assists with disaster recovery as part of their hosting service. Nightly backups are performed. As a minimum, daily backups are retained for the previous five working days, weekly backups are retained for the previous four weeks, and monthly backups are retained for the previous six months.

Access to the database is secure by way of password protection.

Systems used by the trader to calculate submissions are assessed as part of their reconciliation participant audits.

1.5. Breaches or Breach Allegations

There are no breach allegations relevant to the scope of this audit.

1.6. ICP Data

ICP Number	Description	NSP	Profile	Number of items of load	Database wattage (watts)
0009100000CADDC	Dannevirke Street Lighting - Dannevirke Borough	DVK0111	CST	811	35,212
0009101000CAC7C	Street Lighting - Rural Streetlighting	DVK0111	CST	87	3,231
0009102000CAE9C	Street Lighting - Woodville Borough	WDV0111	CST	282	19,081
1000554957PC423	TDC Master stlight - cnr Mangamaire & Tutaekara Road	MGM0331	RPS	471	29,374
Total				**1,651**	**88,898**

As reported in the previous two audits, ICP 7012020000CH14D is also included in the database, but is outside the scope of the audit. The ICP is supplied by Meridian and is settled as standard unmetered load. Tararua Alliance confirmed that the six lights connected do not all have the same point of connection.

Light ID	Road	ICP Group	
1523	052-0063	7012020000CH14D	Betacom 27w led
2564	SEAVIEW RD	7012020000CH14D	40W LED
2565	SEAVIEW RD	7012020000CH14D	40W LED
2540	SEAVIEW RD	7012020000CH14D	40W LED
2541	SEAVIEW RD	7012020000CH14D	40W LED
2542	SEAVIEW RD	7012020000CH14D	40W LED

Only loads below the unmetered load threshold with a single point of connection may be settled as standard unmetered load. The recommendation from the last two audit's is repeated. Separate ICPs should be created for each point of connection so it can continue to be treated as standard unmetered load, or the ICPs should be treated as DUML. This will also be raised in the next Meridian Reconciliation Participant audit.

Recommendation	Description	Audited party comment	Remedial action
Database Accuracy	ICP 7012020000CH14D is invalidly treated as standard unmetered load. Either: 1. create a separate ICP for each point of connection, and then settle each ICP as standard unmetered load, or 2. switch the ICP to GENE and settle the load as DUML.	Genesis has no contractual obligation with this ICP. Genesis will discuss this further with The Council and Meridian. Maintaining the assets as DUML within the database is logical.	Investigating

1.7. Authorisation Received

All information was provided directly by Genesis or TDC.

1.8. Scope of Audit

This audit of the TDC DUML database and processes was conducted at the request of Genesis in accordance with clause 15.37B. The purpose of this audit is to verify that the volume information is being calculated accurately, and that profiles have been correctly applied.

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

Streetlight load is determined by wattages held within TDC's RAMM database. New connection, fault, maintenance, and upgrade work is completed by Scanpower, Centralines and Powerco. Since TDC's LED upgrade was completed there have been few changes to the database, over the last 12 months there has been approximately 40 – 50 changes that required updating. Scanpower, Centralines and Powerco have been asked to provide information when changes are made, and this is used to update RAMM.

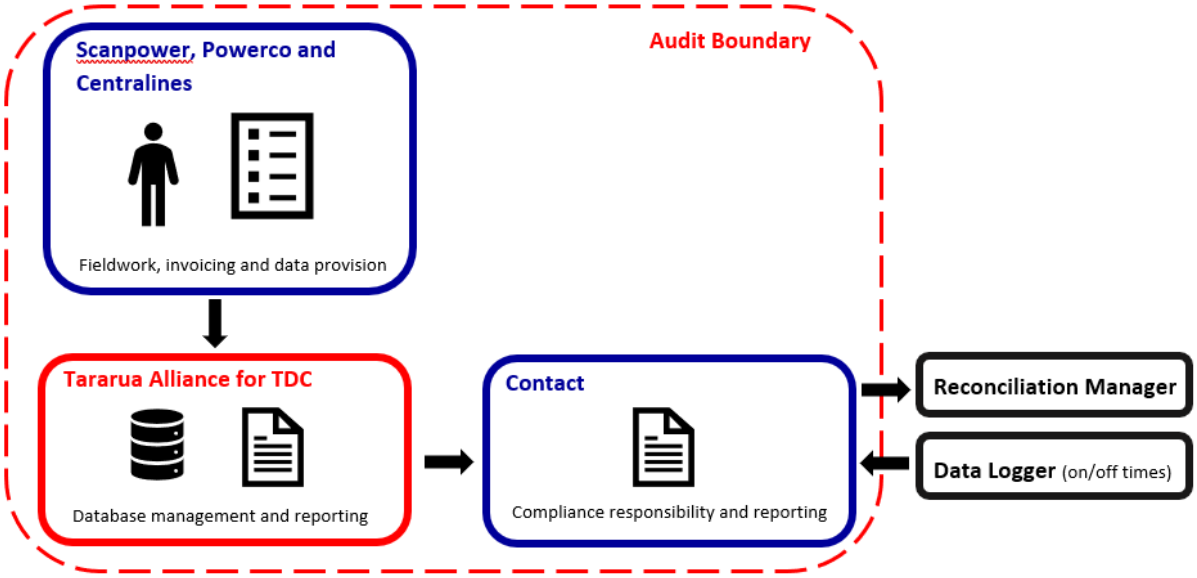
A full audit was completed in 2020 by TDC and the database was updated as required.

NZTA lights are recorded in the database. They do not provide information when lights are added or changed. The NZTA RAMM database is being updated and the NZTA lights currently recorded in the TDC RAMM database are expected to be transferred to the NZTA database once the work presently underway by NZ streetlighting has been completed. NZTA have not yet engaged with Tararua DC, therefore the timeframe for this to be completed by NZTA is unknown.

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

The outcome of the TCD tender process to appoint a new contractor resulted in three contractors being engaged to cover different areas of the region.

- Scanpower (Dannevirke, Woodville, Northwood, Ormondville),
- Powerco (Pahiatua, Eketahuna, Akitio, Pongaroa, and
- Central lines (Herbertville).



The field audit was undertaken of a statistical sample of 248 items of load on 18th and 19th May 2021.

1.9. Summary of previous audit

The previous audit of this database was undertaken by Rebecca Elliot of Veritek Limited in July 2020. 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
Deriving submission information	2.1	11(1) of Schedule 15.3	Database is not confirmed as accurate with a 95% level of confidence resulting in an estimated under submission of 61,000 kWh per annum.	Still existing
			The monthly database extract provided does not track changes at a daily basis and is provided as a snapshot.	Still existing
			Eight items of load had a missing gear wattage, and two items of load had invalid gear wattages of zero.	Still existing for different lights
			55 items of load had invalid gear wattages for their lamp model description resulting in an estimated under submission of 2,208 kWh per annum.	Still existing for different lights
			Festive lighting in Woodville and Dannevirke not recorded in the database.	Still existing
Description and capacity of load	2.4	11(2)(c) and (d) of Schedule 15.3	Eight items of load have a missing gear wattage, and a further two	Still existing for different lights

Subject	Section	Clause	Non-compliance	Status
			items of load have invalid gear wattages of zero.	
Database accuracy	3.1	15.2 and 15.37B(b)	Database is not confirmed as accurate with a 95% level of confidence resulting in an estimated under submission of 61,000 kWh per annum. The monthly database extract provided does not track changes at a daily basis and is provided as a snapshot. Eight items of load had a missing gear wattage, and two items of load had invalid gear wattages of zero. 28 items of load have the incorrect lamp description. 55 items of load had invalid gear wattages for their lamp model description resulting in an estimated under submission of 2,208 kWh per annum. Festive lighting in Woodville and Dannevirke not recorded in the database.	Still existing Still existing Still existing for different lights Sill existing Still existing for different lights Still existing
Volume information accuracy	3.2	15.2 and 15.37B(c)	Database is not confirmed as accurate with a 95% level of confidence resulting in an estimated under submission of 61,000 kWh per annum. The monthly database extract provided does not track changes at a daily basis and is provided as a snapshot. Eight items of load had a missing gear wattage, and two items of load had invalid gear wattages of zero. 55 items of load had invalid gear wattages for their lamp model description resulting in an estimated under submission of 2,208 kWh per annum. Festive lighting in Woodville and Dannevirke not recorded in the database.	Still existing Still existing Still existing for different lights Still existing for different lights Still existing

Table of Recommendations

Subject	Section	Description	Recommendation	Status
ICP data	1.6	ICP data	Confirm whether this ICP 7012020000CH14D is standard or distributed unmetered load, and work	Still existing

Subject	Section	Description	Recommendation	Status
			with TDC to update the database if necessary	
All load recorded in the database	2.5	Inclusion of under verandah lights.	Check under the verandah lights in Pahiatua and add them to the database if they are unmetered.	Still existing
Database Accuracy	3.1	Field audit	100% field audit of the TDC lights required to bring database up to acceptable accuracy level.	Completed

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 and the application of profiles was checked. The database was checked for accuracy.

Audit commentary

Genesis reconciles the DUML using the CST profile. The on and off times are derived from data logger information. Wattages are derived from a database extract provided by TDC each month.

I recalculated the submissions for April 2021 for the four ICPs associated with the database using the data logger and database information. I confirmed that it was calculated accurately based on the database and data logger information.

The field audit against the database quantities found that the database is not confirmed as accurate with a 95% level of confidence resulting in an estimated under submission of 39,100 kWh per annum. This is detailed in **section 3.1**.

There are 12 items of load have either missing or blank lamp model, lamp wattage or, gear wattage. Resulting in an estimated under submission of 927 kWh per annum.

As detailed in **section 3.1**, there is festive lighting used in Woodville and Dannevirke. This is put up by the Community boards around Christmas, TDC are not advised when the lights are put up or for how long. The lighting is not recorded in the database. This is recorded as non-compliance.

On 18 June 2019, the Electricity Authority issued a memo clarifying the memo of 2012 that stated that a monthly snapshot was sufficient to calculate submission from, and confirmed 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. 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 is working to develop event-based calculations, which will enable accurate volume calculations where lamps change part way through a month.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 2.1 With: Clause 11(1) of Schedule 15.3 From: 28-Aug-20 To: 17-May-21	Database is not confirmed as accurate with a 95% level of confidence resulting in an estimated under submission of 39,100 kWh per annum. 12 items of load have either missing or blank lamp model, lamp wattage or, gear wattage resulting in an estimated under submission of 927 kWh per annum. Festive lighting in Woodville and Dannevirke not recorded in the database. The monthly database extract provided does not track changes at a daily basis and is provided as a snapshot. Potential impact: Medium Actual impact: Medium Audit history: Multiple times Controls: Moderate Breach risk rating: 4
Audit risk rating	**Rationale for audit risk rating**
Medium	The controls are rated as moderate as controls will mitigate risk most of the time, but there is room for improvement. The audit risk rating is assessed to be medium based on the potential submission inaccuracies.

Actions taken to resolve the issue	Completion date	Remedial action status
Genesis has advised TDC of the corrective actions, TDC has engaged with the NZTA to ascertain when they plan on removing the assets from the TDC database which has been indicated to be 01/07/2021	01/09/2021	Investigating
Preventative actions taken to ensure no further issues will occur	**Completion date**	
Genesis has advised TDC of the corrective actions, TDC has engaged with the NZTA to ascertain when they plan on removing the assets from the TDC database which has been indicated to be 01/07/2021	01/09/2021	

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

Code reference

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

Code related audit information

The DUML database must contain:

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

Audit observation

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

Audit commentary

All items of load have an ICP recorded against them.

Audit outcome

Compliant

2.3. Location of each item of load (Clause 11(2)(b) of Schedule 15.3)

Code reference

Clause 11(2)(b) of Schedule 15.3

Code related audit information

The DUML database must contain the location of each DUML item.

Audit observation

The database was checked to confirm the location is recorded for all items of load.

Audit commentary

The database contains fields for the road name, location number, side, and GPS coordinates.

All items of load are locatable. 1,637 (99.15%) of the 1,651 items of load have GPS coordinates.

The other fourteen items of load have a road name that is numeric e.g. '052-0093'. The GPS coordinates enable them to be mapped and located. The fourteen items of load should have the road name updated to ensure they are easily located.

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 light make, light model, light wattage, gear make, gear model and gear wattage.

I check the items of load, 99.2% have the light make, light model, light wattage, gear make, gear model and gear wattage recorded.

In the last audit there were ten items of load with either missing or blank lamp model, lamp wattage or, gear wattage. These have been corrected. In this audit I found 12 new items of load with either missing or blank lamp model, lamp wattage or, gear wattage:

Light ID	Road	Lamp Model	Lamp Wattage	Gear wattage	Expected gear/lamp wattage
1439	ALLAN ST	Blank	Blank	0	unknown
2682	QUEEN ST (D)	GL520 Optic 7032	Blank	0	27
1151	WARD ST	GL520 Optic 7031	Blank	0	27
1152	WARD ST	GL520 Optic 7031	Blank	0	27
1153	WARD ST	GL520 Optic 7031	Blank	0	27
197	WAKEMAN ST, Pahiatua	Blank	Blank	0	unknown
2662	GIBBARD PLACE CARPARK	Blank	Blank	Blank	unknown
1180	CADMAN ST	250W High Pressure Sodium	250	0	28
1181	CADMAN ST	250W High Pressure Sodium	250	0	28
2754	TAPUATA PL	150W High Pressure Sodium	10	0	18
335	TARARUA ST	150W High Pressure Sodium	150	0	18
494	ROSS ST (W)	60W Fluorescent	60	0	17
Total					**217**

The accuracy of lamp descriptions, wattage and ballast 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: 28-Aug-20 To: 17-May-21	12 items of load have either missing or blank lamp model, lamp wattage or, gear wattage. Resulting in an estimated under submission of 927 kWh per annum. Potential impact: Low Actual impact: Low Audit history: Four times Controls: Moderate Breach risk rating: 2
Audit risk rating	**Rationale for audit risk rating**
Low	The controls are rated as moderate as controls will mitigate risk most of the time, but there is room for improvement. The impact on settlement and participants is minor; therefore, the audit risk rating is low.

Actions taken to resolve the issue	Completion date	Remedial action status
Tararua DC has been notified and have discussed the required reporting requirements in length with the asset technician. It is expected the corrective action be completed by July2021	01/07/2021	Identified
Preventative actions taken to ensure no further issues will occur	**Completion date**	
Genesis provides exception management reporting back to the database manager.	01/07/2021	

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 248 items of load on 18th and 19th May 2021. The sample was selected from three strata, as follows:

1. Dannevirke
2. Woodville
3. Pahiatua

Audit commentary

The field audit discrepancies are detailed in the table below:

Street	Database count	Field count	Light count difference	Wattage recorded incorrectly	Comments
OXFORD RD	3	4	+1	2	1 additional 250W HPS found in the field 2 x 27W LED recorded in the database but 2 x 250W HPS found in the field
HUXLEY ST	20	20		4	4 x 40W LED recorded in the database but 4 x 107W LED found in the field
STANLEY ST (W)	2	2		2	2 x 40W LED recorded in the database but 2 x 27 LED found in the field
STOUT ST	3	2	-1		1 x 40W LED recorded in the database but not found in the field
UPPER MCLEAN RD	1	1		1	1 x 40W LED recorded in the database but 1 x 27W LED found in the field
Grand Total	**248**	**248**	**2**	**9**	

The audit found one additional light in the field. This is recorded a non-compliance.

As reported in the previous three audits, Tararua Alliance believed some under verandah lights in Pahiatua were unmetered but not recorded in the database, and a recommendation was raised to check the lights and update the database as necessary. Tararua Alliance has been unable to arrange for an electrician to check these lights due to safety concerns as the buildings affected do not meet the current building standards or have a valid CoC. At this stage, Tararua Alliance believes at least some of the lights are metered through the buildings' electricity meters, and some may be unmetered. Checks will be completed once the building issues have been resolved, and I repeat the recommendation to maintain visibility.

Recommendation	Description	Audited party comment	Remedial action
Database Accuracy	Check under the verandah lights in Pahiatua and add them to the database if they are unmetered.	These have been raised with the council and have asked them to verify.	Investigating

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

Audit outcome

Non-compliant

Non-compliance	Description		
Audit Ref: 2.5 With: Clause 11(2A) of Schedule 15.3 From: 28-Aug-20 To: 17-May-21	One additional light in the field Potential impact: Low Actual impact: Low Audit history: None Controls: Moderate Breach risk rating: 2		
Audit risk rating	**Rationale for audit risk rating**		
Low	The controls are recorded as moderate because they mitigate risk most of the time but there is room for improvement. The impact is assessed to be low due to the small number of additional lights found.		
Actions taken to resolve the issue		**Completion date**	**Remedial action status**
Genesis has advised to add the missing asset found in the field.		01/07/2021	Identified
Preventative actions taken to ensure no further issues will occur		**Completion date**	

2.6. Tracking of load changes (Clause 11(3) of Schedule 15.3)

Code reference

Clause 11(3) of Schedule 15.3

Code related audit information

The DUML database must track additions and removals in a manner that allows the total load (in kW) to be retrospectively derived for any given day.

Audit observation

The process for tracking of changes in the database was examined.

Audit commentary

The RAMM database functionality achieves compliance with the code.

Audit outcome

Compliant

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

Code reference

Clause 11(4) of Schedule 15.3

Code related audit information

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

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

Audit observation

The database was checked for audit trails.

Audit commentary

The database has a complete audit trail.

Audit outcome

Compliant

3. ACCURACY OF DUML DATABASE

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

Code reference

Clause 15.2 and 15.37B(b)

Code related audit information

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

Audit observation

Genesis' submissions are based on a monthly extract from the RAMM database. A database extract was provided in April 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	Tararua District Council streetlights
Strata	The database contains the TDC items of load for DUML ICPs in the Tararua region. The processes for the management of all TDC items of load are the same, but I decided to place the items of load into three strata: 1. Dannevirke 2. Paihiatua 3. Woodville.
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 31 sub-units.
Total items of load	248 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

Field audit findings

A field audit was conducted of a statistical sample of 248 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	110.5	Wattage from survey is higher than the database wattage by 10.5%
R_L	99.2	With a 95% level of confidence, it can be concluded that the error could be between -0.8% and +60.8%
R_H	160.8	

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 B (detailed below) applies. Non-compliance is recorded because the potential error is greater than 5.0%.

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 0.8% lower and 60.8% higher than the wattage recorded in the DUML database.

In absolute terms the installed capacity is estimated to be 9 kW higher than the database indicates.

There is a 95% level of confidence that the installed capacity is 1 kW lower to 53,000 kW higher than the database.

In absolute terms, total annual consumption is estimated to be 39,100 kWh higher than the DUML database indicates.

There is a 95% level of confidence that the annual consumption is between 3,100 kWh lower p.a. to 225,800 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 %

TDC have undertaken the 100% field audit as recommended in the last audit. The number of errors found in this audit is less than the last, but due to the wattage differences the database is still outside the allowable +/- 5% threshold. It is a big improvement since the last audit, however this audit identified 4 x 107W lamps and 3 x 250 W lamps that have resulted in the overstating of the variance in the audit sample.

Light description and capacity accuracy

As discussed in **section 2.4,** 12 items of load have either missing or blank lamp model, lamp wattage or, gear wattage. Resulting in an estimated under submission of 927 kWh per annum based on 4,271 burn hours p.a.

Lamp and gear wattages were compared to the expected values, and I found a further 15 items of load had gear wattages that did not match the expected values and the light description was incorrect for 28 lamps. The differences are expected to result in under an estimated under submission of 3,464 kWh p.a. based on 4,271 burn hours p.a.

Change management process findings

I walked through the new connection, fault, maintenance, and upgrade work processes. New connection, fault, maintenance, and upgrade work is completed by Scanpower, Centralines and Powerco. Since TDC's LED upgrade was completed there have been few changes to the database, over the last 12 months there has been approximately 40 – 50 changes that required updating. Scanpower, Centralines and Powerco have been asked to provide information when changes are made, and this is used to update RAMM.

The new connections process remains unchanged from the previous audits.

- When a new subdivision is created, an application is sent to TDC and planning approval is provided, then the streetlights are installed and connected by either Scanpower or Powerco. Tararua Alliance monitors construction and once a code of compliance and "as built" plans are provided the lights are vested in Council and added to the RAMM database. There have been no new subdivisions in recent years.
- New connections for network extensions are initiated by TDC, and the new connection is completed by Scanpower or Powerco. TDC updates RAMM when the light is connected.

NZTA lights are recorded in the database. They do not provide information when lights are added or changed. The NZTA RAMM database is being updated and the NZTA lights currently recorded in the TDC RAMM database are expected to be transferred to the NZTA database once the work presently underway by NZ streetlighting has been completed. NZTA have not yet engaged, the timeframe for this to be completed by NZTA is unknown.

Tararua Alliance do not complete regular outage patrols, any issues are identified reactively through the TDC or Scanpower, there is not a lot of activity in this area.

The current monthly report is provided as a snapshot and this practice is non-compliant. 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 is working to develop event-based calculations, which will enable accurate volume calculations where lamps change part way through a month.

The RAMM database records an installation date. The date of installation recorded on the as built is used as the liven date.

Festive lights

Festive lighting is used in Woodville and Dannevirke. This is put up by the Community boards around Christmas, TDC are not advised when the lights are put up or for how long. The lighting is not recorded in the database. This is recorded as non-compliance.

Private lights

Tararua Alliance is not aware of any private unmetered lights.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 3.1 With: Clause 15.2 and 15.37B(b) From: 28-Oct-20 To: 17-May-21	Database is not confirmed as accurate with a 95% level of confidence resulting in an estimated under submission of 39,100 kWh per annum. 12 items of load have either missing or blank lamp model, lamp wattage or, gear wattage resulting in an estimated under submission of 927 kWh per annum. 28 items of load have the incorrect lamp description. 15 lamps with incorrect gear wattages for their lamp model description resulting in estimated under submission of 3,463.77 kWh p.a. Festive lighting in Woodville and Dannevirke not recorded in the database. The monthly database extract provided does not track changes at a daily basis and is provided as a snapshot. Potential impact: Medium Actual impact: Medium Audit history: Multiple times Controls: Moderate Breach risk rating: 4
Audit risk rating	**Rationale for audit risk rating**
Medium	The controls are rated as moderate as controls will mitigate risk most of the time, but there is room for improvement. The audit risk rating is assessed to be medium based on the potential submission inaccuracies.

Actions taken to resolve the issue	Completion date	Remedial action status
Tararua DC has been notified and have discussed the required reporting requirements in length with the asset technician. It is expected the corrective action be completed by July2021. Genesis has raised the requirement of change tracking and the expectation that this too is maintained within the monthly reporting. Genesis are still working with the council to effectively manage these changes.	01/07/2021	Investigating
Preventative actions taken to ensure no further issues will occur	**Completion date**	
Genesis provides exception management reporting back to the database manager.	01/07/2021	

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 using the CST profile. The on and off times are derived from data logger information. Wattages are derived from a database extract provided by TDC each month.

I recalculated the submissions for April 2021 for the four ICPs associated with the database using the data logger and database information. I confirmed that it was calculated accurately based on the database and data logger information.

The field audit against the database quantities found that the database is not confirmed as accurate with a 95% level of confidence resulting in an estimated under submission of 39,100 kWh per annum. This is detailed in **section 3.1**.

There are 12 items of load have either missing or blank lamp model, lamp wattage or, gear wattage. Resulting in an estimated under submission of 927 kWh per annum.

Lamp and gear wattages were compared to the expected values, and I found a further 15 items of load had gear wattages that did not match the expected values and the light description was incorrect for 28 lamps. The differences are expected to result in under an estimated under submission of 3,464 kWh p.a. based on 4,271 burn hours p.a.

Festive lighting is used in Woodville and Dannevirke. This is put up by the Community boards around Christmas, TDC are not advised when the lights are put up or for how long. The lighting is not recorded in the database. This is recorded as non-compliance.

On 18 June 2019, the Electricity Authority issued a memo clarifying the memo of 2012 that stated that a monthly snapshot was sufficient to calculate submission from, and confirmed 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. 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 is working to develop event-based calculations, which will enable accurate volume calculations where lamps change part way through a month.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 3.2 With: Clause 15.2 and 15.37B(c) From: 28-Aug-20 To: 17-May-21	Database is not confirmed as accurate with a 95% level of confidence resulting in an estimated under submission of 39,100 kWh per annum. The monthly database extract provided does not track changes at a daily basis and is provided as a snapshot. 12 items of load have either missing or blank lamp model, lamp wattage or, gear wattage resulting in an estimated under submission of 927 kWh per annum. 28 items of load have the incorrect lamp description. 15 lamps with incorrect gear wattages for their lamp model description resulting in estimated under submission of 3,463.77 kWh p.a. Festive lighting in Woodville and Dannevirke not recorded in the database. Potential impact: Medium Actual impact: Medium Audit history: Multiple times Controls: Moderate Breach risk rating: 4
Audit risk rating	**Rationale for audit risk rating**
Medium	The controls are rated as moderate as controls will mitigate risk most of the time, but there is room for improvement. The audit risk rating is assessed to be medium based on the potential submission inaccuracies.

Actions taken to resolve the issue	Completion date	Remedial action status
Tararua DC has been notified and have discussed the required reporting requirements in length with the asset technician. It is expected the corrective action be completed by July2021. Genesis has raised the requirement of change tracking and the expectation that this too is maintained within the monthly reporting. Genesis are still working with the council to effectively manage these changes.	01/07/2021	Investigating
Preventative actions taken to ensure no further issues will occur	**Completion date**	
Genesis provides exception management reporting back to the database manager. Genesis has advised that the community board should not be connecting any load to the network without the council's consent. It is to be established whether an ICP is introduced by Scanpower to manage these assets, that are not part of the Council streetlighting portfolio.	01/09/2021	

CONCLUSION

Streetlight load is determined by wattages held within TDC's RAMM database, which is managed by Tararua Alliance and TDC. New connection, fault, maintenance, and upgrade work is completed by Scanpower, Centralines and Powerco.

NZTA lights are recorded in the database. They do not provide information when lights are added or changed. The NZTA RAMM database is being updated and the NZTA lights currently recorded in the TDC RAMM database are expected to be transferred to the NZTA database. NZTA have not yet engaged, the timeframe for this to be completed by NZTA is unknown.

The outcome of the TCD tender process to appoint a new contractor resulted in three contractors being engaged to cover different areas of the region.

- Scanpower (Dannevirke, Woodville, Northwood, Ormondville),
- Powerco (Pahiatua, Eketahuna, Akitio, Pongaroa, and
- Central lines (Herbertville).

Database accuracy is described as follows:

Result	Percentage	Comments
The point estimate of R	110.5	Wattage from survey is higher than the database wattage by 10.5%
R_L	99.2	With a 95% level of confidence, it can be concluded that the error could be between -0.8% and +60.8%
R_H	160.8	

The variability of the sample results across the strata means that the true wattage (installed in the field) could be between 0.8% lower and 60.8% higher than the wattage recorded in the DUML database.

- In absolute terms the installed capacity is estimated to be 9 kW higher than the database indicates.
- There is a 95% level of confidence that the installed capacity is 1 kW lower to 53,000 higher than the database.
- In absolute terms, total annual consumption is estimated to be 39,100 kWh higher than the DUML database indicates.
- There is a 95% level of confidence that the annual consumption is between 3,100 kWh lower p.a. to 225,800 kWh p.a. higher than the database indicates.

The audit found five non-compliances and makes two recommendations. The future risk rating of 16 indicates that the next audit be completed in six months. I have considered this in conjunction with Genesis' comments and recommend that that the next audit period be in 12 months.

PARTICIPANT RESPONSE

Genesis and the Tararua DC asset technician have discussed the issues at length. Tararua will be revising the current reporting to introduce more visibility to determine the change tracking requirements. The Council will need to mitigate the risk to its outcome by managing the community board's introduction of festive lighting to ensure their database compliance is not affected. Tararua has agreed to the corrective actions to cleanse the current data and make the necessary updates. The NZTA assets has indicated, but not confirmed, that these assets will be removed from the TDC database as @ 01/07/2021. Until them Genesis will continue to review those assets and ascertain the relevant wattages based off the lamp descriptions.