ELECTRICITY INDUSTRY PARTICIPATION CODE
DISTRIBUTED UNMETERED LOAD AUDIT REPORT

For

OTOROHANGA DISTRICT COUNCIL
AND GENESIS ENERGY LIMITED

Prepared by: Tara Gannon

Date audit commenced: 9 November 2020

Date audit report completed: 12 November 2020

Audit report due date: 1 December 2020

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EXECUTIVE SUMMARY

This audit of the **Otorohanga District Council (ODC)** 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.

A RAMM database is held by ODC, who is Genesis' customer. RATA (Waikato Regional Asset Technical Accord) provides technical support for RAMM road asset information as a shared service across the Waikato region. New connection, fault and maintenance work is completed by The Lines Company contract division (TLC), who update the database from the field using RAMM contractor.

A monthly report from the database is provided to Genesis by ODC, which is used to calculate submissions. Genesis reconciles the DUML load as NHH using the NST profile, and on and off times are derived from data logger information.

Database accuracy is described as follows:

Result	Percentage	Comments
The point estimate of R	103.2	Wattage from survey is higher than the database wattage by 3.2%
R_L	100.5	With a 95% level of confidence it can be concluded that the error could be between 0.5% and 4.6%
R_H	104.6	

These results were categorised in accordance with the "Distributed Unmetered Load Statistical Sampling Audit Guideline", effective from 01/02/19. The table below shows that Scenario A (detailed below) applies, and the best available estimate indicates that the database is accurate within ± 5.0%.

- In absolute terms the installed capacity is estimated to be 1 kW higher than the database indicates.
- There is a 95% level of confidence that the installed capacity is between 0 and 2 kW higher than the database.
- In absolute terms, total annual consumption is estimated to be 4,700 kWh higher than the DUML database indicates.
- There is a 95% level of confidence that the annual consumption is between 700 to 6800 kWh p.a. higher than the database indicates.

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.

RAMM is updated at the time work is completed from the field using RAMM contractor, which ensures that correct installation, change, and removal dates are recorded. New subdivisions are rare, but when they occur RAMM is updated as soon as possible once connection is confirmed.

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

The future risk rating of eight indicates that the next audit be completed in 18 months. Clear remedial actions have been identified, and I recommend that the next audit is completed in a minimum of 18 months.

The matters raised are detailed 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	203W relating to festive lights was included in the August 2020 submission when the lights were disconnected. Some decorative and festive lights are not recorded in the database.	Moderate	Low	2	Identified
All load recorded in database	2.5	11(2A) of Schedule 15.3	Three additional items of load found in the field. Some decorative and festive lights are not recorded in the database.	Moderate	Low	2	Identified
Database accuracy	3.1	15.2 and 15.37B(b)	Some decorative and festive lights are not recorded in the database.	Moderate	Low	2	Identified
Volume information accuracy	3.2	15.2 and 15.37B(c)	203W relating to festive lights was included in the August 2020 submission when the lights were disconnected. Some decorative and festive lights are not recorded in the database.	Moderate	Low	2	Identified
Future Risk Rating						8	

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
Festive and decorative lights	2.1	Identify all unmetered festive and decorative lights, confirm their wattages, and update RAMM. If the lights are not connected year-round, communicate the on and off times to Genesis, so that the lights are correctly included in submission information when connected, and excluded from submission information when disconnected.
Tracking of load changes for NZTA lights	3.1	Develop a process to ensure that all NZTA lights are accurately recorded in the database, and changes are captured.

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

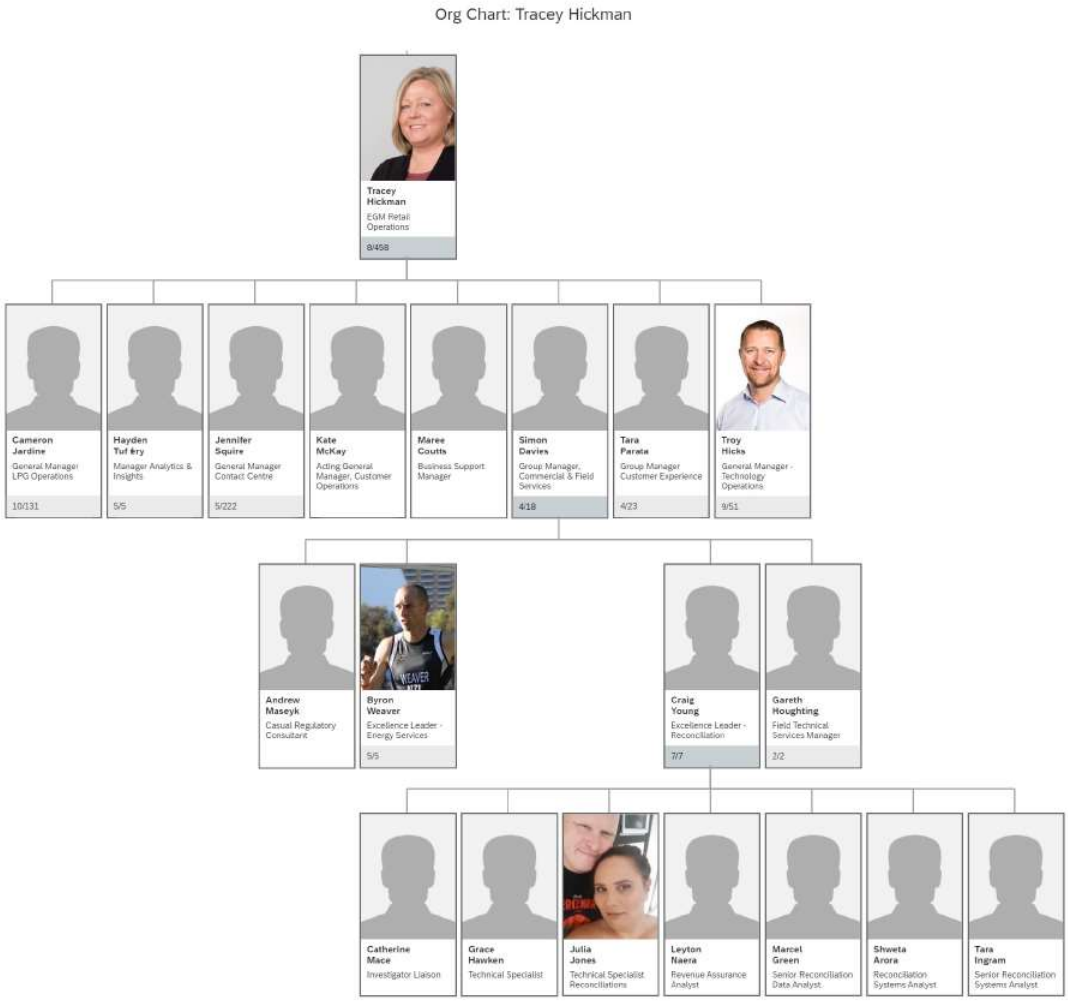
The Electricity Authority's website was reviewed to identify any exemptions relevant to the scope of this audit.

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:

Tara Gannon

Veritek Limited

Electricity Authority Approved Auditor

Other personnel assisting in this audit were:

Name	Title	Company
Sam Lyta	Senior Engineering Assistant	Otorohanga District Council
Cameron Senior	Asset Information Engineer – RATA	RATA – Waikato Regional Asset Technical Accord
Grace Hawken	Technical Specialist - Reconciliation Team	Genesis

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)
0000400332WA74B	Te Kawa	TMU0111	STL	3	66
0000400337WAA04	OPARAU/AOTEA S/LTS	TMU0111	STL	10	220
0000400341WAED6	Kawhia	TMU0111	STL	111	2,502
0001111170WMD3F	State Highway Urban	HTI0331	STL	132	22,623
0008807415WMBD6	Local Authority Streetlights	HTI0331	STL	402	8,863
Total				**623**	**34,422**

1.7. Authorisation Received

All information was provided directly by Genesis, ODC and RATA – Waikato Regional Asset Technical Accord.

1.8. Scope of Audit

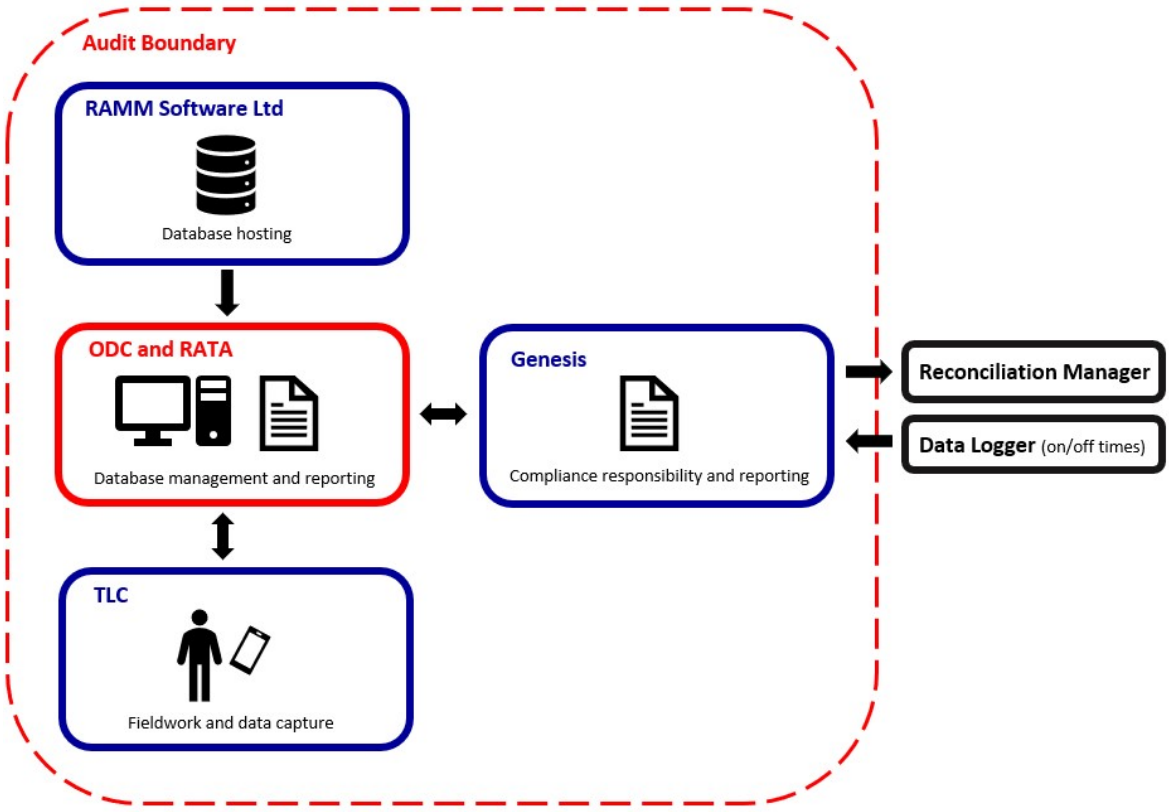
This audit of the ODC DUML database and processes was conducted at the request of Genesis in accordance with clause 15.37B. The purpose of this audit is to verify that the volume information is being calculated accurately, and that profiles have been correctly applied.

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

A RAMM database is held by ODC, who is Genesis' customer. RATA (Waikato Regional Asset Technical Accord) provides technical support for RAMM road asset information as a shared service across the Waikato region. New connection, fault and maintenance work is completed by TLC, who update the database from the field using RAMM contractor.

A monthly report from the database is provided to Genesis by ODC, which is used to calculate submissions. Genesis reconciles the DUML load as NHH using the NST profile, and on and off times are 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 135 items of load on 9-11 November 2020.

1.9. Summary of previous audit

The previous audit was completed in May 2019 by Rebecca Elliot of Veritek Limited. The current status of that audit's findings is detailed below.

Subject	Section	Clause	Non-compliance	Status
Deriving submission information	2.1	11(1) of Schedule 15.3	Ballasts being applied outside of the database and the incorrect ballasts are recorded in RAMM. Decorative LED lights in two redwood trees not recorded in the database. Festive lights not recorded in the database.	Cleared Still existing Still existing
Location of each item of load	2.3	11(2)(b) of Schedule 15.3	One item of load with insufficient details to locate it.	Cleared
All load recorded in database	2.5	11(2A) of Schedule 15.3	Three additional items of load found in the field. Decorative LED lights in two redwood trees not recorded in the database. Festive lights not recorded in the database.	Still existing Still existing Still existing

Subject	Section	Clause	Non-compliance	Status
Database accuracy	3.1	15.2 and 15.37B(b)	Incorrect ballasts recorded in RAMM.	Cleared, but some non-compliance is still present
Volume information accuracy	3.2	15.2 and 15.37B(c)	Decorative LED lights in two redwood trees not recorded in the database. Festive lights not recorded in the database.	Still existing Still existing

Subject	Section	Clause	Recommendation for Improvement	Status
All load recorded in database	2.5	11(2A) of Schedule 15.3	Determine load associated with LED lights in the redwood trees and record in the database.	In progress
Tracking of load change	2.6	11(3) of Schedule 15.3	ODC to liaise with NZTA to ensure changes made in the field are advised to ODC in a timely manner.	In progress
			ODC to liaise with the trader and The Lines Company to review the electrical connection of new streetlights.	Cleared

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 the DUML load as NHH using the NST profile.

- Wattages are derived from an extract provided by ODC each month. The best available estimate indicates that the database is accurate within ± 5 % as discussed in **section 3.1**.
- On and off times are derived from data logger information.

I recalculated the submissions for August using the data logger and the database information. I confirmed that the calculation method was correct, and submission was based on the database information and logger hours. The incorrect ballasts identified in the previous audit have been corrected.

Festive lights for Maniapoto Street were added to the database following the 2019 audit; and are connected from 1 December until 31 January each year. I found the festive lights were included in the submission data for August 2020 although they were not connected. This resulted in over submission of 203 W or 81.7 kWh for August 2020.

Some other festive and decorative lights are not recorded in the database; and were therefore excluded from submission information.

- The 2019 audit found that decorative LED lights in the redwood trees on Maniapoto Street, Otorohanga were not recorded in the database. ODC has been working with TLC to confirm the correct wattages for these lights, which are difficult to access due to the height of the trees. Once the wattages are confirmed the database will be updated.
- During the field audit, I found five LED strings of festive lights on Jellicoe Street, Kawhia which were not recorded in the database. ODC intends to investigate to determine the wattages and when the lamps are connected, and will update the database and communicate the on and off dates to Genesis.

Recommendation	Description	Audited party comment	Remedial action
Festive and decorative lights	Identify all unmetered festive and decorative lights, confirm their wattages, and update RAMM. If the lights are not connected year-round, communicate the on and off times to Genesis, so that the lights are correctly	Genesis will be raising this with the council and will determine a corrective solution with them.	Investigating

Recommendation	Description	Audited party comment	Remedial action
	included in submission information when connected, and excluded from submission information when disconnected.		

Sources of database inaccuracy are as follows:

Issue	Estimated volume information impact (annual kWh)
Five LED strings of festive lights on Jellicoe Street, Kawhia are not recorded in the database.	Unknown
Decorative LED lights in redwood trees on Maniapoto Street, Otorohanga are not recorded in the database.	Unknown

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.

RAMM is updated at the time work is completed from the field using RAMM contractor, which ensures that correct installation, change, and removal dates are recorded. New subdivisions are rare, but when they occur RAMM is updated as soon as possible once connection is confirmed.

The current monthly report is provided as a snapshot and is non-compliant. Genesis completes revision submissions where corrections are required. 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: 01-Aug-20 To: 11-Nov-20	203W relating to festive lights was included in the August 2020 submission when the lights were disconnected. Some decorative and festive lights are not recorded in the database. Potential impact: Low Actual impact: Low Audit history: Once Controls: Moderate Breach risk rating: 2

Audit risk rating	Rationale for audit risk rating
Low	The controls are rated as moderate: • a small volume was over reported relating to festive lights, and • a small number of decorative and festive lights were missing from the database; ODC intends to investigate to determine the wattages and when the lamps are connected, and will update the database and communicate the on and off dates to Genesis. . The impact is assessed to be low as the unrecorded lights are LEDs and expected to have low wattages. 81.7 kWh was over reported for festive lights in August 2020.

Actions taken to resolve the issue	Completion date	Remedial action status
Genesis has requested the council proactively manage the festive lighting in the area, including on off times and to clearly identify each asset.		Identified
Preventative actions taken to ensure no further issues will occur	**Completion date**	
Genesis reviews the ODC asset information provided monthly and was unable to ascertain in the August 2020 data which were Festive lighting assets.		

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 as required by this clause.

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 road names, displacements, and Global Positioning System (GPS) coordinates.

GPS coordinates are populated for 649 of the 658 items of load, and the remaining items have sufficient location information to enable them to be readily 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 fields for lamp make, lamp model, lamp wattage and gear wattage.

All items of load had a valid description, lamp wattage and gear wattage apart from pole ID 18, which did not have a lamp wattage recorded in the extract provided for the audit in October 2020. I checked the light in RAMM and at its location on 11 November 2020, and confirmed it was correctly recorded in the database as an L21. Compliance is recorded in this section because the missing wattage was a timing difference.

Audit outcome

Compliant

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 135 items of load on 9-11 November 2020. The sample was selected from four strata:

1. 0000400332WA74B (Te Kawa), 0000400337WAA04 (Aotea) and 0000400341WAED6 (Kawhia)
2. 0001111170WMD3F (State Highway Urban) street names A-MAIN
3. 0001111170WMD3F (State Highway Urban) street names MANI to Z, and
4. 0008807415WMBD6 (Local Authority Streetlights).

Audit commentary

The field audit discrepancies are detailed in the table below:

Street	Database count	Field count	Light count difference	Wattage recorded incorrectly	Comments
0000400332WA74B (Te Kawa), 0000400337WAA04 (Aotea) and 0000400341WAED6 (Kawhia)					
OMIMITI ST	7	7	-1 +1	3	One L22 was recorded as L27 in the database. One 70W SON outside number 166 was recorded in the database but not present on the street. One L22 outside number 196 was missing from the database.
0001111170WMD3F (State Highway Urban) street names MANI to Z					
OTOROHANGA RD (SH 3)	13	15	+2	-	One 150W SON at the intersection of SH3 and Blackett Rd was missing from the database. One 150W SON at the southern end of the intersection of SH3 and Puketarata St was missing from the database.
0001111170WMD3F (State Highway Urban) street names MANI to Z					
GLENDON PL	8	6	-2	-	Pole IDs 161 and 166 were duplicated in the database, resulting in two more L22s recorded in the database than were present on the street.
HUIPUTEA DR	30	29	-1	-	One L21 outside the Countdown supermarket was recorded in the database but not present on the street.
Total	**135**	**134**	**1** **(-3 and +4)**	**3**	

Three additional items of load were found in the field audit and are recorded as non-compliance below.

Festive lights for Maniapoto Street were added to the database following the 2019 audit and are connected from 1 December until 31 January each year. I found that the lights were included in submission information in August 2020 when they were not connected, which is recorded as non-compliance in **sections 2.1** and **3.2**.

The 2019 audit found that decorative LED lights in the redwood trees on Maniapoto Street, Otorohanga were not recorded in the database. ODC has been working with TLC to confirm the correct wattages for these lights, which are difficult to access due to the height of the trees. Once the wattages are confirmed the database will be updated.

During the field audit, I found five LED strings of festive lights on Jellicoe Street, Kawhia which were not recorded in the database. This is not recorded in the field sample differences because Jellicoe Street was not part of the sample. ODC intends to investigate to determine the wattages and when the lamps are connected, and will update the database and communicate the on and off dates to Genesis.

A recommendation is made in **section 2.1** to identify all unmetered festive and decorative lights, confirm their wattages, and update RAMM. If the lights are not connected year-round, the on and off dates should be communicated to Genesis, so that the lights are correctly included in submission information when connected and excluded from submission information when disconnected.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 2.5 With: Clause 11(2A) of Schedule 15.3 From: unknown To: 31-Mar-19	Three additional items of load found in the field. Some decorative and festive lights are not recorded in the database. Potential impact: Low Actual impact: Low Audit history: Once Controls: Moderate Breach risk rating: 2
Audit risk rating	**Rationale for audit risk rating**
Low	The controls are rated as moderate overall because controls over NZTA lights, festive lights, and decorative lights are weaker than for other streetlights. The impact is assessed to be low, because the best available estimate indicates that the database is accurate within ± 5 %, and the wattages for the missing festive and decorative lights are expected to be low.

Actions taken to resolve the issue	Completion date	Remedial action status
Genesis has requested the council to include all missing assets.		Identified
Preventative actions taken to ensure no further issues will occur	**Completion date**	
Genesis will follow up with Council to confirm that the information has been updated.		

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 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 RAMM database extract was provided in October 2020 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	Otorohanga district
Strata	The database contains items of load in the Otorohanga area, recorded against five ICPs. The processes for the management of ODC items of load are the same, but I decided to place the items of load into four strata: 1. 0000400332WA74B (Te Kawa), 0000400337WAA04 (Aotea) and 0000400341WAED6 (Kawhia) 2. 0001111170WMD3F (State Highway Urban) street names A-MAIN 3. 0001111170WMD3F (State Highway Urban) street names MANI to Z, and 4. 0008807415WMBD6 (Local Authority Streetlights).
Area units	I created a pivot table of the roads in each area and I used a random number generator in a spreadsheet to select a total of 13 sub-units or 21% of the database wattage.
Total items of load	135 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 135 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	103.2	Wattage from survey is higher than the database wattage by 3.2%
R_L	100.5	

Result	Percentage	Comments
R_H	104.6	With a 95% level of confidence it can be concluded that the error could be between 0.5% and 4.6%

These results were categorised in accordance with the "Distributed Unmetered Load Statistical Sampling Audit Guideline", effective from 01/02/19. The table below shows that Scenario A (detailed below) applies, and the best available estimate indicates that the database is accurate within ± 5.0%.

- In absolute terms the installed capacity is estimated to be 1 kW higher than the database indicates.
- There is a 95% level of confidence that the installed capacity is between 0 and 2 kW higher than the database.
- In absolute terms, total annual consumption is estimated to be 4,700 kWh higher than the DUML database indicates.
- There is a 95% level of confidence that the annual consumption is between 700 to 6,800 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 %

Light description and capacity accuracy

As discussed in **section 2.4**, All items of load had a valid description, lamp wattage and gear wattage apart from pole ID 18, which did not have a lamp wattage recorded in the extract provided for the audit in October 2020. I checked the light in RAMM and at its location on 11 November 2020, and confirmed

it was correctly recorded in the database as an L21. Compliance is recorded in this section because the missing wattage was a timing difference.

Lamp and gear wattages were compared to the expected values. All wattages were as expected, and the incorrect ballast wattages identified in the previous audit had been corrected.

Address accuracy

As discussed in **section 2.3**, all items of load have address information recorded. No inaccurate addresses were identified during the field audit.

ICP number accuracy

As discussed in **section 2.2**, all items of load have an ICP number recorded. The accuracy of ICP numbers was checked by comparing the ICP description to the location for each item of load for consistency. ICP assignment appeared reasonable for all items of load.

Change management process findings

ODC use a RAMM database to manage this DUML load. RATA (Waikato Regional Asset Technical Accord) provides technical support for RAMM road asset information as a shared service across the Waikato region. New connection, fault and maintenance work is completed by TLC. RAMM contractor is used to track load changes from the field and the correct change, installation, and removal dates are entered. ODC's Senior Engineering Assistant validates the RAMM changes against the invoices provided by TLC to ensure that records are updated correctly.

I walked through the new connection process. TLC requires a new connection application for any new ICPs and a load change application for additions to existing streetlight circuits. Trader approval is gained as part of this process.

- New subdivisions are rare, but one was completed last year and the RAMM records were viewed during the audit. The developer arranges for the contractor to install the streetlights, and the contractor advises ODC once the lights are connected. ODC's engineering assistant visits the site to collect the data using RAMM as soon as possible after this notification.
- All other new connections are completed by TLC and the details are loaded into RAMM contractor from the field at the time the installation is completed.

ODC have completed an LED roll out, and no CMS system is installed or planned. Outage patrols are completed every three months, and residents also report faulty streetlights.

All changes made during a month are included in the monthly report provided to Genesis for submission.

NZTA lights

NZTA lights are included in the ODC streetlight database, and the associated load is reconciled by Genesis. ODC do not maintain these lights and there is no process in place for them to be advised of any changes made, and I found that at least two NZTA lights were missing from the database for the sample selected.

I recommend that ODC review this process with NZTA to ensure changes made are advised to them. ODC believes that TLC is responsible for maintaining the NZTA lights in the region and will approach them as a starting point for developing a process.

Recommendation	Description	Audited party comment	Remedial action
Tracking of load changes for NZTA lights	Develop a process to ensure that all NZTA lights are accurately recorded in the database, and changes are captured.	Genesis will review the NZTA assets via google to locate and compare asset information being provided. NZTA Waikato is currently under tender and unsure whether these assets will be reassigned as part of their programme of work being conducted by Kara Atkinson.	Investigating

Festive and decorative lights

Festive lights for Maniapoto Street were added to the database following the 2019 audit and are connected from 1 December until 31 January each year. I found that the lights were included in submission information for August 2020 when they were not connected, which is recorded as non-compliance in **sections 2.1** and **3.2**.

The 2019 audit found that decorative LED lights in the redwood trees on Maniapoto Street, Otorohanga were not recorded in the database. ODC has been working with TLC to confirm the correct wattages for these lights, which are difficult to access due to the height of the trees. Once the wattages are confirmed the database will be updated.

During the field audit, I found five LED strings of festive lights on Jellicoe Street, Kawhia which were not recorded in the database. ODC intends to investigate to determine the wattages and when the lamps are connected, and will update the database and communicate the on and off dates to Genesis.

A recommendation is made in **section 2.1** to identify all unmetered festive and decorative lights, confirm their wattages, and update RAMM. If the lights are not connected year-round, the on and off dates should be communicated to Genesis, so that the lights are correctly included in submission information when connected and excluded from submission information when disconnected.

Private lights

Three private lights are recorded in the database. The private lights are paid for by ODC and have the correct ICP number assigned which ensures that they are included in Genesis' reconciliation submissions as part of the DUML load.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 3.1 With: Clause 15.2 and 15.37B(b) From: 01-Oct-20 To: 11-Nov-20	Some decorative and festive lights are not recorded in the database. Potential impact: Low Actual impact: None Audit history: Twice Controls: Moderate Breach risk rating: 2

Audit risk rating	Rationale for audit risk rating
Low	Controls are rated as moderate. A small number of decorative and festive lights were missing from the database. ODC has been trying to confirm the correct wattages for the redwood lights but was unaware of the Kawhia lights. The impact is assessed to be low as the unrecorded lights are LEDs and expected to have low wattages.

Actions taken to resolve the issue	Completion date	Remedial action status
Genesis has requested that festive lighting be clear identified to ensure the assets are only included during the actual operational period.	28/02/2021	Identified
Preventative actions taken to ensure no further issues will occur	**Completion date**	
Continue to review the asset information provided monthly by the council.		

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 NST profile, and the correct profile is recorded on the registry.

- Wattages are derived from an extract provided by ODC each month. The best available estimate indicates that the database is accurate within ± 5 % as discussed in **section 3.1**.
- On and off times are derived data logger information.

I recalculated the submissions for August using the data logger and the database information. I confirmed that the calculation method was correct, and submission was based on the database information and logger hours. The incorrect ballasts identified in the previous audit have been corrected.

Festive lights for Maniapoto Street were added to the database following the 2019 audit and are connected from 1 December until 31 January each year. I found the festive lights were included in the

submission data for August 2020 although they were not connected. This resulted in over submission of 203 W or 81.7 kWh for August 2020.

Some other festive and decorative lights are not recorded in the database, and where therefore excluded from submission information.

- The 2019 audit found that decorative LED lights in the redwood trees on Maniapoto Street, Otorohanga were not recorded in the database. ODC has been working with TLC to confirm the correct wattages for these lights, which are difficult to access due to the height of the trees. Once the wattages are confirmed the database will be updated.
- During the field audit, I found five LED strings of festive lights on Jellicoe Street, Kawhia which were not recorded in the database. ODC intends to investigate to determine the wattages and when the lamps are connected, and will update the database and communicate the on and off dates to Genesis.

A recommendation is made in **section 2.1** to identify all unmetered festive and decorative lights, confirm their wattages, and update RAMM. If the lights are not connected year-round, the on and off dates should be communicated to Genesis, so that the lights are correctly included in submission information when connected, and excluded from submission information when disconnected.

Sources of database inaccuracy are as follows:

Issue	Estimated volume information impact (annual kWh)
Five LED strings of festive lights on Jellicoe Street, Kawhia are not recorded in the database.	Unknown
Decorative LED lights in redwood trees on Maniapoto Street, Otorohanga are not recorded in the database.	Unknown

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.

RAMM is updated at the time work is completed from the field using RAMM contractor, which ensures that correct installation, change, and removal dates are recorded. New subdivisions are rare, but when they occur RAMM is updated as soon as possible once connection is confirmed.

The current monthly report is provided as a snapshot and is non-compliant. Genesis completes revision submissions where corrections are required. 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: 01-Aug-20 To: 11-Nov-20	203W relating to festive lights was included in the August 2020 submission when the lights were disconnected. Some decorative and festive lights are not recorded in the database. Potential impact: Low Actual impact: Low Audit history: Once Controls: Moderate Breach risk rating: 2
Audit risk rating	**Rationale for audit risk rating**
Low	The controls are rated as moderate: • a small volume was over reported relating to festive lights, and • a small number of decorative and festive lights were missing from the database; ODC intends to investigate to determine the wattages and when the lamps are connected, and will update the database and communicate the on and off dates to Genesis. . The impact is assessed to be low as the unrecorded lights are LEDs and expected to have low wattages. 81.7 kWh was over reported for festive lights in August 2020.

Actions taken to resolve the issue	Completion date	Remedial action status
Genesis has requested that festive lighting be clear identified to ensure the assets are only included during the actual operational period.	28/02/2021	Identified
Preventative actions taken to ensure no further issues will occur	**Completion date**	
Continue to review the asset information provided monthly by the council.		

CONCLUSION

A RAMM database is held by ODC, who is Genesis' customer. RATA (Waikato Regional Asset Technical Accord) provides technical support for RAMM road asset information as a shared service across the Waikato region. New connection, fault and maintenance work is completed by The Lines Company contract division (TLC), who update the database from the field using RAMM contractor.

A monthly report from the database is provided to Genesis by ODC, which is used to calculate submissions. Genesis reconciles the DUML load as NHH using the NST profile, and on and off times are derived from data logger information.

Database accuracy is described as follows:

Result	Percentage	Comments
The point estimate of R	103.2	Wattage from survey is higher than the database wattage by 3.2%
R_L	100.5	With a 95% level of confidence it can be concluded that the error could be between 0.5% and 4.6%
R_H	104.6	

These results were categorised in accordance with the "Distributed Unmetered Load Statistical Sampling Audit Guideline", effective from 01/02/19. The table below shows that Scenario A (detailed below) applies, and the best available estimate indicates that the database is accurate within ± 5.0%.

- In absolute terms the installed capacity is estimated to be 1 kW higher than the database indicates.
- There is a 95% level of confidence that the installed capacity is between 0 and 2 kW higher than the database.
- In absolute terms, total annual consumption is estimated to be 4,700 kWh higher than the DUML database indicates.
- There is a 95% level of confidence that the annual consumption is between 700 to 6800 kWh p.a. higher than the database indicates.

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.

RAMM is updated at the time work is completed from the field using RAMM contractor, which ensures that correct installation, change, and removal dates are recorded. New subdivisions are rare, but when they occur RAMM is updated as soon as possible once connection is confirmed.

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

The future risk rating of eight indicates that the next audit be completed in 18 months. Clear remedial actions have been identified, and I recommend that the next audit is completed in a minimum of 18 months.

PARTICIPANT RESPONSE

Genesis has raised the issue identified in the audit with the council. Genesis will continue to review the information to address any asset discrepancies still outstanding.