ELECTRICITY INDUSTRY PARTICIPATION CODE
DISTRIBUTED UNMETERED LOAD AUDIT REPORT

VERITEK

For

HASTINGS DISTRICT COUNCIL AND GENESIS ENERGY

Prepared by: Steve Woods

Date audit commenced: 13 November 2020

Date audit report completed: 2 December 2020

Audit report due date: 01-Dec-20

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EXECUTIVE SUMMARY

This audit of the Hastings District Council **(HDC)** Unmetered Streetlights 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.

A RAMM database is managed by HDC and monthly reporting is provided to Genesis. The database is remotely hosted by RAMM Software Ltd. The field work, asset data capture and database population is conducted by Pope Electrical.

The audit identified three main issues, as follows:

1. In absolute terms, total annual consumption is estimated to be 73,700 kWh lower than the DUML database indicates, based on a field audit of 329 items of load.
2. Submission is based on a snapshot of the database at the end of the month and does not consider historic adjustments, or the fact that lights can be livened before they are entered into the database.
3. There are incorrect ballast wattages leading to over submission of 11,147 kWh per annum.

The future risk rating of 30 indicates that the next audit be completed in three months. I recommend a next audit period of six to nine months to allow Genesis time to work through these issues with their agent.

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	In absolute terms, total annual consumption is estimated to be 73,700 kWh lower than the DUML database indicates. The monthly database extract provided does not track changes at a daily basis and is provided as a snapshot. Incorrect ballasts applied resulting in an estimated 11,147 kWh over submission.	Weak	High	9	Identified
All load recorded in the database	2.5	11(2A) of Schedule 15.3	Three additional lights identified by the field count.	Weak	Low	3	Investigating
Database accuracy	3.1	15.2 and 15.37B(b)	In absolute terms, total annual consumption is estimated to be 73,700 kWh lower than the DUML database indicates. Incorrect ballasts applied resulting in an estimated 11,147 kWh over submission.	Weak	High	9	Investigating

Subject	Section	Clause	Non-Compliance	Controls	Audit Risk Rating	Breach Risk Rating	Remedial Action
Volume information accuracy	3.2	15.2 and 15.37B(c)	In absolute terms, total annual consumption is estimated to be 73,700 kWh lower than the DUML database indicates. The monthly database extract provided does not track changes at a daily basis and is provided as a snapshot. Incorrect ballasts applied resulting in an estimated 11,147 kWh over submission.	Weak	High	9	Investigating
					Future Risk Rating	**30**	

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	Description	Action
		Nil	

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

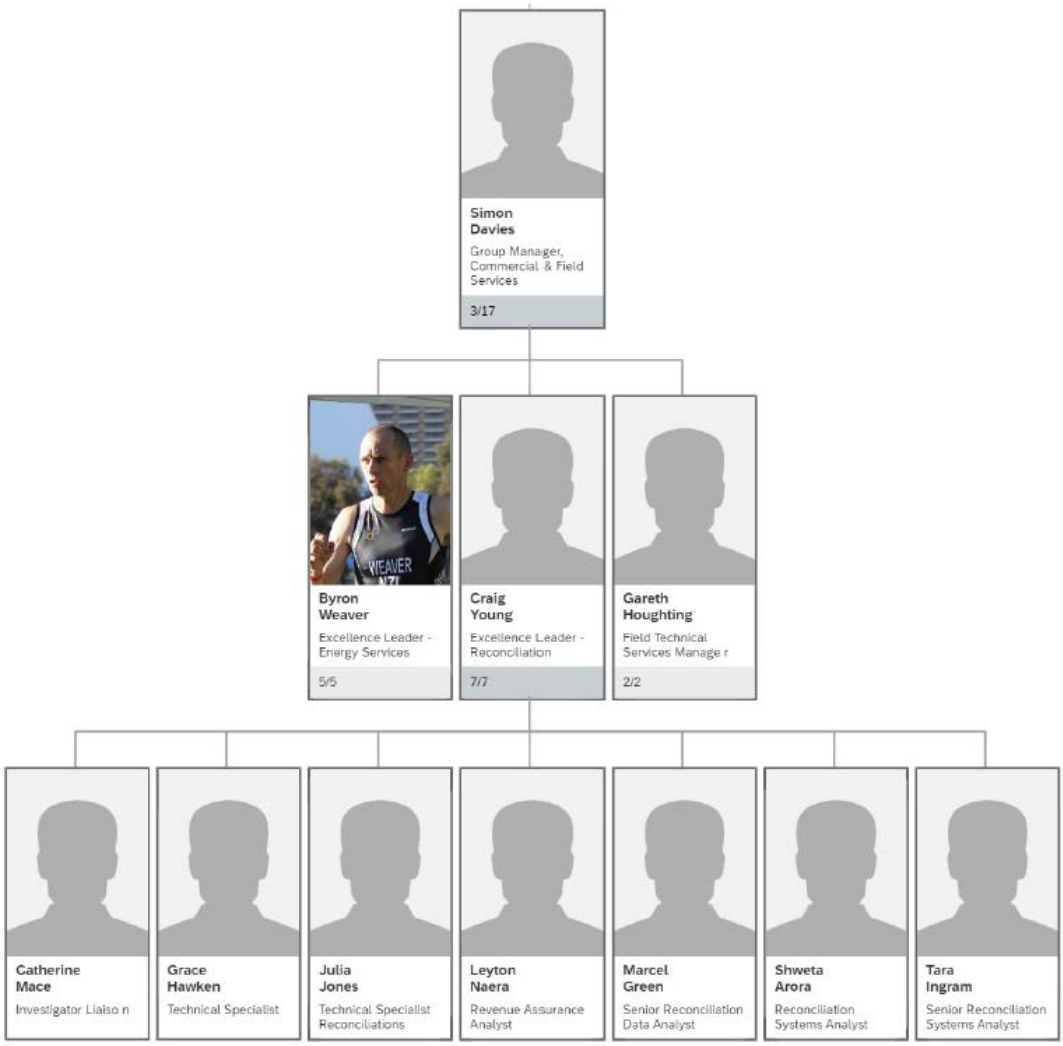
Section 11 of the Electricity Industry Act provides for the Electricity Authority to exempt any participant from compliance with all or any of the clauses.

Audit commentary

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

1.2. Structure of Organisation

Genesis provided the relevant organisational structure:



1.3. Persons involved in this audit

Auditor:

Name	Title
Steve Woods	Auditor

Other personnel assisting in this audit were:

Name	Title	Company
Craig Young	Excellence Leader - Reconciliation	Genesis Energy
Grace Hawken	Technical Specialist - Reconciliations Team	Genesis Energy
Marius Van Niekerk	Transportation Asset Manager	Hastings DC

1.4. Hardware and Software

The RAMM database used for the management of DUML is remotely hosted by RAMM Software Ltd.

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

Systems used by the trader to calculate submissions 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 (kW)
0000939902HBFF4	STREETLIGHTING MASTER ICP - FHL0331	FHL0331	NST	2593	164.673
0000939904HBE7B	STREETLIGHTS - RURAL MASTER ICP - FHL0331	FHL0331	NST	103	10.725
0000045106HB0D7	STREETLIGHTING MASTER ICP - RDF0331	RDF0331	NST	21	2.49

0000045104HB052	STREETLIGHTING MASTER ICP - WTU0331	WTU0330	NST	4558	340.484
0000045107HBC92	STREETLIGHTS - RURAL MASTER ICP - RDF0331	RDF0331	NST	80	4.441
0000045105HBC17	STREETLIGHTS - RURAL MASTER ICP - WTU0331	WTU0331	NST	54	4.687

1.7. Authorisation Received

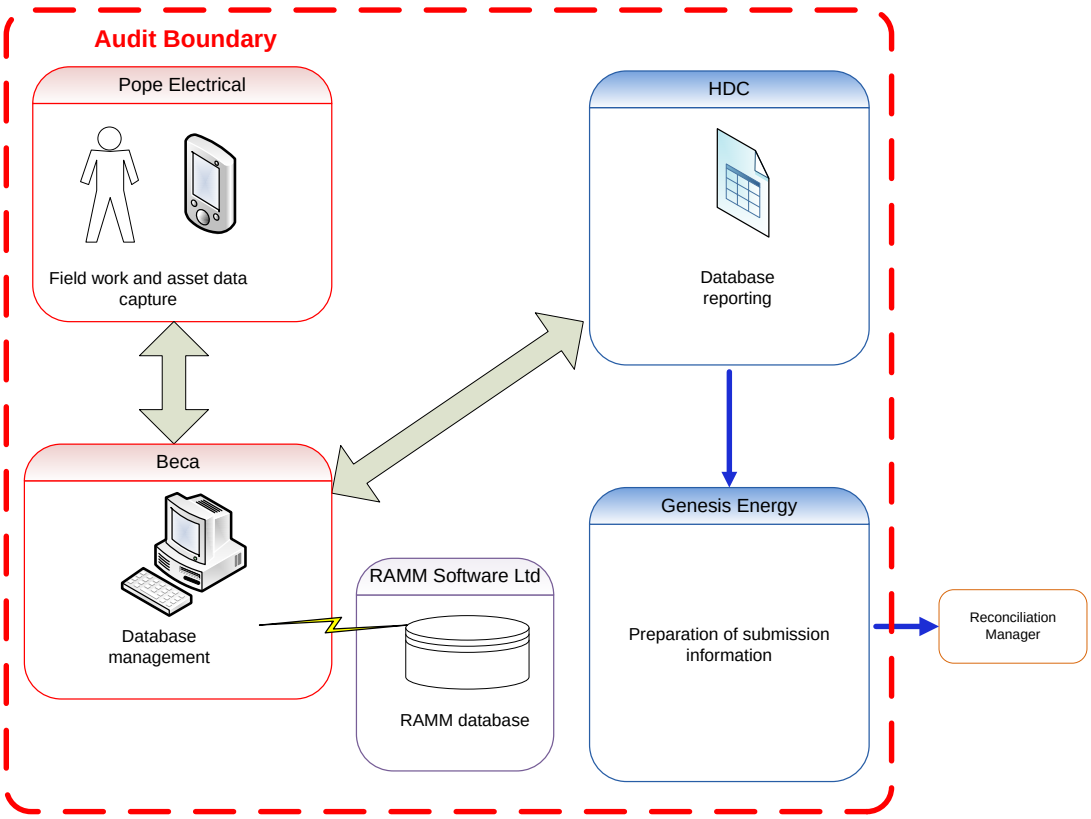
All information was provided directly by Genesis or HDC.

1.8. Scope of Audit

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

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

The database is remotely hosted by RAMM Software Ltd. The field work, asset data capture and database population is conducted by Pope Electrical. The database is managed by Beca Limited on behalf of HDC. The scope of the audit encompasses the collection, security and accuracy of the data, including the preparation of submission information based on the database reporting. The diagram below shows the audit boundary for clarity.



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

The audit was carried out in Hastings on 13/11/20. A field audit was conducted of 329 items of load.

1.9. Summary of previous audit

Genesis provided a copy of the last audit report undertaken by Steve Woods of Veritek Limited in May 2019. The table below records the findings.

Table of Non-Compliance

Subject	Section	Clause	Non-compliance	Status
Deriving submission information	2.1	11(1) of Schedule 15.3	Incorrect ballasts applied resulting in an estimated 11,147 kWh over submission.	Still existing
Database accuracy	3.1	15.2 and 15.37B(b)	Incorrect ballasts applied resulting in an estimated 11,147 kWh over submission.	Still existing
Volume information accuracy	3.2	15.2 and 15.37B(c)	Incorrect ballasts applied resulting in an estimated 11,147 kWh over submission.	Still existing

Table of Recommendations

Subject	Section	Clause	Recommendation for Improvement	Status
			Nil	

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 has 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. Compliance is confirmed.

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 this DUML load using the NST profile.

I checked the submission calculation provided by Genesis and found the correct kW and hours figures were used.

The field audit found a large number of errors. In absolute terms, total annual consumption is estimated to be 73,700 kWh lower than the DUML database indicates.

Submission is based on a snapshot of the database at the end of the month and does not consider historic adjustments, or the fact that lights can be livened before they are entered into the database.

There is some inaccurate data within the database used to calculate submissions as detailed in the table below. This is recorded as non-compliance and discussed in **sections 2.4, 3.1** and **3.2**.

Issue	Volume information impact (annual kWh)
Incorrect ballasts applied	11,147 kWh over submission

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 2.1 With: Clause 11(1) of Schedule 15.3 From: 01-Nov-17 To: 15-Apr-19	In absolute terms, total annual consumption is estimated to be 73,700 kWh lower than the DUML database indicates. The monthly database extract provided does not track changes at a daily basis and is provided as a snapshot. Incorrect ballasts applied resulting in an estimated 11,147 kWh over submission. Potential impact: High Actual impact: High Audit history: Three times Controls: Weak Breach risk rating: 9

Audit risk rating	Rationale for audit risk rating		
High	The controls are rated as weak, because they are insufficient to ensure the database is accurate most of the time. The impact is assessed to be high, based on the kWh differences described above.		
Actions taken to resolve the issue		**Completion date**	**Remedial action status**
Genesis has raised these instances with HDC and will follow up to ensure the correct ballast is applied.		01/03/2021	Identified
Preventative actions taken to ensure no further issues will occur		**Completion date**	
Genesis has reviewed the October data set provided by the HDC I November by the database administrator and found what Genesis believes to be inaccurate gear wattages (9 instances) annual kWh 265			

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 street address and also GPS coordinates. There are three records that do not have GPS coordinates, but in all cases the item of load can be located by the address.

Audit outcome

Compliant

2.4. Description and capacity of load (Clause 11(2)(c) and (d) of Schedule 15.3)

Code reference

Clause 11(2)(c) and (d) of Schedule 15.3

Code related audit information

The DUML database must contain:

- *a description of load type for each item of load and any assumptions regarding the capacity*
- *the capacity of each item in watts.*

Audit observation

The database was checked to confirm that it contained a field for lamp type, wattage capacity, and included any ballast or gear wattage. Wattages were checked for alignment with the published standardised wattage table produced by the Electricity Authority.

Audit commentary

Fields exist in RAMM for lamp make and model. I analysed the database and found no blank records, but there were several incorrect ballast wattages, as recorded in **section 3.1**.

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 329 lights using the statistical sampling methodology. The population was divided into the following strata:

- Amenity,
- Roading A-H,
- Roading I-M,
- Roading N-Z, and
- NZTA.

Audit commentary

The field audit findings are detailed in the table below and show some discrepancies.

Road	SLIM Pole	DB watts	Field watts	Comments
PARK ROAD SOUTH		0	103	Additional 103W LED
TE AUTE ROAD		0	114	Additional 100W HPS
TE AUTE ROAD		0	114	Additional 100W HPS
FERRY ROAD 79 - 93	33044	83	21	LED estimated at 21 watts
KIRKWOOD ROAD	38851	114	134	134 watt LED installed
KIRKWOOD ROAD	38870	114	134	134 watt LED installed
KIRKWOOD ROAD	39923	114	134	134 watt LED installed
KIRKWOOD ROAD	38944	114	134	134 watt LED installed
KIWI LANE	37717	28	0	Light has been removed
NELSON STREET SOUTH	36158	153	68	68 watt LED
NELSON STREET SOUTH	41849	102	75	75 watt LED
NELSON STREET SOUTH	41847	102	75	75 watt LED
NELSON STREET SOUTH	36066	168	75	75 watt LED
NELSON STREET SOUTH	36026	168	75	75 watt LED
NELSON STREET SOUTH	36021	168	75	75 watt LED
NELSON STREET SOUTH	35984	168	75	75 watt LED
NELSON STREET SOUTH	35969	168	75	75 watt LED
NELSON STREET SOUTH	35933	168	75	75 watt LED
NELSON STREET SOUTH	35927	278	75	75 watt LED

NELSON STREET SOUTH	35867	20	28	28 watt LED
RUAHAPIA ROAD (NORTH)	33105	168	112	LED installed estimated at 112 watts
SOUTHERN CARPARK	35800	114	228	This is a double fitting with two 100 watt HPS. The database has this recorded as a single fitting
STATE HIGHWAY 51	36835	168	0	Fitting was not found in the field
STATE HIGHWAY 51	42054	150	112	112 W LED
STATE HIGHWAY 51	42053	150	112	112 W LED

The field audit found several discrepancies as recorded in the table above.

This clause relates to lights in the field not recorded in the database. There were three additional lamps found in the field.

Audit outcome

Non-compliant

Non-compliance	Description		
Audit Ref: 2.5 With: Clause 11(2A) of Schedule 15.3 From: 01-Apr-19 To: 16-Nov-20	Three additional lights identified by the field count. Potential impact: Medium Actual impact: Low Audit history: None Controls: Weak Breach risk rating: 3		
Audit risk rating	**Rationale for audit risk rating**		
Low	The controls are rated as weak, because they are insufficient to ensure the database is accurate most of the time. The impact is assessed to be low based on the kWh differences described above.		
Actions taken to resolve the issue		**Completion date**	**Remedial action status**
Genesis has requested HDC review the asset database to ensure all assets are accounted for. Genesis will follow up with the council monthly to establish whether the database has been populated with the missing assets found in the field and that the assets not found are either removed or the correct locational details are populated.		01/03/2020	Investigating

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 ability of the database to track changes was assessed and the process for tracking of changes in the database was examined.

Audit commentary

The 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

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

Plan Item	Comments
Area of interest	Hastings District Council streetlights
Strata	The database contains items of load in the Hastings District Council area. The processes for the management of items of load are the same, but I decided to place the items of load into five strata, as follows: • Amenity, • Roading A-H, • Roading I-M, • Roading N-Z, and • NZTA.
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 38 sub-units.
Total items of load	329 items of load were checked.

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

Audit commentary

Database accuracy based on the field audit

A field audit was conducted of a statistical sample of 329 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	96.7	Wattage from survey is lower than the database wattage by 3.3%
R_L	87.8	With a 95% level of confidence it can be concluded that the error could be between -12.2% and +1.2%
R_H	101.2	

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

The conclusion from Scenario C is that the variability of the sample results across the strata means that the true wattage (installed in the field) could be between 12.2% lower and 1.2% higher than the wattage recorded in the DUML database. Non-compliance is recorded because the potential error is greater than 5.0%.

In absolute terms the installed capacity is estimated to be 17.0 kW lower than the database indicates.

There is a 95% level of confidence that the installed capacity is between 6 kW higher and 64 kW lower than the database.

In absolute terms, total annual consumption is estimated to be 73,700 kWh lower than the DUML database indicates.

There is a 95% level of confidence that the annual consumption is between 274,300 kWh p.a. lower to 27,200 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 %

As detailed in **section 2.1**, incorrect ballasts are applied resulting in an estimated 11,147 kWh over submission.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 3.1 With: Clause 15.2 and 15.37B(b) From: 01-Nov-17 To: 15-Apr-19	In absolute terms, total annual consumption is estimated to be 73,700 kWh lower than the DUML database indicates. Incorrect ballasts applied resulting in an estimated 11,147 kWh over submission. Potential impact: High Actual impact: High Audit history: Three times Controls: Weak Breach risk rating: 9
Audit risk rating	**Rationale for audit risk rating**
High	The controls are rated as weak, because they are insufficient to ensure the database is accurate most of the time. The impact is assessed to be high, based on the kWh differences described above.

Actions taken to resolve the issue	Completion date	Remedial action status
Genesis has requested HDC review the asset database to ensure all asset information is complete and accurate. Genesis will follow up with the council monthly for exception management.	01/03/2020	Investigating
Preventative actions taken to ensure no further issues will occur	**Completion date**	

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 burn hours against the submitted figure to confirm accuracy.

Audit commentary

Genesis reconciles this DUML load using the NST profile.

I checked the submission calculation provided by Genesis and found the correct kW and hours figures were used.

The field audit found a large number of errors. In absolute terms, total annual consumption is estimated to be 73,700 kWh lower than the DUML database indicates.

Submission is based on a snapshot of the database at the end of the month and does not consider historic adjustments, or the fact that lights can be livened before they are entered into the database.

There is some inaccurate data within the database used to calculate submissions as detailed in the table below. This is recorded as non-compliance and discussed in **sections 2.4, 3.1** and **3.2**.

Issue	Volume information impact (annual kWh)
Incorrect ballasts applied	11,147 kWh over submission

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 3.2 With: Clause 15.2 and 15.37B(c) From: 01-Apr-19 To: 16-Nov-20	In absolute terms, total annual consumption is estimated to be 73,700 kWh lower than the DUML database indicates. The monthly database extract provided does not track changes at a daily basis and is provided as a snapshot. Incorrect ballasts applied resulting in an estimated 11,147 kWh over submission. Potential impact: High Actual impact: High Audit history: Three times Controls: Weak Breach risk rating: 9
Audit risk rating	**Rationale for audit risk rating**
High	The controls are rated as weak, because they are insufficient to ensure the database is accurate most of the time. The impact is assessed to be high, based on the kWh differences described above.

Actions taken to resolve the issue	Completion date	Remedial action status
Genesis has requested HDC review the asset database to ensure all asset information is complete and accurate. Genesis will follow up with the council monthly for exception management. Tracking of changes has been requested by Genesis to be included in the monthly reporting.	01/03/2020	Investigating

Preventative actions taken to ensure no further issues will occur	Completion date	
Genesis has reviewed data sets and provided feedback to the database administrator outlining the importance of change tracking. Genesis will need to work further with the council's contractor find the solution to this non-compliance.		

CONCLUSION

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

A RAMM database is managed by HDC and monthly reporting is provided to Genesis. The database is remotely hosted by RAMM Software Ltd. The field work, asset data capture and database population is conducted by Pope Electrical.

The audit identified three main issues, as follows:

1. In absolute terms, total annual consumption is estimated to be 73,700 kWh lower than the DUML database indicates, based on a field audit of 329 items of load.
2. Submission is based on a snapshot of the database at the end of the month and does not consider historic adjustments, or the fact that lights can be livened before they are entered into the database.
3. There are incorrect ballast wattages leading to over submission of 11,147 kWh per annum.

The future risk rating of 30 indicates that the next audit be completed in three months. I recommend a next audit period of six to nine months to allow Genesis time to work through these issues with their agent.

PARTICIPANT RESPONSE

Genesis has requested the council to review its asset information and to find a solution enabling the tracking of change information to be reporting monthly to the trader.