ELECTRICITY INDUSTRY PARTICIPATION CODE
DISTRIBUTED UNMETERED LOAD AUDIT REPORT

VERITEK

For

WAKA KOTAHI WAIKATO
AND
GENESIS ENERGY
NZBN:9429037706609

Prepared by: Steve Woods

Date audit commenced: 21 April 2024

Date audit report completed: 25 June 2024

Audit report due date: 3 June 2024

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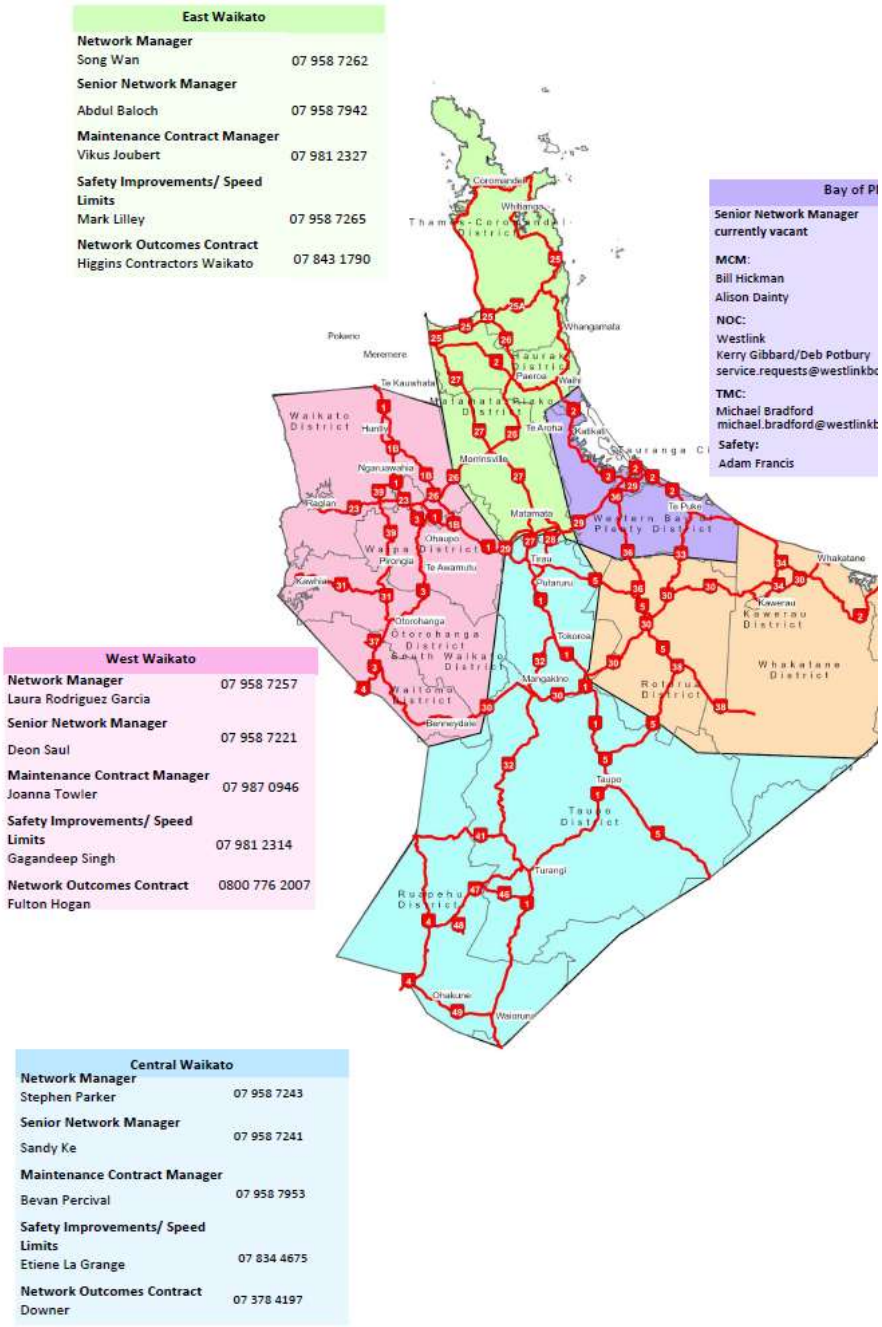
EXECUTIVE SUMMARY

This audit of the **Waka Kotahi Waikato (NZTA)** 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 area covered by this audit includes the green, pink and blue areas detailed in the Waka Kotahi provided map below:



The ICPs associated with this audit are detailed in **section 1.6**.

The previous audit identified a 21% error rate, resulting in over submission of 235,300 kWh per annum. Genesis disputed these findings, stating *"…robust processes are in place and Genesis and our customer believe that correct wattages are recorded against these assets that were found to be non-compliant."* Despite disputing the findings, 68 of the 103 discrepancies have been corrected.

I have repeated the recommendation from the last audit, that a full audit of the database is carried out using "as built" plans and field audits where plans are not available. I've also recommended the database updating processes are reviewed and improved.

Other findings are as follows:

- the recent profile audit, finalised in September 2023, concluded that the NST, CST and SST profile rules were not fit for purpose because they allow the shape files for each profile to be different to actual on/off times by up to 29 minutes at the start and end of each streetlight "on" period; the Authority allowed Genesis until the end of March 2024 to move all relevant ICPs onto a compliant profile, which has not yet occurred,
- ICP 1000522354PCD90 still has the UNM profile and submission is based on 12 kWh per day, rather than 300 kWh per day, leading to under submission by 105,000 kWh per annum,
- the database is not confirmed as accurate with a 95% level of confidence resulting in an estimated over submission of 110,700 kWh per annum,
- 35 of 103 discrepancies identified in the last audit have not been corrected, and
- two items of load with zero wattage recorded.

The audit found four non-compliances and makes three recommendations. The future risk rating of 29 indicates that the next audit be completed in three months. I have considered this in conjunction with the comments from Genesis, where the findings are now accepted. I've also taken into consideration the fact that NZTA still has not conducted a full field audit and that revisions will not address inaccurate submission information outside the 14-month window. There has been little improvement to the database accuracy or associated processes, therefore I repeat the recommendation from the previous audit that the next audit is conducted in three 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	Non-compliant profiles NST and CST still being used. Under submission of 105,000 kWh per annum for ICP 1000522354PCD90. Database is not confirmed as accurate with a 95% level of confidence resulting in an estimated over submission of 110,700 kWh per annum. 35 of 103 discrepancies identified in the last audit have not been corrected. Two items of load with zero wattage recorded.	Weak	High	9	Investigating
Description and capacity of load	2.4	11(2)(c) and (d) of Schedule 15.3	Two items of load with zero wattage recorded. 64 items of load with unknown light make.	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 110,700 kWh per annum. 35 of 103 discrepancies identified in the last audit not corrected. Two items of load with zero wattage recorded. 64 items of load with unknown light make. Submission is based on a snapshot and does not consider changes during the month.	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)	Non-compliant profiles NST and CST still being used. Under submission of 105,000 kWh per annum for ICP 1000522354PCD90. Database is not confirmed as accurate with a 95% level of confidence resulting in an estimated over submission of 110,700 kWh per annum. 35 of 103 discrepancies identified in the last audit have not been corrected. Two items of load with zero wattage recorded.	Weak	High	9	Investigating
Future Risk Rating						29	

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
Database Accuracy	3.1	Conduct a full audit of the database using “as built” plans and field audits to improve accuracy.
		Review quality control processes to ensure database updates are accurate.
		Genesis to liaise with relevant networks for Waka Kotahi new connections.

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

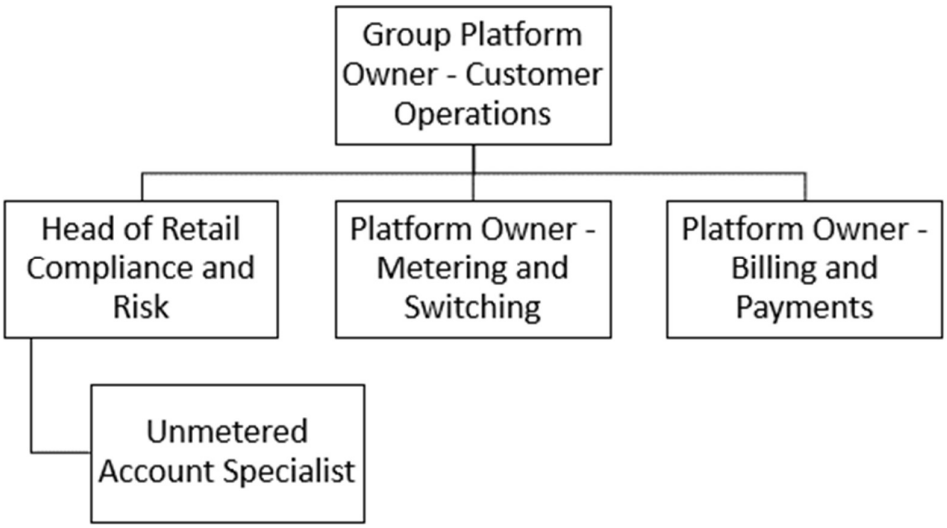
The Electricity Authority's website was reviewed to identify any exemptions relevant to the scope of this audit.

Audit commentary

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

1.2. Structure of Organisation

Genesis provided the relevant organisational structure:



1.3. Persons involved in this audit

Auditors:

Name	Company	Title
Steve Woods	Veritek Limited	Auditor

Other personnel assisting in this audit were:

Name	Title	Company
Alysha Majury	Unmetered Account Specialist	Genesis Energy
Kara Atkinson	Director	NZ Streetlighting

1.4. Hardware and Software

The SQL database used for the management of DUML is remotely hosted by thinkproject New Zealand Limited. The database is commonly known as "RAMM" which stands for "Road Assessment and Maintenance Management". The specific data used for DUML is held in the Streetlight tables. thinkproject New Zealand Limited backs up the database and assists with disaster recovery as part of their hosting service.

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

The Genesis Waka Kotahi Waikato DUML database contains the following unmetered ICPs.

ICP Number	NSP	Profile	Number of items of load	Database wattage (watts)	Comment
0000011095WE94E	HAM0331	NST	907	168,998	
0000022579WE623	HLY0331	NST	314	51,629	
0000036247WE323	TWH0331	NST	852	165,184	
0000036463HR791	ROT0111	NST	16	3,568	
0000053741WE2D1	HAM0111	NST	17	2,783	
0000381313TUB52	WRK0331	NST	12	2,074	
0000400344WA399	TMU0111	NST	341	53,942	
0000557929UNE2C	HIN0331	NST	259	38,541	
0000806950WA53A	CBG0111	NST	188	30,249	
0000890166TU7C3	WRK0331	NST	23	3,776	
0001111171WM17A	ONG0331	CST	19	2,792	
0001111173WM1FF	NPK0331	CST	22	3,831	
0001111175WM070	OKN0111	CST	54	9,158	
0001425637UN339	KPU0661	NST	502	84,169	
0001425638UNCE7	WKO0331	NST	366	54,545	
0008806768WM373	HTI0331	NST	318	49,398	
0008809657WMB31	TKU0331	CST	2	336	
0088051901WM4EB	TKU0331	CST	58	9,744	
1000522354PCD90	PAO1101	UNM	170	26,529	UNM profile, should be DST, under submission of 105,000 kWh per annum due to incorrect daily kWh

ICP Number	NSP	Profile	Number of items of load	Database wattage (watts)	Comment
1000608049PC05C	KIN0331	NST	146	26,770	
1000613268PCC4A	ARI1102		152	33,038	Now "active", was "ready" during the last audit. UNM profile which will be changed to a more appropriate profile.
1000614310PC667	WHU0331	NST	189	29,835	
1000614311PCA22	MTR0331	CST	44	6,564	
1000614328PC38B	OKN0111	CST	2	166	
TOTAL			**4,973**	**857,616**	

All items of load are now assigned to the correct ICPs. The database has metered ICPs as well, but this audit is only concerned with unmetered ICPs.

ICP 1000522354PCD90 has the UNM profile in the registry, which will be changed to a new profile.

ICP 1000613268PCC4A is now at the "active" status and submission is occurring.

1.7. Authorisation Received

All information was provided directly by Genesis and Waka Kotahi.

1.8. Scope of Audit

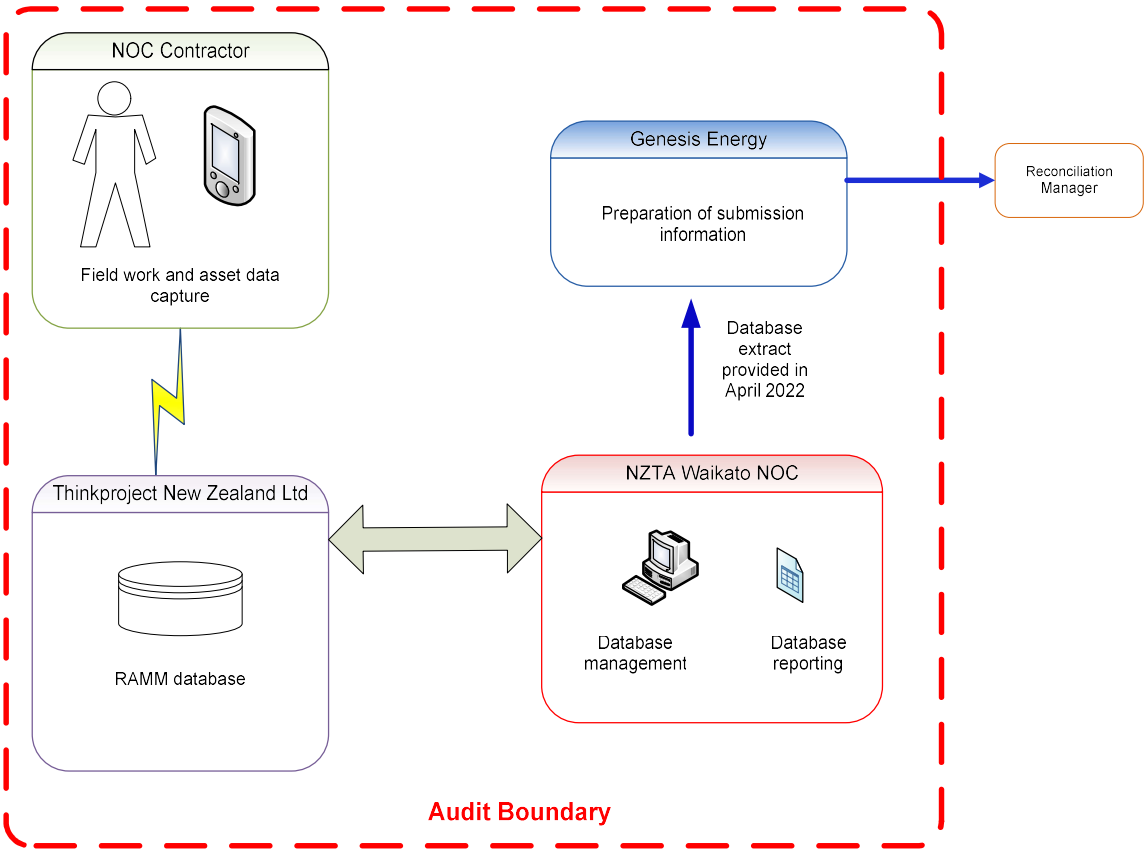
This audit of the Waka Kotahi Waikato (Waka Kotahi) DUML database and processes was conducted at the request of Genesis Energy Limited (Genesis) in accordance with clause 15.37B. The purpose of this audit is to verify that the volume information is being calculated accurately, and that profiles have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

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

Monthly reporting is provided to Genesis, which is used for billing and submission.

Contractors are assigned on an area basis but the processes to manage change in the database as are the same. The contractors for each area are detailed in the Waka Kotahi diagram in the Executive Summary.

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:



A field audit was undertaken of a statistical sample of 459 items of load in the month of April 2024.

1.9. Summary of previous audit

The last audit report undertaken by Steve Woods of Veritek Limited in November 2023 was reviewed. The status of those audit findings is detailed below:

Table of Non-Compliance

Subject	Section	Clause	Non-compliance	Status
Distributed unmetered load audits	1.10	16A.26 and 17.295F	Audit not conducted within the required timeframe.	Cleared
Deriving submission information	2.1	11(1) of Schedule 15.3	Submission is not occurring for ICP 1000613268PCC4A, therefore under submission has occurred by 12,000 kWh per month since March 2023. Data loggers used across more than one network resulting in the incorrect burn hours being applied. Database is not confirmed as accurate with a 95% level of confidence resulting in an estimated under submission of 235,300 kWh per annum. One invalid light type. Four items of load with the incorrect ballast applied.	Cleared Cleared Still existing Cleared Cleared
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 235,300 kWh per annum. One invalid light type. Four items of load with the incorrect ballast applied.	Still existing Cleared Cleared
Volume information accuracy	3.2	15.2 and 15.37B(c)	Submission is not occurring for ICP 1000613268PCC4A, therefore under submission has occurred by 12,000 kWh per month since March 2023. Data loggers used across more than one network resulting in the incorrect burn hours being applied. Database is not confirmed as accurate with a 95% level of confidence resulting in an estimated under submission of 235,300 kWh per annum. One invalid light type. Four items of load with the incorrect ballast applied.	Cleared Cleared Still existing Cleared Cleared

Table of Recommendations

Subject	Section	Recommendation for Improvement	Status
Database Accuracy	3.1	Conduct a full audit of the database using "as built" plans and field audits to improve accuracy.	Repeated
		Review quality control processes to ensure database updates are accurate.	Repeated
		Genesis to liaise with relevant networks for Waka Kotahi new connections.	Repeated

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 compliance with this clause.

Audit outcome

Compliant

2. DUML DATABASE REQUIREMENTS

2.1. Deriving submission information (Clause 11(1) of Schedule 15.3)

Code reference

Clause 11(1) of Schedule 15.3

Code related audit information

The retailer must ensure the:

- *DUML database is up to date,*
- *methodology for deriving submission information complies with schedule 15.5.*

Audit observation

The process for calculation of consumption was examined.

Audit commentary

Genesis reconciles this DUML load using the CST and NST profiles as indicated in **section 1.6** above. The recent profile audit, finalised in September 2023, concluded that the NST, CST and SST profile rules were not fit for purpose because they allow the shape files for each profile to be different to actual on/off times by up to 29 minutes at the start and end of each streetlight "on" period. The Authority allowed Genesis until the end of March 2024 to move all relevant ICPs onto a compliant profile, which has not yet occurred.

I reviewed the submission for the month of March 2024 and found that the kWh values matched the database in most cases, with the exception of ICP 1000522354PCD90, which still has the UNM profile and submission is based on 12 kWh per day, rather than 300 kWh per day, leading to under submission by 105,000 kWh per annum.

As discussed in **section 3.1**:

- the database is not confirmed as accurate with a 95% level of confidence resulting in an estimated over submission of 110,700 kWh per annum,
- 35 of 103 discrepancies identified in the last audit have not been corrected, and
- two items of load with zero wattage recorded.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 2.1 With: Clause 11(1) of Schedule 15.3 From: 01-Dec-23 To: 28-Apr-24	Non-compliant profiles NST and CST still being used. Under submission of 105,000 kWh per annum for ICP 1000522354PCD90. Database is not confirmed as accurate with a 95% level of confidence resulting in an estimated over submission of 110,700 kWh per annum. 35 of 103 discrepancies identified in the last audit have not been corrected. Two items of load with zero wattage recorded. Potential impact: High Actual impact: High Audit history: Multiple times previously. Controls: Weak Breach risk rating: 9

Audit risk rating	Rationale for audit risk rating
High	The controls are recorded to be weak because some of the issues recorded were present during the previous audit and have not been remedied. The impact is assessed to be high due to the estimated kWh impact.

Actions taken to resolve the issue	Completion date	Remedial action status
Genesis continues to work on its application for a new profile and have these applied in the registry. NZTA are aware of the findings and recommendations to ensure accuracy of their database. Genesis continues to work with NZTA to increase the accuracy of their database. NZTA has requested the as-builts for SH 3 McAndrew St – Kihikihi to investigate the field findings. NZTA are investigating the findings for SH 1C Wairere Interchange with the supplier and maintenance contractors.	Continuous Improvement	Investigating
Preventative actions taken to ensure no further issues will occur	**Completion date**	
Genesis has had its profile shape application submitted and is working on applying these in the registry. The registry & Genesis data has been updated for 1000522354PCD90 to 305 kWh per day effective 01/06/2024 NZTA have made wattage corrections to SH 3 Waikeria Rd and a RAMM data output was provided.	Continuous Improvement	

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

Code reference

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

Code related audit information

The DUML database must contain:

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

Audit observation

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

Audit commentary

The database extract provided had an ICP recorded for all items of load apart from 16 where the lights are solar powered.

The accuracy of the ICP allocation to the items of load is discussed in **section 3.1**.

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, and GPS coordinates. All items of load have GPS coordinates.

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 model description, lamp wattage and gear wattage.

Two items of load at pole IDs 42936 and 97909 have zero wattage recorded. 64 items of load have an unknown light make description.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 2.4 With: Clause 11(2)(c) and (d) of Schedule 15.3 From: 01-Dec-23 To: 28-Apr-24	Two items of load with zero wattage recorded. 64 items of load with unknown light make. Potential impact: Medium 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 on settlement and participants is minor; therefore, the audit risk rating is low.

Actions taken to resolve the issue	Completion date	Remedial action status
NZTA are aware of the findings and recommendations to ensure accuracy of their database. Genesis continues to work with NZTA to increase the accuracy of their database. NZTA has requested the as-builts for SH 3 McAndrew St – Kihikihi to investigate the field findings. NZTA are investigating the findings for SH 1C Wairere Interchange with the supplier and maintenance contractors.	Continuous Improvement	Investigating
Preventative actions taken to ensure no further issues will occur	**Completion date**	
The registry & Genesis data has been updated for 1000522354PCD90 to 305 kWh per day effective 01/06/2024 NZTA have made wattage corrections to SH 3 Waikeria Rd and a RAMM data output was provided.	Continuous Improvement	

2.5. All load recorded in database (Clause 11(2A) of Schedule 15.3)

Code reference

Clause 11(2A) of Schedule 15.3

Code related audit information

The retailer must ensure that each item of DUML for which it is responsible is recorded in this database.

Audit observation

A field audit was undertaken of a statistical sample of 459 items of load in the month of April 2024.

Audit commentary

The table below shows a summary of findings.

Finding	Quantity
Lights missing from the database	0
Lights missing from the field	0
Incorrect wattage in database	87

There were no additional lights identified in the field. The main discrepancy is incorrect wattages, which is discussed in **section 3.1**.

Audit outcome

Compliant

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

Code reference

Clause 11(3) of Schedule 15.3

Code related audit information

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

Audit observation

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

Audit commentary

The database functionality achieves compliance with the code.

Audit outcome

Compliant

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

Code reference

Clause 11(4) of Schedule 15.3

Code related audit information

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

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

Audit observation

The database was checked for audit trails.

Audit commentary

The RAMM database contains a compliant 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

A field audit was undertaken of 459 items of load. 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	Waka Kotahi Waikato
Strata	The Waka Kotahi RAMM database covers the Waikato area. The management of the Waka Kotahi items of load are the same, but I decided to place the items of load into three similarly sized strata by network as follows: • strata 1 – HAWK, LINE and WAIP, • strata 2 – POCO, and • strata 3 – WAIK.
Area units	I created a pivot table of the area units, and I used a random number generator in a spreadsheet to select a total of 22 sub-units or 9% of the database.
Total items of load	459 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 to track changes and timeliness of database updates was evaluated.

Audit commentary

A field audit was conducted of a statistical sample of 459 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	96.9%	Wattage from survey is lower than the database wattage by 3.1%
R_L	94.1%	With a 95% level of confidence, it can be concluded that the error could be between -5.9% and -0.3%
R_H	99.7%	

These results were categorised in accordance with the "Distributed Unmetered Load Statistical Sampling Audit Guideline", effective from 1 February 2019 and the table below shows that Scenario 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 0.3% and 5.9% lower than the wattage recorded in the DUML database. Non-compliance is recorded because the potential error is greater than 5.0%.

In absolute terms the installed capacity is estimated to be 26 kW lower than the database indicates.

There is a 95% level of confidence that the installed capacity is between 2 kW to 50 kW lower than the database.

In absolute terms, total annual consumption is estimated to be 110,700 kWh lower than the DUML database indicates.

There is a 95% level of confidence that the annual consumption is between 9,400 kWh p.a. to 215,100 kWh pa. lower than the database indicates.

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

The field audit identified 87 incorrect wattages. 19 were where LED upgrades had occurred but were not recorded in the database. A further 19 were where 150-watt high pressure sodium lights were recorded as 70 watts and the remaining 49 were incorrectly recorded LED wattages.

The previous audit identified 103 discrepancies. Genesis disputed these findings, stating *"…robust processes are in place and Genesis and our customer believe that correct wattages are recorded against these assets that were found to be non-compliant."* Despite disputing the findings, 68 of the 103 discrepancies have been corrected.

As recorded in the previous audit, I recommend a full audit is conducted, where the recent "as built" plans are compared to the database, and where these plans are not available, a field audit is conducted. Whilst this is a large and costly exercise, there will be savings in energy costs, where Waka Kotahi is currently paying more per annum than the database indicates, and there will also be audit cost savings because audits will be less frequent if the database is more accurate.

Description	Recommendation	Audited party comment	Remedial action
Database accuracy	Conduct a full audit of the database using "as built" plans and field audits to improve accuracy.	NZTA are aware of the findings and recommendations. The findings are currently under investigation and some changes have been made using the as-builts. The registry & Genesis data has been updated for 1000522354PCD90 to 305 kWh per day effective 01/06/2024 NZTA have made wattage corrections to SH 3 Waikeria Rd and a RAMM data output was provided. NZTA has requested the as-builts for SH 3 McAndrew St – Kihikihi to investigate the field findings. NZTA are investigating the findings for SH 1C Wairere Interchange with the supplier and maintenance contractors.	Investigating

Lamp description and capacity accuracy

As recorded in **section 2.4**, two items of load at pole IDs 42936 and 97909 have zero wattage recorded. 64 items of load have an unknown light make description.

ICP Accuracy

All NSPs now have an ICP, and no discrepancies were identified.

Change management process findings

Waka Kotahi requires the NOC to maintain the RAMM database as part of their contract for maintenance carried out on the network. Contractors use pocket RAMM to track changes. Claims are submitted by the 28th of each month for all work carried out for the month prior. Install dates are being used by contractors when tracking changes in RAMM. Reporting of this activity is in development but is expected to provide Genesis with a monthly wattage report that tracks changes at a daily level.

The NOC contractor is required to have an internal quality control process to ensure that updates are accurate. The last audit field audit findings indicated that this process is not working as expected and I recommended that this was reviewed. This is still in progress, so I have repeated the recommendation to maintain visibility.

Recommendation	Description	Audited party comment	Remedial action
Database Accuracy	Review quality control processes to ensure database updates are accurate.	NZTA is aware of the findings and recommendations. Genesis continues to work with NZTA to ensure there is accuracy of their database.	Investigating

As detailed in the last audit, the new connection process is managed on a project basis. Much like new Council lights, Waka Kotahi only accepts the assets at the end of project and the contractor controls the livening of new lights with the relevant networks. This will be resulting in lights being on and burning before they are being reconciled. I recommend that Genesis work with the relevant networks to ensure there are robust processes in place to ensure new connections are reconciled from the time they are electrically connected.

Recommendation	Description	Audited party comment	Remedial action
Database Accuracy	Genesis to liaise with relevant networks for Waka Kotahi new connections.	Genesis to review & investigate best practice to ensure accuracy of reconciliation.	Investigating

Outage patrols are undertaken on a three-monthly basis.

There are no private or festive lights connected to the Waka Kotahi load.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 3.1 With: Clause 15.2 and 15.37B(b) From: 01-Dec-23 To: 28-Apr-24	Database is not confirmed as accurate with a 95% level of confidence resulting in an estimated under submission of 110,700 kWh per annum. 35 of 103 discrepancies identified in the last audit not corrected. Two items of load with zero wattage recorded. 64 items of load with unknown light make. Submission is based on a snapshot and does not consider changes during the month. Potential impact: High Actual impact: High Audit history: Multiple times previously Controls: Weak Breach risk rating: 9
Audit risk rating	**Rationale for audit risk rating**
High	The controls are recorded to be weak because some of the issues recorded were present during the previous audit and have not been remedied. The impact is assessed to be high due to the estimated kWh impact.
Actions taken to resolve the issue	**Completion date** / **Remedial action status**

NZTA are aware of the findings and recommendations. The findings are currently under investigation and some changes have been made using the as-builts. The registry & Genesis data has been updated for 1000522354PCD90 to 305 kWh per day effective 01/06/2024 NZTA have made wattage corrections to SH 3 Waikeria Rd and a RAMM data output was provided. NZTA has requested the as-builts for SH 3 McAndrew St – Kihikihi to investigate the field findings. NZTA are investigating the findings for SH 1C Wairere Interchange with the supplier and maintenance contractors.	Continuous Improvement	Investigating
Preventative actions taken to ensure no further issues will occur	**Completion date**	
The registry & Genesis data has been updated for 1000522354PCD90 to 305 kWh per day effective 01/06/2024 NZTA have made wattage corrections to SH 3 Waikeria Rd and a RAMM data output was provided.	Continuous Improvement	

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

Code reference

Clause 15.2 and 15.37B(c)

Code related audit information

The audit must verify that:

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

Audit observation

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

- checking the registry to confirm that all ICPs have the correct profile and submission flag, and
- checking the database extract combined with the burn hours against the submitted figure to confirm accuracy.

Audit commentary

Genesis reconciles this DUML load using the CST and NST profiles as indicated in **section 1.6** above. The recent profile audit, finalised in September 2023, concluded that the NST, CST and SST profile rules were not fit for purpose because they allow the shape files for each profile to be different to actual on/off times by up to 29 minutes at the start and end of each streetlight "on" period. The Authority allowed Genesis until the end of March 2024 to move all relevant ICPs onto a compliant profile, which has not yet occurred.

I reviewed the submission for the month of March 2024 and found that the kWh values matched the database in most cases, with the exception of ICP 1000522354PCD90, which still has the UNM profile and submission is based on 12 kWh per day, rather than 300 kWh per day, leading to under submission by 105,000 kWh per annum.

As discussed in **section 3.1**:

- the database is not confirmed as accurate with a 95% level of confidence resulting in an estimated over submission of 110,700 kWh per annum,
- 35 of 103 discrepancies identified in the last audit have not been corrected, and
- two items of load with zero wattage recorded.

Audit outcome

Non-compliant

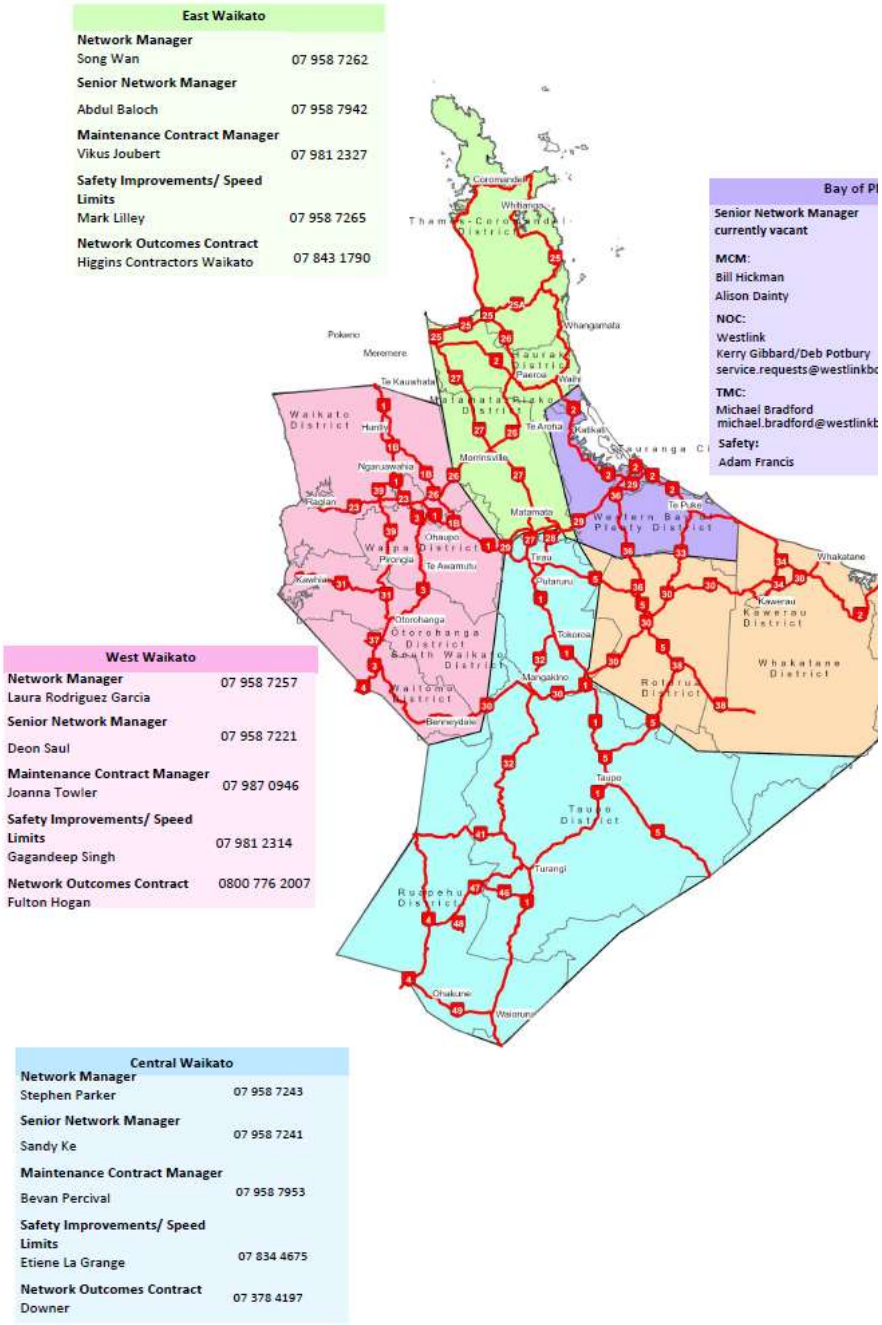
Non-compliance	Description
Audit Ref: 3.2 With: Clause 15.2 and 15.37B(c) From: 01-Dec-23 To: 28-Apr-24	Non-compliant profiles NST and CST still being used. Under submission of 105,000 kWh per annum for ICP 1000522354PCD90. Database is not confirmed as accurate with a 95% level of confidence resulting in an estimated over submission of 110,700 kWh per annum. 35 of 103 discrepancies identified in the last audit have not been corrected. Two items of load with zero wattage recorded. Potential impact: High Actual impact: High Audit history: Multiple times previously. Controls: Weak Breach risk rating: 9
Audit risk rating	**Rationale for audit risk rating**
High	The controls are recorded to be weak because some of the issues recorded were present during the previous audit and have not been remedied. The impact is assessed to be high due to the estimated kWh impact.

Actions taken to resolve the issue	Completion date	Remedial action status
Genesis continues to work on its application for a new profile and have these applied in the registry. NZTA are aware of the findings and recommendations to ensure accuracy of their database. Genesis continues to work with NZTA to increase the accuracy of their database. NZTA has requested the as-builts for SH 3 McAndrew St – Kihikihi to investigate the field findings. NZTA are investigating the findings for SH 1C Wairere Interchange with the supplier and maintenance contractors.	Continuous Improvement	Investigating
Preventative actions taken to ensure no further issues will occur	**Completion date**	

Genesis has had its profile shape application submitted and is working on applying these in the registry. The registry & Genesis data has been updated for 1000522354PCD90 to 305 kWh per day effective 01/06/2024 NZTA have made wattage corrections to SH 3 Waikeria Rd and a RAMM data output was provided.	Continuous Improvement	

CONCLUSION

The area covered by this audit includes the green, pink and blue areas detailed in the Waka Kotahi provided map below:



The ICPs associated with this audit are detailed in **section 1.6**.

The previous audit identified a 21% error rate, resulting in over submission of 235,300 kWh per annum. Genesis disputed these findings, stating *"…robust processes are in place and Genesis and our customer believe that correct wattages are recorded against these assets that were found to be non-compliant."* Despite disputing the findings, 68 of the 103 discrepancies have been corrected.

I have repeated the recommendation from the last audit, that a full audit of the database is carried out using "as built" plans and field audits where plans are not available. I've also recommended the database updating processes are reviewed and improved.

Other findings are as follows:

- the recent profile audit, finalised in September 2023, concluded that the NST, CST and SST profile rules were not fit for purpose because they allow the shape files for each profile to be different to actual on/off times by up to 29 minutes at the start and end of each streetlight "on" period; the Authority allowed Genesis until the end of March 2024 to move all relevant ICPs onto a compliant profile, which has not yet occurred,
- ICP 1000522354PCD90 still has the UNM profile and submission is based on 12 kWh per day, rather than 300 kWh per day, leading to under submission by 105,000 kWh per annum,
- the database is not confirmed as accurate with a 95% level of confidence resulting in an estimated over submission of 110,700 kWh per annum,
- 35 of 103 discrepancies identified in the last audit have not been corrected, and
- two items of load with zero wattage recorded.

The audit found four non-compliances and makes three recommendations. The future risk rating of 29 indicates that the next audit be completed in three months. I have considered this in conjunction with the comments from Genesis, where the findings are now accepted. I've also taken into consideration the fact that NZTA still has not conducted a full field audit and that revisions will not address inaccurate submission information outside the 14-month window. There has been little improvement to the database accuracy or associated processes, therefore I repeat the recommendation from the previous audit that the next audit is conducted in three months.

PARTICIPANT RESPONSE

Genesis agrees with the findings found. NZTA are aware of the findings and recommendations that have been made.

There has been progress made by NZTA in reviewing the as-builts and NZTA have made wattage corrections to SH 3 Waikeria Rd and a RAMM data output was provided. NZTA continue to investigate the remaining findings with the as-builts, maintenance contractors and the light supplier.

Genesis continues to work with NZTA to ensure accuracy of their database and Genesis continues to work on his applications for a new profile.

APPENDIX 1 CONFIRMATION OF FIELD FINDINGS

Below are several examples showing different lights in the field as recorded in the database. The audit findings are based on field observations.

road_id	road_name	location	pole_id	light_id	lamp_wattage	gear_wattage	Total Wattage	Field wattage	Comments
4050	003-0016/11.62	15582	97695	100941	80	0	80	99	4 panel LED 99W estimate

The light model is described as an I-Tron Zero OC6, but the photos below confirm it's a 4 Module Italo

I-Tron Zero OC6

Photo from the field

Lights at the intersection of Waikeria Rd and SH3

road_i	road_name	locatio	pole_i	light_i	lamp_wattag	gear_wattag	Total	Field	Comments	light_make_de	light_model_desc	
4050	003-0016/11.62	18276	60702	60707	133	0	133	150	8m not 7M estimated at 150	AEC	ITALO 2 STE-S 4.5 7M 133W	AEC
4050	003-0016/11.62	18320	60703	60708	133	0	133	133	7M correct	AEC	ITALO 2 STE-S 4.5 7M 133W	AEC
4050	003-0016/11.62	18363	60704	60709	133	0	133	150	8m not 7M estimated at 150	AEC	ITALO 2 STE-S 4.5 7M 133W	AEC
4050	003-0016/11.62	18404	60705	60710	150	0	150	150	8M correct	AEC	ITALO 2 STW 4.5-8M 150W	AEC
4050	003-0016/11.62	18430	60706	60711	150	0	150	150	8M correct	AEC	ITALO 2 STW 4.5-8M 150W	AEC
4050	003-0016/11.62	18444	98008	102182	133	0	133	150	8m not 7M estimated at 150	AEC	ITALO 2 STE-S 4.5 7M 133W	AEC
4050	003-0016/11.62	18464	60707	60712	150	0	150	150	8M correct	AEC	ITALO 2 STW 4.5-8M 150W	AEC
4050	003-0016/11.62	18497	60708	60713	150	0	150	150	8M correct	AEC	ITALO 2 STW 4.5-8M 150W	AEC
4050	003-0016/11.62	18547	60709	60714	150	0	150	150	8M correct	AEC	ITALO 2 STW 4.5-8M 150W	AEC

Audit notes

Additional 8M Italo identified in the field

60707

60708

ID60707 recorded as 7M but is 8M, photo to the right

ID60708 Correctly recorded as 7M, photo to the right

ID60709 recorded as 7M but is 8M, photo to the right

102182

Correctly recorded as 8M

Correctly recorded as 8M

ID102182 recorded as 7M but is 8M, photo to the right

Correctly recorded as 8M

Correctly recorded as 8M

Correctly recorded as 8M

road_i	road_name	locatio	pole_i	light_i	lamp_wattag	gear_wattag	Total	Field	Comments
4036	01C-0022-R2	159	86033	86033	169	0	169	75	Not Italo 5M estimated at 75

Italo 5M example

Light installed, note surrounding

road_i	road_name	locatio	pole_i	light_i	lamp_wattag	gear_wattag	Total	Field	Comments	light_make_de	light_model_desc	
3375	01C-0019/02.71-D	3027	86017	86017	122	0	122	169	7 module labelled as 169	AEC	ITALO 2 0F2 STA 3.100-5M	AEC
3375	01C-0019/02.71-D	3078	86018	86018	122	0	122	169	7 module labelled as 169	AEC	ITALO 2 0F2 STA 3.100-5M	AEC
3375	01C-0019/02.71-D	3551	48456	66171	150	0	150	20	Labelled as L20	AEC	I-Tron Zero OC6	AEC
3375	01C-0019/02.71-D	3650	48445	57183	169	0	169	19.9	Labelled as L19.9	AEC	ITALO 2 0F2 3.100-7m 169w	AEC

ID86107, 7M not 5M and labelled as 169

ID86108, 7M not 5M and labelled as 169

ID66171 labelled as 20 watts not 150 watts