ELECTRICITY INDUSTRY PARTICIPATION CODE
DISTRIBUTED UNMETERED LOAD AUDIT REPORT

For

WAKA KOTAHI WAIKATO
(FORMERLY NZTA EAST WAIKATO,
NZTA WEST WAIKATO AND NZTA TAUPO)
AND
GENESIS ENERGY

Prepared by: Rebecca Elliot

Date audit commenced: 28 April 2022

Date audit report completed: 1 July 2022

Audit report due date: 11 March 2021

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EXECUTIVE SUMMARY

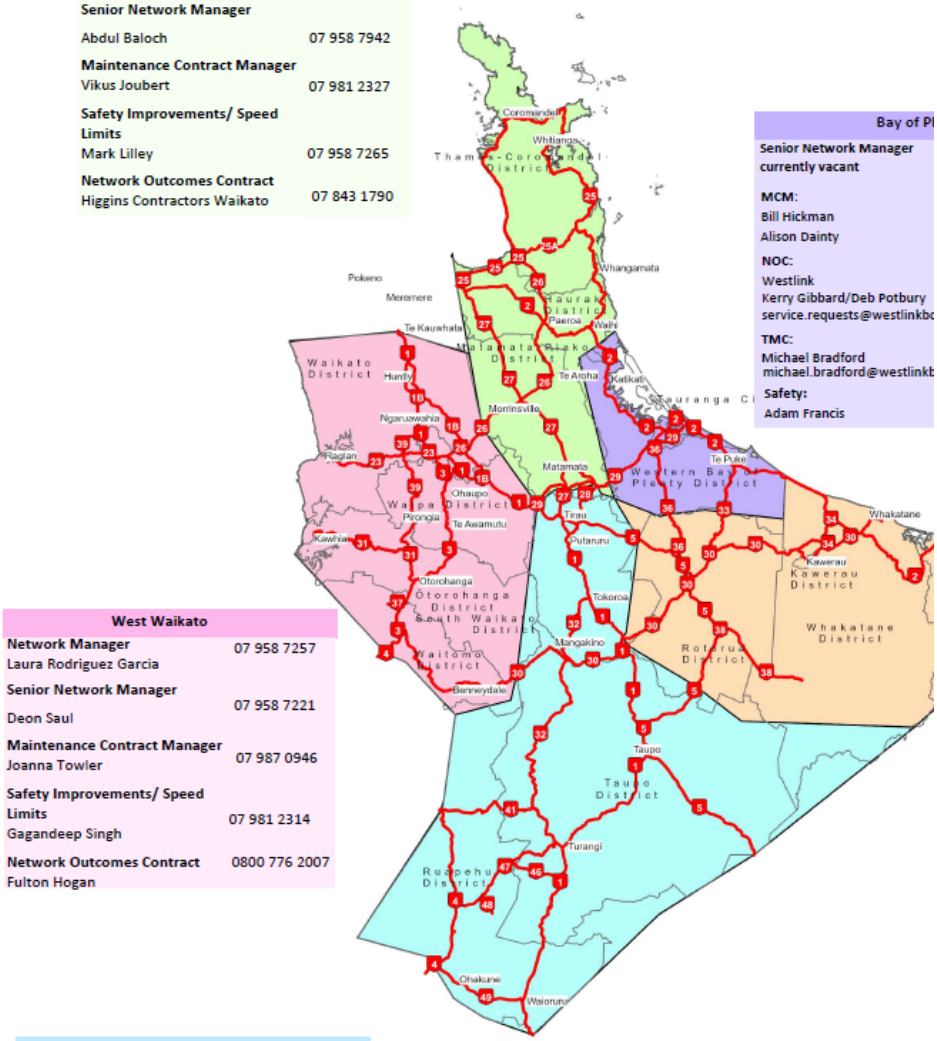
This audit of the **Waka Kotahi Waikato (NZTA)** DUML database and processes was conducted at the request of **Genesis Energy Limited** (**Genesis**) in accordance with clause 15.37B. The purpose of this audit is to verify that the volume information is being calculated accurately, and that profiles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

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

This audit reports combines the previous three DUML audits of East Waikato, West Waikato and Taupo NZTA. The area covered includes the green, pink and blue areas detailed in the Waka Kotahi provided map below:

East Waikato	
Network Manager Song Wan	07 958 7262
Senior Network Manager Abdul Baloch	07 958 7942
Maintenance Contract Manager Vikus Joubert	07 981 2327
Safety Improvements/ Speed Limits Mark Lilley	07 958 7265
Network Outcomes Contract Higgins Contractors Waikato	07 843 1790

Bay of Pl
Senior Network Manager currently vacant
MCM: Bill Hickman Alison Dainty
NOC: Westlink Kerry Gibbard/Deb Potbury service.requests@westlinkbc
TMC: Michael Bradford michael.bradford@westlinkb
Safety: Adam Francis



West Waikato	
Network Manager Laura Rodriguez Garcia	07 958 7257
Senior Network Manager Deon Saul	07 958 7221
Maintenance Contract Manager Joanna Towler	07 987 0946
Safety Improvements/ Speed Limits Gagandeep Singh	07 981 2314
Network Outcomes Contract Fulton Hogan	0800 776 2007

Central Waikato	
Network Manager Stephen Parker	07 958 7243
Senior Network Manager Sandy Ke	07 958 7241
Maintenance Contract Manager Bevan Percival	07 958 7953
Safety Improvements/ Speed Limits Etiene La Grange	07 834 4675
Network Outcomes Contract Downer	07 378 4197

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

A RAMM database extract was provided, and this was compared to the data sets provided for the previous three DUML audits and found three ICPs missing from the dataset. Analysis of the missing ICPs found:

- data from the Thames Coromandel DC RAMM database continues to be used for submission for ICP 0001425637UN339, and Genesis are working with NZTA to get this data added to the NZTA RAMM database - as this is from a different database a separate audit for this load is required until these items of load are added to the NZTA RAMM database,
- ICP 0000026694WE641 has been recorded as being "reconciled elsewhere" against ICP 0000011095WE94E since 1 February 2022; I checked the items of load associated with ICP 0000026694WE641 against those recorded against ICP 0000011095WE94E in the NZTA RAMM database and found these are not recorded in the database, which will be resulting in an estimated under submission of 3,255 kWh per month since February 2022,
- ICP 0000036254WE54E was included in the NZTA West Waikato DUML audit report but Genesis are using the registry record to reconcile this load which is described as the Ngaruawahia by-pass lights with a daily unmetered load figure of 55.683 kWh; as no database details could be located in the last DUML audit I mapped all the ICPs associated with the only ICP associated with the NSP HLY0331 in the NZTA RAMM database extract which found only six items of load in the Ngaruawahia area (the Waikato Expressway has bypassed Ngaruawahia and the old state highway has been passed back to Waikato DC so I recommend that Genesis investigate what if any load if any is associated with this ICP).

I reviewed the NSPs for the Waikato NZTA area against the ICPs and NSPs and found seven NSPs with no NZTA ICP associated. Analysis of the associated Council databases which also contain NZTA lighting indicate that ICPs may need to be created to allocate the load to the correct NSP. It also found that some of the load is allocated to the incorrect NSP. This is detailed in the report, and I recommend that the ICP allocation for the database load be reviewed.

The Waikato NZTA area covers several council areas. Various arrangements have been in place with the councils. Some councils pay for all the NZTA streetlighting and then claim the costs back from NZTA. Some have this arrangement for urban NZTA lighting only and the rural portion is paid for by NZTA. The last NZTA East Waikato audit completed in November 2019 identified duplicate submission was occurring as detailed below:

Council	**Database source:**					
	NZTA Urban Lights	**ICP & NSP**	**Submitted by:**	**NZTA Rural Lights**	**ICP & NSP**	**Submitted by:**
Hauraki District Council	HDC RAMM database	1000508887PC891 WKO0331	Meridian	HDC RAMM database	1000508887PC891 WKO0331	Meridian

The NZTA lights associated with NSP WKO0331 (ICP 0001425638UNCE7) was being submitted by both Genesis for NZTA and by Meridian for Hauraki District Council (coloured orange). This was estimated to be resulting in an estimated annual over submission of 287,620 kWh.

NZTA have been working to use their own RAMM database to manage and pay for the unmetered streetlight loads across the country and remove these from the council databases. My analysis identified that duplicate submission is occurring in some instances. The table below summarises the effects on reconciliation of these duplicated submissions:

Council Area	Current trader	Council submitted NZTA kWh volume per annum	Comments
Ruapehu DC	Meridian	121,715	This has been raised in the RDC's audit
Taupo DC	Meridian	34,719	This has been raised in the TDC's audit
Otorohonga DC	Genesis	104,930	This has been raised in the ODC's audit
Matamata Piako DC	Meridian	303,735	This has been raised in the MPDC's audit.
Hauraki DC	Meridian	168,395	This was not raised in the HDC audit as it predated this database extract being available but was raised in the last East Waikato NZTA audit completed in November 2019.
TOTAL		733,494	

Genesis intends to work with NZTA, the alternate trader, and the local council to get this resolved. Non-compliance has been raised in the local council DUML audits as well as in this audit.

Database accuracy is described as follows:

Result	**Percentage**	**Comments**
The point estimate of R	105.0%	Wattage from survey is higher than the database wattage by 5%
R_L	94.8%	With a 95% level of confidence, it can be concluded that the error could be between -5.2% and +27.6%
R_H	127.6%	

The conclusion from Scenario B is that the variability of the sample results across the strata means that the true wattage (installed in the field) could be between 5.2% lower to 24.8% 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 35.0 kW higher than the database indicates.
- There is a 95% level of confidence that the installed capacity is between 36 kW lower to 194 kW higher than the database.
- In absolute terms, total annual consumption is estimated to be 150,200 kWh higher than the DUML database indicates.
- There is a 95% level of confidence that the annual consumption is between 155,200 kWh lower to 830,100 kWh p.a. higher than the database indicates.

The audit found six non-compliances and makes six recommendations. The future risk rating of 42 indicates that the next audit be completed in three months. I have considered this in conjunction with

Genesis' comments, and I recommend that the next audit is in nine months to allow sufficient time for the Genesis to work with Waka Kotahi, other trader's and local councils to resolve the matters raised.

The matters raised are detailed below:

AUDIT SUMMARY

NON-COMPLIANCES

Subject	Section	Clause	Non-Compliance	Controls	Audit Risk Rating	Breach Risk Rating	Remedial Action
Distributed unmetered load audits	1.10	17.295F	Audit not completed within the required timeframe.	Weak	Low	3	Investigating

Deriving submission information	2.1	11(1) of Schedule 15.3	Incorrect volume submitted for ICP 0001425638UNCE7 resulting in an estimated over submission of 1,018.54 kWh for May 2022. 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 150,200 kWh per annum. An unknown number of items of load allocated to the incorrect ICP and therefore the incorrect NSP and possibly balancing area and network including an estimated 22 NZTA lights or 19,540 kWh per annum reconciled to the Lines Company network instead of the Waipa network. ICP 0000026694WE641 incorrectly recorded as "reconciled elsewhere" resulting in an estimated under submission of 3,255 kWh per month since February 2022. 295 items of load with the incorrect ballast applied resulting an estimated over submission of 1,627 kWh per annum. One item of load with no wattage recorded. Duplicated submission with five local council databases resulting in	Weak	High	9	Identified

Subject	Section	Clause	Non-Compliance	Controls	Audit Risk Rating	Breach Risk Rating	Remedial Action
			an estimated over submission of 733,494 kWh per annum.				
Description and capacity of load	2.4	11(2)(c) and (d) of Schedule 15.3	30 items of load with no lamp description. One item of load with no wattage recorded.	Weak	Low	3	Identified
All load recorded in database	2.5	11(2A) of Schedule 15.3	31 additional items of load found in the field of a sample of 325 (10% error rate).	Weak	High	9	Identified

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 150,200 kWh per annum. 30 items of load with no lamp description. One item of load with no wattage recorded. Ten items of load with an invalid lamp description. 295 items of load with the incorrect ballast applied resulting an estimated over submission of 1,627 kWh per annum. One item of load with no wattage recorded. ICP 0000026694WE641 incorrectly recorded as reconciled elsewhere resulting in an estimated under submission of 3,255 kWh per month since February 2022. An unknown number of items of load allocated to the incorrect ICP and therefore the incorrect NSP and possibly balancing area and network including an estimated 22 NZTA lights or 19,540 kWh per annum reconciled to the Lines Company network instead of the Waipa network. Duplicated submission with five local council databases resulting in an estimated over submission of 733,494 kWh per annum.	Weak	High	9	Investigating

Volume information accuracy	3.2	15.2 and 15.37B(c)	Incorrect volume submitted for ICP 0001425638UNCE7 resulting in an estimated over submission of 1,018.54 kWh for May 2022. 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 150,200 kWh per annum. An unknown number of items of load allocated to the incorrect ICP and therefore the incorrect NSP and possibly balancing area and network including an estimated 22 NZTA lights or 19,540 kWh per annum reconciled to the Lines Company network instead of the Waipa network. ICP 0000026694WE641 incorrectly recorded as reconciled elsewhere resulting in an estimated under submission of 3,255 kWh per month since February 2022. 295 items of load with the incorrect ballast applied resulting an estimated over submission of 1,627 kWh per annum. One item of load with no wattage recorded. ICP 0000026694WE641 incorrectly recorded as reconciled elsewhere	Weak	High	9	

Subject	Section	Clause	Non-Compliance	Controls	Audit Risk Rating	Breach Risk Rating	Remedial Action
			resulting in an estimated under submission of 3,255 kWh per month since February 2022. Duplicated submission with five local council databases resulting in an estimated over submission of 733,494 kWh per annum.				
Future Risk Rating						42	

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
GPS coordinates	2.3	Populate GPS coordinates for the 12 items of load with no GPS co-ordinates.
Database Accuracy	3.1	Confirm correct light type for the ten items of load with an invalid description.
		Investigate what load if any is associated with ICP 0000036254WE54E.
		Review ICP allocation for all items of load.
		Liaise with Meridian to switch ICP 0000036463HR791 (NSP ROT0111) in for the same date as the data is added to the NZTA RAMM database.
		Review quality control processes.

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

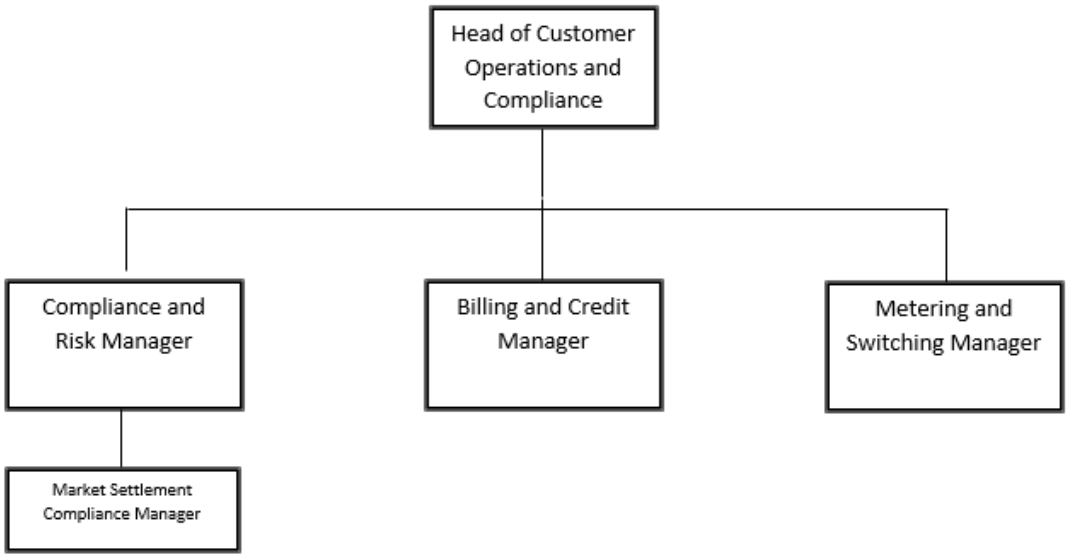
The Electricity Authority's website was reviewed to identify any exemptions relevant to the scope of this audit.

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

Auditor:

Rebecca Elliot

Veritek Limited

Electricity Authority Approved Auditor

Other personnel assisting in this audit were:

Name	Title	Company
Julia Jones	DUML Data & Stakeholder Lead - Market Settlement Compliance	Genesis Energy
Craig Young	Rubiks Business Service Owner – Market Settlements and Interactions	Genesis Energy
Mark Poole	Compliance and Risk Manager	Genesis Energy
Martin Hamilton	Relationship Manager	Genesis Energy
Deepa Pathak	Business Support Officer	Waka Kotahi
Sunny Zhang	Principal Asset Network Manager	Waka Kotahi
Martin Lynch	Director	Martin Lynch Consulting

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 NZTA Waikato area DUML database contains the following unmetered load ICPs traded by Genesis Energy in the table below:

ICP Number	Description	NSP	Profile	Number of items of load	Database wattage (watts)
0000381313TUB52	STATE HIGHWAY 5	WRK0331	NST	60	13204
0000890166TU7C3	MASTER ICP TRANSIT WHAKAMARU	WRK0331	NST	136	35706
0008806768WM373	TRANSIT NEW ZEALAND LTD WAITOMO	HTI0331	NST	324	56511
0008809657WMB31	S/H LIGHTS TURANGI	TKU0331	CST	2	336
0088051901WM4EB	SH1_SH41 SH47	TKU0331	CST	202	33,663
0000557858UNE30	STREETLIGHTS WAIKATO	HIN0331	NST	234	38,409
0000557929UNE2C	Master Transit Street Light ICP OKOROIRE	HIN0331	NST	81	12,862
0000557951UN965	STREETLIGHTS WAIKATO- Paeroa	HIN0331	NST	357	56,927
0000557952UN5A5	STREETLIGHTS WAIKATO- Whitianga	HIN0331	NST	183	33,133
0000562185UN32C	STREETLIGHTS WAIKATO- Hinuera	HIN0331	NST	111	21,437
0000562362UNE5B	STREETLIGHTS WAIKATO- Matamata	HIN0331	NST	387	63,391
0001425638UNCE7	TRANSIT WKO0331	WKO0331	NST	4	672
1000522354PCD90	STATE HIGHWAY 26	PAO1101	NST	89	13,138
0000400320WAD63	SH31 & SH39 Cambridge	TMU0111	NST	77	13,791
0000400344WA399	SH3 Waipa	TMU0111	NST	233	44,660
0000806850WAC3E	ST/LGHTING HOUR MTR CAMBRIDGE	CBG0111	NST	10	2,078
0000806950WA53A	ST/LGHTING HOUR MTR TAMAHERE	CBG0111	NST	88	23,713
0000806955WA875	SH 1 South Cambridge By-Pass	CBG0111	NST	10	2,091
0000808803WA036	ST/LGHTING HOUR MTR KARAPIRO	CBG0111	NST	39	9,617

ICP Number	Description	NSP	Profile	Number of items of load	Database wattage (watts)
0000011095WE94E	Cnr Tidd & Horne St- Hamilton Lake	HAM0331	NST	374	76,649
0000022579WE623	State Highway 1 Te Kauwhata	HLY0331	NST	803	183,488
0000036247WE323	TE RAPA BYPASS STREETLIGHTS	TWH0331	NST	145	38,971
TOTAL				**3,949**	**774,447**

The list of ICPs was compared with the ICPs associated with the previous three DUML audits. Detailed below are the ICPs that were associated with these loads, but were not in the data extract provided:

NZTA East Waikato

ICP Number	NSP	Profile	Number of items of load	Database wattage (watts)	Comments
0001425637UN339	KPU0661	NST	392	67,700	This load is being recorded from the data in the TCDC database. TCDC has not maintained this data since October 2018. As this is a different database it is subject to a separate audit.

NZTA West Waikato

ICP Number	NSP	Profile	Number of items of load	Database wattage (watts)	Comments
0000036254WE54E	HLY0331	NST	No data in database extract provided	unknown	These are the Ngaruawahia by-pass lights. The registry records 55.683 kWh per day. I reviewed the load recorded against ICP 0000022579WE623 (the only other ICP associated with the HLY0331) and found only six items of load in the Ngaruawhahia area. This is discussed further in **section 3.1**.
0000026694WE641	HAM0331	UNM	36	9,146	Registry status of "inactive- reconciled elsewhere" against ICP 0000011095WE94E. These items of load are not recorded against ICP 0000011095WE94E. This is discussed further in **section 3.1**.

1.7. Authorisation Received

All information was provided directly by Genesis and Waka Kotahi.

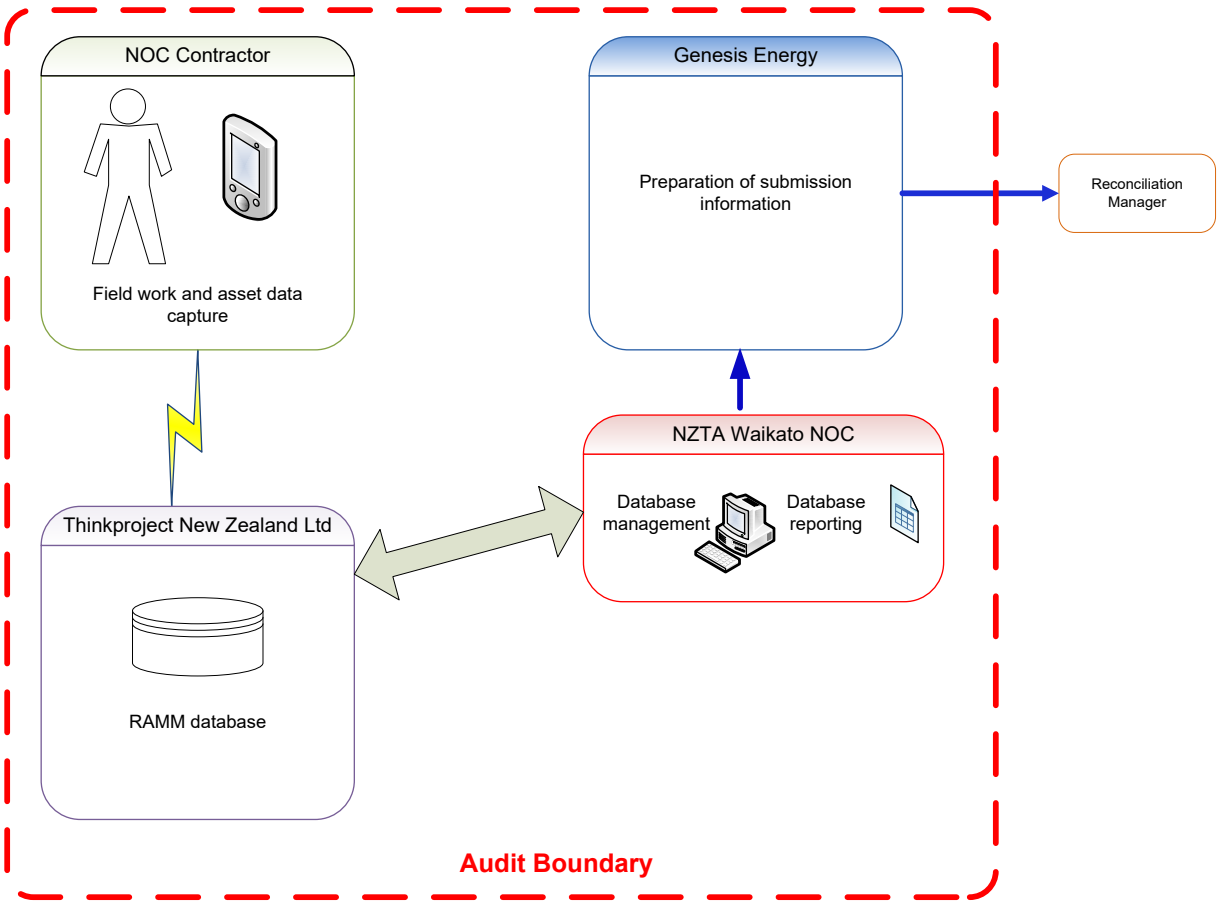
1.8. Scope of Audit

This audit of the Waka Kotahi Waikato (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.

Genesis was provided a database extract from NZTA for the Waikato area in April 2022 and revised all submissions for the previous 14 months. NZTA will commence sending a monthly database extract to Genesis from July 2022. 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 NZTA 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 325 items of load recorded of the areas covered in the database from May 15th to June 29th, 2022.

1.9. Summary of previous audits

The previous audit of the three NZTA DUML audits covering East Waikato (completed 6 December 2019), West Waikato (completed 30 November 2019) and Taupo (completed 4 May 2022) have been combined. All three were reviewed and their findings are detailed below with the current status below. Genesis was the trader for the East and West Waikato NZTA DUML audits. Trustpower was the trader for the NZTA Taupo DUML:

NZTA East Waikato - GENE 2019

Table of Non-Compliance

Subject	Section	Clause	Non-compliance	Status
Audit	1.10	17.295F	Audit not completed within the required timeframe.	Still existing
Deriving submission information	2.1	11(1) of Schedule 15.3	Outdated registry UML figures and not a current database used to calculate submission for eight ICPs. Incorrect calculations were found for one ICP resulting in a minor over submission of 120 kWh for the month of September 2019. Monthly wattage report for ICP 0001425637UN339 is provided as a snapshot. Lights associated with ICP 0001425637UN339 were also being submitted by TCDC council trader resulting in an estimated annual over submission of 269,450 kWh until October 2018. Lights associated with ICP 0001425638UNCE are also being submitted by MPDC council trader resulting in an estimated annual over submission of 287,620 kWh. Ballasts are being applied outside of the RAMM database for ICP 0001425637UN339.	Still existing for different reasons
ICP Identifier	2.2	11(2)(a) and (aa) of Schedule 15.3	No database used to reconcile 8 ICPs.	Cleared
Location of each item of load	2.3	11(2)(b) of Schedule 15.3	No database used to reconcile 8 ICPs.	Cleared
Description and capacity of load	2.4	11(2)(c) and (d) of Schedule 15.3	No database used to reconcile 8 ICPs.	Still existing for different reasons

Subject	Section	Clause	Non-compliance	Status
All load recorded in database	2.5	11(2A) of Schedule 15.3	No load recorded in the database for eight of the nine ICPs provided. Items of load are missing from the database.	Still existing for different reasons
Audit trail	2.7	11(4) of schedule 15.3	Eight ICPs with no database and therefore no audit trail.	Cleared
Database accuracy	3.1	15.2 and 15.37B(b)	No database used to reconcile 8 ICPs. 22 items of load in the TCDC database have the incorrect ballast recorded in the RAMM database which would result in a minor amount of inaccurate submission if used. Incorrect ICP recorded against each item of NZTA load in the TCDC RAMM database.	Still existing for different reasons
Volume information accuracy	3.2	15.2 and 15.37B(c)	Outdated registry UML figures and not a current database used to calculate submission for eight ICPs. Incorrect calculations were found for one ICPs resulting in a minor over submission of 120kWh for the month of September 2019. Monthly wattage report for ICP 0001425637UN339 is provided as a snapshot. Lights associated with ICP 0001425637UN339 were also being submitted by TCDC council trader resulting in an estimated annual over submission of 269,450 kWh until October 2018. Lights associated with ICP 0001425638UNCE are also being submitted by MPDC council trader resulting in an estimated annual over submission of 287,620 kWh. Ballasts are being applied outside of the RAMM database for ICP 0001425637UN339.	Still existing for different reasons

Table of Recommendations

Subject	Section	Recommendation for Improvement	Status
Database accuracy	3.1	Responsibility for the database accuracy is included in the NOC contract with a KPI linked to database accuracy findings assessed in the EA DUML audit to ensure that database accuracy is maintained.	Not adopted

NZTA West Waikato - GENE 2019

Table of Non-Compliance

Subject	Section	Clause	Non-compliance	Status
Audit	1.10	17.295F	Audit not completed within the required timeframe	Still existing
Deriving submission information	2.1	11(1) of Schedule 15.3	Outdated database or registry UML figures and not a current database used to calculate submission. This will be resulting in an estimated annual over submission of 20,449.58 kWh for the three ICPs where it was compared with the NZTA RAMM database.	Still existing for different reasons
ICP Identifier	2.2	11(2)(a) and (aa) of Schedule 15.3	No database used to reconcile ICPs.	Cleared
Location of each item of load	2.3	11(2)(b) of Schedule 15.3	No database used to reconcile ICPs.	Cleared
Description and capacity of load	2.4	11(2)(c) and (d) of Schedule 15.3	No database used to reconcile ICPs.	Still existing for different reasons
All load recorded in database	2.5	11(2A) of Schedule 15.3	No database used to reconcile ICPs.	Still existing for different reasons
Audit trail	2.7	11(4) of schedule 15.3	No database used to reconcile ICPs and therefore no audit trail.	Cleared
Database accuracy	3.1	15.2 and 15.37B(b)	No database used to reconcile ICPs.	Still existing for different reasons
Volume information accuracy	3.2	15.2 and 15.37B(c)	Outdated database or registry UML figures and not a current database used to calculate submission. This will be resulting in an estimated annual over submission of 20,449.58 kWh for the three ICPs where it was compared with the NZTA RAMM database.	Still existing for different reasons

Table of Recommendations

Subject	Section	Recommendation for Improvement	Status
Database accuracy	3.1	Responsibility for the database accuracy is included in the NOC contract with a KPI linked to database accuracy findings assessed in the EA DUML audit to ensure that database accuracy is maintained.	Not adopted

NZTA East Waikato - TRUS 2022

Table of Non-Compliance

Subject	Section	Clause	Non-compliance	Status
DUML Audit	1.10	17.295F	Audit report not submitted within the required timeframe resulting in under submission of volume due to the under submission that will not be corrected as it is outside the 14-month revision cycle.	Different trader--not relevant
Deriving submission information	2.1	11(1) of Schedule 15.3	DUML database has not been up to date resulting in an estimated under submission of 312,844 kWh that will not be corrected as this is outside of the 14-month revision cycle. 51 duplicated lights incorrectly included in the 14-month revisions being processed. The database accuracy is not within the allowable +/-5% threshold resulting in an estimated over submission of 10,426 kWh per annum. 209 NZTA lights in the Ruapehu DC & Taupo DC areas that are being reconciled by both the council and NZTA databases resulting in potentially 36.63 kW or 156,434 kWh per annum of load being submitted twice. The data used for submission does not track changes at a daily basis and is provided as a snapshot.	Still existing for different reasons
Database accuracy	3.1	15.2 and 15.37B(b)	The database accuracy is not within the allowable +/-5% threshold resulting in an estimated over submission of 10,426 kWh per annum. 209 NZTA lights in the Ruapehu DC & Taupo DC areas that are being reconciled by both the council and NZTA databases resulting in potentially 36.63 kW or 156,434 kWh per annum of load being submitted twice. 25 lamps were found to have the incorrect ballast recorded the impact of this is included in the database inaccuracy recorded above.	Still existing for different reasons

Subject	Section	Clause	Non-compliance	Status
Volume information accuracy	3.2	15.2 and 15.37B(c)	DUML database has not been up to date resulting in an estimated under submission of 312,844 kWh that will not be corrected as this is outside of the 14-month revision cycle. 51 duplicated lights incorrectly included in the 14-month revisions being processed. The database accuracy is not within the allowable +/-5% threshold resulting in an estimated over submission of 10,426 kWh per annum. 209 NZTA lights in the Ruapehu DC & Taupo DC areas that are being reconciled by both the council and NZTA databases resulting in potentially 36.63 kW or 156,434 kWh per annum of load being submitted twice. The data used for submission does not track changes at a daily basis and is provided as a snapshot.	Still existing for different reasons

Table of Recommendations

Subject	Section	Recommendation for Improvement	Status
Database accuracy	3.1	Liaise with NZTA to ensure SH lights are included for all SH associated with this area. Liaise with local councils and NZTA to determine which database the duplicated lights are to be recorded in.	In progress

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 of this database has been unable to be completed by the due date, due to the delays in NZTA providing a database to audit. NZTA are working with Martin Lynch Consulting to complete the consolidation of this database, and bed in BAU processes to provide Genesis monthly wattage reports. This is recorded as non-compliance.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 1.10 Clause 16A.26 Waikato From: 12-Mar-21 To: 22-Jun-22	Audit not completed within the required timeframe. Potential impact: Low Actual impact: Low Audit history: Once previously Controls: Weak Breach risk rating: 3
Audit risk rating	**Rationale for audit risk rating**
Low	The controls are rated as weak as Genesis are in the process of a staff change resulting in there being insufficient resource to manage the DUML audit process at this time. The impact is assessed to be low, as this has no direct impact on reconciliation.

Actions taken to resolve the issue	Completion date	Remedial action status
Genesis is currently in the process of reviewing the NZTA Waikato data base to ascertain data base accuracy levels, with the intent to update database exceptions by the 01/08/2022.	1/08/2022	Investigating
Preventative actions taken to ensure no further issues will occur	**Completion date**	
Genesis and NZTA Waikato agree to review RAMM database on a monthly basis to mitigate risk associated with asset database misalignment. Initial review completed with updates expected to be completed by the 01/08/2022.	O1/08/2022	

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. They were provided a database extract from NZTA for the Waikato area in April 2022 and revised all submissions for the previous 14 months. NZTA will commence sending a monthly database extract to Genesis from July 2022. This will include any changes made during the month so any changes made during the month will be taken into account from the date of the change.

I reviewed the submission for the month of May 2022 and found that all values matched with the exception of ICP 0001425638UNCE7. This was due to more items of load being recorded by Genesis than in the database extract provided to me as detailed below:

ICP Number	NZTA dB extract kW value	Items of load	Genesis May dB extract kW value	Submitted R1 kWh	May kWh submission difference
0001425638UNCE7	0.672	4	3.070	15	-1,018.54

The data loggers used to calculate the burn hours were reviewed and found data loggers from the incorrect network are being used as the burn hours will be different between networks:

ICP Number	NSP	Logger No.	Network
0000381313TUB52	WRK0331	206558603	HAWK
0000890166TU7C3	WRK0331	206558603	HAWK
0001425638UNCE7	WKO0331	206558603	POCO
0000557858UNE30	HIN0331	206558444	POCO
0000557929UNE2C	HIN0331	206558444	POCO
0000557951UN965	HIN0331	206558444	POCO
0000557952UN5A5	HIN0331	206558444	POCO
0000562185UN32C	HIN0331	206558444	POCO

ICP Number	NSP	Logger No.	Network
0000562362UNE5B	HIN0331	206558444	POCO
1000522354PCD90	PAO1101	206558444	POCO
0000011095WE94E	HAM0331	206558444	WEL
0000022579WE623	HLY0331	206558444	WEL
0000036247WE323	TWH0331	206558444	WEL

As discussed in **section 3.1**:

- the field audit against the database quantities found that the database is not confirmed as accurate with a 95% level of confidence resulting in an estimated over submission of 150,200 kWh per annum,
- ICP allocation needs review to ensure that these are allocated correctly as this will be resulting in volumes being incorrectly allocated to the incorrect NSP and therefore potentially the incorrect balancing area and/or network,
- ICP 0000026694WE641 status is being "reconciled elsewhere" against ICP 0000011095WE94E since 1 February 2022; I checked the items of load associated with ICP 0000026694WE641 against those recorded in the NZTA RAMM database and found these are not recorded in the database which will result in an estimated under submission of 3,255 kWh per month since February 2022,
- 295 items of load with the incorrect ballast applied resulting in an estimated over submission of 1,627 kWh per annum,
- One item of load with no wattage recorded,
- ICP 0000026694WE641incorreclty recorded as reconciled elsewhere resulting in an estimated under submission of 3,255 kWh per month since February 2022.
- an unknown number of items of load allocated to the incorrect ICP and therefore the incorrect NSP and possibly balancing area and network including an estimated 22 NZTA lights or 19,540 kWh per annum reconciled to the Lines Company network instead of the Waipa network, and
- duplicated submission with five local council databases resulting in an estimated over submission of 733,494 kWh per annum.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 2.1 With: Clause 11(1) of Schedule 15.3 From: 02-Dec-19 To: 30-Apr-22	Incorrect volume submitted for ICP 0001425638UNCE7 resulting in an estimated over submission of 1,018.54 kWh for May 2022. 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 150,200 kWh per annum. An unknown number of items of load allocated to the incorrect ICP and therefore the incorrect NSP and possibly balancing area and network including an estimated 22 NZTA lights or 19,540 kWh per annum reconciled to the Lines Company network instead of the Waipa network. ICP 0000026694WE641 incorrectly recorded as "reconciled elsewhere" resulting in an estimated under submission of 3,255 kWh per month since February 2022. 295 items of load with the incorrect ballast applied resulting an estimated over submission of 1,627 kWh per annum. One item of load with no wattage recorded. Duplicated submission with five local council databases resulting in an estimated over submission of 733,494 kWh per annum. Potential impact: High Actual impact: High Audit history: Twice previously Controls: Weak Breach risk rating: 9
Audit risk rating	**Rationale for audit risk rating**
High	The controls are rated as weak as they are not sufficient to ensure that the database is accurate. Genesis is working with NZTA to improve this. The audit risk rating is assessed to be high, based on the estimated reconciliation impact.

Actions taken to resolve the issue	Completion date	Remedial action status
Through the audit sample the above outline exceptions have identified, however after initial review Genesis has identified further anomalies and have raised these with NZTA Waikato with the intent to have all exceptions updated by the 01/10/2022	01/10/2022	Identified
Preventative actions taken to ensure no further issues will occur	**Completion date**	
Genesis and NZTA Waikato agree to review RAMM database on a monthly basis to mitigate risk associated with asset database misalignment. Initial review completed with updates expected to be completed by the 01/08/2022.	O1/10/2022	

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. 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 apart from 12 items of load have GPS coordinates populated. The 12 items of load without GPS coordinates have a road name, location and a pole number and are locatable, however I recommend the GPS coordinates are populated.

Recommendation	Description	Audited party comment	Remedial action
GPS coordinates	Populate GPS coordinates for the 12 items of load with no GPS co-ordinates.	Genesis has raised all GPS coordinate issues with NZTA Waikato with the intent the updates will be populated or updated for accuracy.	Identfied

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.

30 items of load have a blank or unknown light model description. One of these has no wattage recorded.

The accuracy of the wattages and ballasts are discussed in **sections 2.1, 3.1** and **3.2**.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 2.4 With: Clause 11(2)(c) & (d)of Schedule 15.3 From: 02-Dec-19 To: 30-Apr-22	30 items of load with no lamp description. One item of load with no wattage recorded. Potential impact: Low Actual impact: Low Audit history: Once previously Controls: Weak Breach risk rating: 3
Audit risk rating	**Rationale for audit risk rating**
Low	The controls are rated as weak the controls in place do not mitigate risk to an acceptable level. The impact is assessed to be low as number of items affected is very small.

Actions taken to resolve the issue	Completion date	Remedial action status
Genesis and NZTA Waikato agree to review RAMM database on a monthly basis to mitigate risk associated with asset database misalignment.	01/10/2022	Identified
Preventative actions taken to ensure no further issues will occur	**Completion date**	
Genesis will advise NZTA Waikato of any exceptions where the monthly review has identified any anomaly.	01/10/2022	

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 325 items of load recorded of the areas covered in the database from May 15th to June 29th, 2022.

Audit commentary

The field audit found the following discrepancies:

RAMM road reference	Database count	Field count	Light count differences	Wattage recorded incorrectly	Comments
003-0000	20	20	-	2	2x est. 80W LED found in the field but recorded as 150W HPS in the database.
003-0000/00.45-I	28	30	+2	1	2x additional 150W HPS found in the field. 1x est. 80W LED found in the field but recorded as 150W HPS in the database.
003-0001-W	2	2	-	1	1x est. 80W LED found in the field but recorded as 250W HPS in the database.
003-0016 4 Block #1	10	10		2	1x 108W LED found in the field but recorded as 250W HPS in the database. 1x 150W HPS found in the field but recorded as 250W HPS in the database.
003-0016 4 Block #7	13	13		5	3x est. 49W LED found in the field but recorded as 150W HPS in the database. 2x est. 108W LED found in the field but recorded as 1x 150W HPS and 1x 250W HPS in the database.
005-0137	8	8		1	1x 40W LED found in the field but recorded as 150W HPS in the database.
01N-0540-D Block #3	14	16	+2	2	2x additional 250W HPS found in the field. 2x est. 135W LED found in the field but recorded as 250W HPS in the database.
01N-0554/01.75-I Block #2	22	37	-12 +27		4x 250W HPS not found in the field. 8x 150W HPS not found in the field. 27x additional 293W LED found in the field.
021-0000/00.15	11	9	-2		1x 250W HPS not found in the field. 1x 150W HPS not found in the field.
024-0000-I Block #1	22	22	-	1	1x 80W LED found in the field but recorded as 150W HPS in the database.
026-0060	24	24	-	8	3x 60.5W LED found in the field but recorded as 2x 150W HPS and 1x 80W MV in the database.

RAMM road reference	Database count	Field count	Light count differences	Wattage recorded incorrectly	Comments
					3x 80W LED found in the field but recorded as 2x 28W LED and 1x 150W HPS in the database. 2x 150W HPS found in the field but recorded as 80W HPS in the database.
027-0067 Block #2	20	20	-	1	1x150W HPS found in the field but recorded as 80W LED in the database.
029-0061 Block #1	18	18	-	1	1x150W HPS found in the field but recorded as 80W LED in the database.
039-0043 Block #1	21	21		8	2x est. 49W LED found in the field but recorded as 2x 70W HPS in the database. 5x 102W LED found in the field but recorded as 150W HPS in the database. 1x 108W LED found in the field but recorded as 150W HPS in the database.
039-0043 Block #3	3	3	-	1	1x22W LED found in the field but recorded as 29W LED in the database.
049-0029	13	12	-1		Light no. 62907 has no light head.
Grand Total	**325**	**341**	**46** **(-15/+31)**	**34**	

The field audit found 31 more lamps in the field than were recorded in the database. This is recorded as non-compliance below.

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

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 2.5 With: Clause 11(2A) of Schedule 15.3 From: 04-Nov-19 To: 01-Apr-22	31 additional items of load found in the field of a sample of 325 (10% error rate). Potential impact: High Actual impact: High Audit history: Once previously Controls: Weak Breach risk rating: 9
Audit risk rating	**Rationale for audit risk rating**
High	The controls are rated as weak as the despite the processes in place having quality checks, the level of error indicates that this is not ensuring data is entered correctly. The impact is assessed to be high, as the volume of additional lights found in the field audit indicate a potential large under submission to the market.

Actions taken to resolve the issue	Completion date	Remedial action status
Genesis and NZTA Waikato agree to review RAMM database on a monthly basis to mitigate risk associated with asset database misalignment.	01/10/2022	Identified
Preventative actions taken to ensure no further issues will occur	**Completion date**	
Genesis will advise NZTA Waikato of any exceptions where the monthly review has identified any anomaly.	01/10/2022	

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 325 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	NZTA Waikato
Strata	The NZTA RAMM database covers the Waikato area. The management of the NZTA items of load are the same, but I decided to place the items of load into three similarly sized strata by network as follows: 1. Strata 1 – HAWK, LINE and WAIP, 2. Strata 2 – POCO, and 3. 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 27 sub-units or 9% of the database.
Total items of load	325 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 325 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	105.0%	Wattage from survey is higher than the database wattage by 5%
R_L	94.8%	With a 95% level of confidence, it can be concluded that the error could be between -5.2% and +27.6%
R_H	127.6%	

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 B (detailed below) applies. The conclusion from Scenario B is that the variability of the sample results across the strata means that the true wattage (installed in the field) could be between 5.2% lower to 24.8% 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 35.0 kW higher than the database indicates.

There is a 95% level of confidence that the installed capacity is between 36 kW lower to 194 kW higher than the database.

In absolute terms, total annual consumption is estimated to be 150,200 kWh higher than the DUML database indicates.

There is a 95% level of confidence that the annual consumption is between 155,200 kWh lower to 830,100 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 %

Lamp description and capacity accuracy

As discussed in **section 2.4**, 30 items of load have a blank or unknown light model description and one item of load has no wattage recorded.

Examination of the database found six lamp invalid types:

Lamp Description	No of items of load
135w High Pressure Sodium	1
153w High Pressure Sodium	1
158w High Pressure Sodium	1
180w High Pressure Sodium	1
40w High Pressure Sodium	1
90w High Pressure Sodium	5
TOTAL	10

I recommend these are reviewed and the light type confirmed and updated.

Recommendation	Description	Audited party comment	Remedial action
Database Accuracy	Confirm correct light type for the ten items of load with an invalid description.	Genesis has raised this with NZTA Waikato who has agreed complete updates by 01/10/2022.	Identified

One 150W HPS light recorded with an incorrect wattage of 178W.

The ballasts accuracy was checked and found 295 incorrect (including 86 zero ballast where ballast was expected) or a 7% error rate as detailed below:

Ballast									
Watts	**0**	**9**	**10**	**12**	**13**	**14**	**18**	**28**	**TOTAL**
Incorrect	86	1	10	7	6	4	50	131	295
Database total	654	1	42	7	119	9	1,944	1,173	3,949

There are both overs and unders, but the overall estimated impact of these on submission is an over submission of 1,627 kWh per annum.

The check of LED wattages found that lamp descriptions were sufficient to confirm the correct wattage.

ICP Accuracy

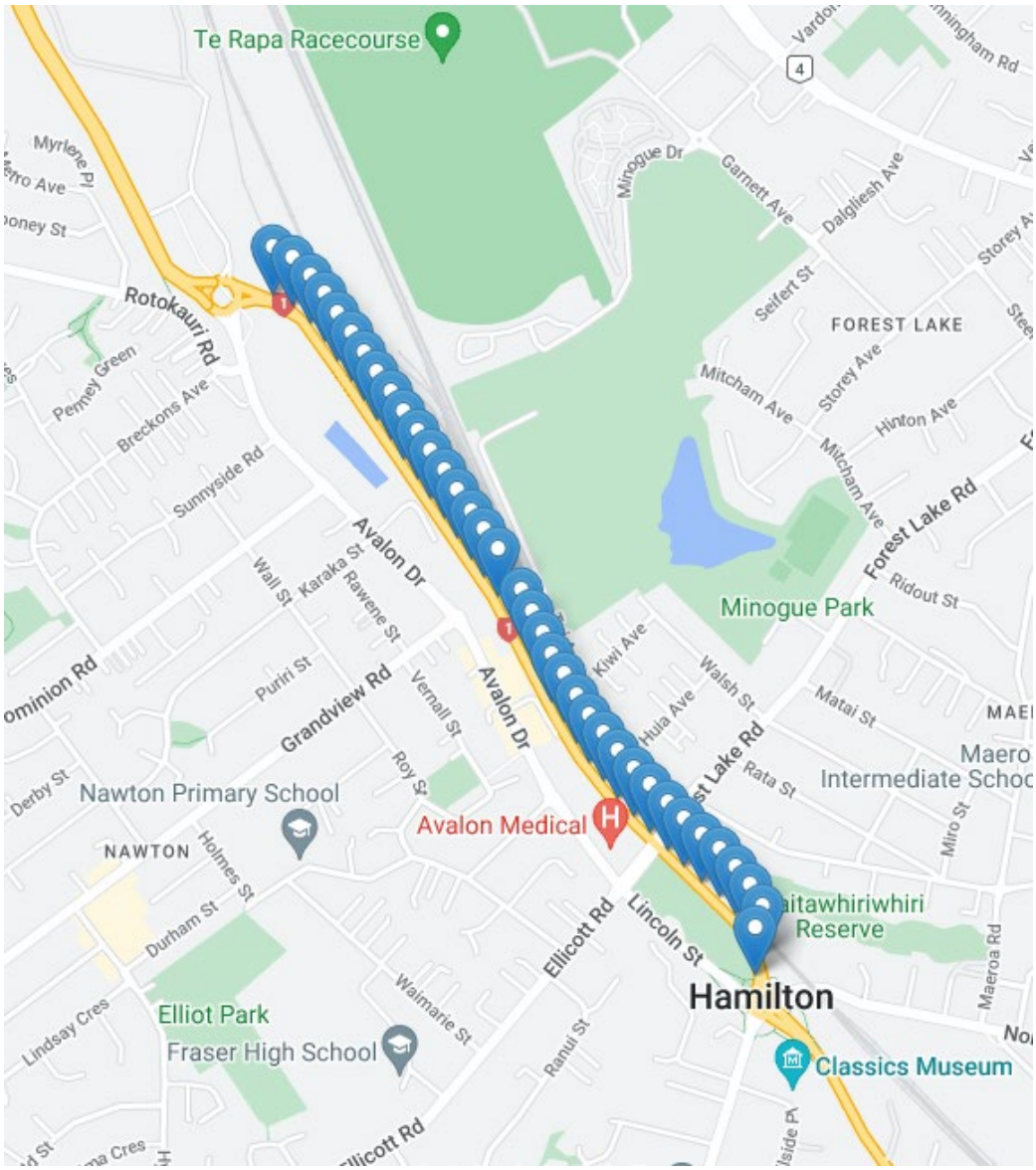
I reviewed the NSP's in the NZTA Waikato area and found most but not all NSPs have an NZTA ICP associated:

NSP POC	Network	Description	NSPs with NZTA Waikato ICPs associated	Comments
HIN0331	POCO	HINUERA	Yes	
KPU0661	POCO	KOPU	No	The NZTA lights are being reconciled using the TCDC RAMM information which is no longer being maintained.
OKN0111	POCO	OHAKUNE	No	Needs investigation to determine if any unmetered NZTA lighting is connected to this NSP.
PAO1101	POCO	PIAKO 110KV	Yes	
WHU0331	POCO	WAIHOU	No	Needs investigation to determine if any unmetered NZTA lighting is connected to this NSP. This was noted in the last Waikato East DUML audit.
WKO0331	POCO	WAIKINO	Yes	A very small number of lights are recorded in the database against this NSP. This is discussed below in relation to ICP 0001425638UNCE7
HAM0111	WAIK	HAMILTON	No	Needs investigation to determine if any unmetered NZTA lighting is connected to this NSP.
HAM0331	WAIK	HAMILTON	Yes	
HLY0331	WAIK	Huntly	Yes	
TWH0331	WAIK	TE KOWHAI	Yes	
HTI0331	LINE	HANGATIKI	Yes	
NPK0331	LINE	NATIONAL PARK	No	Needs investigation to determine if any unmetered NZTA lighting is connected to this NSP.
OKN0111	LINE	OHAKUNE	No	Needs investigation to determine if any unmetered NZTA lighting is connected to this NSP.
ONG0331	LINE	ONGARUE	No	Needs investigation to determine if any unmetered NZTA lighting is connected to this NSP.
TKU0331	LINE	TOKAANU	Yes	
WRK0331	HAWK	WAIRAKEI	Yes	
CBG0111	WAIP	Cambridge	Yes	
TMU0111	WAIP	Te Awamutu	Yes	
HIN0331	POCO	HINUERA	Yes	

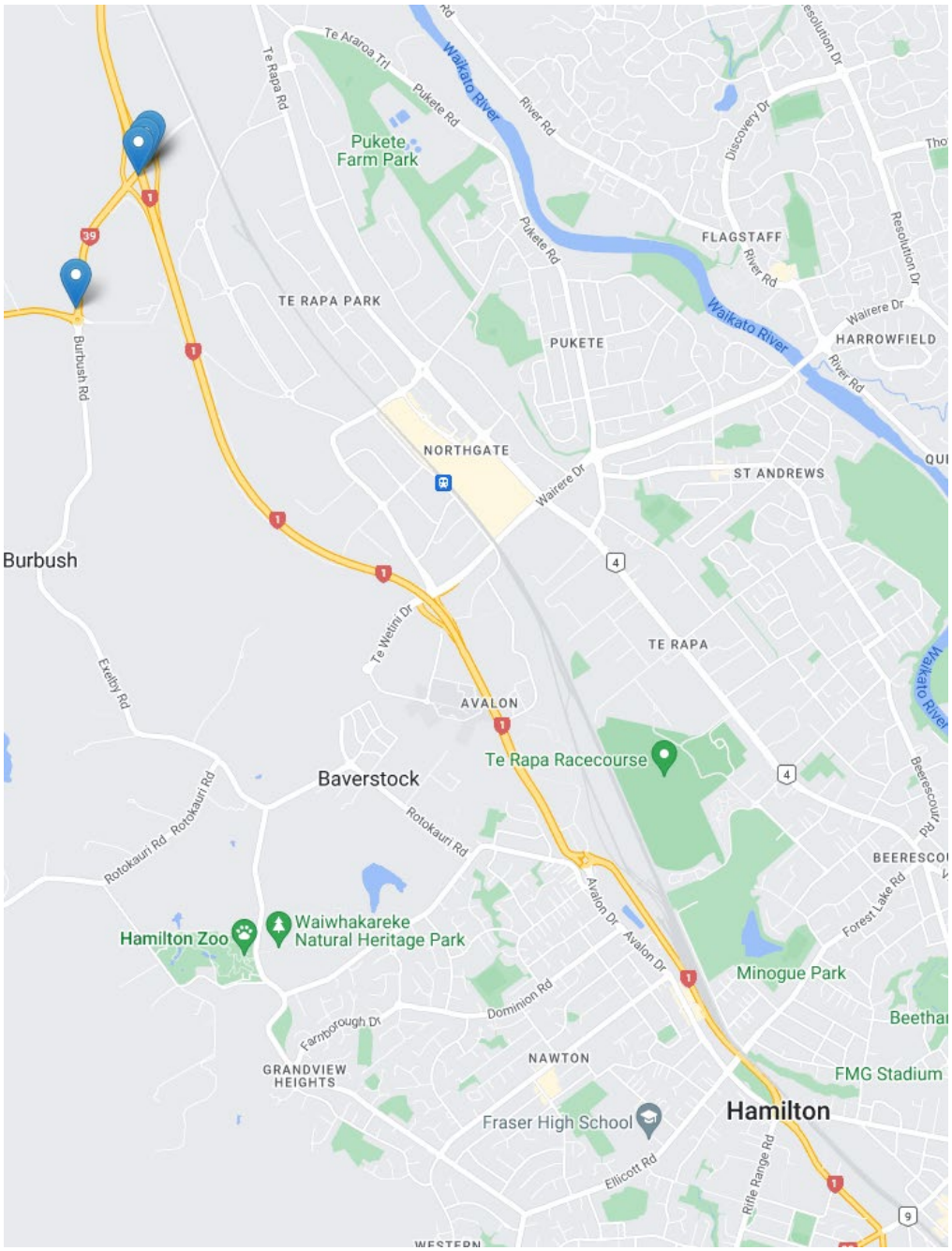
In addition to the findings above, examination of the database against the various council streetlight databases found that the ICPs may not be allocated correctly. Examples of this are detailed below:

ICP 0000026694WE641 status is being "reconciled elsewhere" against ICP 0000011095WE94E since 1 February 2022. I checked the items of load associated with ICP 0000026694WE641 against those recorded in the NZTA RAMM database and found these are not recorded in the database. The pictures below detail this:

Items of load for ICP 0000026694WE641 from the NZTA West Waikato 2019 database extract:



Current NZTA Waikato RAMM database extract for ICP 0000011095WE94E:



This will be resulting in an estimated under submission of 3,255 kWh per month since February 2022. This is recorded as non-compliance below.

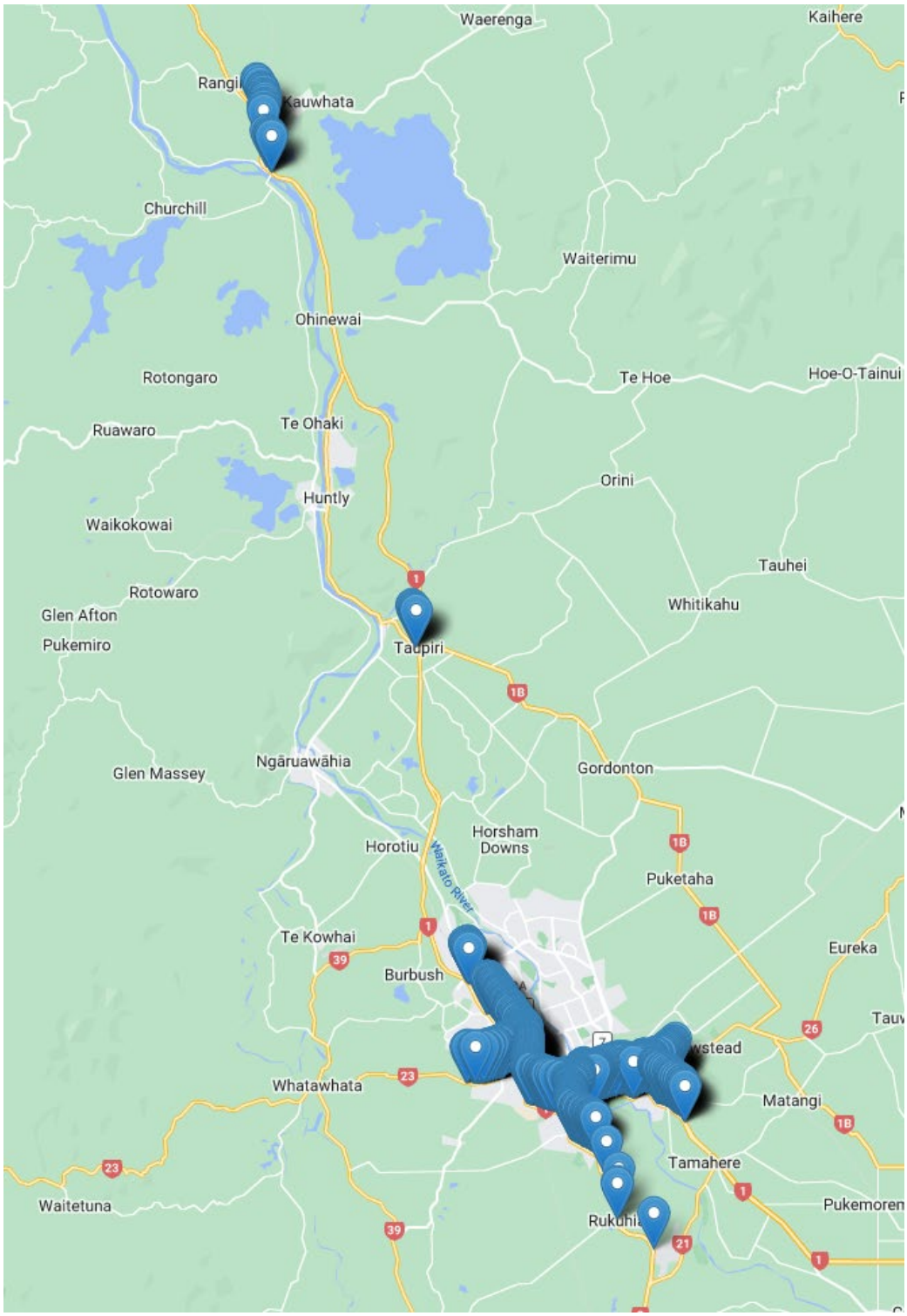
ICP 0000036254WE54E

This ICP was included in the NZTA West Waikato DUML audit report. Genesis is using the registry record to reconcile this load. These are described as the Ngaruawahia by-pass lights with a daily unmetered load figure of 55.683 kWh. No database details could be located in the last DUML audit. I mapped all the ICPs associated with the only ICP on NSP HLY0331 in the NZTA RAMM database extract. This found only six items of load in the Ngaruawahia area. The Waikato Expressway has bypassed Ngaruawahia, and the old state highway has been passed back to Waikato DC. I recommend that Genesis investigate what if any load if any is associated with this ICP.

Recommendation	Description	Audited party comment	Remedial action
Database Accuracy	Investigate what load if any is associated with ICP 0000036254WE54E.	Genesis confirms that historical are correct however Genesis has identified that the new data set provided by NZTA Waikato has incorrectly allocated the Huntly GXP ICP to these assets. Genesis' review recommended these assets to be reallocated to Hamilton HAM0331 ICP 0000011095WE94E	Identified

It also showed the load for this ICP is mostly in Hamilton city suggesting that the majority of the load for recorded against the incorrect NSP and therefore ICP.

The geographical map below details this:



ICP 0001425638UNCE7

I found only four items of load connected to ICP 0001425638UNCE7 (NSP WKO0331) in this database, but the Hauraki DC NZTA load has 267 items of load recorded against the same NSP. These are in the same balancing areas so this has no direct effect on submission, but should the balancing areas be revised the incorrect NSP allocation could affect submission accuracy.

Otorohonga DC

The ODC NZTA lights are spread across the both the Lines Company and Waipa Networks but are only being reconciled to the Lines Company network. I identified 22 lights that are likely to be on the Waipa network. This will be resulting in an estimated 19,540 kWh per annum being reconciled and billed to the incorrect network.

I recommend that the ICP allocation for all items of load is checked for accuracy.

Recommendation	Description	Audited party comment	Remedial action
Database Accuracy	Review ICP allocation for all items of load.	Genesis has completed the review and recommendations has been provided to NZTA Waikato.	Identified

NZTA and local Council NZTA lighting loads

The Waikato NZTA area covers several council areas. Various arrangements have been in place with the councils. Some councils pay for all the NZTA streetlighting and then claim the costs back from NZTA. Some have this arrangement for urban NZTA lighting only and the rural portion is paid for by NZTA. NZTA have been working to use their own RAMM database to manage and pay for the unmetered streetlight loads across the country and remove these from the council databases. Genesis commenced submission from the NZTA RAMM database in April 2022. I checked all the council streetlight audits for the Waikato area as detailed below:

Council	Comment
Waipa DC	NZTA lights are not included
Waitomo DC	NZTA Urban lights are recorded but are not reconciled in this database
Waikato DC	NZTA lights are not included
Hamilton CC	NZTA lights are not included
South Waikato DC	Some NZTA lighting is recorded in this database - see below for details
Hauraki DC	NZTA lighting is recorded in both the NZTA RAMM database and the council database - see below for details
Ruapehu DC	NZTA lighting is recorded in both the NZTA RAMM database and the council database - see below for details
Taupo DC	NZTA lighting is recorded in both the NZTA RAMM database and the council database - see below for details
Otorohonga DC	NZTA lighting is recorded in both the NZTA RAMM database and the council database - see below for details
Matamata Piako DC	NZTA lighting is recorded in both the NZTA RAMM database and the council database - see below for details
Thames Coromandel DC	As detailed in **section 2.1**, NZTA lights for the TCDC area are being reconciled from the TCDC database.

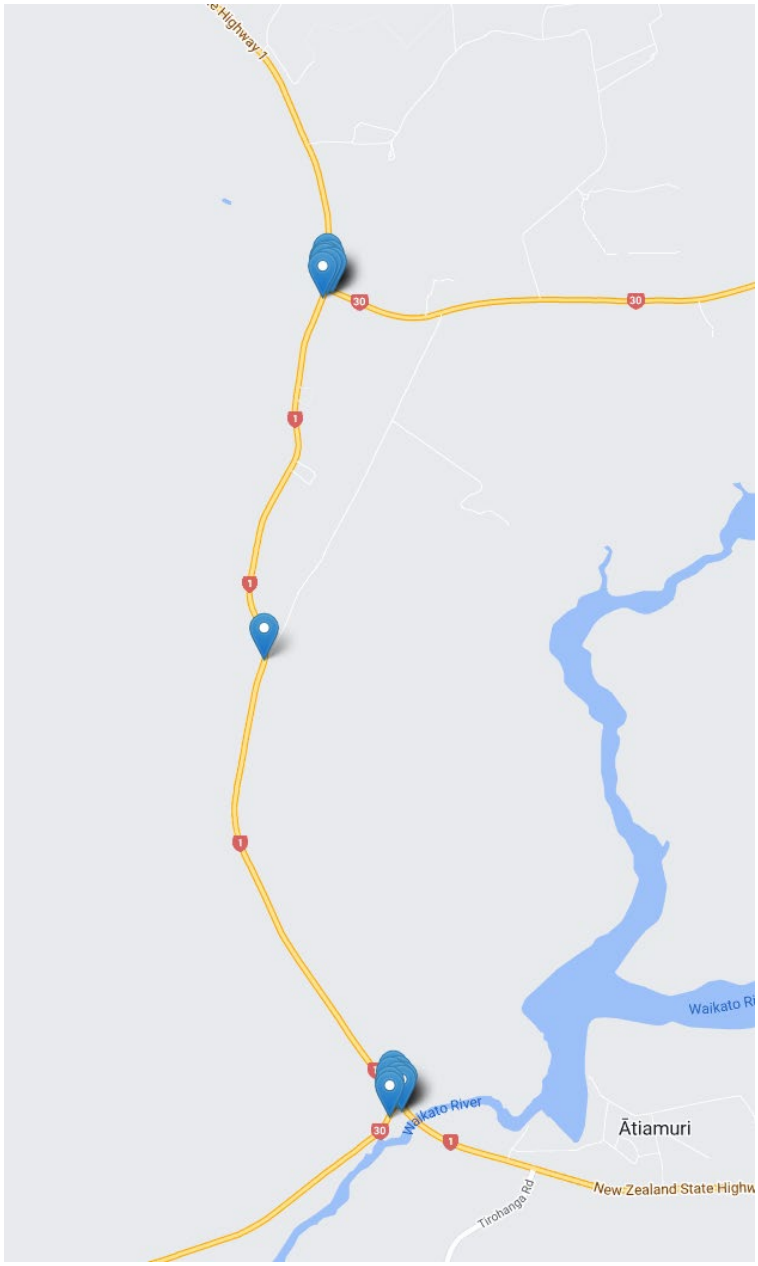
In reviewing the NZTA Waikato area, I found that there are some NZTA lights that are still being submitted for by both the council and NZTA.

South Waikato DC

ICP 0000036463HR791 (NSP ROT0111) covers the NZTA lights on SH1 around Atiamuri. These lights are not in the NZTA Waikato RAMM database. NZTA are getting these lights added to the NZTA RAMM database. I recommend that Genesis liaise Meridian to get this ICP switched in.

Recommendation	Description	Audited party comment	Remedial action
Database Accuracy	Liaise with Meridian to switch ICP 0000036463HR791 (NSP ROT0111) in for the same date as the data is added to the NZTA RAMM database.	Genesis has completed the switch as of the 01/07/2022.	Cleared

South Waikato NZTA lighting



Hauraki DC

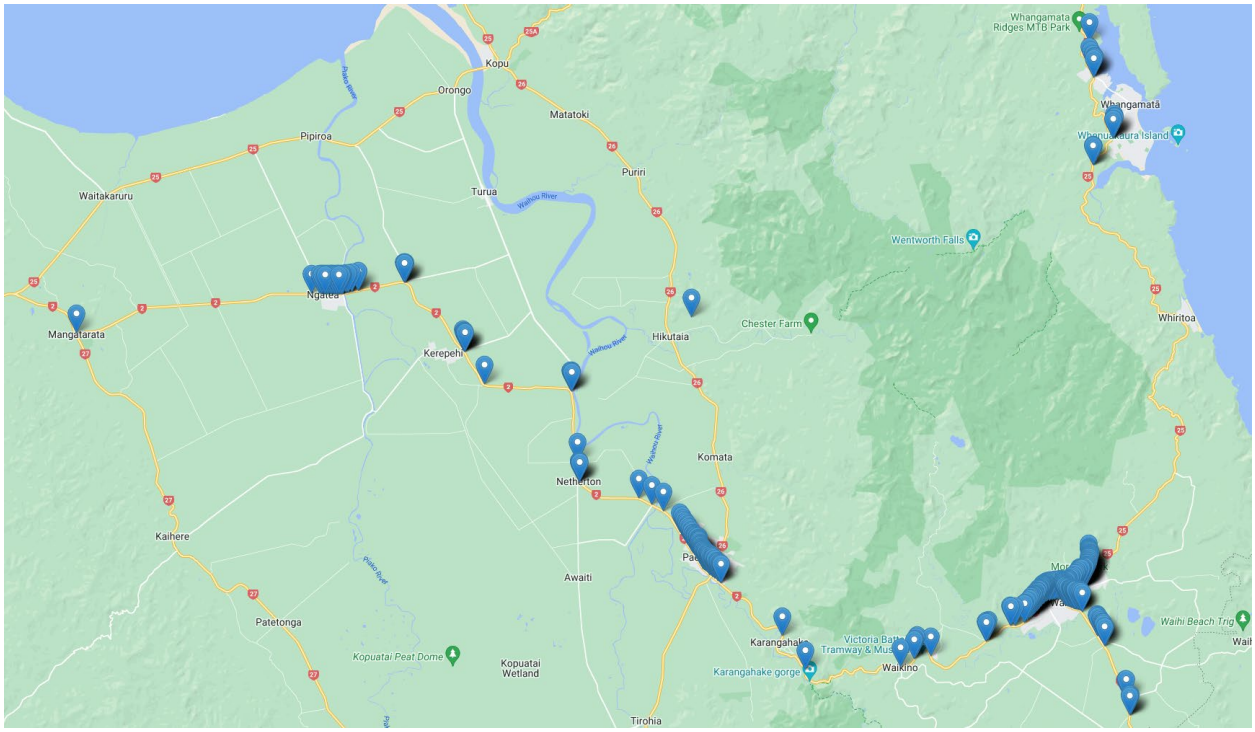
The last NZTA East Waikato audit completed in November 2019 identified duplicate submission was occurring as detailed below:

Council	Database source:					
	NZTA Urban Lights	ICP & NSP	Submitted by:	NZTA Rural Lights	ICP & NSP	Submitted by:
Hauraki District Council	HDC RAMM database	1000508887PC891 WKO0331	Meridian	HDC RAMM database	1000508887PC891 WKO0331	Meridian

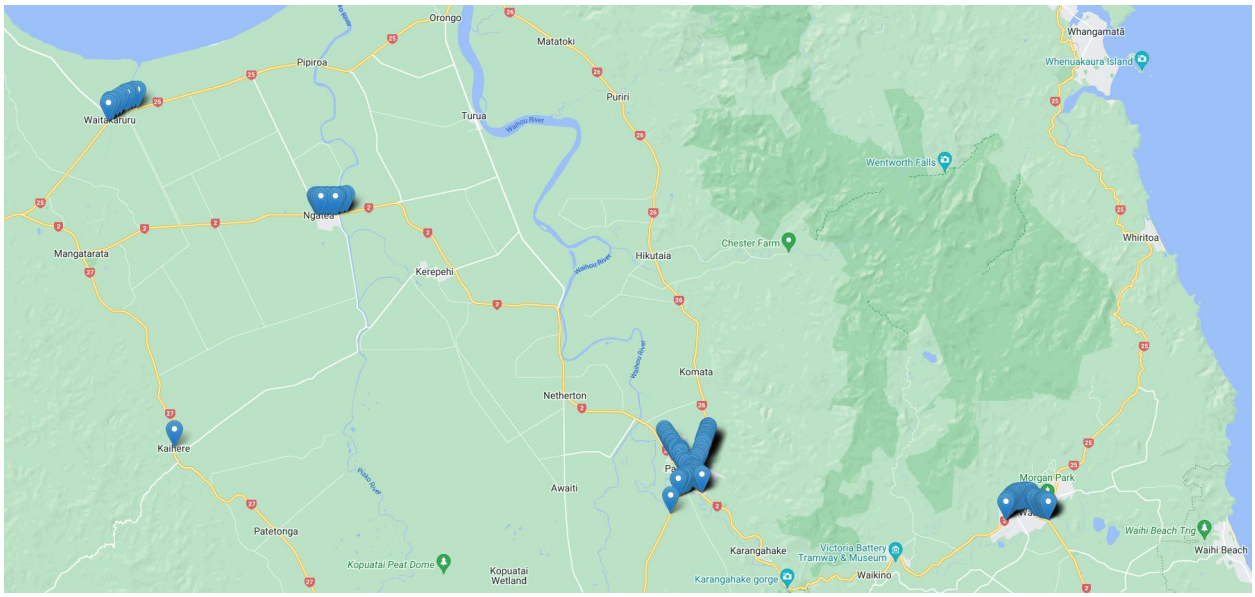
The NZTA lights associated with NSP WKO0331 (ICP 0001425638UNCE7) was being submitted by both Genesis for NZTA and by Meridian for Hauraki District Council (coloured orange). This was estimated to be resulting in an estimated annual over submission of 287,620 kWh.

Analysis for this audit found the Hauraki DC database contains 319 NZTA items of load being reconciled against ICP 1000508887PC891 (WKO0331). The Waikato lights are also being reconciled by NZTA under ICPs 0001425638UNCE7 (WKO0331) and 0000557951UN965 (HIN0331). The accuracy of the ICP allocation is discussed above. This is estimated to be resulting in 168,395 kWh of over submission to the market per annum. I have mapped both sets of lights for visual reference below:

NZTA Waikato database



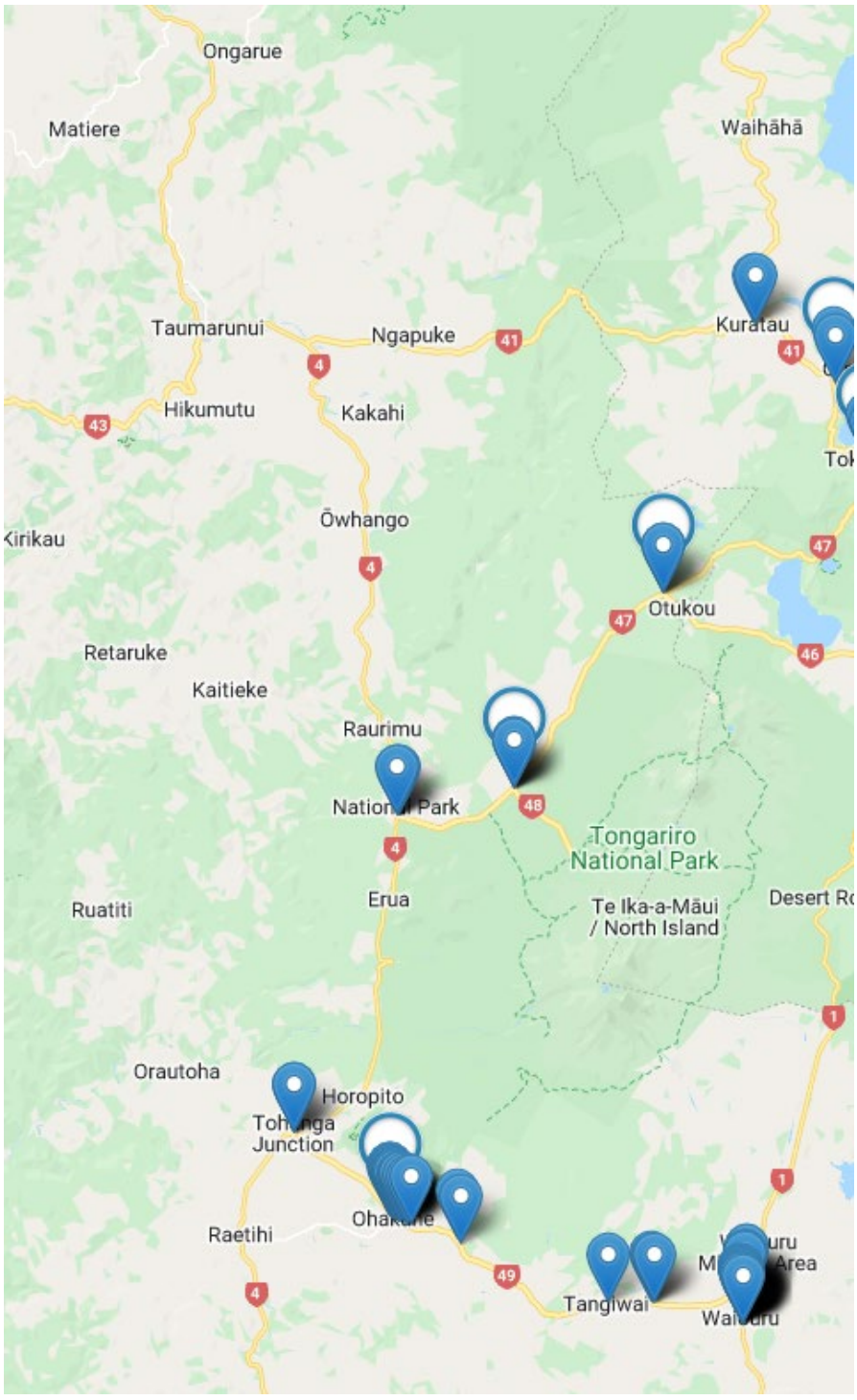
Hauraki DC database



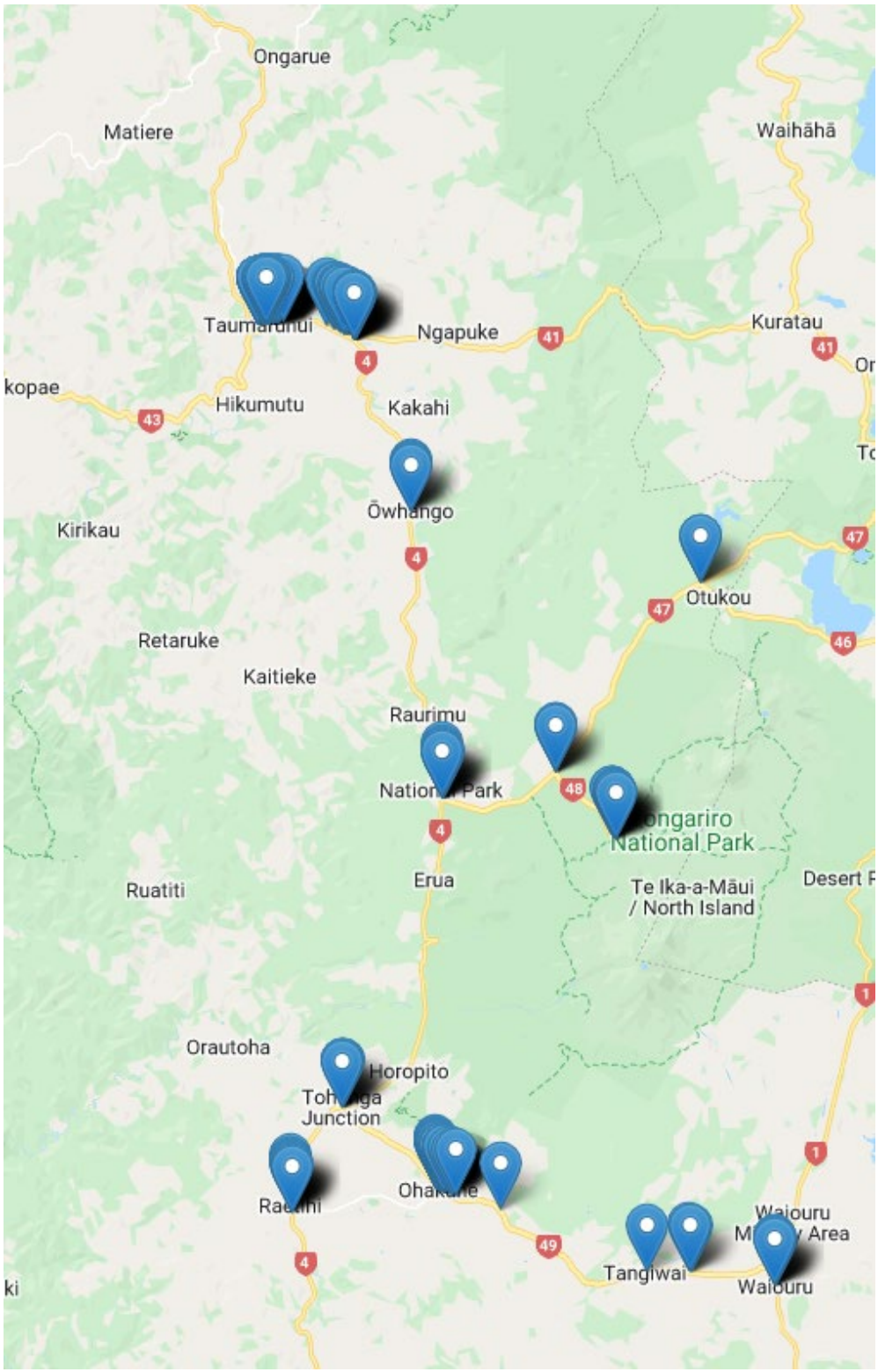
<u>Ruapehu and Taupo District Councils</u>

The NZTA ICPs for the Ruapehu and Taupo area (ICPs 0000381313TUB52 and 0088051901WM4EB) switched into Genesis from 1 April 2022. There are 209 NZTA lights in the Ruapehu DC and Taupo DC areas that are being reconciled by both the councils and NZTA resulting in an estimated 36.63 kW or 13,434 kWh per month of load being submitted twice. The duplicated lights have been provided to NZTA to investigate. I have included detailed pictures below showing the council boundaries, the NZTA RAMM database lights and the RDC SH lights:

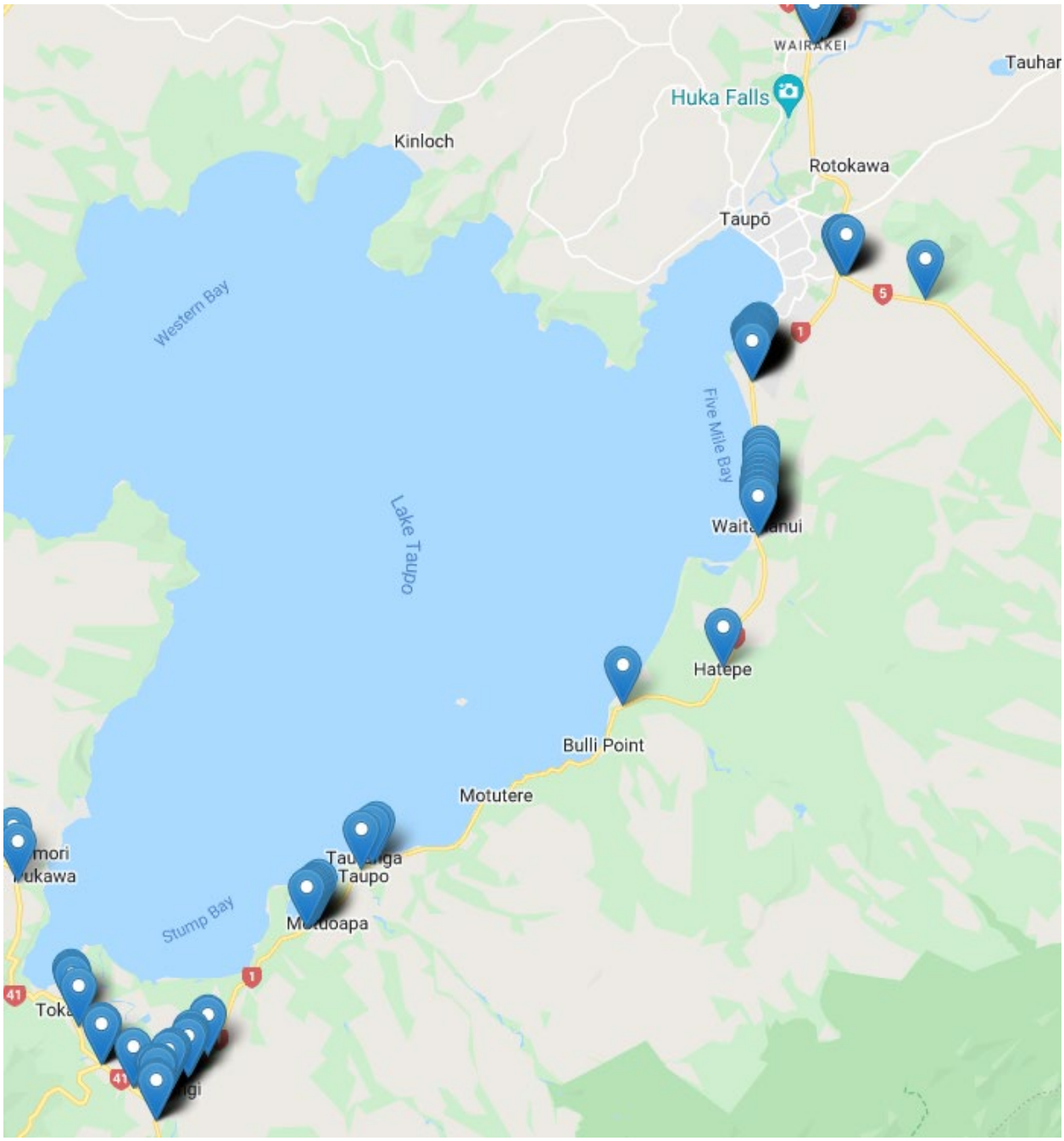
NZTA RAMM database- Ruapehu area



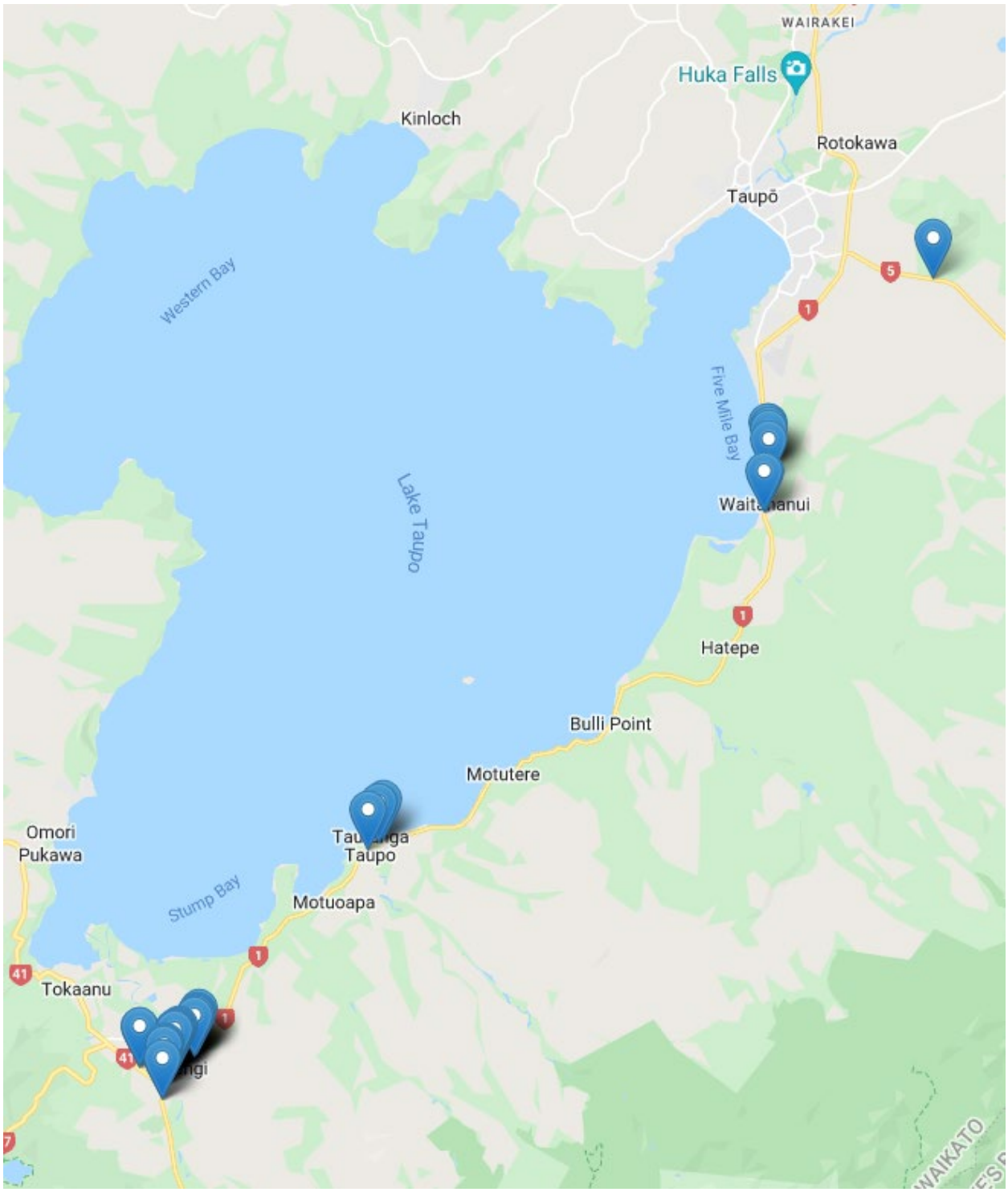
Ruapehu District Council NZTA lights



NZTA RAMM database- Taupo area



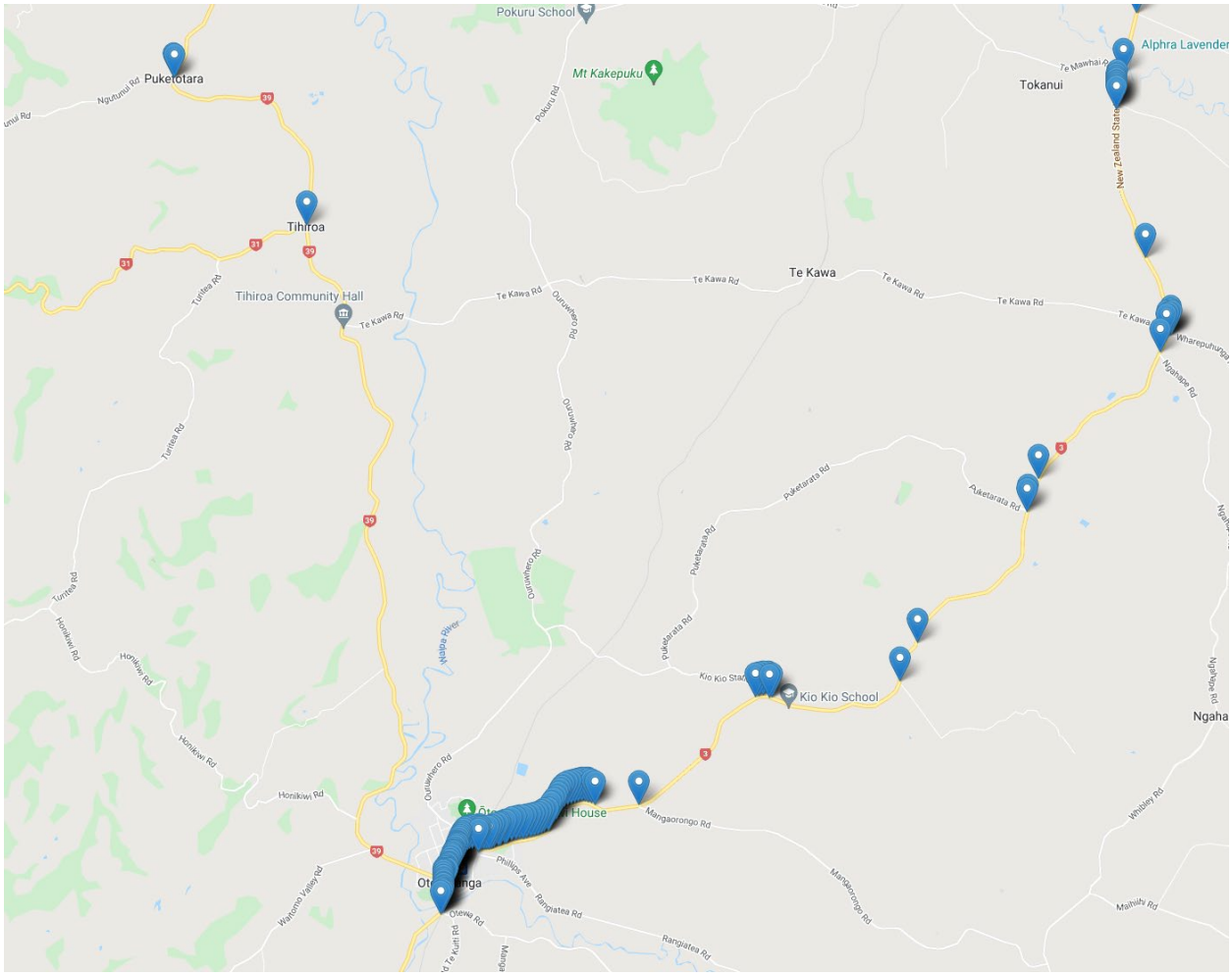
Taupo District Council NZTA lights



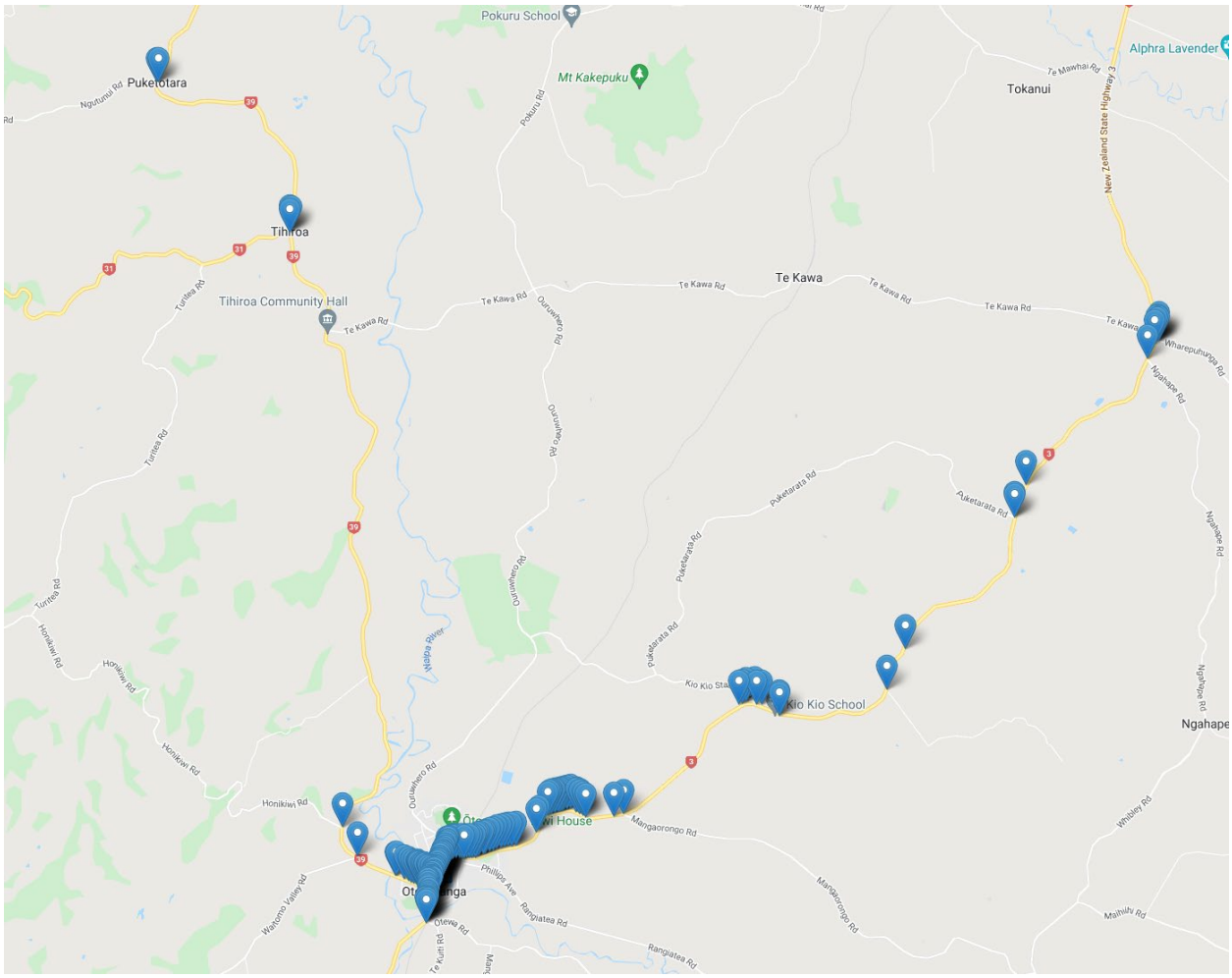
Otorohonga District Council

The NZTA load recorded against ICP 0001111170WMD3F (HTI0331) in the Otorohonga District Council database is also being reconciled by NZTA under ICPs 0000400344WA399 (TMU0111), 0000400320WAD63 (TMU0111) and 0008806768WM373 (HTI0331). This is estimated to be resulting in 104,930 kWh of over submission to the market per annum. I have mapped both sets of lights for visual reference below:

NZTA RAMM database- Otorohonga area



Otorohonga District Council NZTA lights

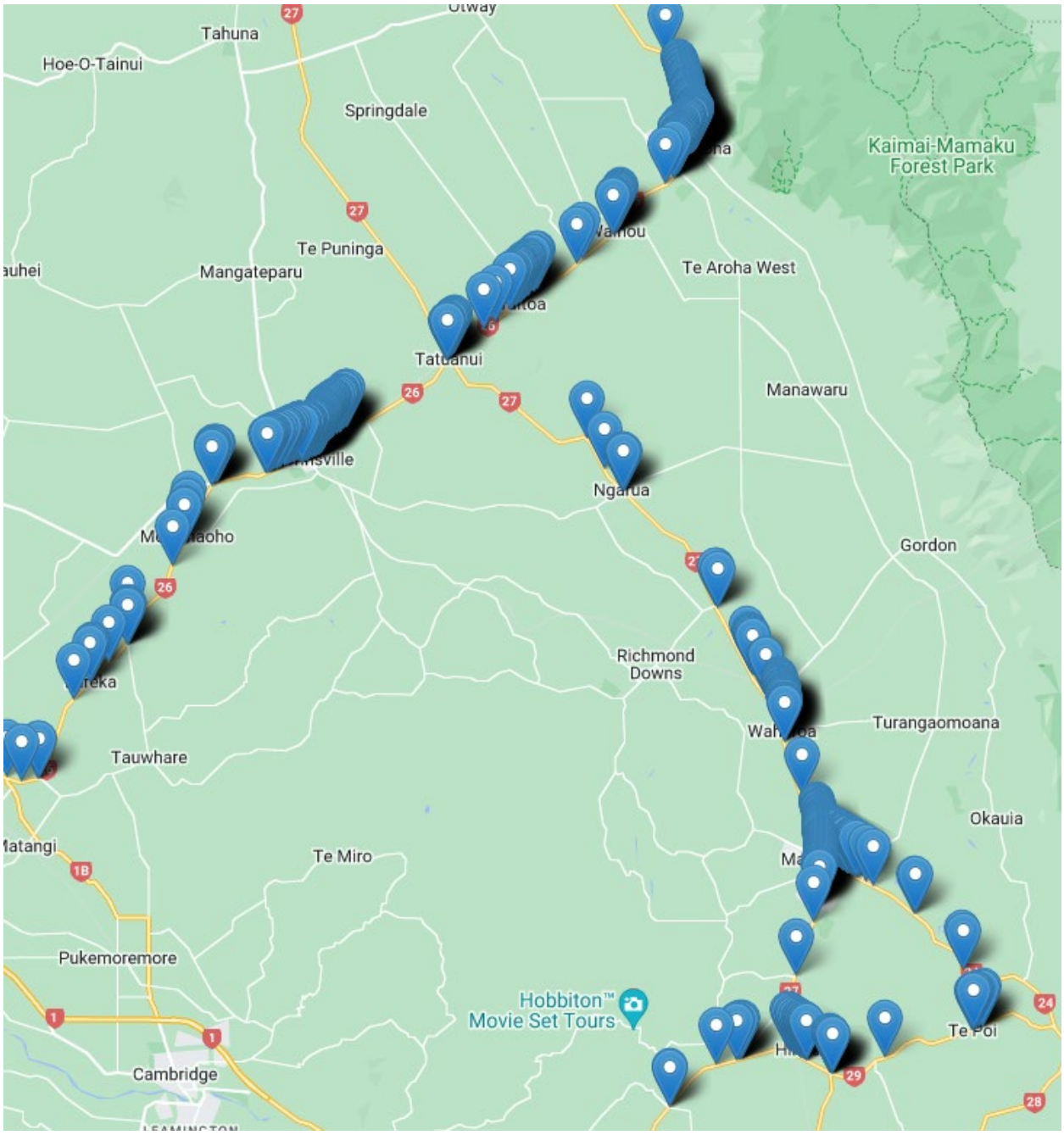


Matamata Piako District Council

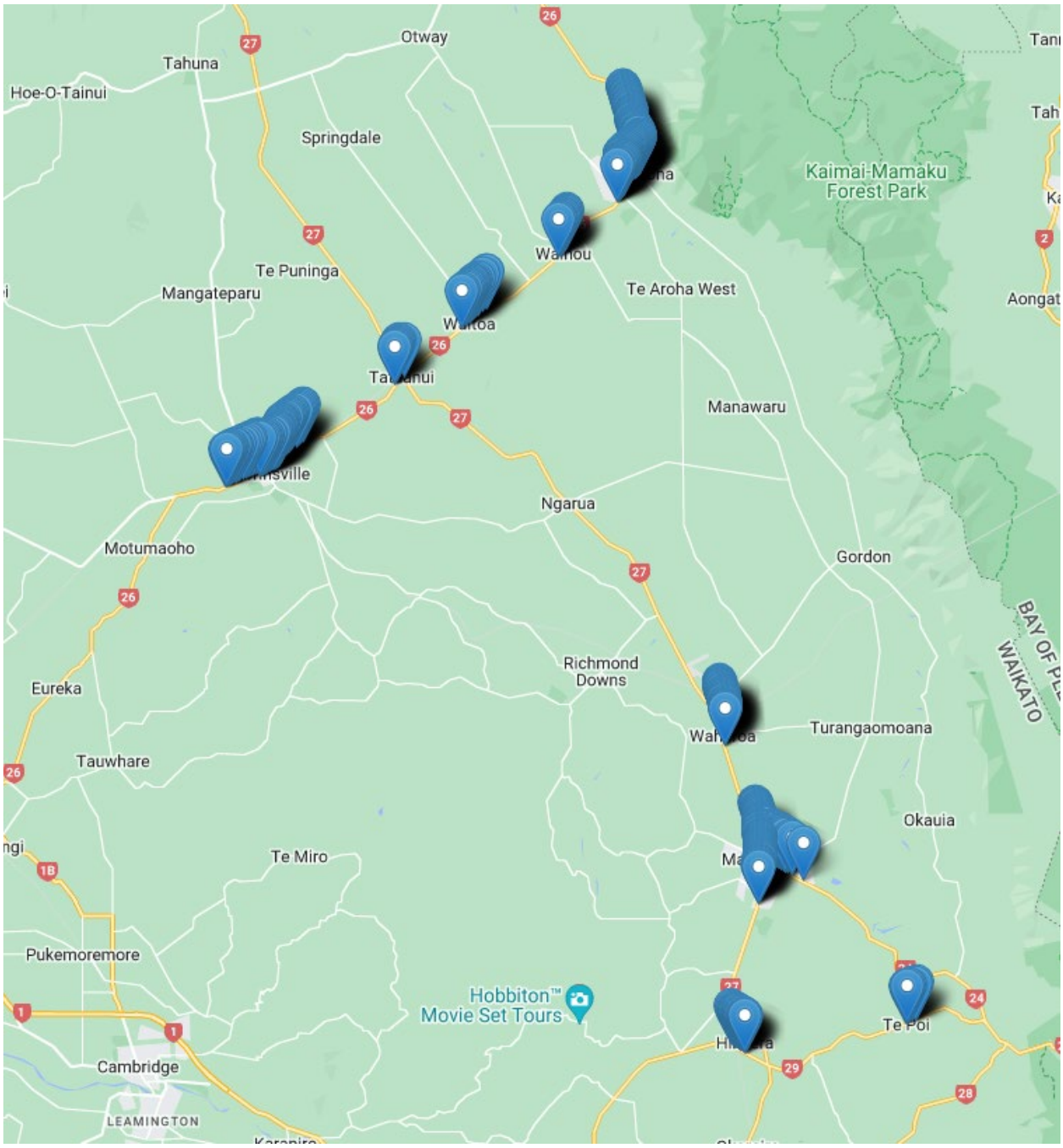
The 462 NZTA urban lights are being submitted by Matamata Piako DC as well as NZTA. The council has compared their data set to that held by NZTA and these findings have been passed to NZTA.

Below are the plotted lights recorded in both databases as detailed below:

NZTA RAMM database- Matamata Piako area



Matamata Piako District Council NZTA lights



This will be resulting in an estimated over submission of 303,735 kWh per annum, but I note that once agreed, revisions are expected to be carried out to correct this over submission from the date that the NZTA urban load commenced being submitted by NZTA.

The table below summarises the effects on reconciliation of these duplicated submissions:

Council Area	Current trader	Council submitted NZTA kWh volume per annum	Comments
Ruapehu DC	Meridian	121,715	This has been raised in the RDC's audit
Taupo DC	Meridian	34,719	This has been raised in the TDC's audit
Otorohonga DC	Genesis	104,930	This has been raised in the ODC's audit
Matamata Piako DC	Meridian	303,735	This has been raised in the MPDC's audit.
Hauraki DC	Meridian	168,395	This was not raised in the HDC audit as it predated this database extract being available but was raised in the last East Waikato NZTA audit completed in November 2019.
TOTAL		733,494	

Genesis intends to work with NZTA, the alternate trader, the local council to get this resolved. Non-compliance has been raised in the local council DUML audits as well as in this audit.

Change management process findings

Genesis continues to use the TCDC RAMM database to reconcile the load for ICP 0001425637UN339. TCDC have not maintained these lights since October 2018 so any changes made in the field will not be recorded, therefore over time the data accuracy is expected to have declined. As reported in the last audit Genesis and NZTA are working to bring this load into the NZTA RAMM database. As this is a different database it is subject to a separate audit.

NZTA require 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. The NOC contractor is required to have an internal quality control process to ensure that updates are accurate. The field audit findings indicate that this process is not working as expected and I recommend that this is reviewed.

Recommendation	Description	Audited party comment	Remedial action
Database Accuracy	Review quality control processes.	Genesis has discussed this with NZTA Waikato who are raising quality control measures with their contractors.	Investigating

The new connection process is managed on a project basis. Much like new Council lights, NZTA 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. The Distributor is required to get consent from a trader before load is added to the network. This issue will be raised with the relevant networks.

Outage patrols are undertaken on a 3-monthly basis.

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

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 3.1 With: Clause 15.2 and 15.37B(b) From: 02-Dec-19 To: 30-Apr-22	Database is not confirmed as accurate with a 95% level of confidence resulting in an estimated under submission of 150,200 kWh per annum. 30 items of load with no lamp description. One item of load with no wattage recorded. Ten items of load with an invalid lamp description. 295 items of load with the incorrect ballast applied resulting an estimated over submission of 1,627 kWh per annum. ICP 0000026694WE641incorreclty recorded as reconciled elsewhere resulting in an estimated under submission of 3,255 kWh per month since February 2022. An unknown number of items of load allocated to the incorrect ICP and therefore the incorrect NSP and possibly balancing area and network including an estimated 22 NZTA lights or 19,540 kWh per annum reconciled to the Lines Company network instead of the Waipa network. Duplicated submission with five local council databases resulting in an estimated over submission of 733,494 kWh per annum. Potential impact: High Actual impact: High Audit history: Twice previously Controls: Weak Breach risk rating: 9
Audit risk rating	**Rationale for audit risk rating**
High	The controls are rated as weak as changes made in the field are not always being made accurately and I recommend that this process is reviewed. The impact is assessed to be high due to the estimated kWh impact to the market and the database accuracy issues raised above. .

Actions taken to resolve the issue	Completion date	Remedial action status
Genesis has completed the review of NZTA Waikato assets pertaining to MPDC and HDC with the reallocation of asset to the correct ICP/ NSP completed. Genesis is currently working with ODC and TDC to ascertain asset reallocation with the intent to be conclude by the 01/10/2022. Revision for submissions will be historically corrected as per revision schedule.	01/10/2022	Investigating
Preventative actions taken to ensure no further issues will occur	**Completion date**	
Genesis and NZTA Waikato agree to review RAMM database on a monthly basis to mitigate risk associated with asset database misalignment.	01/10/2022	

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. They were provided a database extract from NZTA for the Waikato area in April 2022 and revised all submissions for the previous 14 months. NZTA will commence sending a monthly database extract to Genesis from July 2022. This will include any changes made during the month so any changes made during the month will be taken into account from the date of the change.

I reviewed the submission for the month of May 2022 and found that all values matched with the exception of ICP 0001425638UNCE7. This was due to more items of load being recorded by Genesis than in the database extract provided to me as detailed below:

ICP Number	NZTA dB extract kW value	Items of load	Genesis May dB extract kW value	Submitted R1 kWh	May kWh submission difference
0001425638UNCE7	0.672	4	3.070	15	-1,018.54

The data loggers used to calculate the burn hours were reviewed and found data loggers from the incorrect network are being used when the burn hours will be different between networks:

ICP Number	NSP	Logger No.	Network
0000381313TUB52	WRK0331	206558603	HAWK
0000890166TU7C3	WRK0331	206558603	HAWK
0001425638UNCE7	WKO0331	206558603	POCO
0000557858UNE30	HIN0331	206558444	POCO
0000557929UNE2C	HIN0331	206558444	POCO
0000557951UN965	HIN0331	206558444	POCO
0000557952UN5A5	HIN0331	206558444	POCO

ICP Number	NSP	Logger No.	Network
0000562185UN32C	HIN0331	206558444	POCO
0000562362UNE5B	HIN0331	206558444	POCO
1000522354PCD90	PAO1101	206558444	POCO
0000011095WE94E	HAM0331	206558444	WEL
0000022579WE623	HLY0331	206558444	WEL
0000036247WE323	TWH0331	206558444	WEL

As discussed in **section 2.1**:

- the field audit against the database quantities found that the database is not confirmed as accurate with a 95% level of confidence resulting in an estimated over submission of 150,200 kWh per annum,
- ICP allocation needs review to ensure that these are allocated correctly as this will be resulting in volumes being incorrectly allocated to the incorrect NSP and therefore potentially the incorrect balancing area and/or network,
- ICP 0000026694WE641 status is being "reconciled elsewhere" against ICP 0000011095WE94E since 1 February 2022; I checked the items of load associated with ICP 0000026694WE641 against those recorded in the NZTA RAMM database and found these are not recorded in the database which will result in an estimated under submission of 3,255 kWh per month since February 2022,
- 295 items of load with the incorrect ballast applied resulting in an estimated over submission of 1,627 kWh per annum,
- one item of load with no wattage recorded,
- ICP 0000026694WE641incorreclty recorded as reconciled elsewhere resulting in an estimated under submission of 3,255 kWh per month since February 2022,
- an unknown number of items of load allocated to the incorrect ICP and therefore the incorrect NSP and possibly balancing area and network including an estimated 22 NZTA lights or 19,540 kWh per annum reconciled to the Lines Company network instead of the Waipa network, and
- duplicated submission with five local council databases resulting in an estimated over submission of 733,494 kWh per annum.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 3.2 With: Clause 15.2 and 15.37B(c) From: 02-Dec-19 To: 30-Apr-22	Incorrect volume submitted for ICP 0001425638UNCE7 resulting in an estimated over submission of 1,018.54 kWh for May 2022. 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 150,200 kWh per annum. An unknown number of items of load allocated to the incorrect ICP and therefore the incorrect NSP and possibly balancing area and network including an estimated 22 NZTA lights or 19,540 kWh per annum reconciled to the Lines Company network instead of the Waipa network. ICP 0000026694WE641 incorrectly recorded as "reconciled elsewhere" resulting in an estimated under submission of 3,255 kWh per month since February 2022. 295 items of load with the incorrect ballast applied resulting an estimated over submission of 1,627 kWh per annum. One item of load with no wattage recorded. Duplicated submission with five local council databases resulting in an estimated over submission of 733,494 kWh per annum. Potential impact: High Actual impact: High Audit history: Twice previously Controls: Weak Breach risk rating: 9
Audit risk rating	**Rationale for audit risk rating**
High	The controls are rated as weak as they are not sufficient to ensure that the database is accurate. Genesis is working with NZTA to improve this. The audit risk rating is assessed to be high, based on the estimated reconciliation impact.

Actions taken to resolve the issue	Completion date	Remedial action status
Genesis' review of the NZTA Waikato data set has revealed anomalies across the majority of asset allocation which Genesis has provided NZTA Waikato with the exception list with the intent to have updates completed by the 01/08/2022. In relation to Logger allocation Genesis has been provided by EMS the correct logger for each NSP which will be used for revision purposes. In relation ICP 0000026694WE641, incorrectly recorded as "reconciled elsewhere" incorrect as the assets have been reconciled against ICP 0000022579WE623 instead of ICP 0000026694WE641. Therefore, the issue is asset allocation rather than under submission. This will also be addressed in the list of exception provided to NZTA Waikato.	1/10/2022	Identified
Preventative actions taken to ensure no further issues will occur	**Completion date**	
Continuation of NZTA Waikato monthly database extraction will provided exception to be reviewed by NZTA.	01/10/2022	

CONCLUSION

A RAMM database extract was provided, and this was compared to the data sets provided for the previous three DUML audits and found three ICPs missing from the dataset. Analysis of the missing ICPs found:

- data from the Thames Coromandel DC RAMM database continues to be used for submission for ICP 0001425637UN339, and Genesis are working with NZTA to get this data added to the NZTA RAMM database - as this is from a different database a separate audit for this load is required until these items of load are added to the NZTA RAMM database,
- ICP 0000026694WE641 has been recorded as being "reconciled elsewhere" against ICP 0000011095WE94E since 1 February 2022; I checked the items of load associated with ICP 0000026694WE641 against those recorded against ICP 0000011095WE94E in the NZTA RAMM database and found these are not recorded in the database, which will be resulting in an estimated under submission of 3,255 kWh per month since February 2022,
- ICP 0000036254WE54E was included in the NZTA West Waikato DUML audit report but Genesis are using the registry record to reconcile this load which is described as the Ngaruawahia by-pass lights with a daily unmetered load figure of 55.683 kWh; as no database details could be located in the last DUML audit I mapped all the ICPs associated with the only ICP associated with the NSP HLY0331 in the NZTA RAMM database extract which found only six items of load in the Ngaruawahia area (the Waikato Expressway has bypassed Ngaruawahia and the old state highway has been passed back to Waikato DC so I recommend that Genesis investigate what if any load if any is associated with this ICP).

I reviewed the NSPs for the Waikato NZTA area against the ICPs and NSPs and found seven NSPs with no NZTA ICP associated. Analysis of the associated Council databases which also contain NZTA lighting indicate that ICPs may need to be created to allocate the load to the correct NSP. It also found that some of the load is allocated to the incorrect NSP. This is detailed in the report, and I recommend that the ICP allocation for the database load be reviewed.

The Waikato NZTA area covers several council areas. Various arrangements have been in place with the councils. Some councils pay for all the NZTA streetlighting and then claim the costs back from NZTA. Some have this arrangement for urban NZTA lighting only and the rural portion is paid for by NZTA. The last NZTA East Waikato audit completed in November 2019 identified duplicate submission was occurring as detailed below:

Council	**Database source:**					
	NZTA Urban Lights	**ICP & NSP**	**Submitted by:**	**NZTA Rural Lights**	**ICP & NSP**	**Submitted by:**
Hauraki District Council	HDC RAMM database	1000508887PC891 WKO0331	Meridian	HDC RAMM database	1000508887PC891 WKO0331	Meridian

The NZTA lights associated with NSP WKO0331 (ICP 0001425638UNCE7) was being submitted by both Genesis for NZTA and by Meridian for Hauraki District Council (coloured orange). This was estimated to be resulting in an estimated annual over submission of 287,620 kWh.

NZTA have been working to use their own RAMM database to manage and pay for the unmetered streetlight loads across the country and remove these from the council databases. My analysis identified that duplicate submission is occurring in some instances. The table below summarises the effects on reconciliation of these duplicated submissions:

Council Area	Current trader	Council submitted NZTA kWh volume per annum	Comments
Ruapehu DC	Meridian	121,715	This has been raised in the RDC's audit
Taupo DC	Meridian	34,719	This has been raised in the TDC's audit
Otorohonga DC	Genesis	104,930	This has been raised in the ODC's audit
Matamata Piako DC	Meridian	303,735	This has been raised in the MPDC's audit.
Hauraki DC	Meridian	168,395	This was not raised in the HDC audit as it predated this database extract being available but was raised in the last East Waikato NZTA audit completed in November 2019.
TOTAL		733,494	

Genesis intends to work with NZTA, the alternate trader, and the local council to get this resolved. Non-compliance has been raised in the local council DUML audits as well as in this audit.

Database accuracy is described as follows:

Result	**Percentage**	**Comments**
The point estimate of R	105.0%	Wattage from survey is higher than the database wattage by 5%
R_L	94.8%	With a 95% level of confidence, it can be concluded that the error could be between -5.2% and +27.6%
R_H	127.6%	

The conclusion from Scenario B is that the variability of the sample results across the strata means that the true wattage (installed in the field) could be between 5.2% lower to 24.8% 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 35.0 kW higher than the database indicates.
- There is a 95% level of confidence that the installed capacity is between 36 kW lower to 194 kW higher than the database.
- In absolute terms, total annual consumption is estimated to be 150,200 kWh higher than the DUML database indicates.
- There is a 95% level of confidence that the annual consumption is between 155,200 kWh lower to 830,100 kWh p.a. higher than the database indicates.

The audit found six non-compliances and makes six recommendations. The future risk rating of 42 indicates that the next audit be completed in three months. I have considered this in conjunction with Genesis' comments, and I recommend that the next audit is in nine months to allow sufficient time for the Genesis to work with Waka Kotahi, other trader's and local councils to resolve the matters raised. 

PARTICIPANT RESPONSE

Genesis has conducted a review of the NZTA Waikato database extraction provided on the 01/07/2022. Genesis accepts the findings of the audit conducted April 2022, with the exception of the under submission of asset pertaining to ICP 0000026694WE641 as this is an ICP/NSP reallocation issue which has also been addressed under the review of the NZTA Waikato database assets.

Genesis and NZTA Waikato have the intent to have all updated completed by the 01/10/2022, it would be Genesis Energy's request for a nine monthly audit review to enable historical revisions to be conducted and provide the ability to embed controls and allow for the NZTA Waikato quality controls and reporting to be established.