# ELECTRICITY INDUSTRY PARTICIPATION CODE
# DISTRIBUTED UNMETERED LOAD AUDIT REPORT

VERITEK

For

## PORIRUA NZTA
## AND GENESIS ENERGY LIMITED

Prepared by: Tara Gannon, Steve Woods, and Rebecca Elliot

Date audit commenced: 12 January 2021

Date audit report completed: 9 March 2021

Audit report due date: 31 March 2021

## TABLE OF CONTENTS

## EXECUTIVE SUMMARY

This audit of the **Porirua 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 scope of the audit encompasses the collection, security, and accuracy of the data, including the preparation of submission information.

The NZTA Porirua DUML load is captured by three ICPs:

- 1001102038UN6D0 MASTER ICP NZTA STREETLIGHT TKR0331,
- 1001102039UNA95 MASTER ICP NZTA STREETLIGHT PNI0331 (INCL. SH58), and
- 1001101874UN586 TRAFFIC LIGHTS-TRANSIT MANA ESPLANADE.

**ICPs 1001102038UN6D0 and 1001102039UNA95**

ICPs 1001102038UN6D0 and 1001102039UNA95 are recorded in NZTA's RAMM database, and were previously recorded in Porirua City Council's RAMM database. Field work, asset data capture and database population is conducted by **Capital Journeys**. Dispatch of field work and return of work completion details is managed using Pocket RAMM. RAMM asset information is updated by Capital Journeys' Asset Management Specialist based on the information returned from the field, including installation and removal dates. Changes to the database information are infrequent.

The field audit was not based on a statistical sample due to the difficulty in checking lighting on motorways and state highways. I selected 148 lights where the checks could be conducted from the footpath, or where it was safe to stop at the roadside. I found that the field wattage for the sample was 96.2% of the database wattage. Most of the differences related to LED upgrades which had not been recorded in the database.

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 | 96.2 | Wattage from survey is lower than the database wattage by -3.8%. |
| $R_L$ | 91.9 | With a 95% level of confidence it can be concluded that the error could be between -8.1% and -1.1%. |
| $R_H$ | 98.9 | |

The variability of the sample results across the strata means that the true wattage (installed in the field) could be 1.1% to 8.1% lower than the wattage recorded in the DUML database.

These results were categorised in accordance with the "Distributed Unmetered Load Statistical Sampling Audit Guideline", effective from 1 February 2019. The best available estimate is not precise enough to conclude that the database is accurate within ±5.0%.

- In absolute terms the installed capacity is estimated to be 6 kW lower than the database indicates.
- There is a 95% level of confidence that the installed capacity is between 2 and 12 kW lower than the database.
- In absolute terms, total annual consumption is estimated to be 23,900 kWh lower than the DUML database indicates.

- There is a 95% level of confidence that the annual consumption is between 6,800 and 51,700 kWh p.a. lower than the database indicates.

ICPs 1001102038UN6D0 and 1001102039UNA95 are settled using the CST profile. Submission volumes are calculated from a monthly database extract provided by Capital Journeys and data logger hours.

**ICP 1001101874UN586**

ICP 1001101874UN586 is not recorded in the RAMM or on the DUML audit register, and Genesis asked Veritek to include it in this audit. Based on the registry unmetered load information, there are seven items of load totalling 3,500 W which are connected 24 hours per day, using 84 kWh per day or 30,660 kWh per annum.

ICP 1001101874UN586 is settled using the UML profile. Submission volumes are calculated from the registry daily unmetered kWh.

**Conclusion**

The future risk rating of 18 indicates that the next audit be completed in six months. I recommend that the next audit is completed in a minimum of nine months, as the participant comments indicate that the issues are being resolved, and this will allow time for the improvements to be completed and demonstrated.

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 | **ICPs 1001102038UN6D0 and 1001102039UNA95**<br>The database is not confirmed as accurate with a 95% level of confidence.<br>Gear wattages for pole IDs 46426 and 15935 are blank, but should have zero recorded.<br>Pole ID 55991 was temporarily recorded against 1001102039UN-A95 (PNI0331) instead of 1001102038UN-6D0 (TKR0331), and was corrected during the audit.<br>The monthly database extract provided does not track changes at a daily basis and is provided as a snapshot.<br>**ICP 1001101874UN586**<br>ICP 1001101874UN586 is not recorded in RAMM, and settlement is not based on database information. | Weak | Medium | 6 | Investigating |
| Description and capacity of load | 2.4 | 11(2)(b) of Schedule 15.3 | Gear wattages for pole IDs 46426 and 15935 are blank, but should have zero recorded. | Moderate | Low | 2 | Identified |
| Database accuracy | 3.1 | 15.2 and 15.37B(b) | **ICPs 1001102038UN6D0 and 1001102039UNA95**<br>The database is not confirmed as accurate with a 95% level of confidence.<br>Gear wattages for pole IDs 46426 and 15935 are blank, but should have zero recorded.<br>Pole ID 55991 was temporarily recorded against 1001102039UN-A95 (PNI0331) instead of 1001102038UN-6D0 (TKR0331), and was corrected during the audit. | Moderate | Medium | 4 | 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) | **ICPs 1001102038UN6D0 and 1001102039UNA95**<br>The database is not confirmed as accurate with a 95% level of confidence.<br>Gear wattages for pole IDs 46426 and 15935 are blank, but should have zero recorded.<br>Pole ID 55991 was temporarily recorded against 1001102039UN-A95 (PNI0331) instead of 1001102038UN-6D0 (TKR0331), and was corrected during the audit.<br>The monthly database extract provided does not track changes at a daily basis and is provided as a snapshot.<br>**ICP 1001101874UN586**<br>ICP 1001101874UN586 is not recorded in RAMM, and settlement is not based on database information.<br>UNM profile is recorded on the registry, but UML profile is correctly applied for submission. | Weak | Medium | 6 | Investigating |
| | | | | | **Future Risk Rating** | | **18** |

| **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 | Recommendation |
|---|---|---|---|
| Description and capacity of load | 2.4 | Zero and missing gear wattages | Confirm the correct gear wattages for pole IDs 16206, 16207 and 16208 and update the database as needed. |
| Database accuracy | 3.1 | Lamp wattage details for Pole ID 46426 | Confirm the correct lamp and wattage details for Pole ID 46426 and update the database as needed. |

## ISSUES

| Subject | Section | Description | Issue |
|---|---|---|---|
| | | Nil | |

# 1. ADMINISTRATIVE

## 1.1. Exemptions from Obligations to Comply with Code

### Code reference

*Section 11 of Electricity Industry Act 2010.*

### Code related audit information

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

### Audit observation

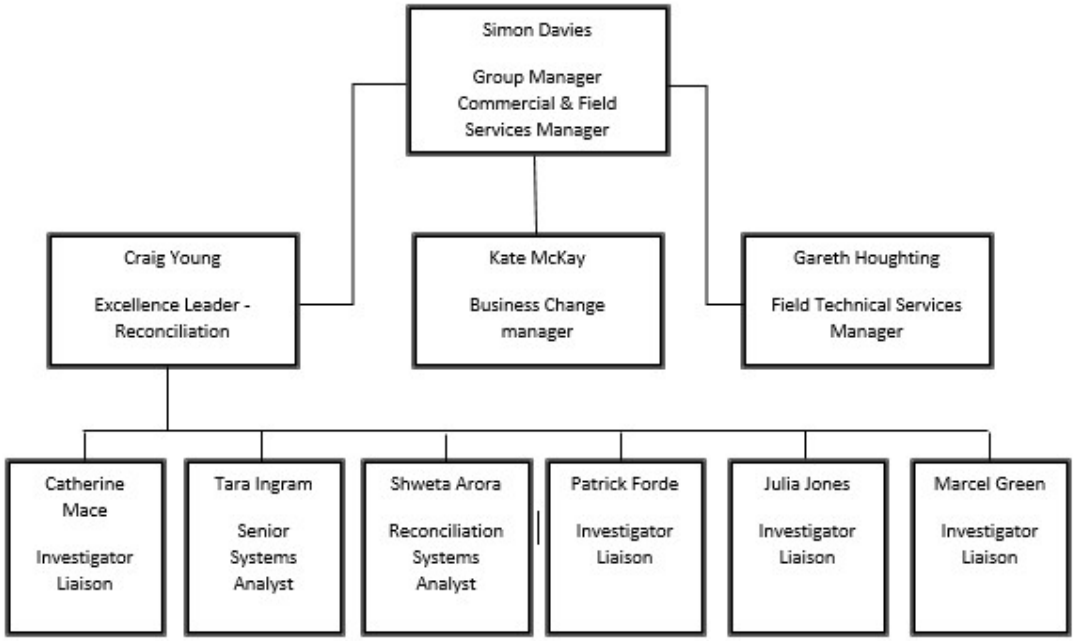
The Electricity Authority's website was reviewed to identify any exemptions relevant to the scope of this audit.

### Audit commentary

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

## 1.2. Structure of Organisation

Genesis provided a copy of their organisational structure.



## 1.3. Persons involved in this audit

Auditor:

| Name | Company | Role |
|---|---|---|
| Tara Gannon | Veritek Limited | Lead auditor |
| Steve Woods | Veritek Limited | Supporting auditor |
| Rebecca Elliot | Veritek Limited | Supporting auditor |

Other personnel assisting in this audit were:

| Name | Title | Company |
|---|---|---|
| Craig Young | Excellence Leader - Reconciliation | Genesis Energy |
| Julia Jones | Technical Specialist – Reconciliations Compliance | Genesis Energy |
| Colin Tubb | Asset Management Specialist | Capital Journeys |

## 1.4. Hardware and Software

The SQL database used for the management of DUML is remotely hosted by RAMM Software Ltd. The database is commonly known as "RAMM" which stands for "Roading Asset and Maintenance Management".

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

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

## 1.5. Breaches or Breach Allegations

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

## 1.6. ICP Data

| ICP Number | Description | NSP | Registry profile | Number of items of load | Database wattage (watts) |
|---|---|---|---|---|---|
| 1001102038UN6D0 | MASTER ICP NZTA STREETLIGHT TKR0331 | TKR0331 | CST | 425 | 109,174 |
| 1001102039UNA95 | MASTER ICP NZTA STREETLIGHT PNI0331 (INCL. SH58) | PNI0331 | CST | 155 | 39,570 |

| ICP Number | Description | NSP | Registry profile | Number of items of load | Database wattage (watts) |
|---|---|---|---|---|---|
| 1001101874UN586 | TRAFFIC LIGHTS-TRANSIT MANA ESPLANADE | PNI0331 | UNM[1] | Not in RAMM | Not in RAMM |
| **Total** | | | | **580** | **148,744** |

ICP 1001101874UN586 is not recorded in the RAMM or on the DUML audit register, and Genesis asked Veritek to include it in this audit. The unmetered load details recorded on the registry are:

| Daily Unmetered kWh | Unmetered Load Details - Trader | Unmetered Load Details - Distributor |
|---|---|---|
| 84 kWh | 3.5KW; 24; 7 X TRAFFICLIGHTS 400-599W | 3.50kW:24:G55 - Trafficl |

Based on this information, I estimate that seven items of load totalling 3,500 W are connected 24 hours per day, using 84 kWh per day or 30,660 kWh per annum. These lights are settled with the UML profile based on the unmetered load details currently on the registry.

### 1.7. Authorisation Received

All information was provided directly by Genesis or Capital Journeys.

### 1.8. Scope of Audit

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

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

The 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 NZTA Porirua DUML load is captured by three ICPs:

- 1001102038UN6D0 MASTER ICP NZTA STREETLIGHT TKR0331
- 1001102039UNA95 MASTER ICP NZTA STREETLIGHT PNI0331 (INCL. SH58), and
- 1001101874UN586 TRAFFIC LIGHTS-TRANSIT MANA ESPLANADE.

**ICPs 1001102038UN6D0 and 1001102039UNA95**

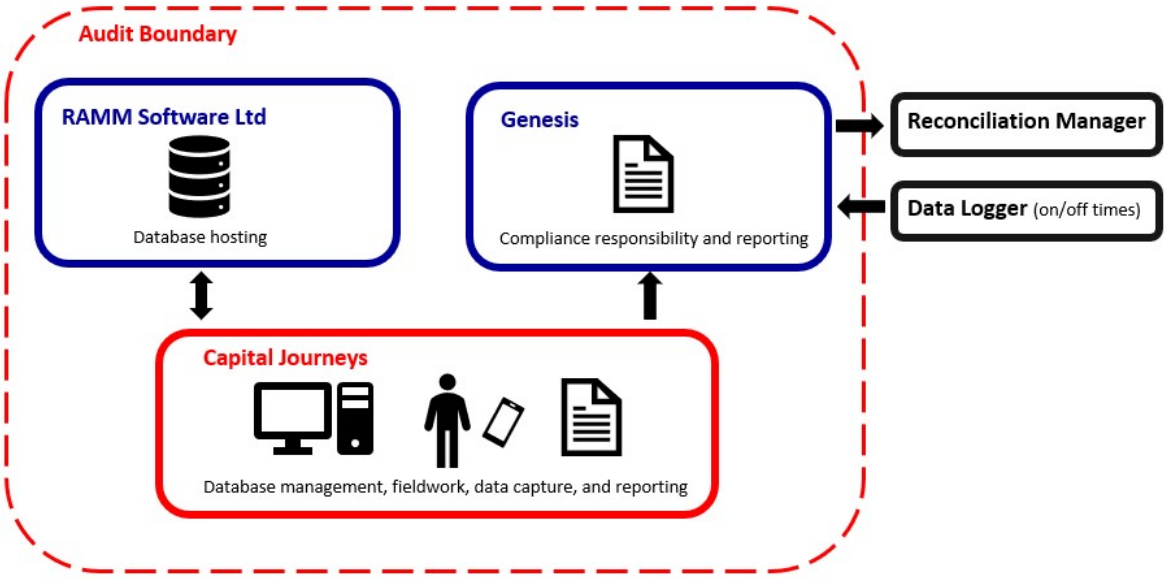
ICPs 1001102038UN6D0 and 1001102039UNA95 are recorded in NZTA's RAMM database, and were previously recorded in Porirua City Council's RAMM database. Field work, asset data capture and database population is conducted by Capital Journeys. Dispatch of field work and return of work completion details is managed using Pocket RAMM. RAMM asset information is updated by Capital Journeys' Asset Management Specialist based on the information returned from the field, including installation and removal dates. Changes to the database information are infrequent.

[1] The profile used for submission is UML, a registry discrepancy is present.

ICPs 1001102038UN6D0 and 1001102039UNA95 are settled using the CST profile. Submission volumes are calculated from a monthly database extract provided by Capital Journeys and data logger hours.

A field audit of 148 items of load was conducted on 21 February 2021.

The diagram below shows the audit boundary for clarity.

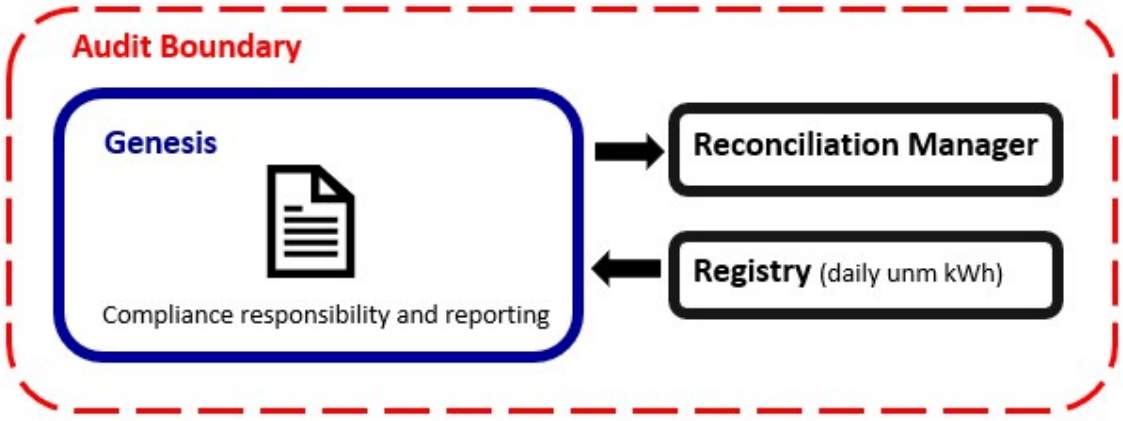



**ICP 1001101874UN586**

ICP 1001101874UN586 is not recorded in the RAMM or on the DUML audit register, and Genesis asked Veritek to include it in this audit. Based on the registry unmetered load information, there are seven items of load totalling 3,500 W which are connected 24 hours per day, using 84 kWh per day or 30,660 kWh per annum.

ICP 1001101874UN586 is settled using the UML profile. Submission volumes are calculated from the registry daily unmetered kWh.

The diagram below shows the audit boundary for clarity.



## 1.9. Summary of previous audit

The previous audit was completed in August 2020 by Steve Woods of Veritek Limited. The current status of that audit's findings is detailed below.

| Subject | Section | Clause | Non-compliance | Status |
|---|---|---|---|---|
| Audit requirement | 1.10 | 16A.26 and 17.295F | Database not audited within 3 months. | Cleared |
| Deriving submission information | 2.1 | 11(1) of Schedule 15.3 | Under submission of 206,454 kWh per annum due to the use of an inaccurate database. | Some exceptions still existing |
| ICP identifier and items of load | 2.2 | 11(2)(a) and (aa) of Schedule 15.3 | Nine items of load with a blank ICP. | Cleared |
| Description and capacity of load | 2.4 | 11(2)(b) of Schedule 15.3 | 14 records do not have a lamp make and model.<br>340 records have an unknown make and model but have sufficient information to determine wattage.<br>221 lamp wattages are blank.<br>348 gear wattages are blank.<br>8 gear wattages are incorrect. | Some exceptions still existing |
| Database accuracy | 3.1 | 15.2 and 15.37B(b) | A large number of discrepancies exist in the database. | Some exceptions still existing |
| Volume information accuracy | 3.2 | 15.2 and 15.37B(c) | Under submission of 206,454 kWh per annum due to the use of an inaccurate database. | Some exceptions still existing |

## 1.10. Distributed unmetered load audits (Clause 16A.26 and 17.295F)

**Code reference**

*Clause 16A.26 and 17.295F*

**Code related audit information**

*Retailers must ensure that DUML database audits are completed:*

1. *by 1 June 2018 (for DUML that existed prior to 1 June 2017)*
2. *within three months of submission to the reconciliation manager (for new DUML)*
3. *within the timeframe specified by the Authority for DUML that has been audited since 1 June 2017.*

### Audit observation

Genesis have requested Veritek to undertake this streetlight audit.

### Audit commentary

This audit report confirms that the requirement to conduct an audit has been met for this database within the required timeframe.

### Audit outcome

Compliant

## 2. DUML DATABASE REQUIREMENTS

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

**Code reference**

*Clause 11(1) of Schedule 15.3*

**Code related audit information**

*The retailer must ensure the:*

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

**Audit observation**

The process for calculation of consumption was examined and the application of profiles was checked. The database was checked for accuracy.

**Audit commentary**

Genesis reconciles this DUML load as shown in the table below:

| ICP Number | Description | Registry profile | Submission profile | On hours based on | Wattage based on |
|---|---|---|---|---|---|
| 1001102038UN6D0 | MASTER ICP PORIRUA CC TRANSIT SH1-PUKERUA BAY | CST | CST | Data logger | NZTA RAMM |
| 1001102039UNA95 | MASTER ICP PORIRUA CC TRANSIT SH1 | CST | CST | Data logger | NZTA RAMM |
| 1001101874UN586 | TRAFFIC LIGHTS-TRANSIT MANA ESPLANADE | UNM | UML | Registry information | Registry information |

**ICPs 1001102038UN6D0 and 1001102039UNA95**

I recalculated the submissions for 1001102038UN6D0 and 1001102039UNA95 for October 2020 using the data logger and the database information. I confirmed that the calculation method was correct, and submission was based on the database information and logger hours. The field survey found that the best available estimate of field wattage is not precise enough to conclude that the database is accurate within ±5.0% as recorded in **section 3.1**.

The database contains some inaccurate content:

| Issue | Estimated volume information impact (annual kWh) |
|---|---|
| Gear wattages for pole IDs 46426 and 15935 are blank, but should have zero recorded. | 0 kWh |
| Pole ID 55991 (250W SON) was recorded against ICP 1001102039UN-A95 (PNI0331), but should have been recorded against ICP 1001102038UN-6D0 (TKR0331). Capital Journeys corrected the ICP to 1001102038UN-6D0 during the audit. | -1187 kWh at TKR0331<br>+1187 kWh at PNI0331 |

| Issue | Estimated volume information impact (annual kWh) |
|---|---|
| There is no impact on reconciliation because both NSPs are within the same balancing area (WELLTONUNETG). | 0 kWh overall difference at balancing area WELLTONUNETG |

On 18 June 2019, the Electricity Authority issued a memo confirming that the code requirement to calculate the correct monthly load must:

- take into account when each item of load was physically installed or removed, and
- wash up volumes must take into account where historical corrections have been made to the DUML load and volumes.

The database contains a "light install date" and a "lamp install date" but there is not a field for "livening date" for newly connected lights. The "light install date" is used to record the connection date. When a wattage is changed in the database due to a physical change or a correction, only the record present at the time the report is run will be recorded if the monthly report process is based on a snapshot, not the historical information showing dates of changes.

**ICP 1001101874UN586**

ICP 1001101874UN586 is not recorded in the RAMM. I recalculated the October 2019 to December 2020 submissions for 1001101874UN586 and found that they were consistent with the registry's 84 daily unmetered kWh. The daily unmetered kWh was also consistent with the registry's trader and distributor unmetered load details. Non-compliance is recorded below because a database is not used for submission.

### Audit outcome

Non-compliant

| Non-compliance | Description |
|---|---|
| Audit Ref: 2.1<br>With: Clause 11(1) of Schedule 15.3<br><br>From: 01-Oct-19<br>To: 31-Dec-20 | **ICPs 1001102038UN6D0 and 1001102039UNA95**<br>The database is not confirmed as accurate with a 95% level of confidence.<br>Gear wattages for pole IDs 46426 and 15935 are blank, but should have zero recorded.<br>Pole ID 55991 was temporarily recorded against 1001102039UN-A95 (PNI0331) instead of 1001102038UN-6D0 (TKR0331), and was corrected during the audit.<br>The monthly database extract provided does not track changes at a daily basis and is provided as a snapshot.<br>**ICP 1001101874UN586**<br>ICP 1001101874UN586 is not recorded in RAMM, and settlement is not based on database information.<br>Potential impact: High<br>Actual impact: Unknown<br>Audit history: Once<br>Controls: Weak<br>Breach risk rating: 6 |

| Audit risk rating | Rationale for audit risk rating |
|---|---|
| **Medium** | The controls are rated as weak, because NZTA's RAMM information is only used for settlement of two of the three ICPs.<br><br>The overall impact is unknown because the correct wattage for ICP 1001101874UN586 was unable to be determined. Based on the assumption that the registry data applied for submission is a reasonable estimate of the load, the impact is assessed to be a maximum of medium.<br><br>The incorrect ICP number and blank gear wattages have no impact on reconciliation results. |

| Actions taken to resolve the issue | Completion date | Remedial action status |
|---|---|---|
| Genesis continues to work with the NZTA and Capital Journey's to gain accuracy levels. Genesis are aware that there is a continuous gradual improvement in the asset information from where it began.<br><br>Genesis will be working with the contractor reiterate the necessity of change reporting. | continuous improvements being conducted | Investigating |
| **Preventative actions taken to ensure no further issues will occur** | **Completion date** | |
| Genesis has requested the assets for ICP 1001101874UN586 be audited under the DUML due to its load. Genesis and NZTA are currently investigating these connections and whether they are able to be metered. | unknown | |

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

### Code reference

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

### Code related audit information

*The DUML database must contain:*

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

### Audit observation

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

### Audit commentary

All items of load had an ICP recorded as required by this clause.

### Audit outcome

Compliant

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

**Code reference**

*Clause 11(2)(b) of Schedule 15.3*

**Code related audit information**

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

**Audit observation**

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

**Audit commentary**

The database contains road name, location ID, displacement, nearest house address, pole number, side, and GPS coordinates. GPS coordinates are recorded for all items of load.

**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 and wattage and gear make, model and wattage. All items of load have lamp wattage and description information recorded.

Six 1000W metal halide lamps are recorded with a gear wattage of zero. Capital Journeys have asked their electrical team to confirm the correct gear wattages for these lights, and will update the database as necessary once the correct wattages are confirmed. The zero gear wattages are not recorded as non-compliance, because they may be genuine.

| Pole ID | Make | Model | Model | Lamp wattage | Gear wattage |
|---|---|---|---|---|---|
| 16206 | Philips | MH10 | 1000w Metal Halide | 1000 | 0 |
| 16206 | Philips | MH10 | 1000w Metal Halide | 1000 | 0 |
| 16207 | Philips | MH10 | 1000w Metal Halide | 1000 | 0 |

| Pole ID | Make | Model | Model | Lamp wattage | Gear wattage |
|---|---|---|---|---|---|
| 16207 | Philips | MH10 | 1000w Metal Halide | 1000 | 0 |
| 16208 | Philips | MH10 | 1000w Metal Halide | 1000 | 0 |
| 16208 | Philips | MH10 | 1000w Metal Halide | 1000 | 0 |

| Description | Recommendation | Audited party comment | Remedial action |
|---|---|---|---|
| Zero and missing gear wattages | Confirm the correct gear wattages for pole IDs 16206, 16207 and 16208 and update the database as needed. | Genesis has requested the POLE ID asset information be updated as necessary | Identified |

Two items of load have blank gear wattages, which are expected to be recorded as zero for completeness. Capital Journeys intends to update the gear wattage to zero.

| Pole ID | Make | Model | Model | Gear wattage |
|---|---|---|---|---|
| 46426 | AEC | IT2V | ITALO 2-Veh | |
| 15935 | Philips | GPLS | LED Roadstar GPLS | |

The accuracy of recorded wattages is discussed in **section 3.1**.

### Audit outcome

Non-compliant

| Non-compliance | Description |
|---|---|
| Audit Ref: 2.4<br>With: Clause 11(2)(b) of Schedule 15.3<br><br>From: 03-Dec-20<br>To: 03-Dec-20 | Gear wattages for pole IDs 46426 and 15935 are blank, but should have zero recorded.<br>Potential impact: Medium<br>Actual impact: Low<br>Audit history: Once<br>Controls: Moderate<br>Breach risk rating: 2 |
| **Audit risk rating** | **Rationale for audit risk rating** |
| **Low** | The controls are moderate because lamp description, lamp wattages and gear wattages are recorded for almost all lamps.<br>The audit risk rating is low because the two blank gear wattages should be recorded as zero, and Capital Journeys intends to update the database. |

| Actions taken to resolve the issue | Completion date | Remedial action status |
|---|---|---|
| Genesis has requested the asset gear wattages be populated | 01/04/2021 | Identified |
| **Preventative actions taken to ensure no further issues will occur** | **Completion date** | |
| Genesis continues to work with the NZTA and Capital Journey's to gain accuracy levels. Genesis are aware that there is a continuous gradual improvement in the asset information from where it began. | continuous improvements being conducted | |

## 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 database extract was provided in December 2020. The field audit was not based on a statistical sample due to the difficulty in checking lighting on motorways and state highways. I selected 148 lights where the checks could be conducted from the footpath, or where it was safe to stop at the roadside.

### Audit commentary

The field audit was conducted on 21 February 2021. The field audit discrepancies are detailed in the table below:

| Area and light type | Database count | Field count | Light count difference | Wattage recorded incorrectly | Comments |
|---|---|---|---|---|---|
| Paremata Rd Paremata Boating Club to Browns Bay Park (Postgate Dr) - Roadstar GPLS 45W | 1 | 1 | - | 1 | Pole ID 15935 75W LED is recorded in the database as a 45W LED. |
| Pukerua Bay - Pa Rd to Te Ara Rd - 150 HPS SON/T | 16 | 16 | - | 1 | Pole ID 15774 149W LED is recorded in the database as a 150W HPS. |
| Paremata Rd Paremata Boating Club to Browns Bay Park (Postgate Dr) - 150 HPS SON/T | 24 | 24 | - | 1 | Pole ID 15927 149W LED is recorded in the database as a 150W HPS. |
| Paremata Rd & Joseph Banks Dr | 9 | 9 | - | 1 | Pole ID 15951 149W LED is recorded in the database as a 150W HPS. |

| Area and light type | Database count | Field count | Light count difference | Wattage recorded incorrectly | Comments |
|---|---|---|---|---|---|
| (up to stream) - 150 HPS SON/T | | | | | |
| Pukerua Bay - Paekakariki end to Pa Rd - 150 HPS SON/T | 11 | 11 | - | 1 | Pole ID 15770 36W LED is recorded in the database as a 150W HPS. |
| Pukerua Bay – Teihana Rd to Gray St - 150 HPS SON/T | 5 | 4 | 1 | - | Pole ID 15805 removed light is recorded in the database as a 150W HPS. |
| Pukerua Bay – Te Kura Rd to Teihana Rd - 150 HPS SON/T | 9 | 8 | 1 | 2 | Pole IDs 15803 and 15799 with 149W LEDs are recorded in the database as 150W HPS. Pole 55942 recorded in the database as a 150W HPS is missing. |
| Plimmerton – Acheron Rd to Dolly Varden Cres - 250 HPS | 19 | 18 | 1 | 1 | Pole ID 42233 removed light is recorded in the database as a 250W HPS. Pole ID 16136 149W LED is recorded in the database as a 250W HPS. |
| **Total** | **148** | **145** | **3** | **8** | |

The field audit did not identify any lights which were present in the field but not recorded in the database. The accuracy of the database is detailed 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 RAMM database functionality achieves compliance with the code for ICPs 1001102038UN6D0 and 1001102039UNA95. The change management process and the compliance of the database reporting provided to Genesis is detailed in **sections 3.1** and **3.2**.

ICP 1001101874UN586 is not recorded in a database, and this is recorded as non-compliance in **sections 2.1** and **3.2**.

**Audit outcome**

Compliant

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

**Code reference**

*Clause 11(4) of Schedule 15.3*

**Code related audit information**

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

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

**Audit observation**

The database was checked for audit trails.

**Audit commentary**

The database has a complete audit trail for ICPs 1001102038UN6D0 and 1001102039UNA95.

ICP 1001101874UN586 is not recorded in a database, and this is recorded as non-compliance in **sections 2.1** and **3.2**.

**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 database extract was provided in December 2020. The field audit was not based on a statistical sample due to the difficulty in checking lighting on motorways and state highways. I selected 148 lights where the checks could be conducted from the footpath, or where it was safe to stop at the roadside.

| Plan Item | Comments |
|---|---|
| Area of interest | NZTA Porirua streetlights |
| Strata | The database contains the NZTA Porirua streetlights. The processes for the management of all items of load are the same, and there are 580 items of load in the database. One strata was created. |
| Area units | I mapped all the streetlights and selected a sample of 148 lights where the checks could be conducted from the footpath, or where it was safe to stop at the roadside. |
| Total items of load | 148 items of load making up 26% of the lights in the database and 20% of the database wattage. |

Wattages were checked for alignment with the published standardised wattage table produced by the Electricity Authority against the spreadsheet 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**

**Field audit findings**

The field audit was not based on a statistical sample due to the difficulty in checking lighting on motorways and state highways. I selected 148 lights where the checks could be conducted from the footpath, or where it was safe to stop at the roadside. I found that the field wattage for the sample was 96.2% of the database wattage. Most of the differences related to LED upgrades which had not been recorded in the database.

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 | 96.2 | Wattage from survey is lower than the database wattage by -3.8%. |
| $R_L$ | 91.9 | With a 95% level of confidence it can be concluded that the error could be between -8.1% and -1.1%. |
| $R_H$ | 98.9 | |

The variability of the sample results across the strata means that the true wattage (installed in the field) could be 1.1% to 8.1% lower than the wattage recorded in the DUML database.

These results were categorised in accordance with the "Distributed Unmetered Load Statistical Sampling Audit Guideline", effective from 1 February 2019. The best available estimate is not precise enough to conclude that the database is accurate within ±5.0%.

- In absolute terms the installed capacity is estimated to be 6 kW lower than the database indicates.
- There is a 95% level of confidence that the installed capacity is between 2 and 12 kW lower than the database.
- In absolute terms, total annual consumption is estimated to be 23,900 kWh lower than the DUML database indicates.
- There is a 95% level of confidence that the annual consumption is between 6,800 and 51,700 kWh p.a. lower than the database indicates.

| Scenario | Description |
|---|---|
| A - **Good accuracy, good precision** | This scenario applies if:<br>(a) $R_H$ is less than 1.05; and<br>(b) $R_L$ is greater than 0.95<br>The conclusion from this scenario is that:<br>(a) the best available estimate indicates that the database is accurate within +/- 5 %; and<br>(b) this is the best outcome. |
| B - **Poor accuracy, demonstrated with statistical significance** | This scenario applies if:<br>(a) the point estimate of R is less than 0.95 or greater than 1.05<br>(b) as a result, either $R_L$ is less than 0.95 or $R_H$ is greater than 1.05.<br>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:<br>(a) the point estimate of R is between 0.95 and 1.05<br>(b) $R_L$ is less than 0.95 and/or $R_H$ is greater than 1.05<br>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 described in **section 2.4**, all items of load have lamp wattage and description information recorded.

Six 1000W metal halide lamps are recorded with a gear wattage of zero. Capital Journeys have asked their electrical team to confirm the correct gear wattages for these lights, and will update the database as necessary once the correct wattages are confirmed. The zero gear wattages are not recorded as non-compliance, because they may be genuine.

Two items of load have blank gear wattages, which are expected to be recorded as zero for completeness. Capital Journeys intends to update the gear wattage to zero.

Wattages were checked for alignment with the published standardised wattage table produced by the Electricity Authority against the spreadsheet or in the case of LED lights against the LED light specification. I was unable to locate matching specifications for Pole ID 46426 (AEC ITALO 2-Veh 293W). Capital Journeys believes that this light was installed as part of the Transmission Gully project, and a default maximum wattage has been applied. Capital Journeys intends to investigate to confirm the correct lamp details.

| Description | Recommendation | Audited party comment | Remedial action |
|---|---|---|---|
| Lamp wattage details for Pole ID 46426 | Confirm the correct lamp and wattage details for Pole ID 46426 and update the database as needed. | Genesis has requested all assets information relating to potential errors on the pole id's outlined in the audit be rectified. | Identified |

**Location accuracy**

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

**ICP number and owner accuracy**

As discussed in **section 2.2**, all items of load have an ICP number recorded.

The accuracy of ICP numbers was checked by comparing the ICP description to the location for each item of load for consistency. ICP assignment appeared reasonable for all items of load except pole ID 55991 (250W SON) outside Mobil Paremata which was recorded against ICP 1001102039UNA95 (PNI0331), but all surrounding lights were recorded against ICP 1001102038UN6D0 (TKR0331). Capital Journeys corrected the ICP to 1001102038UN6D0 during the audit. There is no impact on reconciliation because both NSPs are within the same balancing area (WELLTONUNETG).

**Change management process findings**

<u>ICPs 1001102038UN6D0 and 1001102039UNA95</u>

ICPs 1001102038UN6D0 and 1001102039UNA95 are recorded in NZTA's RAMM database. Field work, asset data capture and database population is conducted by Capital Journeys. Dispatch of field work and return of work completion details is managed using Pocket RAMM. RAMM asset information is updated by Capital Journeys' Asset Management Specialist based on the information returned from the field, including installation and removal dates.

I found two lights where light changes had been made by other parties, but updated in the database by Capital Journeys' Asset Management specialist:

- NZTA Pole ID 15935 (LED Roadstar GPLS) was upgraded to an LED by Porirua City Council as part of their LED upgrade for an intersecting street; the light has a blank gear wattage, which is recorded as non-compliance below and in **section 2.4**, and
- Pole ID 46426 (AEC ITALO 2-Veh) is believed to have been upgraded as part of the Transmission Gully project; the wattage was unable to be verified against specifications, and I recommend that this is checked and updated.

Changes to the database information are infrequent, and new connections are rare. Damaged lights are normally replaced by another light of the same type, and there are no immediate plans to complete an LED roll out. During the field audit I found that some LED upgrades had not been recorded in the database, which affected database accuracy.

Outage patrols are completed at least fortnightly, and Capital Journeys has completed a field audit to check database completeness and accuracy.

The database contains a "light install date" and a "lamp install date" but there is not a field for "livening date" for newly connected lights. The light install date is used to record the connection date.

ICP 1001101874UN586

ICP 1001101874UN586 is not recorded in a database, and this is recorded as non-compliance in **sections 2.1** and **3.2**.

**Audit outcome**

Non-compliant

| Non-compliance | Description |
|---|---|
| Audit Ref: 3.1<br>With: Clause 15.2 and 15.37B(b)<br><br>From: 03-Dec-20<br>To: 03-Dec-20 | **ICPs 1001102038UN6D0 and 1001102039UNA95**<br>The database is not confirmed as accurate with a 95% level of confidence.<br>Gear wattages for pole IDs 46426 and 15935 are blank, but should have zero recorded.<br>Pole ID 55991 was temporarily recorded against 1001102039UN-A95 (PNI0331) instead of 1001102038UN-6D0 (TKR0331), and was corrected during the audit.<br>Potential impact: High<br>Actual impact: Low<br>Audit history: Once<br>Controls: Moderate<br>Breach risk rating: 4 |
| **Audit risk rating** | **Rationale for audit risk rating** |
| **Medium** | Controls are rated as moderate, as they are sufficient to mitigate the risk most of the time but there is room for improvement.<br>The impact is assessed to be medium, based on the kWh differences described above. |

| Actions taken to resolve the issue | Completion date | Remedial action status |
|---|---|---|
| Genesis continues to work with the NZTA and Capital Journey's to gain accuracy levels. Genesis are aware that there is a continuous gradual improvement in the asset information from where it began.<br>Genesis will be working with the contractor reiterate the necessity of change reporting. | continuous improvements being conducted | Investigating |
| **Preventative actions taken to ensure no further issues will occur** | **Completion date** | |
| Genesis has requested the assets for ICP 1001101874UN586 confirmed in previous conversations. Genesis will raise its concerns again. | unknown | |

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

### Code reference

*Clause 15.2 and 15.37B(c)*

### Code related audit information

*The audit must verify that:*

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

### Audit observation

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

- checking the registry to confirm that the ICP has the correct profile and submission flag, and
- checking the database extract combined with the on hours against the submitted figure to confirm accuracy.

### Audit commentary

Genesis reconciles this DUML load as shown in the table below:

| ICP Number | Description | Registry profile | Submission profile | On hours based on | Wattage based on |
|---|---|---|---|---|---|
| 1001102038UN6D0 | MASTER ICP PORIRUA CC TRANSIT SH1-PUKERUA BAY | CST | CST | Data logger | NZTA RAMM |
| 1001102039UNA95 | MASTER ICP PORIRUA CC TRANSIT SH1 | CST | CST | Data logger | NZTA RAMM |
| 1001101874UN586 | TRAFFIC LIGHTS-TRANSIT MANA ESPLANADE | UNM | UML | Registry information | Registry information |

**ICPs 1001102038UN6D0 and 1001102039UNA95**

I recalculated the submissions for 1001102038UN6D0 and 1001102039UNA95 for October 2020 using the data logger and the database information. I confirmed that the calculation method was correct, and submission was based on the database information and logger hours. The field survey found that the best available estimate of field wattage is not precise enough to conclude that the database is accurate within ±5.0% as recorded in **section 3.1**.

The correct profiles and submission types are recorded on the registry.

The database contains some inaccurate content:

| Issue | Estimated volume information impact (annual kWh) |
|---|---|
| Gear wattages for pole IDs 46426 and 15935 are blank, but should have zero recorded. | 0 kWh |

| Issue | Estimated volume information impact (annual kWh) |
|---|---|
| Pole ID 55991 (250W SON) was recorded against ICP 1001102039UN-A95 (PNI0331), but should have been recorded against ICP 1001102038UN-6D0 (TKR0331). Capital Journeys corrected the ICP to 1001102038UN-6D0 during the audit.<br><br>There is no impact on reconciliation because both NSPs are within the same balancing area (WELLTONUNETG). | -1187 kWh at TKR0331<br>+1187 kWh at PNI0331<br><br>0 kWh overall difference at balancing area WELLTONUNETG |

On 18 June 2019, the Electricity Authority issued a memo confirming that the code requirement to calculate the correct monthly load must:

- take into account when each item of load was physically installed or removed, and
- wash up volumes must take into account where historical corrections have been made to the DUML load and volumes.

The database contains a "light install date" and a "lamp install date" but there is not a field for "livening date" for newly connected lights. The "light install date" is used to record the connection date. When a wattage is changed in the database due to a physical change or a correction, only the record present at the time the report is run will be recorded if the monthly report process is based on a snapshot, not the historical information showing dates of changes.

**ICP 1001101874UN586**

ICP 1001101874UN586 is not recorded in the RAMM. I recalculated the October 2019 to December 2020 submissions for 1001101874UN586 and found that they were consistent with the registry's 84 daily unmetered kWh. The daily unmetered kWh was also consistent with the registry's trader and distributor unmetered load details. Non-compliance is recorded below because a database is not used for submission.

UNM profile is recorded on the registry, but UML profile is correctly applied for submission. The submission type is correctly recorded on the registry.

### Audit outcome

Non-compliant

| Non-compliance | Description |
|---|---|
| Audit Ref: 3.2<br><br>With: Clause 15.2 and 15.37B(c) | **ICPs 1001102038UN6D0 and 1001102039UNA95**<br><br>The database is not confirmed as accurate with a 95% level of confidence.<br><br>Gear wattages for pole IDs 46426 and 15935 are blank, but should have zero recorded.<br><br>Pole ID 55991 was temporarily recorded against 1001102039UN-A95 (PNI0331) instead of 1001102038UN-6D0 (TKR0331), and was corrected during the audit.<br><br>The monthly database extract provided does not track changes at a daily basis and is provided as a snapshot.<br><br>**ICP 1001101874UN586**<br><br>ICP 1001101874UN586 is not recorded in RAMM, and settlement is not based on database information. |

| | |
|---|---|
| From: 01-Oct-19<br>To: 31-Dec-20 | UNM profile is recorded on the registry, but UML profile is correctly applied for submission.<br>Potential impact: High<br>Actual impact: Unknown<br>Audit history: Once<br>Controls: Weak<br>Breach risk rating: 6 |

| Audit risk rating | Rationale for audit risk rating |
|---|---|
| **Medium** | The controls are rated as weak, because NZTA's RAMM information is only used for settlement of two of the three ICPs.<br>The overall impact is unknown because the correct wattage for ICP 1001101874UN586 was unable to be determined. Based on the assumption that the registry data applied for submission is a reasonable estimate of the load, the impact is assessed to be a maximum of medium.<br>The incorrect ICP number and blank gear wattages have no impact on reconciliation results. |

| Actions taken to resolve the issue | Completion date | Remedial action status |
|---|---|---|
| Genesis continues to work with the NZTA and Capital Journey's to gain accuracy levels. Genesis are aware that there is a continuous gradual improvement in the asset information from where it began.<br>Genesis will be working with the contractor reiterate the necessity of change reporting. | continuous improvements being conducted | Investigating |
| **Preventative actions taken to ensure no further issues will occur** | **Completion date** | |
| Genesis has requested the assets for ICP 1001101874UN586 to be confirmed in previous conversations. Genesis has raised its concerns again and the NZTA are currently investigating the possibility of metering the connection. | unknown | |

## CONCLUSION

The NZTA Porirua DUML load is captured by three ICPs:

- 1001102038UN6D0 MASTER ICP NZTA STREETLIGHT TKR0331
- 1001102039UNA95 MASTER ICP NZTA STREETLIGHT PNI0331 (INCL. SH58), and
- 1001101874UN586 TRAFFIC LIGHTS-TRANSIT MANA ESPLANADE.

### ICPs 1001102038UN6D0 and 1001102039UNA95

ICPs 1001102038UN6D0 and 1001102039UNA95 are recorded in NZTA's RAMM database, and were previously recorded in Porirua City Council's RAMM database. Field work, asset data capture and database population is conducted by **Capital Journeys**. Dispatch of field work and return of work completion details is managed using Pocket RAMM. RAMM asset information is updated by Capital Journeys' Asset Management Specialist based on the information returned from the field, including installation and removal dates. Changes to the database information are infrequent.

A field audit was conducted of a sample of 148 items of load, and I found that the field wattage was 96.2% of the database wattage. Most of the differences related to LED upgrades which had not been recorded in the database.

ICPs 1001102038UN6D0 and 1001102039UNA95 are settled using the CST profile. Submission volumes are calculated from a monthly database extract provided by Capital Journeys and data logger hours.

### ICP 1001101874UN586

ICP 1001101874UN586 is not recorded in the RAMM or on the DUML audit register, and Genesis asked Veritek to include it in this audit. Based on the registry unmetered load information, there are seven items of load totalling 3,500 W which are connected 24 hours per day, using 84 kWh per day or 30,660 kWh per annum.

ICP 1001101874UN586 is settled using the UML profile. Submission volumes are calculated from the registry daily unmetered kWh.

### Conclusion

The future risk rating of 18 indicates that the next audit be completed in six months. I recommend that the next audit is completed in a minimum of nine months, as the participant comments indicate that the issues are being resolved, and this will allow time for the improvements to be completed and demonstrated.

PARTICIPANT RESPONSE

Genesis apologies for the lateness of the submission of this audit, however Genesis needed to discuss the issues with the NZTA prior to commenting.

The NZTA is progressing well and is actively working to raise the integrity of the database information. In doing so, Genesis will be engaging with the NZTA to clarify the asset details for ICP 1001101874UN586. Genesis has requested the contractor tidy up the highlighted asset anomalies as it continues to work in cleansing the RAMM database pertaining to NZTA Porirua.

Genesis has included the ICP 1001101874UN586 in the NZTA audit as the assets should be part of the DUML database, however due to the connections being traffic lights these have generally not been included in RAMM. NZTA have advised that there is the possibility of cameras etc that over time have been connected to the circuit. Currently the ICP's assets are labelled as 24hr lights, which is the reasoning behind it being settled under the UML profile. The NZTA & Genesis are investigating what is currently connected and whether it is possible for the assets to be metered. Genesis has previously mentioned that the EA should develop and maintain a 24hr profile that can be utilised by traders, other than UML.