VERITEK

# Electricity Industry Participation Code Audit Report

**For**

## Meridian Energy Limited

meridian

## Palmerston North City Council
## Distributed Unmetered Load

**Prepared by Tara Gannon – Veritek Ltd**

**Date of Audit:** 16/12/17

**Date Audit Report Complete:** 01/03/18

# Executive Summary

This audit of the Palmerston North City Council (PNCC) DUML database and processes was conducted at the request of Meridian Energy Limited (Meridian), 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, which became effective on 1 June 2017.

PNCC's streetlight data is recorded within a RAMM database. Alf Downs are responsible for fieldwork, and asset data capture. Database information is reported to Meridian monthly.

EMS creates reconciliation submission information on Meridian's behalf using wattages provided by Meridian, and on and off times derived from a data logger read by EMS.

The database contains some inaccurate information. This primarily relates to wattage differences; the field audit found that lamp and gear model information was highly accurate. The audit process included a field audit of 405 items of load, which found 99.3% accuracy.

PNCC applies profiled wattages for LED lights, to account for dimming and different drive rates. This, combined with some errors in lamp and gear wattages has resulted in 3,629 lamps with differences in lamp or gear wattages, and 13 lamps with inconsistencies between the lamp and gear model recorded. It is estimated that the wattage differences could result in under reporting of around 2,000,000 kWh per annum.

The future risk rating of 30 indicates that the next audit be completed in three months.

## Table of Non-Compliance

| 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 | The database used to prepare submissions contains some inaccurate information. | Weak | High | 9 | Identified |
| All load recorded in database | 2.5 | 11(2A) of Schedule 15.3 | For the sample of 405 lamps checked:<br>• Two lamps were not found.<br>• Three extra lamps were recorded. | Strong | Low | 1 | Identified |
| Tracking of load changes | 2.6 | 11(3) of Schedule 15.3 | Database updates may be late for lights in new subdivisions. | Moderate | Low | 2 | Investigating |
| Database accuracy | 3.1 | 15.2 | • PNCC applies unapproved profiles to adjust specified lamp wattages to account for different drive rates and dimming. 3602 recorded lamp wattages differ from expected values.<br>• 27 recorded gear wattages differ from expected values.<br>• 13 recorded lamp and gear models are inconsistent.<br>• Eleven differences were found for the sample of 405 lamps checked during the field audit. | Weak | High | 9 | Identified |
| Volume information accuracy | 3.2 | 15.2 | The database used to prepare submissions contains some inaccurate information. | Weak | High | 9 | Identified |
| | | | | | Future risk rating | 30 | |
| | | | | | Indicative audit frequency | 3 months | |

| 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 |

## Table of Recommendations

| Subject | Section | Recommendation | Description |
|---|---|---|---|
| ICP identifier | 2.2 | Ensure the correct NSP is recorded for the ICP identifier | Review the data to confirm which NSP the lamps are connected to. Set up a new NSP for Bunnythorpe and assign lamps to it as necessary. |
| Description of load type | 3.1 | Review of recorded wattages | Discuss PNCC's wattage profiling processes with the Electricity Authority, to determine the best way to resolve this non-compliance, including whether the lamps with wattage discrepancies could be split to a separate ICP with a new approved profile. |

## Persons Involved in This Audit:

Auditor:

**Tara Gannon**
**Veritek Limited**
**Electricity Authority Approved Auditor**

Other personnel assisting in this audit were:

| Name | Title | Company |
|---|---|---|
| Neil Warby | Senior Engineering Officer | Palmerston North City Council |
| Phil Harris | Administration | Alf Downs Streetlighting Limited |
| Helen Youngman | Energy Data Analyst | Meridian Energy |

# Contents

# 1. Administrative

## 1.1 Exemptions from Obligations to Comply With Code (Section 11 of Electricity Industry Act 2010)

*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.*

Review of current exemptions on the Electricity Authority's website confirmed that there are no exemptions in place relevant to the scope of this audit.

## 1.2 Supplier List

PNCC, Alf Downs, RAMM Software Limited, and EMS are considered agents, and Meridian clearly understands that the use of agents does not release them from their compliance obligations.

Meridian has a direct contractual relationship with EMS and PNCC, but there is no direct contractual relationship between Meridian and Alf Downs, or Meridian and RAMM Software Limited.

PNCC has contracts with

- **Alf Downs** for fieldwork and asset data capture; and
- **RAMM Software Limited** for database hosting.

This is not seen as an issue, as the processes for updating the database are robust and have appropriate validation controls in place. This is discussed further in **section 2.6.**

## 1.3 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".

Alf Downs confirmed that the database back-up is in accordance with standard industry procedures. The database is password protected. Compliance is confirmed.

## 1.4 List of ICPs

The following ICP is relevant to the scope of this audit:

| ICP | Description | Profile | NSP | No. of items of load |
|---|---|---|---|---|
| 0000031152CPB70 | Streetlights The Square | DST | LTN0331 | 9261 |

## 1.5 Breaches or Breach Allegations

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

## 1.6 Distributed unmetered load audits (Clauses 16A.26 & 17.295F)

*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
Meridian requested Veritek to undertake this streetlight audit.

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

## 1.7 Separate distributed unmetered load audit (Clause 16A.8(4))

*Retailers must ensure that DUML audits are reported in a separate audit report.*

Audit Observation
Meridian requested Veritek to undertake this streetlight audit.

Audit Commentary
The audit report for this DUML database is separate from other audit reports. Compliance is confirmed.

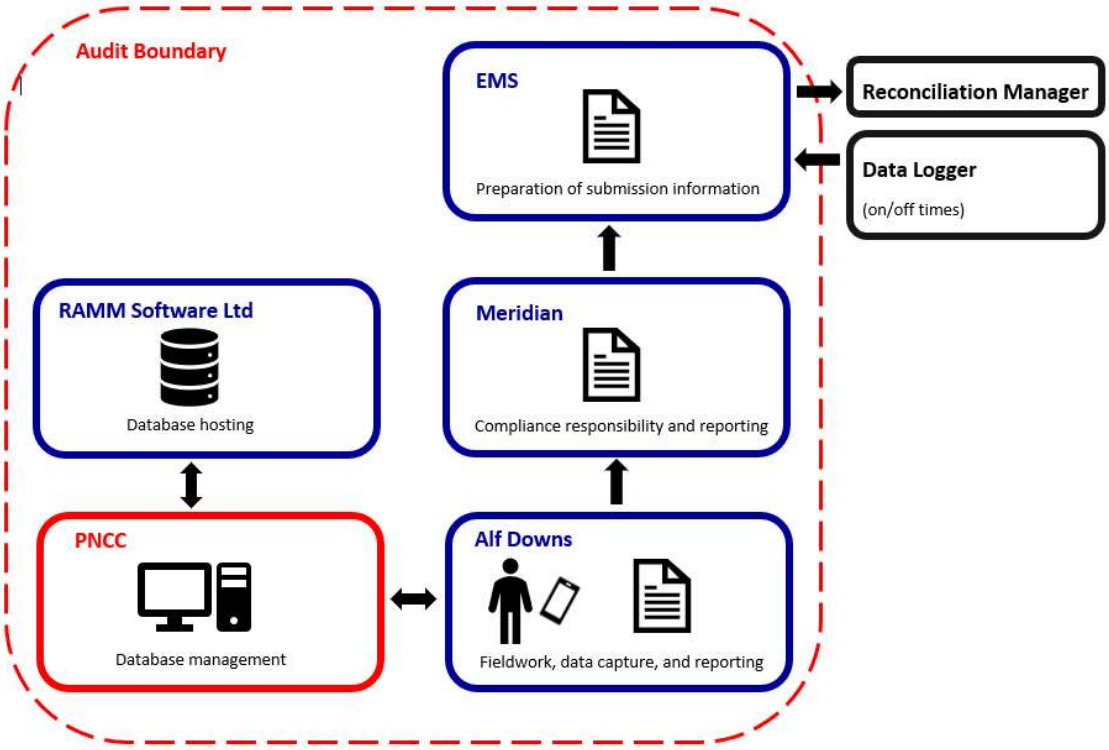
## 1.8 Summary of Previous Audit

This is the first audit completed for Meridian for the PNCC DUML database.

## 1.9 Scope of Audit

A RAMM database is held by PNCC, who is Meridian' customer. This database is hosted by RAMM Software Limited and is managed by PNCC. Alf Downs complete the field work and data capture.

The scope of the audit encompasses the collection, security and accuracy of the data, including the preparation of submission information based on the spreadsheet reporting. The diagram below shows the current flow of information and the audit boundary for clarity.




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

The field audit was undertaken of 405 lights on 16 December 2017 using the statistical sampling methodology. The field selection included three population groups:

- Streets where changes to the database occurred during 2017 for some lamps.
- Streets where an owner other than PNCC roading was recorded for some lamps.
- All other streets.

## 1.10 Data Transmission (Clause 20 of Schedule 15.2)

A password protected report from RAMM is sent to Meridian monthly. Compliance is confirmed.

# 2. DUML database requirements

## 2.1 Deriving Submission Information (Clause 11(1) of Schedule 15.3)

*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

Meridian reconciles this DUML load using the DST profile. The on and off times are derived from a data logger read by EMS, and are used to create a shape file. Meridian supplies EMS with the capacity information and EMS calculates the kWh figure for ICP 0000031152CPB70 and includes this in the relevant AV080 file.

The wattages submitted to EMS were checked against the database information for all months from December 2016 to October 2017 and found to match. This process was audited during Meridian's reconciliation participant audit, and its accuracy and compliance was confirmed.

While Meridian are using up to date database information, there is some inaccurate data within the database. This is recorded as non-compliance below and is discussed further in **section 3.1**.

| Non-compliance | Description |
|---|---|
| Audit Ref: 2.1<br>With: Clause 11(1) of Schedule 15.3<br><br>From: entire audit period | The database used to prepare submissions contains some inaccurate information.<br>Potential impact: High<br>Actual impact: High<br>Audit history: None<br>Controls: Weak<br>Breach risk rating: 9 |
| **Audit risk rating** | **Rationale for audit risk rating** |
| **High** | Controls are rated as weak, as they do not mitigate the risk of incorrect load types and wattages being recorded.<br>It is estimated that the wattage differences could result in under reporting of around 2,000,000 kWh per annum. |

| Actions taken to resolve the issue | Completion date | Remedial action status |
|---|---|---|
| PNCC has agreed to amend their database so that maximum design wattages are recorded for LED lights.<br>Once this update has occurred we will revise historic submissions as required. | 30 September 2018 | Identified |
| **Preventative actions taken to ensure no further issues will occur** | **Completion date** | |
| We will work with PNCC to develop a Code compliant solution for their dimmable LED lighting. | Ongoing | |

## 2.2 ICP Identifier (Clause 11(2)(a) of Schedule 15.3)

*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 analysis found that all items of load had an ICP recorded.

There are two NSPs in the PNCC region; Linton and Bunnythorpe. All streetlights in the PNCC database are recorded against the Linton NSP, including addresses expected to be connected to the Bunnythorpe NSP. I recommend investigation is carried out to confirm which lights are connected to the Bunnythorpe NSP, and create a separate ICP for these lights.

| Subject | Recommendation | Description | Meridian Comments |
|---|---|---|---|
| ICP identifier | Ensure the correct NSP is recorded for the ICP identifier | Review the data to confirm which NSP the lamps are connected to. Set up a new NSP for Bunnythorpe and assign lamps to it as necessary. | We have had discussions with Powerco who advise the lights can be backfed from both LTN and BPE NSPs. We have clarified the requirement for lights to be recorded and submitted against the NSP they are fed from the majority of the time and are awaiting Powerco's response to determine whether a 2nd ICP is required. |

NZTA urban lights remain in the PNCC database, with the ICP number recorded as NZTA. PNCC is not responsible for these lights and does not maintain this information, but keeps the records to help them to identify who is responsible if a fault is reported. NZTA rural lights are not recorded at all.

Compliance is confirmed.

## 2.3 Location of Each Item of Load (Clause 11(2)(b) of Schedule 15.3)

*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

Street address information is recorded for all lamps. The database contains Global Positioning System (GPS) coordinates for 9259 (99.99%) of the 9261 lamps.

Compliance is confirmed.

## 2.4 Description of Load Type (Clause 11(2)(c) & (d) of Schedule 15.3)

*The DUML database must contain:*

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

Audit Observation

The database was checked to confirm that it contained a field for lamp type and wattage capacity, and included any ballast or gear wattage.

Audit Commentary

The database contains a description of lamp type, lamp wattage and a gear wattage for all items of load. Compliance is confirmed.

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

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

Audit Observation

The field audit was undertaken of 405 lights using the statistical sampling methodology. The field selection included three population groups:

- Streets where changes to the database occurred during 2017 for some lamps.
- Streets where an owner other than PNCC roading was recorded for some lamps.
- All other streets.

Audit Commentary

The field audit findings are detailed in the table below. For the sample of 405 lamps checked:

- Two lamps recorded in the database were not found; and
- Three lamps were not recorded in the database.

Six lamp models were recorded incorrectly, this is recorded as non-compliance in **section 3.1**.

| Street | Database count | Field count | Light count differences | Model recorded incorrectly | Comments |
|---|---|---|---|---|---|
| **Changes during 2017** | | | | | |
| ANGLESEY PL EAST, AWAPUNI | 3 | 3 | - | - | |
| ANGLESEY PL, AWAPUNI | 4 | 4 | - | - | |
| ASPEN WAY, PAPAIOEA | 5 | 5 | - | - | |
| BRYCE PL, PAPAIOEA | 1 | 1 | - | - | |
| BURFIELD PL, AWAPUNI | 4 | 4 | - | - | |
| CAULFIELD PL, AWAPUNI | 3 | 3 | - | - | |
| COLOMBO ST, HOKOWHITU | 9 | 9 | - | - | |
| CREMORNE AVE, HOKOWHITU | 4 | 4 | - | - | |
| HODGENS PL, AWAPUNI | 4 | 4 | - | - | |
| JENSEN ST, HOKOWHITU | 4 | 4 | - | - | |
| LORENZO PL, KELVIN GROVE | 1 | 4 | 3 | - | Missing 3 mini 18W LED lamps. |
| NGAIO ST, AWAPUNI | 6 | 6 | - | - | |

| Street | Database count | Field count | Light count differences | Model recorded incorrectly | Comments |
|---|---|---|---|---|---|
| ORLANDO WAY, PAPAIOEA | 3 | 3 | - | - | |
| RODEO DR, PAPAIOEA | 16 | 16 | - | - | |
| ROTHESAY PL, TAKARO | 3 | 3 | - | - | |
| TRUSCOTT GR, AWAPUNI | 3 | 3 | - | - | |
| UNION ST, HOKOWHITU | 8 | 8 | - | - | |
| **Owner other than PNCC roading** | | | | | |
| BERRYMANS LANE_S, PAPAIOEA | 12 | 12 | - | - | |
| CARDRONA CL, PAPAIOEA | 6 | 6 | - | - | |
| CASTLE CT, AWAPUNI | 12 | 10 | -2 | 2 | Pole 102 has two records, each with 18W. It appears there are two 9W fittings and the total should be 18W. Pole numbers 5133 and 5131 were not located, 50W lamps were listed. |
| GLENMARY CL, PAPAIOEA | 12 | 12 | - | 4 | Two 50W lamps, one 70W lamp and one 80W lamp were replaced with 18W LED lamps. |
| SQUARE INNER, CENTRAL | 43 | 43 | - | - | |
| VOGEL ST, PAPAIOEA | 47 | 47 | - | - | |
| **All other streets** | | | | | |
| BRENTWOOD AVE, TAKARO | 10 | 10 | - | - | |
| CASCADE CRES, TAKARO | 11 | 11 | - | - | |
| CECIL PL, TAKARO | 4 | 4 | - | - | |
| HAVERSHAM ST, TAKARO | 6 | 6 | - | - | |
| HIGHBURY AVE, TAKARO | 44 | 44 | - | - | |
| MAIN WEST, AWAPUNI | 57 | 57 | - | - | |
| MARGARET ST, PAPAIOEA | 13 | 13 | - | - | |
| MATIPO ST, TAKARO | 7 | 7 | - | - | |
| RUAMAHANGA CRES, HOKOWHITU | 20 | 20 | - | - | |
| TARARUA TCE, TAKARO | 9 | 9 | - | - | |
| WESTON AVE, PAPAIOEA | 11 | 11 | - | - | |
| **Total** | **405** | **407** | **1** | **6** | |

The recorded wattage for the sample checked was 40,298. The light count and model differences identified in the field totalled -301W. Based on this the sample's accuracy was 99.3%.

| Non-compliance | Description |
|---|---|
| Audit Ref: 2.5<br>With: Clause 11(2A) of Schedule 15.3<br><br>From: entire audit period | For the sample of 405 lamps checked:<br>• Two lamps recorded in the database were not found<br>• Three lamps were not recorded in the database<br>Potential impact: Low<br>Actual impact: Low<br>Audit history: None<br>Controls: Strong<br>Breach risk rating: 1 |
| **Audit risk rating** | **Rationale for audit risk rating** |
| **Low** | Controls are rated as strong, because 99.3% accuracy was achieved for the sample checked.<br>The impact is low, as the wattage difference would result in under reporting of approximately 1300 kWh per annum. |

| Actions taken to resolve the issue | Completion date | Remedial action status |
|---|---|---|
| We have passed the findings of the field audit to PNCC to verify and correct the database where needed. | 30 September 2018 | Identified |
| **Preventative actions taken to ensure no further issues will occur** | **Completion date** | |
| Overall controls are rated as strong and are considered sufficient to mitigate risk | Ongoing | |

## 2.6 Tracking of Load Changes (Clause 11(3) of Schedule 15.3)

*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

Any changes that are made during any given month take effect from the beginning of that month. The information is available which would allow for the total load in kW to be retrospectively derived for any day. On 20 September 2012, the Authority sent a memo to retailers and auditors advising that tracking of load changes at a daily level was not required if the database contained an audit trail. I have interpreted this to mean that the production of a monthly "snapshot" report is sufficient to achieve compliance.

The processes were reviewed for new lamp connections and the tracking of load changes due to faults and maintenance.

Fault, maintenance, and upgrade work is completed by Alf Downs. For routine faults and maintenance the RAMM database is updated in the field using PDAs. LED upgrades are updated in RAMM at the end of each week by Alf Downs office staff, based on information provided by field technicians. This enables the technicians to focus on installing as many LED lamps as possible, and allows the office staff to check the upgrade data as it is entered.

New connections may be completed by the distributor, the developer, or Alf Downs with PNCC's approval. Once livening has occurred an "as built" plan is provided to PNCC, who then takes responsibility for the lights. Alf Downs is responsible for capturing the streetlight data and entering it into RAMM, including the GPS coordinates. This process can result in delays between the lights being connected and included in RAMM. Lights which have been connected but are not vested in council are identified through monthly outage patrols.

Festive lights are recorded in the database, and reported separately with on and off dates when they are connected.

| Non-compliance | Description |
|---|---|
| Audit Ref: 2.6<br>With: Clause 11(3) of Schedule 15.3<br><br>From: entire audit period | Database updates may be late for lights in new subdivisions.<br>Potential impact: Low<br>Actual impact: Low<br>Audit history: None<br>Controls: Moderate<br>Breach risk rating: 2 |
| **Audit risk rating** | **Rationale for audit risk rating** |
| **Low** | Controls are rated as moderate, because they are sufficient to ensure that updates are timely most of the time.<br>The impact is low, as PNCC will usually identify recently connected lamps through its outage patrol processes. |

| Actions taken to resolve the issue | Completion date | Remedial action status |
|---|---|---|
| We will discuss potential process improvements to avoid delays after the material issues regarding database accuracy have been resolved. | 30 November 2018 | Investigating |
| **Preventative actions taken to ensure no further issues will occur** | **Completion date** | |
| As above | | |

## 2.7 Audit Trail (Clause 11(4) of Schedule 15.3)

*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 an audit trail for all changes, in addition this clause requires that an audit trail exists for all processing functions. The provision of reports from the database is considered to be secure, and an audit trail exists for the transmission of these reports.

Compliance is confirmed.

# 3. Accuracy of DUML database

## 3.1 Database Accuracy (Clause 15.2)

*The Audit must verify that the information recorded in the retailer's DUML database is complete and accurate.*

Audit Observation
The audit findings were used to determine if the information contained in the database is complete and accurate.

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

Audit Commentary
The database contains some inaccurate information. This primarily relates to wattage differences; the field audit found that lamp and gear model information was highly accurate.

The listed lamp model and gear model for each lamp were compared to the Electricity Authority's published standardised wattage table or the manufacturer's specifications if the lamp was not included on the wattage table. Where drive rates were included in the lamp model information, this was taken into consideration when reviewing the wattage.

Alf Downs confirmed that PNCC applies profiled wattages for LED lights, to account for dimming and different drive rates. This, combined with some errors in lamp and gear wattages has resulted in 3629 lamps with differences in lamp or gear wattages, and 13 lamps with inconsistencies between the lamp and gear model recorded.

The code requires any non-standard profiles applied to be approved by the Electricity Authority, and recorded on the reconciliation submissions. Meridian reports the load for ICP 0000031152CPB70 against profile DST, the profiles used by PNCC to adjust wattages have not been approved by the Electricity Authority.

Lamp wattage differences were identified for 3602 (38.9%) of PNCCs streetlights, as shown below:

| Lamp Model | Quantity | Lamp Wattage | Expected Lamp Wattage |
|---|---|---|---|
| 20 LED AT 525mA | 6 | 27 | 35-39 (depending on voltage) |
| 20 LED AT 700mA | 4 | 37 | 47-51 (depending on voltage) |

| Lamp Model | Quantity | Lamp Wattage | Expected Lamp Wattage |
|---|---|---|---|
| 30 LED AT 525mA | 10 | 36 | 53-55 (depending on voltage) |
| 30 LED AT 525mA | 20 | 37 | 53-55 (depending on voltage) |
| 30 LED AT 700mA | 7 | 53 | 70-73 (depending on voltage) |
| Piano 1 32 Leds | 3 | 43 | 36 at 350mA, 52 at 500mA, or 73 at 700mA |
| Road Grace BRP711 23LED20W | 2296 | 14 | 20 |
| Road Grace BRP711 30LED26W | 67 | 18 | 26 |
| Teceo 16 LED | 2 | 27 | 20 |
| Teceo 32 LED | 29 | 37 | 36 |
| Teceo 48 LED | 4 | 75 | 53 |
| Teceo 56 LED | 4 | 87 | 62 |
| Teceo 80 LED | 5 | 122 | 86 |
| Teceo 90 LED | 21 | 146 | 96 |
| Tera LED Mini 12W | 90 | 9 | 12 |
| Tera LED Mini 18W | 964 | 15 | 18 |
| Tera LED Mini 24W | 51 | 22 | 51 |
| Tera LED Mini 36W | 19 | 29 | 36 |
| **Total** | **3,602** | **57,654** | **58,330 - 76,187 (depending on voltage)** |

Gear wattage differences were identified for 27 (0.3%) of PNCC's streetlights, as shown below:

| Gear Model | Quantity | Gear Wattage | Expected Gear Wattage |
|---|---|---|---|
| Typical for 2 X 18W | 5 | 8 | 10 |
| Typical for 36w Fluoro | 8 | 4 | 10 |
| Typical for 36watt single Fluo | 1 | 0 | 10 |
| Typical for 36watt single Fluo | 2 | 4 | 10 |
| Typical for 20w fluorescent | 11 | 5 | 9 |
| **Total** | **27** | **135** | **259** |

Lamp and gear models were inconsistent for 13 (0.1%) of PNCC's streetlights, and it is likely that either the lamp or gear wattage is incorrect:

| Lamp Model | Gear Model | Quantity |
|---|---|---|
| 100watt SON-T (HPS) | Ambar 70w HPS | 1 |
| 150watt SON-I (HPS) | GL600 250watt SON (HPS) | 1 |
| 250watt SON-T (HPS) | GL700 150watt SON (HPS) | 3 |
| 150watt SON-T (HPS) | GL700 250watt SON (HPS) | 1 |
| 160watt Mercury Vapour ML | No Gear | 1 |
| 70watt SON-T (HPS) | Road Grace BRP711 23LED20W | 1 |
| 250watt SON-T (HPS) | Road Grace BRP711 30LED26W | 1 |
| 2 X 18W FLUORESCENT | Typical for 20w fluorescent | 1 |
| 2 X 18W PL LAMP | Typical for 20w fluorescent | 1 |
| 9W LED | Typical for 50watt Mercury | 1 |
| 70watt SON-I (HPS) | Typical for 80watt MV | 1 |
| **Total** | | **13** |

Six lamps were found to have incorrect wattages during the field audit and are discussed in **section 2.5**.

The wattage differences are recorded as non-compliance below.

| Non-compliance | Description |
|---|---|
| Audit Ref: 3.1<br>With: Clause 15.2<br><br>From: entire audit period | PNCC applies unapproved profiles to adjust specified lamp wattages to account for different drive rates and dimming. 3602 recorded lamp wattages differ from expected values.<br>27 recorded gear wattages differ from expected values.<br>13 recorded lamp and gear models are inconsistent.<br>11 differences were found for the sample of 405 lamps checked during the field audit.<br>Potential impact: High<br>Actual impact: High<br>Audit history: None<br>Controls: Weak<br>Breach risk rating: 9 |
| **Audit risk rating** | **Rationale for audit risk rating** |
| **High** | Controls are rated as weak, as they do not mitigate the risk of incorrect load types and wattages being recorded.<br>It is estimated that the wattage differences could result in under reporting of around 2,000,000 kWh per annum. |

| Actions taken to resolve the issue | Completion date | Remedial action status |
|---|---|---|
| PNCC has agreed to amend their database so that maximum design wattages are recorded for LED lights.<br>Once this update has occurred we will revise historic submissions as required. | 30 September 2018 | Identified |
| **Preventative actions taken to ensure no further issues will occur** | **Completion date** | |
| We will work with PNCC to develop a long term solution for their dimmable LED lighting. | Ongoing | |

| Subject | Recommendation | Description |
|---|---|---|
| Description of load type | Review of recorded wattages | Discuss PNCC's wattage profiling processes with the Electricity Authority, to determine the best way to resolve this non-compliance, including whether the lamps with wattage discrepancies could be split to a separate ICP with a new approved profile. |

## 3.2 Volume Information Accuracy (Clause 15.2)

*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
- checking the kW information provided to EMS
- confirming the accuracy of EMS' process to calculate volumes.

Audit Commentary

Meridian reconciles this DUML load using the DST profile, and the correct profile and submission flag is recorded on the registry. The on and off times are derived from a data logger read by EMS, and are used to create a shape file. Meridian supplies EMS with the capacity information and EMS calculates the kWh figure for ICP 0000031152CPB70 and includes this in the relevant AV080 file.

The wattages submitted to EMS were checked against the database information for all months from December 2016 to October 2017 and found to match. This process was audited during Meridian's reconciliation participant audit, and its accuracy and compliance was confirmed.

While Meridian are using up to date database information, there is some inaccurate data within the database. This is recorded as non-compliance below and discussed further in **section 3.1**.

| Non-compliance | Description |
|---|---|
| Audit Ref: 3.2<br>With: Clause 15.2<br><br><br><br>From: entire audit period | The database used to prepare submissions contains some inaccurate information.<br>Potential impact: High<br>Actual impact: High<br>Audit history: None<br>Controls: Weak<br>Breach risk rating: 9 |
| **Audit risk rating** | **Rationale for audit risk rating** |
| **High** | Controls are rated as weak, as they do not mitigate the risk of incorrect load types and wattages being recorded.<br>It is estimated that the wattage differences could result in under reporting of around 2,000,000 kWh per annum. |

| Actions taken to resolve the issue | Completion date | Remedial action status |
|---|---|---|
| PNCC has agreed to amend their database so that maximum design wattages are recorded for LED lights.<br>Once this update has occurred we will revise historic submissions as required. | 30 September 2018 | Identified |
| **Preventative actions taken to ensure no further issues will occur** | **Completion date** | |
| We will work with PNCC to develop a Code compliant solution for their dimmable LED lighting. | Ongoing | |

# 4. Conclusions

PNCC's streetlight data is recorded within a RAMM database. Alf Downs are responsible for fieldwork, and asset data capture. Database information is reported to Meridian monthly.

EMS creates reconciliation submission information on Meridian's behalf using wattages provided by Meridian, and on and off times derived from a data logger read by EMS.

The database contains some inaccurate information. This primarily relates to wattage differences; the field audit found that lamp and gear model information was highly accurate. The audit process included a field audit of 405 items of load, which found 99.25% accuracy.

PNCC applies profiled wattages for LED lights, to account for dimming and different drive rates. This, combined with some errors in lamp and gear wattages has resulted in 3629 lamps with differences in lamp or gear wattages, and 13 lamps with inconsistencies between the lamp and gear model recorded. It is estimated that the wattage differences could result in under reporting of around 2,000,000 kWh per annum.

The future risk rating of 30 indicates that the next audit be completed in three months.

**Tara Gannon**
**Veritek Limited**
**Electricity Authority Approved Auditor**

# 5. Meridian Comments

Meridian have reviewed this report, and their comments are contained within its body.