# ELECTRICITY INDUSTRY PARTICIPATION CODE
# DISTRIBUTED UNMETERED LOAD AUDIT REPORT

For

## WELLINGTON CITY COUNCIL AND CONTACT ENERGY

Prepared by: Tara Gannon

Date audit commenced: 13 March 2018

Date audit report completed: 30 April 2018

Audit report due date: 1 June 2018

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## EXECUTIVE SUMMARY

This audit of the Wellington City Council (WCC) DUML database and processes was conducted at the request of Contact Energy (Contact) 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.

The RAMM database used for submission is managed by WCC. New connection, fault, maintenance and upgrade work is completed by Fulton Hogan, City Electricians and Higgins. All update the database using Pocket RAMM. WCC provides a monthly report to Contact from the database.

An LED upgrade is underway, and WCC is using a central management system and dimming.

The future risk rating of 19 indicates that the next audit be completed in six months, however I recommend the next audit should be delayed until the LED rollout is complete and the database has been updated. Six non-compliances were identified, and no recommendations were 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 |
|---|---|---|---|---|---|---|---|
| Deriving submission information | 2.1 | 11(1) of Schedule 15.3 | The database used to prepare submissions contains some inaccurate information. | Moderate | Medium | 4 | Identified |
| Description and capacity of load | 2.4 | 11(2)(c) and (d) of Schedule 15.3 | Some description and capacity information is incomplete or unknown, including:<br>• 85 gear wattages.<br>• 96 gear wattage models and descriptions.<br>• 28 lamp wattages.<br>• 24 lamp models and descriptions. | Weak | Low | 3 | Identified |
| All load recorded in database | 2.5 | 11(2A) of Schedule 15.3 | The field audit identified four lamps which were not recorded in the database. | Moderate | Low | 2 | Identified |
| Tracking of load changes | 2.6 | 11(3) of Schedule 15.3 | Database updates may be late for new subdivisions. | Moderate | Low | 2 | Identified |
| Database accuracy | 3.1 | 15.2 and 15.37B(b) | The database used to prepare submissions contains some inaccurate information. | Moderate | Medium | 4 | Identified |
| Volume information accuracy | 3.2 | 15.2 and 15.37B(c) | The database used to prepare submissions contains some inaccurate information.<br>Incorrect profiles are recorded on the registry for seven ICPs. | Moderate | Medium | 4 | Identified |
| Future Risk Rating | | | | | | 19 | |

| **Future risk rating** | 1-3 | 4-6 | 7-8 | 9-17 | 18-26 | 27+ |
|---|---|---|---|---|---|---|
| **Indicative audit frequency** | 36 months | 24 months | 18 months | 12 months | 6 months | 3 months |

## RECOMMENDATIONS

| Subject | Section | Description | Recommendation |
|---|---|---|---|
| | | Nil | |

## ISSUES

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

# 1. ADMINISTRATIVE

## 1.1. Exemptions from Obligations to Comply with Code

### Code reference

*Section 11 of Electricity Industry Act 2010.*

### Code related audit information

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

### Audit observation

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

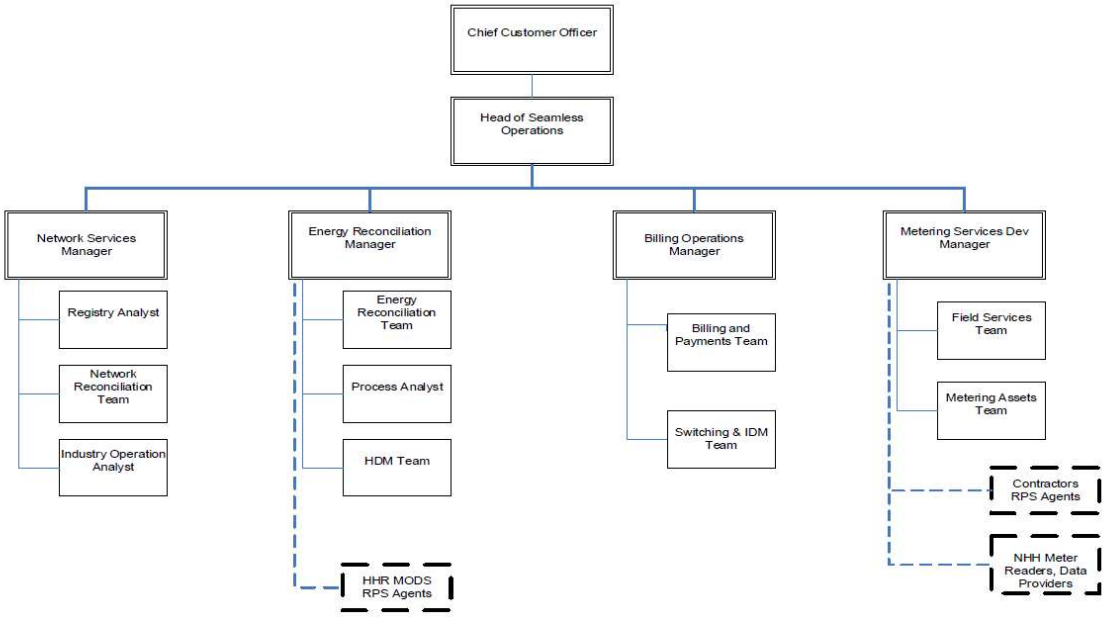
### Audit commentary

There is one exemption in place relevant to the scope of this audit:

**Exemption No. 177:** Exemption to clause 8(g) of schedule 15.3 of the Electricity Industry Participation Code 2010 ("Code") in respect of providing half-hour ("HHR") submission information instead of non half-hour ("NHH") submission information for distributed unmetered load ("DUML"). This exemption expires at the close of 31 October 2023.

## 1.2. Structure of Organisation

Contact Energy provided a copy of their organisational structure.



## 1.3. Persons involved in this audit

Auditor:

**Tara Gannon**

**Veritek Limited**

**Electricity Authority Approved Auditor**

Other personnel assisting in this audit were:

| Name | Title | Company |
|---|---|---|
| Adam Cromie | Data Analyst | Wellington City Council |
| Kevin Turner | Team Leader, Transport Infrastructure | Wellington City Council |
| Kirsten Brown | Data Analyst | Wellington City Council |
| Nayan Swaminarayan | Project Engineer, Streetlighting | Wellington City Council |
| Savaram Rengarajan | Engineer, Streetlighting | Wellington City Council |
| Steve Wright | Team Leader, Resurfacing and Contracts | Wellington City Council |
| Bernie Cross | Energy Reconciliation Manager | Contact Energy |

## 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". The specific module used for DUML is called RAMM Contractor.

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

## 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 | Number of items of load | Database wattage (watts) |
|---|---|---|---|---|
| 0001255309UN981 | MSTR ICP WCC CPK0331 | CPK0331 | 7,300 | 767,143 |
| 1001102041UNDDC | MASTER ICP AIRPORT | CPK0331 | 325 | 61,574 |

| ICP Number | Description | NSP | Number of items of load | Database wattage (watts) |
|---|---|---|---|---|
| 0001256880UN374 | MSTR ICP WCC CPK0111 | CPK0111 | 529 | 53,937 |
| 0001256885UNE3B | MASTER ICP WIL0331 | WIL0331 | 4,396 | 469,982 |
| 0001256890UN9D9 | AOTEA QUAY | TKR0331 | 3,836 | 376,298 |
| 0001256892UN95C | MSTR ICP WCC KWA0111 | KWA0111 | 1,007 | 112,139 |
| 1001152333CKC0E | AMENITIY LIGHTING | CPK0331 | 937 | 49,339 |
| 1001152334CK1C4 | DECORATIVE LIGHTING | CPK0331 | 247 | 10,682 |
| 1001152335CKD81 | 24/7 (1) LIGHTING | CPK0331 | 49 | 6,740 |
| 1001152336CK141 | 24/7 (2) LIGHTING | WIL0331 | 14 | 956 |
| 1001152339CKE9F | 4 HOUR LIGHTING | CPK0331 | 33 | 12,476 |
| **Total** | | | **18,673** | **1,921,266** |

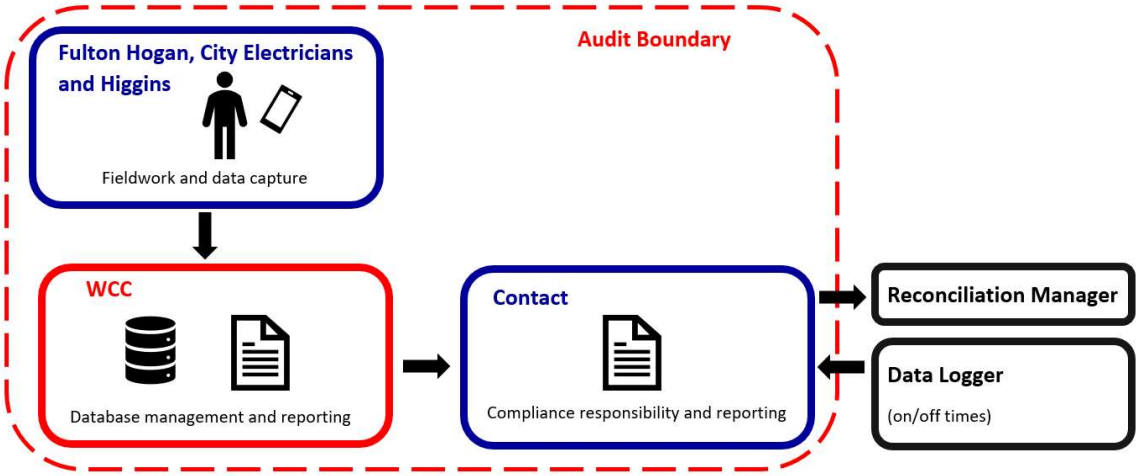
### 1.7. Authorisation Received

All information was provided directly by Contact and WCC.

### 1.8. Scope of Audit

The RAMM database used for submission is managed by WCC. New connection, fault, maintenance and upgrade work is completed by Fulton Hogan, City Electricians, and Higgins. All update the database using Pocket RAMM. WCC provides a monthly report to Contact from the database.

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




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

The field audit was undertaken of a statistical sample of 399 items of load on 2 April 2018. The sample was selected from three strata:

- NZTA
- parks and amenity; and
- ten suburbs that made up at least 1% of the number of lights in the database.

## 1.9. Summary of previous audit

The previous audit was completed in August 2017 by Steve Woods of Veritek Limited. Four non-compliances were identified, and one recommendation was made. The statuses of the non-compliances and recommendation are described below.

### Table of Non-compliance

| Subject | Section | Clause | Non-compliance | Status |
|---|---|---|---|---|
| Deriving submission information | 2.1 | 11(1) of schedule 15.3 | Incorrect profile on the registry.<br>Under submission by approx. 3,000 kWh per annum. | Still existing.<br>Refer to **section 2.4**. |
| Description of load type | 2.2.3 | 11(2)(c) of schedule 15.3 | 140 records with unknown lamp model. | Still existing.<br>Refer to **section 2.4**. |
| Capacity of load | 2.2.4 | 11(2)(d) of schedule 15.3 | 18 records with blank or zero lamp wattage.<br>18 records with blank gear wattage.<br>Some incorrect gear wattage figures. | Still existing.<br>Refer to **section 2.4**. |

| Subject | Section | Clause | Non-compliance | Status |
|---|---|---|---|---|
| Tracking of load changes | 2.3 | 11(3) of schedule 15.3 | Some database errors found during field audit.<br><br>Some late updates to the database for new subdivisions and the livening date is not recorded. | Still existing.<br>Refer to **section 2.5**.<br>Still existing.<br>Refer to **section 2.6**. |

**Table of Recommendations**

| Subject | Section | Clause | Recommendation | Status |
|---|---|---|---|---|
| Tracking of load changes | 2.3 | 11(3) of schedule 15.3 | Review and improve new connections process.<br>Record the livening date in RAMM. | Still existing.<br>Refer to **section 2.6**. |

## 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

Contact 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. Compliance is confirmed.

## 2. DUML DATABASE REQUIREMENTS

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

**Code reference**

*Clause 11(1) of Schedule 15.3*

**Code related audit information**

*The retailer must ensure the:*

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

**Audit observation**

The process for calculation of consumption was examined.

**Audit commentary**

Contact reconciles this DUML load using the HHR profile, in accordance with exemption number 177. This exemption is discussed further in **section 1.1**.

Submissions are based on the database information, with on and off times derived from data logger information.

I recalculated the submissions for February 2018 for all 11 ICPs using the corresponding data logger and database information. I confirmed that the calculation method was correct. Festive lights were correctly excluded from the calculation because they were not connected in this submission period.

There is some inaccurate data within the database used to calculate submissions. This is recorded as non-compliance and discussed in **sections 2.4, 2.5** and **3.1**.

**Audit outcome**

Non-compliant

| Non-compliance | Description |
|---|---|
| Audit Ref: 2.1<br>With: Clause 11(1) of Schedule 15.3<br><br>From: unknown<br>To: 06-Apr-18 | The database used to prepare submissions contains some inaccurate information.<br>• The database accuracy is assessed to be 90.2% indicating an estimated over submission of 12,997 kWh per annum.<br>• Five festive lights have incorrect wattages recorded. The errors amount to 2,161 watts, resulting in under submission of approximately 800 kWh over the Christmas period.<br>• Some variable dimming takes place and the database records the full wattage. The impact of this is unknown.<br>• 268 lamps have incorrect ballast wattage recorded. The errors amount to 614 watts, resulting in over submission of 2,622 kWh per annum.<br>• Some lamps have missing make, model and wattage information.<br>Potential impact: Medium<br>Actual impact: Medium<br>Audit history: Twice previously<br>Controls: Moderate<br>Breach risk rating: 4 |
| **Audit risk rating** | **Rationale for audit risk rating** |
| **Medium** | The controls are rated as moderate, because they are sufficient to ensure that lamp information is correctly recorded most of the time.<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 |
|---|---|---|
| Wellington CC is undertaking and extensive LED roll out program and Contact is working with them to ensure their DUML database is accurately populated in a timely manner as part of this roll out. A full review of streetlight details is expected to be conducted once the LED roll out is completed | Dec 2018 | Identified |
| **Preventative actions taken to ensure no further issues will occur** | **Completion date** | |
| As above | As above | |

### 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**

An ICP is recorded for each item of load.

**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 the nearest street address and Global Positioning System (GPS) coordinates for each item of load and users in the office and field can view these locations on a mapping system.

**Audit outcome**

Compliant

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

**Code reference**

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

**Code related audit information**

*The DUML database must contain:*

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

**Audit observation**

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

### Audit commentary

Lamp make and model, gear model, lamp wattage, gear wattage and total wattage are included in the database.

Some description and capacity information is incomplete:

- 85 items of load have missing gear wattages
- 96 items of load have missing or unknown gear wattage models and descriptions
- 28 items of load have missing lamp wattages
- 24 items of load have missing lamp models and descriptions.

### Audit outcome

Non-compliant

| Non-compliance | Description |
|---|---|
| Audit Ref: 2.4<br>With: Clauses 11(2)(c) and (d) of Schedule 15.3<br><br>From: unknown<br>To: 13-Mar-18 | Some description and capacity information is incomplete or unknown, including:<br>• 85 gear wattages<br>• 96 gear wattage models and descriptions<br>• 28 lamp wattages<br>• 24 lamp models and descriptions.<br>Potential impact: Low<br>Actual impact: Low<br>Audit history: Once previously<br>Controls: Weak<br>Breach risk rating: 3 |
| **Audit risk rating** | **Rationale for audit risk rating** |
| **Low** | Controls are rated as weak, as they are not sufficient to mitigate the risk of incomplete or inaccurate information being recorded.<br>The impact is unable to be accurately assessed, because the correct lamp information is unavailable. It is estimated to be low. |

| Actions taken to resolve the issue | Completion date | Remedial action status |
|---|---|---|
| Wellington CC is undertaking and extensive LED roll out program and Contact is working with them to ensure their DUML database is accurately populated in a timely manner as part of this roll out. A full review of streetlight details is expected to be conducted once the LED roll out is completed | Dec 2018 | Identified |
| **Preventative actions taken to ensure no further issues will occur** | **Completion date** | |
| As above | As above | |

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

### Code reference

*Clause 11(2A) of Schedule 15.3*

### Code related audit information

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

### Audit observation

The field audit was undertaken of a statistical sample of 399 items of load on 2 April 2018. The population was divided into three strata:

- NZTA
- parks and amenity; and
- ten suburbs that made up at least 1% of the number of lights in the database.

### Audit commentary

The field audit findings are detailed in the table below.

| Address | Database Count | Field Count | Count differences | Wattage differences | Comments |
|---|---|---|---|---|---|
| NZTA | | | | | |
| TAKAPU RD, TAKAPU VALLEY | 21 | 20 | - 1 | 8 | Eight L27 lights are recorded as NXT 72m 158w in the database, and one 70W SON light was not located. |
| Parks and Amenity | | | | | |
| ALEXANDRA LOOKOUT RD, MT VICTORIA | 19 | 25 | 6 | - | Excludes six in ground lights on the lookout platform, wattage unknown. |
| ALEXANDRA MEMORIAL RD, MT VICTORIA | 22 | 22 | - | - | |
| Suburb Sample | | | | | |
| ABILENE CRES, CHURTON PARK | 16 | 16 | - | - | |
| ANAHEIM PL, CHURTON PARK | 2 | 2 | - | - | |
| BICKERTON RISE, CHURTON PARK | 5 | 5 | - | - | |
| BURBANK CRES, CHURTON PARK | 9 | 9 | - | - | |
| BURDENDALE GR, CHURTON PARK | 3 | 3 | - | - | |

| Address | Database Count | Field Count | Count differences | Wattage differences | Comments |
|---|---|---|---|---|---|
| CAESARS PL, CHURTON PARK | 5 | 5 | - | - | |
| CAMBRIAN ST, CHURTON PARK | 9 | 9 | - | - | |
| CORSHAM GR, CHURTON PARK | 3 | 3 | - | - | |
| CRANWELL ST, CHURTON PARK | 7 | 7 | - | - | |
| CUNLIFFE ST, CHURTON PARK | 14 | 14 | - | - | |
| EASTCOTT GR, CHURTON PARK | 4 | 4 | - | - | |
| EDINGTON GR, CHURTON PARK | 3 | 3 | - | - | |
| ERLESTOKE CRES, CHURTON PARK | 14 | 14 | - | 3 | Three L27 lights were recorded in the database as 70W SON or 100W SON. |
| FOXHAM TCE, CHURTON PARK | 4 | 4 | - | 1 | One L27 light was recorded in the database as 70W SON. |
| GODDARD GR, CHURTON PARK | 2 | 2 | - | - | |
| ALEXANDRA RD, HATAITAI | 23 | 23 | - | - | |
| ARAWA RD, HATAITAI | 6 | 6 | - | - | |
| DRAKE ST, HATAITAI | 1 | 1 | - | - | |
| BAY RD, KILBIRNIE | 27 | 27 | - | - | |
| BOURKE ST, KILBIRNIE | 3 | 3 | - | - | |
| CRUICKSHANK ST, KILBIRNIE | 4 | 4 | - | - | |
| BUCKINGHAM ST, MELROSE | 12 | 12 | - | - | |

| Address | Database Count | Field Count | Count differences | Wattage differences | Comments |
|---|---|---|---|---|---|
| CARLTON ST, MELROSE | 12 | 12 | - | - | |
| BRUSSELS ST, MIRAMAR | 15 | 15 | - | 6 | Six L27 lights were recorded in the database as 70W SON. |
| CRAWFORD GREEN, MIRAMAR | 5 | 5 | - | - | |
| DARLINGTON TCE, MIRAMAR | 3 | 3 | - | - | |
| DOCTORS COMMON, MT VICTORIA | 1 | 1 | - | 1 | One L26 light was recorded in the database as 70W SON. |
| EDGE HILL, MT VICTORIA | 2 | 2 | - | - | |
| DOMANSKI CRES, OWHIRO BAY | 9 | 9 | - | - | |
| ACHILLES CL, TAWA | 3 | 3 | - | 1 | One 70W SON is recorded in the database as 28W LED. |
| ANTHONY ST, TAWA | 5 | 5 | - | - | |
| BELL ST, TAWA | 24 | 24 | - | - | |
| BING LUCAS DR, TAWA | 13 | 12 | - 1 | 4 | One empty pole, in the process of being changed. Two 70W SON and three 150W SON present in the database were not located. Four L27 lamps were located but not recorded in the database. |
| BOSCOBEL LANE, TAWA | 7 | 7 | - | - | |
| COURT RD SOUTH, TAWA | 3 | 3 | - | 3 | One L27 light was recorded in the database as 70W SON. |
| DAVIDSON CRES, TAWA | 11 | 11 | - | 11 | 11 L27 lights were recorded in the database as 70W SON or 20W LED. |
| DAVIES ST, TAWA | 6 | 6 | - | - | |
| DUVAL GR, TAWA | 4 | 4 | - | - | |
| ESSEX ST-TAWA, TAWA | 4 | 4 | - | - | |

| Address | Database Count | Field Count | Count differences | Wattage differences | Comments |
|---|---|---|---|---|---|
| FRANKLYN RD, TAWA | 11 | 11 | - | 3 | Three L27 lights were recorded in the database as 70W SON. |
| GONVILLE ST, TAWA | 2 | 2 | - | - | |
| DORSET WAY, WILTON | 2 | 2 | - | - | |
| EDGEWARE RD, WILTON | 5 | 5 | - | - | |
| GLOUCESTER ST, WILTON | 14 | 14 | - | - | |
| **Total** | **399** | **403** | **4** | **47** | |

I found four more lamps in the field than were recorded in the database, this is recorded as non-compliance below. There were 47 lamp wattage differences, which are recorded as non-compliance in **section 3.1**.

**Audit outcome**

Non-compliant

| Non-compliance | Description |
|---|---|
| Audit Ref: 2.5<br>With: Clause 11(2A) of Schedule 15.3<br><br>From: unknown<br>To: 02-Apr-18 | The field audit identified four lamps which were not recorded in the database.<br>Potential impact: Low<br>Actual impact: Low<br>Audit history: Once previously<br>Controls: Moderate<br>Breach risk rating: 2 |
| **Audit risk rating** | **Rationale for audit risk rating** |
| **Low** | The controls are rated as moderate, as they are sufficient to ensure that most database information is recorded correctly.<br>The impact is rated as low, 99% of lamps were recorded in the database for the sample checked. |

| Actions taken to resolve the issue | Completion date | Remedial action status |
|---|---|---|
| The field audit is reflective of a large urban council undergoing an extensive LED roll out.<br>Contact is working with them to ensure their DUML database is accurately populated in a timely manner as part of this roll out. A full review of streetlight details is expected to be conducted once the LED roll out is completed | Dec 2018 | Identified |
| **Preventative actions taken to ensure no further issues will occur** | **Completion date** | |
| As above | As above | |

## 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**

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 provision of a copy of the report to Contact each month is sufficient to achieve compliance.

New connection, fault, maintenance and upgrade work is completed by Fulton Hogan, City Electricians and Higgins. All update the database using Pocket RAMM.

A lamp maintenance and replacement programme is followed, and standard lamps are normally replaced every 4 ½ years. An LED upgrade project is underway, and the replacement programme will be revisited as part of this. 15,000 lights are expected to be replaced with LEDs by September 2018.

WCC has implemented a PLANet central management system (CMS) to manage the LED lamps and is using permanent and variable dimming. Most LED lamps are expected to have telecells which will allow communication with the CMS. Eventually almost all LED lights will have telecells, apart from some walkway lights and lights located in Makara. WCC intends to also maintain its streetlight records in RAMM for upgraded lights.

At the end of the LED upgrade project, WCC intends to complete a data cleanse to ensure that the CMS and RAMM data is consistent and accurate.

The new connections process for subdivisions has the following steps:

1. A plan is prepared by the developer and approved by WCC.
2. The installation is completed.
3. WCC notifies Contact that livening is required. Northpower and Wellington Electricity are notified at the same time, and a certificate of compliance is provided.
4. Contact requests livening from Wellington Electricity.
5. An "as built" plan is provided to WCC.
6. The database is updated.

Steps 5 and 6 can be delayed and the items of load do not have a "start date" in the database, the date they are entered is the start date. WCC confirmed that this can cause delays in updating the database and this is recorded as non-compliance below.

There are 84 private lights recorded in the database, and 715 lights with an unknown or blank owner. WCC is working with Wellington Electricity and Contact Energy to confirm light ownership and arrange creation of shared unmetered ICPs for the private lights.

Some Christmas and festive lights are used and are included in the database. These lights are excluded from submissions when they are not connected.

Downer completes monthly outage patrols for main roads and bus routes.

**Audit outcome**

Non-compliant

| Non-compliance | Description |
|---|---|
| Audit Ref: 2.6<br>With: Clause 11(3) of Schedule 15.3<br><br>From: unknown<br>To: 13-Mar-18 | Database updates may be late for new subdivisions.<br>Potential impact: Low<br>Actual impact: Low<br>Audit history: Once previously<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 WCC will usually identify recently connected lamps though outage patrols or when the "as built" plan is provided. |

| Actions taken to resolve the issue | Completion date | Remedial action status |
|---|---|---|
| Contact will continue to work with Wellington CC to refine their processes around management of new subdivision streetlight population into their RAMM in light of their desire to have all LED streetlights managed by their central management system. | Date | Identified |

| Preventative actions taken to ensure no further issues will occur | Completion date | |
|---|---|---|
| As above | As above | |

## 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**

WCC demonstrated a complete audit trail of all additions and changes to the database information.

**Audit outcome**

Compliant

## 3. ACCURACY OF DUML DATABASE

### 3.1. Database accuracy (Clause 15.2 and 15.37B(b))

**Code reference**

*Clause 15.2 and 15.37B(b)*

**Code related audit information**

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

**Audit observation**

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

| Plan Item | Comments |
|---|---|
| Area of interest | WCC region |
| Strata | The database contains items of load in WCC area.<br>The processes for the management of all WCC items of load are the same, and I decided to create three strata:<br>• NZTA<br>• parks and amenity; and<br>• ten suburbs that made up at least 1% of the number of lights in the database. |
| Area units | I created a pivot table of the roads in each stratum and I used a random number generator in a spreadsheet to select a total of 47 sub-units. |
| Total items of load | 399 items of load were checked. |

Wattages for all items of load were checked against the published standardised wattage tables produced by the Electricity Authority and Veritek, or the manufacturer's specifications.

**Audit commentary**

The database was found to contain some inaccuracies and missing data.

The field audit found:

- four more lamps in the field than were recorded in the database
- 47 lamp type and wattage differences.

The field data was 90.2% of the database data for the sample checked. The total wattage recorded in the database for the sample was 30,989 watts. The total wattage found in the field for the sample checked was 27,946 watts, a difference of 3,043 watts. This will result in estimated over submission of 12,997 kWh per annum (based on annual burn hours of 4,271 as detailed in the DUML database auditing tool).

Wattages for all items of load were checked against the published standardised wattage table produced by the Electricity Authority, and the manufacturer's specifications where they were not included in the standardised wattage table.

WCC determines wattages from the manufacturer's specifications and conducts some testing to check wattages.

Lamp and gear wattage information has been cleansed following the 2017 audit, and wattage data accuracy has improved. It is expected that many of the remaining issues will be resolved as data is updated as part of the LED roll out.

Some lamp wattage discrepancies were identified:

- The 2017 audit found NXT-S 24 325mA 2ES and NXT-S 24 325mA 4AH lamps were recorded with lamp wattage of 28. The manufacturer's specification sheet states the wattage should be 35. These 264 lamps were all installed with dimmed dip switches, and WCC confirmed the static dimmed wattage is 28, as recorded in the RAMM database. Contact Energy has submitted a proposal to the Electricity Authority regarding static dimming. I observed the dimmed wattages recorded in the CMS for a sample of lights and noted that the wattage data recorded in RAMM for these lights was consistent.
- Some festive lights have a light model and a descriptor of "rough service" followed by a number. WCC explained that the rough service number denotes how many 25W festive lights are present. Each light has a 5W driver. I compared the wattages recorded in the database to the expected wattages and identified the following differences:

| Lamp Model | Recorded wattage | Expected wattage | Count | Total wattage difference |
|---|---|---|---|---|
| GLS 25W rough service - 10 | 30 | 300 | 1 | 270 |
| GLS 25W rough service - 16 | 47 | 480 | 1 | 433 |
| GLS 25W rough service - 17 | 51 | 510 | 2 | 918 |
| GLS 25W rough service - 20 | 60 | 600 | 1 | 540 |
| | | **Total** | **5** | **2,161** |

- Some variable dimming is used. The wattages recorded in the database reflect the full wattage, which can result in over submission. This is recorded as non-compliance below. Currently, it is difficult for WCC to comply with the code for dimming. WCC hopes to gain approval from the EA to use data from its CMS for submission, which would resolve this issue.

Some lamp types with more than one gear wattage, and some incorrect gear wattages were identified. The gear wattages I believe may be incorrect are highlighted in red below:

| | Gear wattage | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lamp | 0 | 4 | 5 | 6 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 18 | 24 | 28 | 38 | 99 |
| 2x Fluorescent tube 5ft 58W | | | | | | | 1 | | 3 | | | | | | | |
| 2x Fluorescent tubes 2ft 18W | | | | | | | | | 1 | | | | | | | |
| Fluorescent 2 x T8 4ft 36W | | | | | | | | | | | | | 1 | | | |
| Fluorescent 2 x T8 5ft 52W | | | | | | | | | | | | | 3 | | | |
| Fluorescent T8 2ft 18W | | | | | | | | | 2 | | | | | | | |
| Fluorescent T8 4ft 36W | | | | | | | | | 50 | | | | | | | |
| Fluorescent tube 1ft 15W | | | 36 | | | | | | | | | | | | | |
| Fluorescent tube 3ft 30W | | | | | 142 | | | | | 1 | | | | | | |
| Fluorescent tube 5ft 58W | | | | | | | 1 | | | | | | | | | |
| Fluro XXT 2x4ft 36W /840 Cool | | | | | | | | | | | | | 1 | | | |

| | Gear wattage | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lamp | 0 | 4 | 5 | 6 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 18 | 24 | 28 | 38 | 99 |
| Fluro XXT 2x5ft 58W/840 Cool | | | | | | | 28 | | | | | | 16 | | | |
| Fluro XXT 5ft 58W/840 Cool Whi | | | | | | | 13 | | | | | | | | | |
| GLS 60W rough service | 1 | | | | | | | | | | | | | | | |
| GLS 25W rough service - 10 | 1 | | | | | | | | | | | | | | | |
| GLS 25W rough service - 16 | 1 | | | | | | | | | | | | | | | |
| GLS 25W rough service - 17 | 2 | | | | | | | | | | | | | | | |
| GLS 25W rough service - 20 | 1 | | | | | | | | | | | | | | | |
| GLS 25W rough service - red/gr | 9 | | | | | | | | | | | | | | | |
| HP Mercury 50W | | | | | | 58 | | 4 | | | | | | | | |
| HPS SON 100W tubular external | | | | | | | | 1 | | 12 | 850 | | | | | |
| HPS SON NAV-T 150W tubular ext | | | | | | | | 1 | | | | 842 | | | | |
| HPS SON-T 150W | | | | | | | | 1 | | 2 | 2 | 2527 | | 4 | 2 | |
| HPS SON-T 250W | | | | | | | | | | | | 2 | | 218 | | |
| HPS SON-T 70W tubular | | | | | | | | 1 | | 4288 | 5 | 2 | | | | |
| LED 12x1.0W String | | | | | | | | | | | | | | | | |
| LS343 LED 14w Inground uplight | 63 | | | | | | | | 2 | | | | | | | |
| Metal Halide 35 W | | 9 | | | | | | | 49 | | | | | | | |
| Metal Halide MHN-TD 250W | | | | | | | | | | | | 1 | | 72 | | |
| NXT-12S 600mA 4AH | 120 | | | | | | | | | 1 | | | | | | |
| OSRAM DULUX TC-F 36W CompFluro | | | | | | | | | 10 | | | | | | | |
| Philips Alpha (LLM 4000K 25W) | | | | | | | | | | | | | | | | 1 |
| Philips CosmoWhite 140W/620 | | | | | | | | | | 260 | | | | 2 | | |
| Philips CosmoWhite 60W/620 | | | | 9 | | | | | | 1 | | | | | | |
| Philips Lumi LED | 41 | | | | | | | | | 2 | | | | | | |
| Phillips LEDBulb MV(6W) on 8h | 12 | | | | | | | | | 1 | | | | | | |
| SON 70 E E27 CO 1CT | | | | | | 1 | | | | 15 | | 1 | | | | |
| Unknown (assume 70W) | 4 | | | | | | | | | 131 | | | | | | |

268 lamps are believed to have incorrect gear wattages. The expected impact of the incorrect gear wattages is estimated to be 614 watts, resulting in over submission of 2,622 kWh per annum (based on annual burn hours of 4,271 as detailed in the DUML database auditing tool).

### Audit outcome

Non-compliant

| Non-compliance | Description |
|---|---|
| Audit Ref: 3.1<br>With: Clause 15.2 and 15.37B(b)<br><br>From: unknown<br>To: 02-Apr-18 | The database used to prepare submissions contains some inaccurate information.<br>• The database accuracy is assessed to be 90.2% indicating an estimated over submission of 12,997 kWh per annum.<br>• Five festive lights have incorrect wattages recorded. The errors amount to 2,161 watts, resulting in under submission of approximately 800 kWh over the Christmas period.<br>• Some variable dimming takes place and the database records the full wattage. The impact of this is unknown.<br>• 268 lamps have incorrect ballast wattage recorded. The errors amount to 614 watts, resulting in over submission of 2,622 kWh per annum.<br>• Some lamps have missing make, model and wattage information.<br>Potential impact: Medium<br>Actual impact: Medium<br>Audit history: None<br>Controls: Moderate<br>Breach risk rating: 4 |
| **Audit risk rating** | **Rationale for audit risk rating** |
| **Medium** | The controls are rated as moderate, because they are sufficient to ensure that lamp information is correctly recorded most of the time.<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 |
|---|---|---|
| Wellington CC is undertaking and extensive LED roll out program and Contact is working with them to ensure their DUML database is accurately populated in a timely manner as part of this roll out. A full review of streetlight details is expected to be conducted once the LED roll out is completed | Dec 2018 | Identified |
| **Preventative actions taken to ensure no further issues will occur** | **Completion date** | |
| As above | As above | |

### 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
- checking the database extract combined with the burn hours against the submitted figure to confirm accuracy.

**Audit commentary**

Contact reconciles this DUML load using the HHR profile, in accordance with exemption number 177. This exemption is discussed further in **section 1.1**.

The registry shows HHR RPS profile for some WCC ICPs but should show HHR. Contact usually manually corrects the profiles on business day four each month, but some corrections in recent months were missed due to a staff member being on leave. This is recorded as non-compliance below.

| ICP Number | Registry Profile | Date |
|---|---|---|
| 0001255309UN981 | RPS HHR | 28/11/2017 – 6/4/2018 |
| 1001102041UNDDC | RPS HHR | 1/11/2017 – 6/4/2018 |
| 0001256880UN374 | RPS HHR | 1/12/2017 – 6/4/2018 |
| 0001256885UNE3B | RPS HHR | 1/12/2017 – 6/4/2018 |
| 0001256890UN9D9 | RPS HHR | 1/12/2017 – 6/4/2018 |
| 0001256892UN95C | RPS HHR | 1/12/2017 – 6/4/2018 |
| 1001152333CKC0E | RPS HHR | 1/12/2017 – 6/4/2018 |

Submissions are based on the database information, with on and off times derived from data logger information.

I recalculated the submissions for February 2018 for all 11 ICPs using the corresponding data logger and database information. I confirmed that the calculation method was correct. Festive lights were correctly excluded from the calculation because they were not connected in this submission period.

There is some inaccurate data within the database used to calculate submissions. This is recorded as non-compliance and discussed in **sections 2.4, 2.5** and **3.1**.

### Audit outcome

Non-compliant

| Non-compliance | Description |
|---|---|
| Audit Ref: 3.2<br>With: Clauses 15.2 and 15.37B(c)<br><br>From: unknown<br>To: 06-Apr-18 | The database used to prepare submissions contains some inaccurate information.<br>• The database accuracy is assessed to be 90.2% indicating an estimated over submission of 12,997 kWh per annum.<br>• Five festive lights have incorrect wattages recorded. The errors amount to 2,161 watts, resulting in under submission of approximately 800 kWh over the Christmas period.<br>• Some variable dimming takes place and the database records the full wattage. The impact of this is unknown.<br>• 268 lamps have incorrect ballast wattage recorded. The errors amount to 614 watts, resulting in over submission of 2,622 kWh per annum.<br>• Some lamps have missing make, model and wattage information.<br>Incorrect profiles are recorded on the registry for seven ICPs.<br>Potential impact: Medium<br>Actual impact: Medium<br>Audit history: None<br>Controls: Moderate<br>Breach risk rating: 4 |
| **Audit risk rating** | **Rationale for audit risk rating** |
| **Medium** | The controls are rated as moderate, because they are sufficient to ensure that lamp information is correctly recorded most of the time.<br>The impact is assessed to be medium, based on the kWh differences described above. Profiles were recorded correctly on the registry for most of the audit period. |

| Actions taken to resolve the issue | Completion date | Remedial action status |
|---|---|---|
| Wellington CC is undertaking and extensive LED roll out program and Contact is working with them to ensure their DUML database is accurately populated in a timely manner as part of this roll out. A full review of streetlight details is expected to be conducted once the LED roll out is completed | Dec 2018 | Identified |
| The incorrect profile on the registry issue is a result of a system defect – currently a fix is underway to prevent this issue from occurring. A manual work around is currently in place to update the registry where required | July 2018 | |
| **Preventative actions taken to ensure no further issues will occur** | **Completion date** | |
| As above | As above | |

## CONCLUSION

The RAMM database used for submission is managed by WCC. New connection, fault, maintenance and upgrade work is completed by Fulton Hogan, City Electricians and Higgins. All update the database using Pocket RAMM. WCC provides a monthly report to Contact from the database.

An LED upgrade is underway, and WCC is using a central management system and dimming.

The future risk rating of 19 indicates that the next audit be completed in six months, however I recommend the next audit should be delayed until the LED rollout is complete and the database has been updated. Six non-compliances were identified, and no recommendations were raised.

## PARTICIPANT RESPONSE

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