ELECTRICITY INDUSTRY PARTICIPATION CODE
DISTRIBUTED UNMETERED LOAD AUDIT REPORT

VERITEK

For

CHRISTCHURCH CITY COUNCIL UNMETERED TRAFFIC LIGHTS AND CONTACT ENERGY LIMITED

Prepared by: Rebecca Elliot

Date audit commenced: 17 February 2021

Date audit report completed: 8 April 2021

Audit report due date: 28 April 2021

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EXECUTIVE SUMMARY

This audit of the **Christchurch City Council's Christchurch Transport Operation Centre (CTOC)** Unmetered Traffic Light DUML database and processes was conducted at the request of **Contact Energy Limited** (**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.

This DUML database switched from Genesis to Contact using the CTCT participant code on 1 October 2019 and was then switched to Contact Energy's CTCS code on 1 October 2020. This is managed by Contact Energy's subsidiary Simply Energy. Contact Energy carried out a material change audit in relation to the ICPs that were switched to the CTCS code. This did not include the management of unmetered load. Therefore, a material change should have been undertaken prior to this occurring. This is recorded as non-compliance in Contact Energy's Reconciliation Participant audit.

Traffic light data is maintained in RTOAD (Real Time Operations Asset Database) by CTOC. RTOAD records the quantity of each equipment type, including vehicle lanterns of various types and wattages, pedestrian lanterns of various types and wattages, illuminated signs, speed zone signs and traffic safety cameras at each intersection. The wattage for each item is multiplied by the estimated number of hours on per day, power level, and kW per hour to give a daily kWh value. The hours and power level are based on historic metering information, from when a sample of lights were metered to determine these values.

Simply Energy manages unmetered loads by creating dummy meters. If there is no dummy meter their DA software estimates the volume at 55kWh/day. This is resulting in an estimated under submission of 444,770.64 kWh since these ICPs were switched to the CTCS participant code in October 2020. Simply Energy is investigating a solution to ensure accurate submissions.

Six non-compliances were identified. The future risk rating of 34 indicates that the next audit be completed in three months. I have considered this in conjunction with Contact's comments. The report due date was April 2021, it is very overdue and has extended beyond the recommended period, I recommend that the next audit is completed in three months.

The matters raised are detailed below:

AUDIT SUMMARY

NON-COMPLIANCES

Subject	Section	Clause	Non-Compliance	Controls	Audit Risk Rating	Breach Risk Rating	Remedial Action
Deriving submission information	2.1	11(1) of Schedule 15.3	Estimated 444,770.64 kWh of under submission from October 2020 up to March 2021 since switching to the CTCS participant code. The database contained some incorrect daily kWh information, resulting in minor under submission of an estimated 285 kWh per annum.	None	High	12	Identified
ICP identifier and items of load	2.2	11(2)(a) and (aa) of Schedule 15.3	ICP number is not recorded in RTOAD. All items of load have a GXP recorded, and this GXP information is used to map to the correct ICP.	Weak	Low	3	Identified
All load recorded in database	2.5	11(2A) of Schedule 15.3	Eleven traffic safety cameras were missing from the database.	Moderate	Low	2	Identified
Audit trails	2.7	11(4) of Schedule 15.3	No audit trail of changes made in the access database.	Weak	Low	3	Identified
Database accuracy	3.1	15.2 and 15.37B(b)	The database contained some incorrect daily kWh information, resulting in minor under submission of an estimated 285 kWh per annum. ICP number is not recorded in the database.	Moderate	Low	2	Identified

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)	Estimated 444,770.64 kWh of under submission from October 2020 up to March 2021 since switching to the CTCS participant code. The database contained some incorrect daily kWh information, resulting in minor under submission of an estimated 285 kWh per annum.	None	High	12	Identified
					Future Risk Rating		**34**

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
		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.

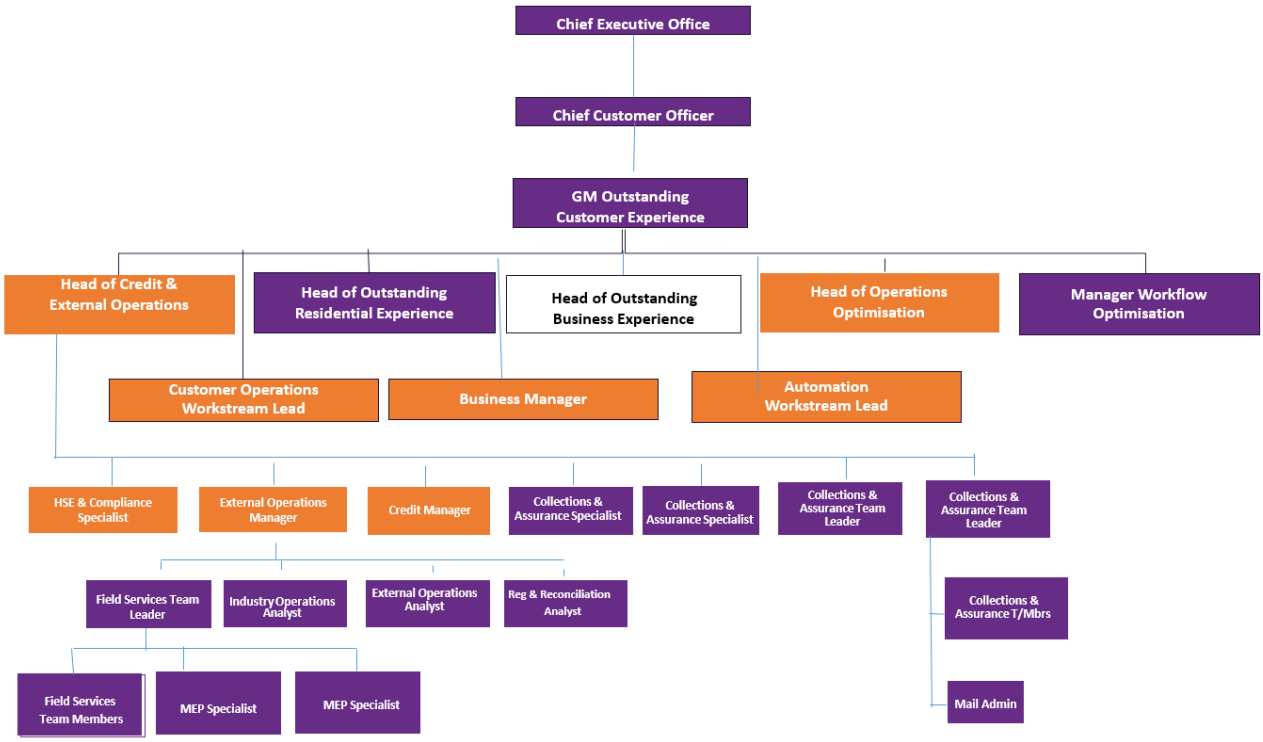
Audit observation

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

Audit commentary

There are no exemptions relevant to the scope of this audit. Contact was submitting this data half hourly under exemption No.177 but when the ICPs transferred to from the CTCT to the CTCS participant code this ceased. The ICPs are now submitted under the UNM or the RPS UNM profile as detailed in **section 1.6**.

1.2. Structure of Organisation



1.3. Persons involved in this audit

Auditor:

Name	Company	Role
Rebecca Elliot	Veritek Limited	Lead Auditor
Claire Stanley	Veritek Limited	Supporting Auditor

Other personnel assisting in this audit were:

Name	Title	Company
Bruce Kelly	SCATS Engineer	Christchurch Transport Operation Centre – Christchurch City Council
Luke Cartmell-Gollan	Commercial Operations Manager	Contact Energy

1.4. Hardware and Software

Traffic light data is maintained in RTOAD Access database by CTOC. Backup and restoration procedures are in accordance with normal industry protocols.

A copy of the traffic light asset information is also maintained within RAMM. RAMM is periodically reconciled for RTOAD to ensure that it holds all traffic light information.

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

1.5. Breaches or Breach Allegations

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

1.6. ICP Data

The following ICPs are relevant to the scope of this audit. The database expresses the wattage as kWh per day.

ICP Number	Description	NSP	Profile	Number of sites	Database kWh per day
0007102602RN872	Ref Orion_Bromley 66kV GXP Traffic Lights	BRY0661	UNM	66	397.20
0007102603RN437	Ref Orion_Islington 33kV GXP Traffic Lights	ISL0331	UNM	17	130.65
0007102604RN9FD	Ref Orion_Islington 66kV GXP Traffic Lights	ISL0661	RPS UNM	306	2,077.41
0000298513MPF38	TRAFFIC LIGHTS OFF RAMP	KAI0111	UNM	5	5.98
			Total	**394**	**2,611.24**

1.7. Authorisation Received

All information was provided directly by Contact or the CTOC.

1.8. Scope of Audit

This audit of the CTOC DUML database and processes was conducted at the request of 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.

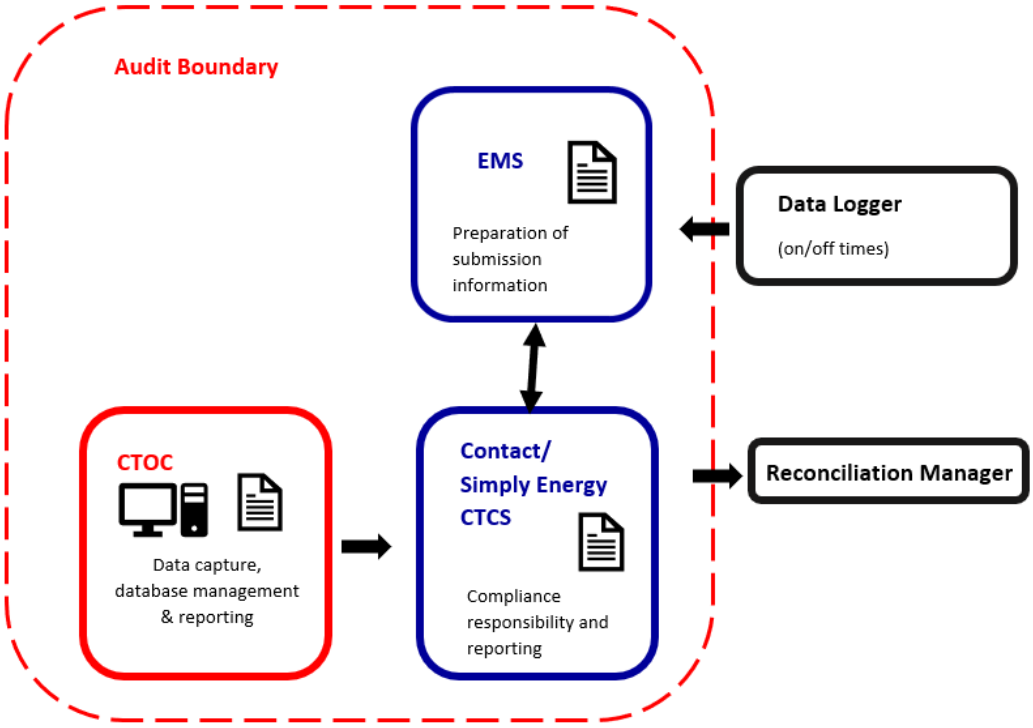
Traffic light data is maintained in RTOAD (Real Time Operations Asset Database) database by CTOC. RTOAD records the quantity of each equipment type, including vehicle lanterns of various types and wattages, pedestrian lanterns of various types and wattages, illuminated signs, speed zone signs and traffic safety cameras at each intersection. The wattage for each item is multiplied by the estimated number of hours on per day, power level, and kW per hour to give a daily kWh value. The hours and power level are based on historic metering information, from when a sample of lights were metered to determine these values.

ICPs 0007102602RN872, 007102603RN437, 0000298513MPF38 and 0007102604RN9FD switched to Contact Energy from 1 October 2019.

Simply Energy is unable to manage unmetered volume, their DA software will treat this as an estimate. The DA software estimates 55kWh/day. Contact is aware of the issue and is investigating a solution to ensure accurate submissions. Contact submits the DUML load as NHH using the UNM profile for ICP 0007102602RN872, 007102603RN437 and 0000298513MPF38. The profile for ICP 0007102604RN9FD is RPS UML.

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 field audit was undertaken of a statistical sample of 101 sites on 16 March 2021.

1.9. Summary of previous audit

Genesis provided a copy of the last audit report undertaken by Tara Gannon of Veritek Limited, completed in May 2020. The table below records the findings.

Table of Non-compliance

Subject	Section	Clause	Non-compliance	Status
Deriving submission information	2.1	11(1) of Schedule 15.3	The database contained some missing and incorrect daily kWh information. The errors were corrected during the audit.	Cleared
ICP identifier and items of load	2.2	11(2)(a) and (aa) of Schedule 15.3	ICP number is not recorded in RTOAD. All items of load have a GXP recorded, and this GXP information is used to map to the correct ICP.	Still existing with new trader
Description and capacity of load	2.4	11(2)(c) and (d) of Schedule 15.3	Two sites had no database kWh per day recorded.	Cleared

Subject	Section	Clause	Non-compliance	Status
All load recorded in database	2.5	11(2A) of Schedule 15.3	One traffic safety camera was missing from the database for site 129.	Cleared
Audit trail	2.7	11(4) of Schedule 15.3	No audit trail of changes made in the access database.	Still existing with new trader
Database accuracy	3.1	15.2 and 15.37B(b)	The database contained some missing and incorrect daily kWh information. The errors were corrected during the audit. ICP number is not recorded in the database.	Cleared Still existing with new trader
Volume information accuracy	3.2	15.2 and 15.37B(c)	The database contained some missing and incorrect daily kWh information. The errors were corrected during the audit.	Cleared

Table of Recommendations

Subject	Section	Description	Recommendation	Status
Database accuracy	3.1	0000298513MPF38 metering	Confirm whether the metering record for this ICP is correct, and which connected load is metered.	Cleared – confirmed this is an unmetered supply

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.

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

RTOAD records the quantity of each equipment type, including vehicle lanterns of various types and wattages, pedestrian lanterns of various types and wattages, illuminated signs, speed zone signs and traffic safety cameras at each intersection. The wattage for each item is multiplied by the estimated number of hours on per day, power level, and kW per hour to give a daily kWh value. The hours and power level are based on historic metering information, from when a sample of lights were metered to determine these values.

These ICPs were submitted under the HHR profile when submitted under the CTCT participant code under exemption 177. I checked the submission from the month of September 2020 and confirmed that the volumes were correctly calculated.

These ICPs were switched to the CTCS participant code from 1 October 2020. Simply Energy manages the submission of this data on behalf of Contact Energy. This load is now submitted as NHH using the UNM profile for ICPs 0007102602RN872, 007102603RN437 and 0000298513MPF38. The profile for ICP 0007102604RN9FD is RPS UML.

Simply Energy manages unmetered loads by creating dummy meters. If there is no dummy meter in their DA software, then the volume is estimated at 55kWh/day. This is resulting in a significant volume of under submission. I checked the volumes submitted for January 2021:

ICP	CCC Monthly kWh value	CTCS volume submitted	kWh volume difference
0007102602RN872	12,313.20	1,705.00	-10,608.20
0007102603RN437	4,050.15	1,705.00	-2,345.15
0007102604RN9FD	64,399.71	1,705.00	-62,694.71
0000298513MPF38	185.38	1,705.00	+1,519.62
		Monthly submission variance	-74.128.44

Simply Energy is investigating a solution to correct this. This has been occurring since October 2020 and will have resulted in an estimated under submission of 444,770.64 kWh up to March 2021. This is recorded as non-compliance below.

The field audit confirmed that the database accuracy fell within the allowable thresholds.

As detailed in **section 3.1**, analysis of the database found some incorrect daily kWh information, resulting in minor under submission of an estimated 285 kWh per annum.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 2.1 With: Clause 11(1) of Schedule 15.3 From: 19-May-20 To: 17-Mar-21	Estimated 444,770.64 kWh of under submission from October 2020 up to March 2021 since switching to the CTCS participant code. The database contained some incorrect daily kWh information, resulting in minor under submission of an estimated 285 kWh per annum. Potential impact: High Actual impact: High Audit history: Three times previously Controls: None Breach risk rating: 12
Audit risk rating	**Rationale for audit risk rating**
High	The controls were rated as none, because they are not sufficient to ensure that submission data is calculated accurately. The impact is assessed to be high due to the level of submission inaccuracy.

Actions taken to resolve the issue	Completion date	Remedial action status
After the material change audit was completed and approved in approximately August 2021, Dummy meters were created, and correct volumes were reconciled from the switch date via the usual reconciliation revision periods.	31/8/2021	Identified
The database was updated during the audit to be correct.	30/4/2021	
Preventative actions taken to ensure no further issues will occur	**Completion date**	
Issue relating to material change was a one-off related to migration of ICPs from the CTCT to the CTCS code and management of that by Simply Energy; we do not anticipate this issue being encountered again.	N/a	

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 the correct ICP was recorded against each item of load.

Audit commentary

ICP number is not recorded in RTOAD. All items of load have a GXP recorded against them, which corresponds to the ICP number. GXPs are confirmed as part of the new connection process. If a new traffic light is surrounded closely by existing lights which all have the same GXP, CTOC assigns that GXP. In all other cases, the GXP is checked with Orion before being recorded in the database.

CTOC advised that Orion provided notification of GXP changes.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 2.2 With: Clause 11(2)(a) and (aa) of Schedule 15.3 From: 19-May-20 To: 17-March-21	ICP number is not recorded in RTOAD. All items of load have a GXP recorded, and this GXP information is used to map to the correct ICP. Potential impact: None Actual impact: None Audit history: Multiple times Controls: Weak Breach risk rating: 3
Audit risk rating	**Rationale for audit risk rating**
Low	The controls were rated as weak. An ICP number field is available in RTOAD but is not used. The impact is assessed to be low. ICP numbers can be determined from the GXP information because there is a 1:1 relationship between GXP and ICP, and the GXP is populated for every item of load. There is no impact on submission.

Actions taken to resolve the issue	Completion date	Remedial action status
A new field was added to RTOAD and populated with the ICP. The ICP is now also included on the Power Invoice listing that is provided by CTOC to Simply Energy.	30/6/2021	Identified
Preventative actions taken to ensure no further issues will occur	**Completion date**	

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

All items of load have a site name recorded which includes the location. 350 of the 394 power sites also have GPS coordinates.

The sites without GPS coordinates are speed signs. Typically, there are between two and 10 speed signs around a school at different locations, which are recorded as one site. RTOAD only allows one GPS location and location description to be recorded for each site, and the description indicates speed signs and the school's name. CTOT will investigate whether to record one of these GPS locations for each site with speed signs.

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 contains load types and capacities.

Audit commentary

RTOAD records the quantity of each equipment type, including vehicle lanterns of various types and wattages, pedestrian lanterns of various types and wattages, illuminated signs, speed zone signs and traffic safety cameras at each intersection. The wattage for each item is multiplied by the estimated number of hours on per day, power level, and kW per hour to give a daily kWh value. The hours and power level are based on historic metering information, from when a sample of lights were metered to determine these values.

The capacity in watts is recorded in the back end of the database as part of the daily kWh calculation and is also set out in the CTOC Traffic Signal Database Traffic Signal Power Calculation Formula document.

All items of load have site units per day recorded.

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

Audit outcome

Compliant

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 101 sites on 16 March 2021.

Audit commentary

The following differences were identified during the field audit:

Address	Database Count	Field Count	Count differences	Wattage differences	Comments
Barbadoes/Edgeware	0	1	+1		1 x TS camera for site ID 209 was not recorded in the database.
Ferry/Fitzgerald	0	1	+1		1 x TS camera for site ID 70 was not recorded in the database.
Manchester/Salisbury	0	1	+1		1x TS camera for site ID 44 was not recorded in the database.
Manchester/Worcester	1	2	+1		1 x additional TS camera for site ID 66 was not recorded in the database
High/Lichfield/Manchester	1	2	+1		1 x additional TS camera for site ID 5 was not recorded in the database
Manchester/Tuam	1	2	+1		1 x additional TS camera for site ID 19 was not recorded in the database
Kilmore/Manchester	1	2	+1		1 x additional TS camera for site ID 37 was not recorded in the database
Gloucester/Manchester	1	2	+1		1 x additional TS camera for site ID 57 was not recorded in the database

Address	Database Count	Field Count	Count differences	Wattage differences	Comments
Hereford/Manchester	1	2	+1		1 x additional TS camera for site ID 59 was not recorded in the database
Armagh/Manchester	1	2	+1		1 x additional TS camera for site ID 60 was not recorded in the database
Cashel/Manchester	1	2	+1		1 x additional TS camera for site ID 67 was not recorded in the database
Total	8	19	+11		

Eleven TS cameras were found to be missing from the database and are recorded as non-compliance below. The lamp wattage differences are recorded as non-compliance in **section 3.1**.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 2.5 With: Clauses 11(2A) of Schedule 15.3 From: 20-May-20 To: 17-Mar-21	Eleven traffic safety cameras were missing from the database. Potential impact: Low Actual impact: Low Audit history: once Controls: Moderate Breach risk rating: 2
Audit risk rating	**Rationale for audit risk rating**
Low	The controls are rated as moderate, because they are sufficient to ensure the database is accurate most of the time. The impact is low because the wattage of the missing cameras is 0.048 kWh per day.

Actions taken to resolve the issue	Completion date	Remedial action status
A field audit completed by CTOC has found that these extra traffic Cameras identified via this audit are not owned by the Council and are therefore outside the scope of this audit. These cameras are owned by NZ Police. These lights have been added to RTOAD for future reference and tagged as NZ Police owned for clarity.	N/a	Identified
Preventative actions taken to ensure no further issues will occur	**Completion date**	

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 process for new connections is well defined. The Christchurch City Council (CCC) capital programme team manage the new connection process, and the CTOC are responsible for programming the lights and ensuring that both RTOAD and RAMM are updated. CTOC is well aware of any new lights to be commissioned and ensures that database information is updated as required.

The GXP, and types and quantities of equipment installed are determined from the signal plan and "as built" information. If a new traffic light is surrounded closely by existing lights which all have the same GXP, CTOC assigns that GXP. In all other cases, the GXP is checked with Orion before being recorded in the database.

Additions, changes and decommissions are managed by CTOC, and the database is updated from the effective date of the change.

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

CTOC RTOAD Access database has no audit trail of additions and changes to the database information.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 2.7 With: Clause 11(4) of Schedule 15.3 From: 19-May-20 To: 17-Mar-21	No audit trail of changes made in the access database. Potential impact: Low Actual impact: Low Audit history: Multiple times Controls: Weak Breach risk rating: 3
Audit risk rating	**Rationale for audit risk rating**
Low	The controls are rated as weak because audit trails do not exist. The impact is rated as low, because it does not affect submission.

Actions taken to resolve the issue	Completion date	Remedial action status
		Identified
Preventative actions taken to ensure no further issues will occur	**Completion date**	
CTOC are currently running a parallel system between Access and RAMM with a view to transition to RAMM within 2 years. Dynamic dimming throughout the year – formula currently used in access – this is the roadblock to transition of electricity submission to RAMM as this will need to be replicated and is complex.	2024	

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	CCC unmetered traffic lights
Strata	The database contains 394 sites in the CCC area. All lights in the database have the same owner, and the management process is the same. The database was divided into two strata: • traffic lights, and • other equipment including CCTV, pedestrian crossing lights, and speed zone signs.
Area units	I used a random number generator to select a total of 23 sub-units across the two strata.
Total items of load	101 items of load were checked.

The calculation of daily kWh in the database was checked, by reperforming the calculation based on the CTOC Traffic Signal Database Traffic Signal Power Calculation Formula document.

Audit commentary

Database accuracy based on the field audit

As described in **section 2.5**, the database was found to contain some inaccurate and missing data. The field audit of 101 sites found 11 TS cameras to be missing from the database and are recorded as non-compliance below.

The four School Zone (SZ) signs that were included in the site audit all had solar panels installed. CTOC is investigating to see if these are connected, if they are, they should not have Site Unit Per Day calculated and included in the submission. There are a 109 School Zone signs installed across 44 locations. SZ Signs are calculated @ 0.03 site units per day.

The unmetered load does not operate only during night hours and is recorded as a daily kWh value. To account for this when assessing database accuracy, I adjusted the data entered into the Authority's DUML database auditing tool as follows:

- I entered the daily kWh for each sub-unit instead of watts, and

- I modified the on hours per annum to 365,000 to reflect (1) that the values entered were kWh not watts, and (2) that the daily average kWh needs to be multiplied by 365 to give annual consumption, instead of 4,271-night burn hours.

Result	Percentage	Comments
The point estimate of R	100.1	Wattage from survey is higher than the database wattage by 0.1%
R_L	100.1	With a 95% level of confidence, it can be concluded that the error could be between +0.1% and +0.3%
R_H	100.3	

These results were categorised in accordance with the "Distributed Unmetered Load Statistical Sampling Audit Guideline", effective from 1 February 2019 and the table below shows that Scenario C (detailed below) applies.

The conclusion from Scenario A is that the variability of the sample results across the strata means that the true wattage (installed in the field) could be between 0.1% and 0.3% higher than the wattage recorded in the DUML database. Compliance is confirmed.

In absolute terms the installed capacity is estimated to be the same as the database indicates.

There is a 95% level of confidence that the installed capacity is the same as the database.

In absolute terms, total annual consumption is estimated to be 1,300 kWh higher than the DUML database indicates.

There is a 95% level of confidence that the annual consumption is between 500 kWh to 3,200 kWh p.a. higher than the database indicates.

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

Wattage accuracy

The accuracy of the wattages recorded in the database was confirmed by reperforming the wattage calculation for each type of equipment and summing the result by site. The recalculation was according to the CTOC Traffic Signal Database Traffic Signal Power Calculation Formula document.

As discussed in **section 2.4**, all items of load had site units per day recorded.

The capacity in watts is recorded in the back end of the database as part of the daily kWh calculation and is also set out in the CTOC Traffic Signal Database Traffic Signal Power Calculation Formula document.

The following discrepancies were identified in the database:

SiteName	Stratum	SiteUnitsPerDay	SZSigns	Correct Site Units per day
SZ Russley School (Cutts)	SZ	0.03	2	2 x 0.03 = 0.06
SZ St Albans Catholic School (Rutland)	SZ	0.03	2	2 x 0.03 = 0.06
SZ Chisnalwood I School (Breezes/Pembrooke)	SZ	0.08	3	3 X 0.03 = 0.09

SiteName	Stratum	SiteUnitsPerDay	SZSigns	Correct Site Units per day
SZ Haeata Campus (Breezes/Shortland)	SZ	0.06	4	4 x 0.03 = 0.12
SZ Belfast P School (Main North)	SZ	0.03	4	4 x 0.03 = 0.12
SZ Templeton P School (Banks St/Kirk)	SZ	0.08	3	3 X 0.03 = 0.09
SZ Spreydon P School (Hoon Hay/Mathers)	SZ	0.08	3	3 X 0.03 = 0.09
SZ Isleworth School (Farrington/Isleworth)	SZ	0.08	3	3 x 0.03 = 0.09
SZ Cashmere P School (Dyers Pass/Hackthorne)	SZ	0.06	4	4 X 0.03 = 0.12
SZ Somerfield School (Somerfield/Studholme)	SZ	0.08	3	3 x 0.03 = 0.09
SZ Burnside H & Christ The King Schools (Greers/Memorial)	SZ	0.02	10	10 X 0.03 = 0.30
Correct Total Site Units per day			41	
Total Site Units per day currently charged			23	
Total discrepancy			**18**	**285 kWh per annum**

This will result in a very minor under submission of 285 kWh per annum.

ICP number accuracy

As discussed in **section 2.2**, ICP number is not recorded in the database but can be mapped using the GXP.

Address location accuracy

As discussed in **section 2.3**, all lights have an address recorded.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 3.1 With: Clause 15.2 and 15.37B(b) From: 19-May-20 To: 17-Mar-21	The database contained some incorrect daily kWh information, resulting in minor under submission of an estimated 285 kWh per annum. ICP number is not recorded in the database. Potential impact: Low Actual impact: Low Audit history: Once previously Controls: Moderate Breach risk rating: 2
Audit risk rating	**Rationale for audit risk rating**
Low	The controls were rated as moderate overall because they are sufficient to ensure that database wattage is accurate for most of the sites. The impact is assessed to be low as the discrepancies found will only have a very minor effect on submission.

Actions taken to resolve the issue	Completion date	Remedial action status
The affected power calculation formula was updated. A new field was added to RTOAD and populated with the ICP. The ICP is now also included on the Power Invoice listing that is provided by CTOC to Simply Energy.	30/6/2021 30/6/2021	Identified
Preventative actions taken to ensure no further issues will occur	**Completion date**	

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 burn hours against the submitted figure to confirm accuracy.

Audit commentary

RTOAD records the quantity of each equipment type, including vehicle lanterns of various types and wattages, pedestrian lanterns of various types and wattages, illuminated signs, speed zone signs and

traffic safety cameras at each intersection. The wattage for each item is multiplied by the estimated number of hours on per day, power level, and kW per hour to give a daily kWh value. The hours and power level are based on historic metering information, from when a sample of lights were metered to determine these values.

These ICPs were submitted under the HHR profile when submitted under the CTCT participant code under exemption 177. I checked the submission from the month of September 2020 and confirmed that the volumes were correctly calculated.

These ICPs were switched to the CTCS participant code from 1 October 2020. Simply Energy manages the submission of this data on behalf of Contact Energy. This load is now submitted as NHH using the UNM profile for ICPs 0007102602RN872, 007102603RN437 and 0000298513MPF38. The profile for ICP 0007102604RN9FD is RPS UML.

Simply Energy manages unmetered loads by creating dummy meters. If there is no dummy meter in their DA software, then the volume is estimated at 55kWh/day. As detailed in **section 2.1**, this has result in an estimated under submission of volume of 74,128.44 kWh per month. The ICPs switched to the CTCS participant code from October 2020, therefore this will have resulted in an estimated under submission of 444,770.64 kWh up to to March 2021. Simply Energy is investigating a solution to correct this.

The field audit confirmed that the database accuracy fell within the allowable thresholds.

As detailed in **section 3.1**, analysis of the database found some incorrect daily kWh information, resulting in minor under submission of an estimated 285 kWh per annum.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 3.2 With: Clause 15.2 and 15.37B(c) From: 19-May-20 To: 17-Mar-21	Estimated 444,770.64 kWh of under submission from October 2020 up to March 2021 since switching to the CTCS participant code. The database contained some incorrect daily kWh information, resulting in minor under submission of an estimated 285 kWh per annum. Potential impact: High Actual impact: High Audit history: Three times previously Controls: None Breach risk rating: 12
Audit risk rating	**Rationale for audit risk rating**
High	The controls were rated as none, because they are not sufficient to ensure that submission data is calculated accurately. The impact is assessed to be high due to the level of submission inaccuracy.

Actions taken to resolve the issue	Completion date	Remedial action status
After the material change audit was completed and approved in approximately August 2021, Dummy meters were created, and correct volumes were reconciled from the switch date via the usual reconciliation revision periods.	31/8/2021	Identified
The affected power calculation formula was updated.	30/6/2021	
Preventative actions taken to ensure no further issues will occur	**Completion date**	

CONCLUSION

This DUML database switched from Genesis to Contact using the CTCT participant code on 1 October 2019 and was then switched to Contact Energy's CTCS code on 1 October 2020. This is managed by Contact Energy's subsidiary Simply Energy. Contact Energy carried out a material change audit in relation to the ICPs that were switched to the CTCS code. This did not include the management of unmetered load. Therefore, a material change should have been undertaken prior to this occurring. This is recorded as non-compliance in Contact Energy's Reconciliation Participant audit.

Traffic light data is maintained in RTOAD (Real Time Operations Asset Database) by CTOC. RTOAD records the quantity of each equipment type, including vehicle lanterns of various types and wattages, pedestrian lanterns of various types and wattages, illuminated signs, speed zone signs and traffic safety cameras at each intersection. The wattage for each item is multiplied by the estimated number of hours on per day, power level, and kW per hour to give a daily kWh value. The hours and power level are based on historic metering information, from when a sample of lights were metered to determine these values.

Simply Energy manages unmetered loads by creating dummy meters. If there is no dummy meter their DA software estimates the volume at 55kWh/day. This is resulting in an estimated under submission of 444,770.64 kWh since these ICPs were switched to the CTCS participant code in October 2020. Simply Energy is investigating a solution to ensure accurate submissions.

Six non-compliances were identified. The future risk rating of 34 indicates that the next audit be completed in three months. I have considered this in conjunction with Contact's comments. The report due date was April 2021, it is very overdue and has extended beyond the recommended period, I recommend that the next audit is completed in three months.

PARTICIPANT RESPONSE

The major issue within this audit of under reconciliation was an issue with Simply Energy's general processes, not specific to this client or database. This general issue was resolved via a material change audit in August 2021 and historic submission were corrected via the usual reconciliation revision processes.