ELECTRICITY INDUSTRY PARTICIPATION CODE
DISTRIBUTED UNMETERED LOAD AUDIT REPORT

VERITEK

For

TASMAN DISTRICT COUNCIL
AND TASMAN NZTA
AND CONTACT ENERGY LIMITED

Prepared by: Rebecca Elliot

Date audit commenced: 16 September 2019

Date audit report completed: 29 November 2019

Audit report due date: 1 December 2019

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EXECUTIVE SUMMARY

This audit of the **Network Tasman distributed unmetered load database containing the Tasman District Council and Tasman NZTA (Network Tasman DUML)** 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.

Network Tasman hold an access database for the Tasman DC and Tasman NZTA unmetered streetlights. Fault, maintenance and upgrade work is conducted by PowerTech and W J Ashton and the database is managed by Network Tasman. New streetlight connections are undertaken by Delta.

Contact reconciles the TDC DUML load using the HHR profile and the NZTA lights using the RPS profile. Submissions are based on Distributor's kW figure populated on the registry. The burn hours for TDC are derived from data logger information. The burn hours for NZTA lights are calculated on 11.5 burn hours per day.

This audit found that database accuracy has declined and is not within the allowable +/- 5% threshold.

On 18 June 2019, the Electricity Authority issued a memo clarifying the memo of 2012 that stated that a monthly snapshot was sufficient to calculate submission from, and confirmed the code requirement to calculate the correct monthly load must:

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

Network Tasman update the database and then update the registry by ICP as changes occur. However, they are unable to effectively backdate changes on the registry as it will overwrite any changes made between the backdated event and the most recent update. Contact use the registry kW value. I recommend that reporting be provided from the database that includes the tracking of changes at a daily level.

The audit found six non-compliances and makes five recommendations. The future risk rating of 28 indicates that the next audit be completed in three months. I have considered this in conjunction with Contact's responses and recommend that the next audit be in six to nine months' time to allow sufficient time to either get improved reporting from the Network Tasman database or find an alternate database source with the Council. ….

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	Incorrect kW value calculations resulting in a combined over submission of (16,524.84 + 10,212.64) 26,737.48kWh from March 2019 - October 2019. Calculation methodology does not meet the code requirements. Database is not confirmed as accurate with a 95% level of confidence. Incorrect wattages for 31 items of load resulting in an estimated minor under submission of 442.5kWh per annum.	Weak	High	9	Investigating
Location of load	2.3	11(2)(b) of Schedule 15.3	73 items of load with insufficient details to locate these.	Strong	Low	1	Investigating
Description and capacity of load	2.4	11(2)(c)& (d) of Schedule 15.3	One item of load with no light or wattage details populated.	Strong	Low	1	Investigating
All load recorded in the database	2.5	11(2A) of Schedule 15.3	Three additional lights found in the field.	Moderate	Low	2	Investigating
Database accuracy	3.1	15.2 and 15.37B(b)	Database is not confirmed as accurate with a 95% level of confidence. One item of load missing lamp description and wattage. Incorrect wattages for 31 items of load resulting in an estimated minor	Moderate	High	6	Investigating

Subject	Section	Clause	Non-Compliance	Controls	Audit Risk Rating	Breach Risk Rating	Remedial Action
			under submission of 442.5kWh per annum.				
Volume information accuracy	3.2	15.2 and 15.37B(c)	Incorrect kW value calculations resulting in a combined over submission of (16,524.84 + 10,212.64) 26,737.48kWh from March 2019 - October 2019. Calculation methodology does not meet the code requirements. Database is not confirmed as accurate with a 95% level of confidence. Incorrect wattages for 31 items of load resulting in an estimated minor under submission of 442.5kWh per annum.	Weak	High	9	Investigating
Future Risk Rating						28	

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	Recommendation
Deriving submission information	I recommend validation processes are reviewed to ensure such errors are identified and corrected.
	Monthly report tracking change at a daily level be provided from the database.
Location of each item of load	Add GPS co-ordinates to items of load with insufficient info.
	Restore the “Area” field to contain “area” details only and not street level detail.
Database accuracy	Update database with lamp descriptions to confirm the correct wattage has been applied.

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.

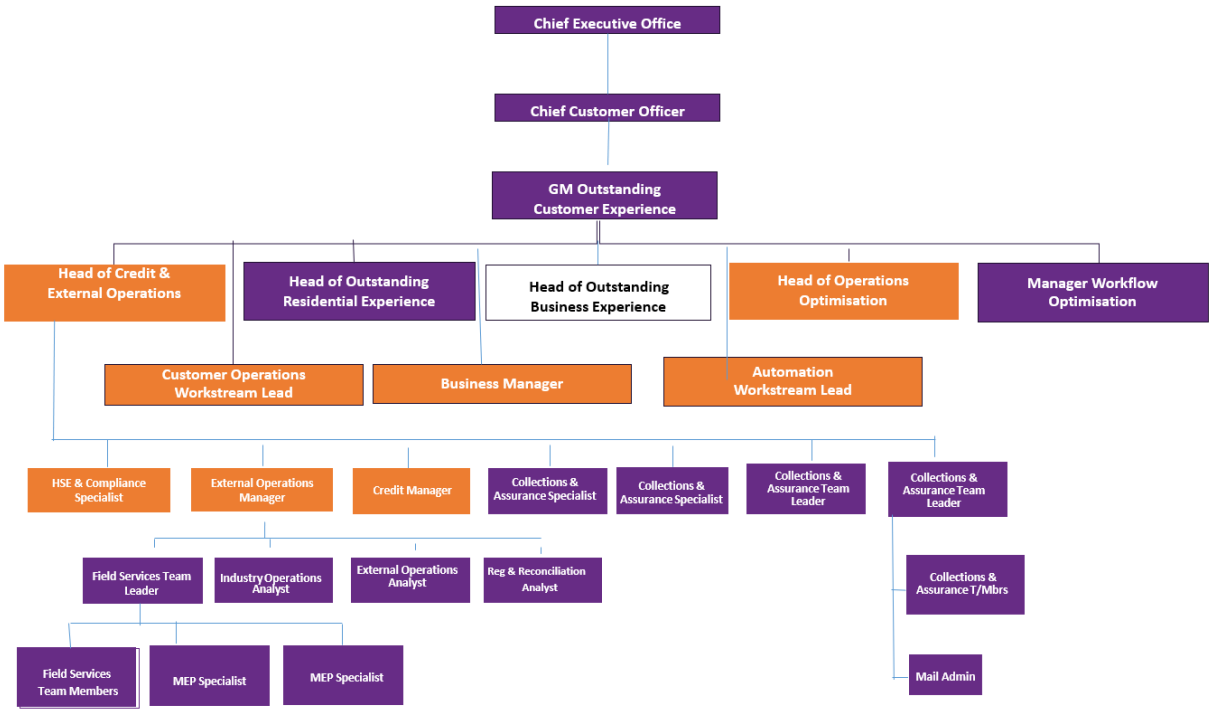
Audit commentary

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:

Rebecca Elliot

Veritek Limited

Electricity Authority Approved Auditor

Other personnel assisting in this audit were:

Name	Title	Company
Kerryn Little	Easement Officer	Network Tasman
Wendy Hartshorne	Revenue Protection Officer/Registry Analyst	Network Tasman
Allie Jones	External Operations	Contact Energy

1.4. Hardware and Software

The Access database used by Network Tasman is backed-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	Profile	Number of items of load	Database wattage (watts)
0000090005NTAE5	TDC STREETLIGHTING KIKIWA	KIK0111	HHR	70	2,638
0000090003NTB6A	TDC STREETLIGHTING MOTUEKA	STK0661	HHR	840	35,213
0000090004NT6A0	TDC STREETLIGHTING MOTUPIPI	STK0661	HHR	254	8,962
0000090006NT625	TDC STREETLIGHTING MURCHISON	MCH0111	HHR	46	1,791
0000090002NT72F	TDC STREETLIGHTING STOKE	STK0331	HHR	1,978	100,720
0000090007NTA60	TRANSIT NZ STREETLIGHTING STOKE POC	STK0331	RPS	390	76,982
0000090009NT9FB	TRANSIT STREETLIGHTING MOTUEKA	STK0661	RPS	120	15,441
0000090010NTD07	TRANSIT STREETLIGHTING MOTUPIPI	STK0661	RPS	55	7,090
0000090012NTD82	TRANSIT STREETLIGHTING MURCHISON	MCH0111	RPS	45	6,168
0000090011NT142	NZTA STREETLIGHTING KIKIWA	KIK0111	RPS	11	881
TOTAL				**3,809**	**255,886**

1.7. Authorisation Received

All information was provided directly by Contact or Network Tasman.

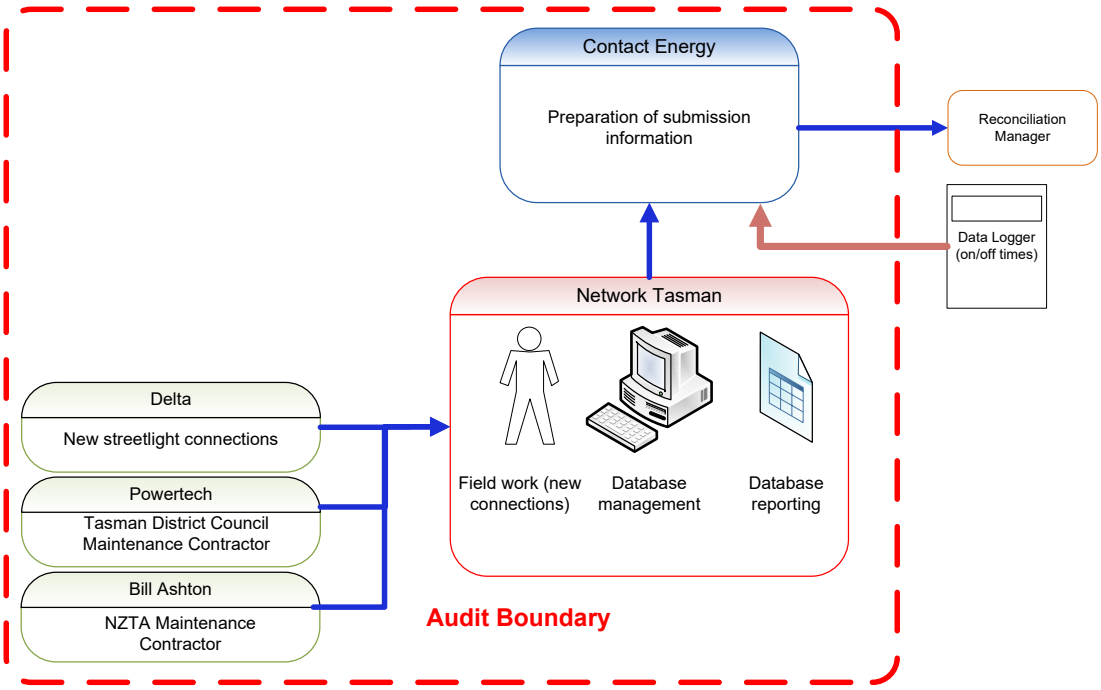
1.8. Scope of Audit

This audit of the Network Tasman distributed unmetered load database containing the Tasman District Council and Tasman NZTA 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.

Network Tasman hold an access database for the Tasman DC and Tasman NZTA unmetered streetlights. Fault, maintenance and upgrade work is conducted by PowerTech and W J Ashton and the database is managed by Network Tasman.. New streetlight connections are undertaken by Delta.

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 346 items of load on 5th & 6th November 2019.

1.9. Summary of previous audit

The previous audit of this database was undertaken by Rebecca Elliot of Veritek Limited in August 2017. The summary table below shows the statuses of the non-compliances raised in the previous audit. No recommendations were made.

Subject	Section	Clause	Non-compliance	Status
Deriving Submission Information	2.1	11(1) of Schedule 15.3	Incorrect profile recorded for 4 ICPs. Accuracy ratio is 99.7% indicating over submission of 220.65 kWh per annum. 31 items of load with the incorrect ballast applied resulting in an estimated annual under submission of 2,246.55 kWh.	Cleared Still existing
Database accuracy	3.1	15.2 & 15.37(b)	Accuracy ratio is 99.7% indicating over submission of 220.65 kWh per annum. 31 items of load with the incorrect ballast applied resulting in an estimated annual	Still existing Still existing

Subject	Section	Clause	Non-compliance	Status
			under submission of 2,246.55 kWh.	
Volume information accuracy	3.2	15.2 & 15.37(c)	Incorrect profile recorded for 4 ICPs. Accuracy ratio is 99.7% indicating over submission of 220.65 kWh per annum. 31 items of load with the incorrect ballast applied resulting in an estimated annual under submission of 2,246.55 kWh.	Cleared Still existing Still existing

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

Code reference

Clause 16A.26 and 17.295F

Code related audit information

Retailers must ensure that DUML database audits are completed:

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

Audit observation

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

Contact reconciles the TDC DUML load using the HHR profile, in accordance with exemption number 177. This exemption is discussed further in **section 1.1**. A logger is used to calculate the burn hours for the TDC ICPs. The NZTA load is reconciled using the RPS profile. Burn hours are based on 11.5 hours per day.

Contact use the kW figure populated by Network Tasman multiplied by the burn hours to calculate the monthly kWh figures. I checked the submission values used for October 2019 and found two errors. I found the volumes for two ICPs were being calculated incorrectly. This is detailed in the table below:

ICPs	kWh value submitted	Calculated kWh value from database	Differences
0000090009NT9FB	11,013.01	5,504.72	-5,508.28
0000090011NT142	962.50	314.08	-1,276.58
Total month kWh difference			-6,785.08

For ICP 0000090009NT9FB, this error has been present since August 2019 and will have resulted in an estimated over submission of 16,524.84kWh. For ICP 0000090011NT142, this error has been present since March 2019 and will have resulted in an estimated over submission of 10,212.64 kWh. This has resulted in a combined over submission of 26,737.48kWh. This will be corrected via revisions. I recommend that the validation checks for this process be reviewed to ensure such errors are identified in a timely manner.

Recommendation	Description	Audited party comment	Remedial action
Deriving submission information	I recommend validation processes are reviewed to ensure such errors are identified and corrected.	Further training has now been supplied to ensure this does not occur again. CTCT will consider looking into the process to see if this can be improved any further	Identified

A monthly wattage report is not provided from the database. Contact uses the Distributor's kW value populated on the registry. Network Tasman update the registry each time changes are made in the database. This process is discussed in detail in **section 3.1** in the tracking of load change. These changes are expected to be taken into account when calculating the monthly kWh. I checked this by calculating the expected load for the two ICPs where changes had occurred during the month of October and found that these changes were not taken into account and that the load had been calculated using a daily kW figure for the month. These variances are detailed in the table below:

ICPs	kWh value submitted	Calculated kWh value from database	Differences
0000090002NT72F	35,5532	35,542	10
0000090007NTA60	27,782	27,497	-285
Total month kWh difference			-275

This will be resulting in incorrect submissions for ICPs where changes occur. This has resulted in 275 kWh of over submission for the month of October 2019.

On 18 June 2019, the Electricity Authority issued a memo clarifying the memo of 2012 that stated that a monthly snapshot was sufficient to calculate submission from, and confirmed the code requirement to calculate the correct monthly load must:

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

The current process of using the registry figure does not meet the code requirements. This is recorded as non-compliance. I recommend that a report from the database that tracks changes at a daily level be provided from the database to Contact on a monthly basis.

Recommendation	Description	Audited party comment	Remedial action
Deriving submission information	Monthly report tracking change at a daily level be provided from the database.	Contact will look into this	Investigating

The field audit against the database quantities found that the database is not confirmed as accurate with a 95% level of confidence as recorded in **section 3.1**.

A check of the wattages applied identified a small number of lights with the incorrect wattage applied resulting in an estimated minor under submission of 442.5 kWh as detailed in **section 3.1**.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 2.1 With: Clause 11(1) of Schedule 15.3 From: 31-Aug-17 To: 31-Oct-19	Incorrect kW value calculations resulting in a combined over submission of (16,524.84 + 10,212.64) 26,737.48kWh from March 2019 - October 2019. Calculation methodology does not meet the code requirements. Database is not confirmed as accurate with a 95% level of confidence. Incorrect wattages for 31 items of load resulting in an estimated minor under submission of 442.5kWh per annum. Potential impact: High Actual impact: High Audit history: Twice previously Controls: Weak Breach risk rating: 9
Audit risk rating	**Rationale for audit risk rating**
High	Controls are rated as weak as the expected process to calculate load is not being followed and errors in the calculation of kWh volumes have not been identified as expected. The audit risk rating is high based on the estimated kWh volume impact of the database inaccuracy and calculation inaccuracies are considered.

Actions taken to resolve the issue	Completion date	Remedial action status
Contact will work with Tasman to ensure that their database is accurate Contact will work with the customer to ensure that they are setup to deliver their data for any given time, as required by the EA	Ongoing	Investigating
Preventative actions taken to ensure no further issues will occur	**Completion date**	
Contact will complete quarterly database checks to ensure the accuracy of Tasman's database	Ongoing	

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

All items of load have an ICP assigned.

Audit outcome

Compliant

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

Code reference

Clause 11(2)(b) of Schedule 15.3

Code related audit information

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

Audit observation

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

Audit commentary

The database contains fields for light ID, location description, area and GPS co-ordinates. All but 856 (22%) of the database have GPS co-ordinates recorded. Of these all but 73 items of load have sufficient details to locate them. The majority were originally loaded with lot numbers and have not been updated with the street number or GPS co-ordinates. This is recorded as non-compliance below. I recommend that GPS co-ordinates are captured for these items of load.

Recommendation	Description	Audited party comment	Remedial action
Location of each item of load	Add GPS co-ordinates to items of load with insufficient information to locate them.	Contact will work with Tasman to ensure they have accurate location details in their database	Investigating

The database addressing structure has changed during the audit period and the "Area" field now contains a mixture of areas and individual street names, effectively containing two different levels of addressing in the one field. I recommend that the field be reviewed to contain areas only as was previously the case.

Recommendation	Description	Audited party comment	Remedial action
Location of each item of load	Restore the "Area" field to contain "area" details only and not street level detail	Contact will work with Tasman to ensure they have accurate location details in their database	Investigating

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 2.3 With: Clause 11(2)(b) of Schedule 15.3 From: 31-Aug-17 To: 31-Oct-19	73 items of load with insufficient details to locate these. Potential impact: Low Actual impact: Low Audit history: None Controls: Strong Breach risk rating: 1
Audit risk rating	**Rationale for audit risk rating**
Low	Controls are rated as strong as the processes in place require all new lights to have GPS co-ordinates recorded. The audit risk rating is recorded as low due to the small number of lights that can't be readily locatable. .

Actions taken to resolve the issue	Completion date	Remedial action status
Contact will work with Tasman to ensure that their database is accurate	Ongoing	Investigating
Preventative actions taken to ensure no further issues will occur	**Completion date**	
Contact will complete quarterly database checks to ensure the accuracy of Tasman's database	Ongoing	

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

Code reference

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

Code related audit information

The DUML database must contain:

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

Audit observation

The database was checked to confirm that:

- it contained a field for light type and wattage capacity;
- wattage capacities include any ballast or gear wattage; and
- each item of load has a light type, light wattage, and gear wattage recorded.

Audit commentary

The database contains fields for lamp type, lamp size and total wattage (this includes ballast where required). All but one item of load (item#30433) have a lamp type, size and total wattage figure populated. No lamp or gear wattages were invalidly recorded as zero.

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

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 2.4 With: Clause 11(2)(c)&(d) of Schedule 15.3 From: 31-Aug-17 To: 31-Oct-19	One item of load with no light or wattage details populated. Potential impact: Low Actual impact: Low Audit history: None Controls: Strong Breach risk rating: 1
Audit risk rating	**Rationale for audit risk rating**
Low	Controls are rated as strong as the processes in place ensure that this detail is captured, and there was only one light that had no wattage or light type recorded. The audit risk rating is recorded as low to none as there was only one light with no wattage recorded. .

Actions taken to resolve the issue	Completion date	Remedial action status
Contact will work with Tasman to ensure that their database is accurate	Ongoing	Investigating
Preventative actions taken to ensure no further issues will occur	**Completion date**	
Contact will complete quarterly database checks to ensure the accuracy of Tasman's database	Ongoing	

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 346 items of load on 5th & 6th November 2019. The sample was selected from eight strata, as detailed in **section 3.1**.

Audit commentary

The field audit discrepancies are detailed in the table below:

Street	Database count	Field count	Light count difference	Wattage recorded incorrectly	Comments
Atkins St	8	8	0	1	1 x 36W LED light recorded as 27W LED in the database.
Brookvale Dr	2	1	-1		1x 25WLED not found in the field
Commercial St	19	20	0	1	1 x 36W LED light recorded as 70W HPS in the database.
Hickmott Pl	7	7	0	1	1x 36W LED recorded as 35W LED in the database.
Lake Rotoiti	12	13	+2 -1		1x 70W HPS not found in the field. 2x extra LED lights found in the field.
Les Wakefield Road	3	2	-1		1x bollard not found in the field.
Motupipi St	12	10	-2		2x (HPS & MV) lights not found in the field.
St Arnaud	11	11	0	5	5x incorrect wattages recorded in the database.
Sutton St	9	9	0	3	All light heads are the same- 3x incorrect LED wattages recorded.
Tapawera	11	10	-1		1x 36W LED not found in the field.
Waverley St	9	9	+1 -1	2	1x 70W HPS not found in the field. 1x 27W LED found in the field. 2x 35W LED found in the field recorded as 53W LED in the database.
Grand Total	**346**	**346**	**10**	**13**	

This clause relates to lights in the field that are not recorded in the database. The field audit found three additional lights. This is recorded as non-compliance. The database accuracy is discussed in **section 3.1**.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 2.5 With: Clause 11(2A) of Schedule 15.3 From: 31-Aug-17 To: 31-Oct-19	Three additional lights found in the field. Potential impact: Low Actual impact: Low Audit history: None Controls: Moderate Breach risk rating: 2
Audit risk rating	**Rationale for audit risk rating**
Low	Controls are rated as moderate as the Network Tasman's process requires that changes made in the field are provided ASAP but there is room for some errors to occur. The audit risk rating is recorded as low as the volume of additional lights found compared to the volume sampled suggests that the impact on reconciliation is small.

Actions taken to resolve the issue	Completion date	Remedial action status
Contact will work with Tasman to ensure that their database is accurate	Ongoing	Investigating
Preventative actions taken to ensure no further issues will occur	**Completion date**	
Contact will complete quarterly database checks to ensure the accuracy of Tasman's database	Ongoing	

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 access database functionality achieves compliance with the code.

The change management process and the compliance of the database reporting provided to Contact is detailed in **sections 3.1** and **3.2**.

Audit outcome

Compliant

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

Code reference

Clause 11(4) of Schedule 15.3

Code related audit information

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

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

Audit observation

The database was checked for audit trails.

Audit commentary

The database has a complete audit trail.

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

Contact's submissions are based on the Distributor's registry UML ICP values. Network Tasman update this as the database is updated. This process is discussed in more detail below. A database extract was provided in October 2019 and I assessed the accuracy of this by using the DUML Statistical Sampling Guideline. The table below shows the survey plan.

Plan Item	Comments
Area of interest	Tasman District Council and Tasman NZTA Street Lights
Strata	The database contains the items of load for DUML ICPs on the Network Tasman network. The processes for the management of all items of load are the same, but I decided to place the items of load into eight strata: 1. Rural A-H 2. Rural J-P 3. Rural R-S 4. Rural T-W 5. Urban A-H 6. Urban J-P 7. Urban R-S 8. Urban T-W
Area units	I created a pivot table of the roads and I used a random number generator in a spreadsheet to select a total of 75 sub-units.
Total items of load	346 items of load were checked, which made up over 5% of the total database wattage.

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

The change management process and timeliness of database updates was evaluated.

Audit commentary

Field audit findings

A field audit was conducted of a statistical sample of 346 items of load. The "database auditing tool" was used to analyse the results, which are shown in the table below.

Result	Percentage	Comments
The point estimate of R	96.1	Wattage from survey is lower than the database wattage by 3.9%
R_L	93.1	With a 95% level of confidence it can be concluded that the error could be between -1.0% and -6.9%
R_H	99.0	

The variability of the sample results across the strata means that the true wattage (installed in the field) could be between 1.0% and 6.9% lower than the wattage recorded in the DUML database.

These results were categorised in accordance with the "Distributed Unmetered Load Statistical Sampling Audit Guideline", effective from 01/02/19 and the table below shows that Scenario C (detailed below) applies.

The conclusion from Scenario C is that the variability of the sample results across the strata means that the true wattage (installed in the field) could be between 1.0% to 6.9% lower than the wattage recorded in the DUML database. Non-compliance is recorded because the potential error is greater than 5.0%.

There is a 95% level of confidence that the annual consumption is between 75,900 kWh and 100,900 kWh p.a. lower than the database indicates.

In absolute terms the installed capacity is estimated to be 10 kW lower than the database indicates.

There is a 95% level of confidence that the installed capacity is between 3 kW and 18 kW lower than the database.

In absolute terms, total annual consumption is estimated to be 42,600 kWh lower than the DUML 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

Scenario	Description
	(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 %

Light description and capacity accuracy

As discussed in **section 2.4**, all but one item of load has a lamp and gear wattage recorded. Lamp and gear wattages were compared to the expected values. This found a minor number of discrepancies. These are detailed in the table below:

Lamp make model	Quantity	Database lamp wattage	Expected lamp wattage	Variance
Fluor (26 watts)	6	33	28.6	-26.4
Fluor (2x58W)	2	130	144	28
Fluor (2x60W)	2	132	143	11
Metal Halide (150W)	2	167	168	2
Metal Halide (70W)	8	86	83	-24
HPS (100W)	3	111	114	9
HPS (400W)	8	425	438	104
			TOTAL	103.6

This will result in an estimated annual under submission of 442.5 kWh per annum (based on 4,271 burn hours). This is recorded as non-compliance below.

There are 10 lights recorded with a light type of “Various”. The details are insufficient to determine if the correct wattage has been recorded. I recommend below that these light descriptions are updated.

The database records all 3,163 LED lights as “LED” lights only. There are 59 different LED wattages recorded. 1,131 of these are the same light type (picture below) but are recorded as 25W, 35W, 36W or 53W LEDs. It is possible that these are all correct as the light maybe programmable. I recommend that all LED light descriptions are reviewed to ensure that they contain enough detail to confirm that the correct wattage has been applied.

Recommendation	Description	Audited party comment	Remedial action
Database Accuracy	Update database with lamp descriptions to confirm the correct wattage has been applied.	Contact will work with Tasman to ensure their database is accurate	Investigating

Change management process findings

Fault, maintenance and upgrade work is managed by either Powertech or W J Ashton. All changes made require a "streetlight advice form" to be supplied to Network Tasman. The database assigns a unique identifier per light. Each item of load has a "UML start date" and "UML end date". The "UML start date" relates to the installation date for the light. The "UML end date" defaults to 2099 and is updated to the date of removal when the light is replaced. As changes are made the ICP kW value is calculated on the day of updating. This is updated on a daily basis in the Network Tasman ICP database which writes this to the registry. Therefore, the database tracks changes at a daily level but the registry is unable to reflect any backdated changes as this will overwrite any changes made between the effective date of change and the date of updating. I recommend in **section 2.1**, that Contact use a report from the database to calculate the correct kW value.

The new connection process follows the same process as changes made in the field. This work is undertaken by Delta. A "streetlight service form" is completed and an "as built" drawing is provided. GPS co-ordinates are not provided as part of this process and often there are lot numbers at this time resulting in lights that have insufficient information to locate them.

The LED roll out is complete in this area, with the exception of the NZTA lights which are expected in the future but there are no immediate plans for these. There is no CMS system in place and no plans for one to be installed.

Festive lights

Network Tasman confirmed that there is no festive lighting used on the Network Tasman network.

Private lights

Private lights are recorded as either standard unmetered load or shared unmetered load as required by the code. No private lights are recorded in the database.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 3.1 With: Clause 15.2 and 15.37B(b) From: 31-Aug-17 To: 31-Oct-19	Database is not confirmed as accurate with a 95% level of confidence. One item of load missing lamp description and wattage. Incorrect wattages for 31 items of load resulting in an estimated minor under submission of 442.5kWh per annum. Potential impact: High Actual impact: High Audit history: Once Controls: Moderate Breach risk rating: 6
Audit risk rating	**Rationale for audit risk rating**
High	The controls are moderate. The database update processes will ensure that in most cases the change date reflects the date that the change is made but the data being provided from the field suggests that errors can occur in the data provided. The audit risk rating indicates that the impact of database inaccuracy is high based on the estimated kWh of over submission.

Actions taken to resolve the issue	Completion date	Remedial action status
Contact will work with Tasman to ensure that their database is accurate	Ongoing	Investigating
Preventative actions taken to ensure no further issues will occur	**Completion date**	
Contact will complete quarterly database checks to ensure the accuracy of Tasman's database	Ongoing	

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

Code reference

Clause 15.2 and 15.37B(c)

Code related audit information

The audit must verify that:

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

Audit observation

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

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

Audit commentary

Contact reconciles the TDC DUML load using the HHR profile, in accordance with exemption number 177. This exemption is discussed further in **section 1.1**. A logger is used to calculate the burn hours for the TDC ICPs. The NZTA load is reconciled using the RPS profile. Burn hours are based on 11.5 hours per day.

Contact use the kW figure populated by Network Tasman multiplied by the burn hours to calculate the monthly kWh figures. I checked the submission values used for October 2019 and found two errors. I found the volumes for two ICPs were being calculated incorrectly. This is detailed in the table below:

ICPs	kWh value submitted	Calculated kWh value from database	Differences
0000090009NT9FB	11,013.01	5,504.72	-5,508.28
0000090011NT142	962.50	314.08	-1,276.58
Total month kWh difference			-6,785.08

For ICP 0000090009NT9FB, this error has been present since August 2019 and will have resulted in an estimated over submission of 16,524.84kWh. For ICP 0000090011NT142, this error has been present since March 2019 and will have resulted in an estimated over submission of 10,212.64 kWh. This has resulted in a combined over submission of 26,737.48kWh. This will be corrected via revisions. I recommend in **section 2.1**, that the validation checks for this process be reviewed to ensure such errors are identified in a timely manner.

A monthly wattage report is not provided from the database. Contact uses the Distributor's kW value populated on the registry. Network Tasman update the registry each time changes are made in the database. This process is discussed in detail in **section 3.1** in the tracking of load change. These changes are expected to be taken into account when calculating the monthly kWh. I checked this by calculating the expected load for the two ICPs where changes had occurred during the month of October and found that these changes were not taken into account and that the load had been calculated using a daily kW figure for the month. These variances are detailed in the table below:

ICPs	kWh value submitted	Calculated kWh value from database	Differences
0000090002NT72F	35,5532	35,542	10
0000090007NTA60	27,782	27,497	-285
Total month kWh difference			-275

This will be resulting in incorrect submissions for ICPs where changes occur. This has resulted in 275 kWh of over submission for the month of October 2019.

On 18 June 2019, the Electricity Authority issued a memo clarifying the memo of 2012 that stated that a monthly snapshot was sufficient to calculate submission from, and confirmed the code requirement to calculate the correct monthly load must:

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

The current process of using the registry figure does not meet the code requirements. This is recorded as non-compliance. I recommend in **section 2.1**, that a report from the database that tracks changes at a daily level be provided from the database to Contact on a monthly basis.

The field audit against the database quantities found that the database is not confirmed as accurate with

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 3.2 With: Clause 15.2 and 15.37B(c) From: 31-Aug-17 To: 31-Oct-19	Incorrect kW value calculations resulting in a combined over submission of (16,524.84 + 10,212.64) 26,737.48kWh from March 2019 - October 2019. Calculation methodology does not meet the code requirements. Database is not confirmed as accurate with a 95% level of confidence. Incorrect wattages for 31 items of load resulting in an estimated minor under submission of 442.5kWh per annum. Potential impact: High Actual impact: High Audit history: Twice previously Controls: Weak Breach risk rating: 9
Audit risk rating	**Rationale for audit risk rating**
High	Controls are rated as weak as the expected process to calculate load is not being followed and errors in the calculation of kWh volumes have not been identified as expected. The audit risk rating is high based on the estimated kWh volume impact of the database inaccuracy and calculation inaccuracies are considered.

Actions taken to resolve the issue	Completion date	Remedial action status
Contact will work with Tasman to ensure that their database is accurate Contact will work with the customer to ensure that they are setup to deliver their data for any given time, as required by the EA	Ongoing	Investigating
Preventative actions taken to ensure no further issues will occur	**Completion date**	
Contact will complete quarterly database checks to ensure the accuracy of Tasman's database	Ongoing	

CONCLUSION

Network Tasman hold an access database for the Tasman DC and Tasman NZTA unmetered streetlights. Fault, maintenance and upgrade work is conducted by PowerTech and W J Ashton and the database is managed by Network Tasman. New streetlight connections are undertaken by Delta.

Contact reconciles the TDC DUML load using the HHR profile and the NZTA lights using the RPS profile. Submissions are based on Distributor's kW figure populated on the registry. The burn hours for TDC are derived from data logger information. The burn hours for NZTA lights are calculated on 11.5 burn hours per day.

This audit found that database accuracy has declined and is not within the allowable +/- 5% threshold.

On 18 June 2019, the Electricity Authority issued a memo clarifying the memo of 2012 that stated that a monthly snapshot was sufficient to calculate submission from, and confirmed the code requirement to calculate the correct monthly load must:

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

Network Tasman update the database and then update the registry by ICP as changes occur. However, they are unable to effectively backdate changes on the registry as it will overwrite any changes made between the backdated event and the most recent update. Contact use the registry kW value. I recommend that reporting be provided from the database that includes the tracking of changes at a daily level.

The audit found six non-compliances and makes five recommendations. The future risk rating of 28 indicates that the next audit be completed in three months. I have considered this in conjunction with Contact's responses and recommend that the next audit be in six to nine months' time to allow sufficient time to either get improved reporting from the Network Tasman database or find an alternate database source with the Council. ….

PARTICIPANT RESPONSE

Tasman have previously showed a high level of accuracy – this has changed due to unforeseen staffing changes – we wish the EA to take this into account when they review this report

It seems clear to me that we need to ensure that there is an accurate database with strong processes surrounding ensuring that this is updated and accurate.

Contact will recommend to the customer that they create their own database for Streetlight management so they can have full control and authority over their own data