ELECTRICITY INDUSTRY PARTICIPATION CODE
DISTRIBUTED UNMETERED LOAD AUDIT REPORT

VERITEK

For

GISBORNE DISTRICT COUNCIL AND MERIDIAN ENERGY

Prepared by: Steve Woods

Date audit commenced: 12 November 2019

Date audit report completed: 11 December 2019

Audit report due date: 01-Dec-19

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EXECUTIVE SUMMARY

This audit of the Gisborne District Council **(GDC)** Unmetered Streetlights DUML database and processes was conducted at the request of Meridian Energy Limited **(Meridian),** in accordance with clause 15.37B. The purpose of this audit is to verify that the volume information is being calculated accurately, and that profiles have been correctly applied.

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

An Access database is hosted and managed by Eastland and monthly reporting is provided to Meridian.

The audit found six non-compliances. No recommendations are made.

The field audit found the database was a lot less accurate than during the previous audit. There is no formal updating of field changes in place between Eastland and the Gisborne District Council. Changes are updated as they are discovered by Eastland's field contractors.

In absolute terms, total annual consumption is estimated to be 160,200 kWh lower than the DUML database indicates.

The future risk rating of 34 indicates that the next audit be completed in 3 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 over submission of 1,708 kWh due to incorrect wattage recorded for one 400W MV lamp in the database. Estimated under submission of 7,534 kWh per annum due to incorrect gear wattages applied in the monthly wattage report. In absolute terms, total annual consumption is estimated to be 160,200 kWh lower than the DUML database indicates.	Weak	High	9	Identified
ICP Identifier and items of load	2.2	11(2)(a) and (aa) of Schedule 15.3	Three items of load do not have an ICP identifier recorded.	Strong	Low	1	Identified

Subject	Section	Clause	Non-Compliance	Controls	Audit Risk Rating	Breach Risk Rating	Remedial Action
Description and capacity	2.4	11(2)(c) of Schedule 15.3	25 items of load have no lamp model or type recorded. Gear wattage is not recorded in the database.	Weak	Low	3	Identified
All load recorded in database	2.5	11(2A) of Schedule 15.3	Eight additional lights were identified in the field	Weak	Low	3	Identified
Database accuracy	3.1	15.2 and 15.37B(b)	In absolute terms, total annual consumption is estimated to be 160,200 kWh lower than the DUML database indicates. The lamp model is blank for 25 items of load. Three items of load do not have an ICP identifier recorded. Estimated over submission of 1,708 kWh due to incorrect wattage recorded in the database for one 400W MV lamp	Weak	High	9	Identified
Volume information accuracy	3.2	15.2 and 15.37B(c)	Estimated over submission of 1,708 kWh due to incorrect wattage recorded for one 400W MV lamp in the database. Estimated under submission of 7,534 kWh per annum due to incorrect gear wattages applied in the monthly wattage report. In absolute terms, total annual consumption is estimated to be 160,200 kWh lower than the DUML database indicates	Weak	High	9	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	Action
		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

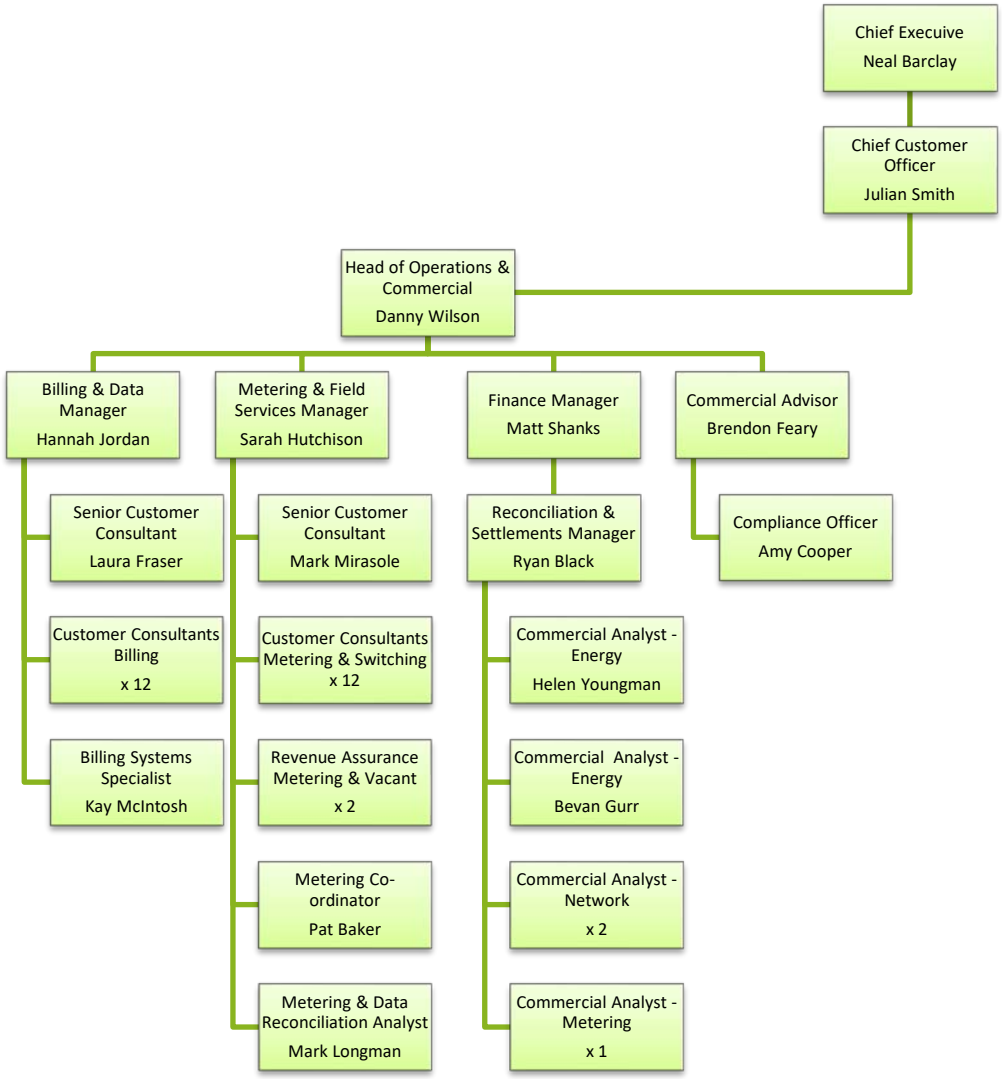
Section 11 of the Electricity Industry Act provides for the Electricity Authority to exempt any participant from compliance with all or any of the clauses.

Audit commentary

Meridian confirms that there are no exemptions in place relevant to the scope of this audit.

1.2. Structure of Organisation

Meridian provided the relevant organisational structure:



1.3. Persons involved in this audit

Auditor:

Name	Title
Steve Woods	Electricity Authority Approved Auditor

Other personnel assisting in this audit were:

Name	Title	Company
Amy Cooper	Compliance Officer	Meridian
Aroha Arago-Kemp	GIS and Data Manager	Eastland

1.4. Hardware and Software

The database used for reporting is an Access database hosted and managed by Eastland. Eastland performs a nightly server backup and on a fortnightly basis a tape backup is performed which are stored off-site. These are periodically restored to check readability. A mirrored server also exists in a separate building.

1.5. Breaches or Breach Allegations

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

1.6. ICP Data

GDC has a large number of DUML ICPs as there is one for each streetlight circuit.

ICP Number	Description	NSP	Profile	Number of items of load	Database wattage (watts)
0000740001EN47C	Gisborne DC	TUI1101	DST	21	911
0000740005EN576	Gisborne DC	TUI1101	DST	3	81
0000740009EN668	Gisborne DC	TUI1101	DST	8	259
0000740011ENED1	Gisborne DC	TUI1101	DST	3	124
0000740015ENFDB	Gisborne DC	TUI1101	DST	27	815
0000740019ENCC5	Gisborne DC	TUI1101	DST	11	383
0000740023EN9AC	Gisborne DC	TUI1101	DST	6	162
0000740025EN823	Gisborne DC	TUI1101	DST	8	259
0000740027EN8A6	Gisborne DC	TUI1101	DST	3	124
0000740031EN384	Gisborne DC	TUI1101	DST	28	842
0000740033EN301	Gisborne DC	TUI1101	DST	45	1592
0000740035EN28E	Gisborne DC	TUI1101	DST	7	189
0000740037EN20B	Gisborne DC	TUI1101	DST	2	54
0000740041EN6D9	Gisborne DC	TUI1101	DST	21	921
0000740043EN65C	Gisborne DC	TUI1101	DST	2	54
0000740045EN7D3	Gisborne DC	TUI1101	DST	28	1143

0000740047EN756	Gisborne DC	TUI1101	DST	5	135
0000740049EN4CD	Gisborne DC	TUI1101	DST	1	27
0000740053ENCF1	Gisborne DC	TUI1101	DST	24	1207
0000740057ENDFB	Gisborne DC	TUI1101	DST	4	151
0000740059ENE60	Gisborne DC	TUI1101	DST	7	189
0000740063ENB09	Gisborne DC	TUI1101	DST	3	81
0000740065ENA86	Gisborne DC	TUI1101	DST	6	162
0000740067ENA03	Gisborne DC	TUI1101	DST	17	803
0000740069EN998	Gisborne DC	TUI1101	DST	83	3892
0000740071EN121	Gisborne DC	TUI1101	DST	2	54
0000740075EN02B	Gisborne DC	TUI1101	DST	53	1601
0000740077EN0AE	Gisborne DC	TUI1101	DST	16	649
0000740079EN335	Gisborne DC	TUI1101	DST	40	2094
0000740081EN136	Gisborne DC	TUI1101	DST	12	754
0000740085EN03C	Gisborne DC	TUI1101	DST	2	177
0000740087EN0B9	Gisborne DC	TUI1101	DST	8	216
0000740089EN322	Gisborne DC	TUI1101	DST	4	108
0000740093ENB1E	Gisborne DC	TUI1101	DST	18	1550
0000740095ENA91	Gisborne DC	TUI1101	DST	55	1794
0000740097ENA14	Gisborne DC	TUI1101	DST	6	1400
0000740101END78	Gisborne DC	TUI1101	DST	4	108
0000740103ENDFD	Gisborne DC	TUI1101	DST	24	941
0000740105ENC72	Gisborne DC	TUI1101	DST	3	124
0000740107ENCF7	Gisborne DC	TUI1101	DST	1	150
0000740109ENF6C	Gisborne DC	TUI1101	DST	20	2354
0000740111EN7D5	Gisborne DC	TUI1101	DST	3	348
0000740113EN750	Gisborne DC	TUI1101	DST	3	81
0000740115EN6DF	Gisborne DC	TUI1101	DST	15	1740
0000740117EN65A	Gisborne DC	TUI1101	DST	3	348
0000740121EN02D	Gisborne DC	TUI1101	DST	3	425
0000740123EN0A8	Gisborne DC	TUI1101	DST	16	1351
0000740127EN1A2	Gisborne DC	TUI1101	DST	13	851
0000740131ENA80	Gisborne DC	TUI1101	DST	8	2000
0000740135ENB8A	Gisborne DC	TUI1101	DST	5	135
0000740139EN894	Gisborne DC	TUI1101	DST	45	1339
0000740141ENFDD	Gisborne DC	TUI1101	DST	1	70
0000740145ENED7	Gisborne DC	TUI1101	DST	1	27
0000740147ENE52	Gisborne DC	TUI1101	DST	7	189
0000740151EN570	Gisborne DC	TUI1101	DST	13	378
0000740153EN5F5	Gisborne DC	TUI1101	DST	5	258
0000740157EN4FF	Gisborne DC	TUI1101	DST	19	900
0000740501EN179	Gisborne DC	TUI1101	DST	30	3860
0000740503EN1FC	Gisborne DC	TUI1101	DST	56	2835
0000740505EN073	Gisborne DC	TUI1101	DST	13	661
0000740507EN0F6	Gisborne DC	TUI1101	DST	131	10267
0000740509EN36D	Gisborne DC	TUI1101	DST	6	592
0000740511ENBD4	Gisborne DC	TUI1101	DST	41	3030
0000740513ENB51	Gisborne DC	TUI1101	DST	102	9250
0000740515ENADE	Gisborne DC	TUI1101	DST	23	1821

0000740517ENA5B	Gisborne DC	TUI1101	DST	29	2660
0000740519EN9C0	Gisborne DC	TUI1101	DST	24	3280
0000740521ENC2C	Gisborne DC	TUI1101	DST	13	910
0000740523ENCA9	Gisborne DC	TUI1101	DST	2	54
0000740525END26	Gisborne DC	TUI1101	DST	42	5284
0000740527ENDA3	Gisborne DC	TUI1101	DST	62	4340
0000740529ENE38	Gisborne DC	TUI1101	DST	15	1050
0000740531EN681	Gisborne DC	TUI1101	DST	71	6010
0000740533EN604	Gisborne DC	TUI1101	DST	4	280
0000740535EN78B	Gisborne DC	TUI1101	DST	105	10020
0000740537EN70E	Gisborne DC	TUI1101	DST	42	3924
0000740539EN495	Gisborne DC	TUI1101	DST	15	1450
0000740541EN3DC	Gisborne DC	TUI1101	DST	21	1876
0000740543EN359	Gisborne DC	TUI1101	DST	27	1890
0000740545EN2D6	Gisborne DC	TUI1101	DST	4	360
0000740547EN253	Gisborne DC	TUI1101	DST	35	3570
0000740549EN1C8	Gisborne DC	TUI1101	DST	94	8474
0000740551EN971	Gisborne DC	TUI1101	DST	7	628
0000740553EN9F4	Gisborne DC	TUI1101	DST	36	4372
0000740555EN87B	Gisborne DC	TUI1101	DST	34	3710
0000740557EN8FE	Gisborne DC	TUI1101	DST	20	1400
0000740559ENB65	Gisborne DC	TUI1101	DST	12	840
0000740561ENE89	Gisborne DC	TUI1101	DST	12	1800
0000740563ENE0C	Gisborne DC	TUI1101	DST	12	1800
0000740565ENF83	Gisborne DC	TUI1101	DST	40	5306
0000740567ENF06	Gisborne DC	TUI1101	DST	28	3032
0000740569ENC9D	Gisborne DC	TUI1101	DST	13	1950
0000740571EN424	Gisborne DC	TUI1101	DST	4	600
0000740573EN4A1	Gisborne DC	TUI1101	DST	61	5699
0000740575EN52E	Gisborne DC	TUI1101	DST	10	705
0000740577EN5AB	Gisborne DC	TUI1101	DST	4	280
0000740579EN630	Gisborne DC	TUI1101	DST	40	3330
0000740581EN433	Gisborne DC	TUI1101	DST	47	5034
0000740583EN4B6	Gisborne DC	TUI1101	DST	25	1348
0000740585EN539	Gisborne DC	TUI1101	DST	82	7137
0000740587EN5BC	Gisborne DC	TUI1101	DST	38	3227
0000740589EN627	Gisborne DC	TUI1101	DST	44	4771
0000740591ENE9E	Gisborne DC	TUI1101	DST	49	5350
0000740593ENE1B	Gisborne DC	TUI1101	DST	89	10300
0000740595ENF94	Gisborne DC	TUI1101	DST	57	4550
0000740597ENF11	Gisborne DC	TUI1101	DST	72	5520
0000740599ENC8A	Gisborne DC	TUI1101	DST	46	3940
0000740601EN27A	Gisborne DC	TUI1101	DST	5	350
0000740603EN2FF	Gisborne DC	TUI1101	DST	9	630
0000740605EN370	Gisborne DC	TUI1101	DST	7	490
0000740607EN3F5	Gisborne DC	TUI1101	DST	3	210
0000740609EN06E	Gisborne DC	TUI1101	DST	9	630
0000740611EN8D7	Gisborne DC	TUI1101	DST	3	210
0000740613EN852	Gisborne DC	TUI1101	DST	20	1400

0000740615EN9DD	Gisborne DC	TUI1101	DST	11	770
0000740617EN958	Gisborne DC	TUI1101	DST	10	940
0000740619ENAC3	Gisborne DC	TUI1101	DST	21	2380
0000740621ENF2F	Gisborne DC	TUI1101	DST	71	5380
0000740623ENFAA	Gisborne DC	TUI1101	DST	4	520
0000740625ENE25	Gisborne DC	TUI1101	DST	3	450
0000740627ENEA0	Gisborne DC	TUI1101	DST	59	7250
0000740629END3B	Gisborne DC	TUI1101	DST	4	280
0000740631EN582	Gisborne DC	TUI1101	DST	11	770
0000740633EN507	Gisborne DC	TUI1101	DST	5	430
0000740635EN488	Gisborne DC	TUI1101	DST	74	6425
0000740637EN40D	Gisborne DC	TUI1101	DST	90	8120
0000740639EN796	Gisborne DC	TUI1101	DST	43	4930
0000740641EN0DF	Gisborne DC	TUI1101	DST	33	2310
0000740643EN05A	Gisborne DC	TUI1101	DST	40	4320
0000740645EN1D5	Gisborne DC	TUI1101	DST	4	280
0000740647EN150	Gisborne DC	TUI1101	DST	23	1690
0000740649EN2CB	Gisborne DC	TUI1101	DST	5	350
0000740651ENA72	Gisborne DC	TUI1101	DST	1	150
0000740653ENAF7	Gisborne DC	TUI1101	DST	31	2170
0000740655ENB78	Gisborne DC	TUI1101	DST	32	2400
0000740657ENBFD	Gisborne DC	TUI1101	DST	17	1190
0000740659EN866	Gisborne DC	TUI1101	DST	6	626
0000740661END8A	Gisborne DC	TUI1101	DST	39	3050
0000740663END0F	Gisborne DC	TUI1101	DST	15	1050
0000740665ENC80	Gisborne DC	TUI1101	DST	15	1050
0000740667ENC05	Gisborne DC	TUI1101	DST	2	140
0000740669ENF9E	Gisborne DC	TUI1101	DST	31	3012
0000740671EN727	Gisborne DC	TUI1101	DST	24	2978
0000740673EN7A2	Gisborne DC	TUI1101	DST	16	1920
0000740674ENA68	Gisborne DC	TUI1101	DST	20	2694
0000740675EN62D	Gisborne DC	TUI1101	DST	18	2424
0000740677EN6A8	Gisborne DC	TUI1101	DST	20	2422
0000740679EN533	Gisborne DC	TUI1101	DST	22	2574
0000740681EN730	Gisborne DC	TUI1101	DST	6	696
0000740683EN7B5	Gisborne DC	TUI1101	DST	5	614
0000740685EN63A	Gisborne DC	TUI1101	DST	16	1958
0000740687EN6BF	Gisborne DC	TUI1101	DST	6	737
0000740689EN524	Gisborne DC	TUI1101	DST	5	614
0000740691END9D	Gisborne DC	TUI1101	DST	18	2190
0000740693END18	Gisborne DC	TUI1101	DST	102	5881
0000740695ENC97	Gisborne DC	TUI1101	DST	15	553
0000740697ENC12	Gisborne DC	TUI1101	DST	70	6762
0000740699ENF89	Gisborne DC	TUI1101	DST	97	8694
0000740701ENB7E	Gisborne DC	TUI1101	DST	14	4650
0000740703ENBFB	Gisborne DC	TUI1101	DST	11	1330
0000740705ENA74	Gisborne DC	TUI1101	DST	1	70
0000740707ENAF1	Gisborne DC	TUI1101	DST	35	4930
0000740709EN96A	Gisborne DC	TUI1101	DST	24	3280

0000740711EN1D3	Gisborne DC	TUI1101	DST	20	2410
0000740713EN156	Gisborne DC	TUI1101	DST	28	3644
0000740714ENC9C	Gisborne DC	TUI1101	DST	1	150
0004801505EN6D7	Gisborne DC	TUI1101	DST	2	140
			Total	**4045**	**344,329**

I note that the total wattage recorded in the database excludes ballast but as detailed in **section 2.1**, this is added to the monthly wattage report sent by Eastland.

1.7. Authorisation Received

All information was provided directly by Meridian or Eastland.

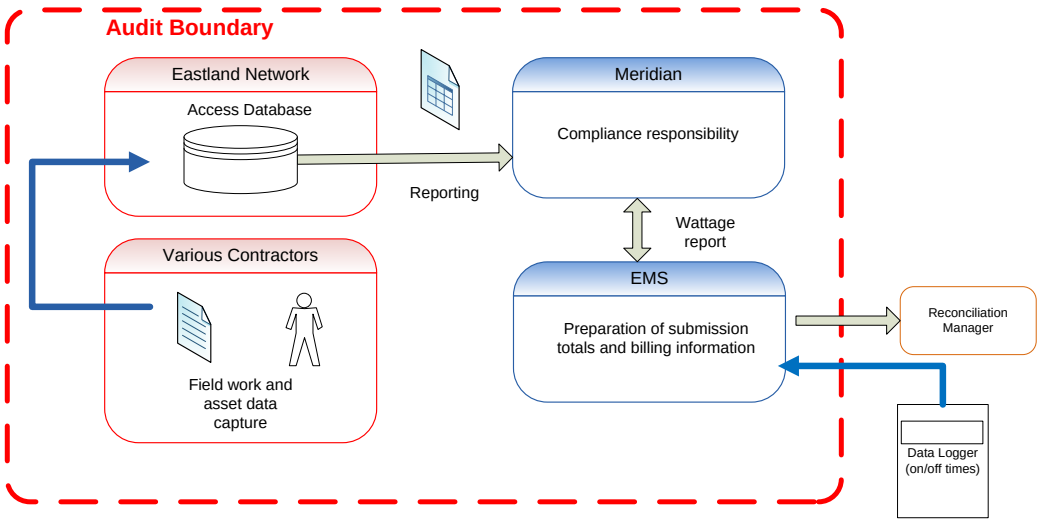
1.8. Scope of Audit

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

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

Eastland data is contained in an Access database and Eastland provides reporting to Meridian on a monthly basis, detailing the total kW per ICP and the on/off times are derived by a data logger interrogated by EMS. Lamp ballast information is not stored in the database, instead is calculated at the time of billing.

The diagram below shows the audit boundary for clarity.



The field audit was carried out of 215 items of load.

1.9. Summary of previous audit

The previous audit was conducted for Meridian by Rebecca Elliot of Veritek Limited in November 2018. 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	Estimated under submission of 1,922 kWh due to missing lamp wattages in the database. Estimated over submission of 1,708 kWh due to incorrect wattage recorded for one 400W MV lamp in the database. Estimated under submission of 3,288.5 kWh per annum due to incorrect gear wattages applied in the monthly wattage report.	Still existing
ICP Identifier and items of load	2.2	11(2)(a) and (aa) of Schedule 15.3	One item of load (Sponge Bay Road 81 - JG_ENL41456374850001) does not have an ICP recorded.	Still existing
Description and capacity	2.4	11(2)(c) of Schedule 15.3	25 items of load have no lamp model or type recorded. Gear wattage is not recorded in the database. 3 lights have no wattage recorded.	Still existing
Database accuracy	3.1	15.2 and 15.37B(b)	Estimated under submission of 1,922 kWh due to missing lamp wattages in the database. Estimated over submission of 1,708 kWh due to incorrect wattage recorded in the database for one 400W MV lamp.	Still existing
Volume information accuracy	3.2	15.2 and 15.37B(c)	Estimated under submission of 1,922 kWh due to missing lamp wattages in the database. Estimated over submission of 1,708 kWh due to incorrect wattage recorded for one 400W MV lamp in the database. Estimated under submission of 3,288.5 kWh per annum due to incorrect gear wattages applied in the monthly wattage report.	Still existing

Recommendation

Subject	Section	Description	Status
Location of each item of load	2.3	Add Street Name and where possible Street Number into the database to assist with location.	Cleared

Description and capacity of load	2.4	Add gear wattage to the database.	Recorded as non-compliance

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

Meridian has 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 and the application of profiles was checked. The database was checked for accuracy.

Audit commentary

Meridian reconciles this DUML load using the DST profile. The on and off times are derived from a data logger read by EMS. This information is used to create a shape file. Meridian supplies EMS with the capacity information and EMS calculates the kWh figure for each ICP and includes this in the relevant AV080 file. This process was examined during EMS's audit in June 2019 and compliance was confirmed. I checked the figures for October 2019, and I confirm the kW value matches the database extract.

The methodology for deriving submission information is compliant, but there is some inaccurate data within the database used to calculate submissions, and ballasts are applied outside of the database. This is recorded as non-compliance and discussed in **sections 3.1** and **3.2**.

Submission is based on a snapshot of the database at the end of the month and does not consider historic adjustments or the fact that lights can be livened before they are entered into the database.

As recorded in Section 3.1, In absolute terms, total annual consumption is estimated to be 160,200 kWh lower than the DUML database indicates.

There is some inaccurate data within the database used to calculate submissions as detailed in the table below.

Issue	Volume information impact (annual kWh)
1 x 400W Mercury Vapour lamp has a wattage of 800 recorded	1,708kWh over submission
Incorrect ballast of 12 watts instead of 13 watts applied in the monthly report from Eastland	7,534 kWh under submission.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 2.1 With: Clause 11(1) of Schedule 15.3 From: 01-Oct-18 To: 25-Nov-19	Estimated over submission of 1,708 kWh due to incorrect wattage recorded for one 400W MV lamp in the database. Estimated under submission of 7,534 kWh per annum due to incorrect gear wattages applied in the monthly wattage report. In absolute terms, total annual consumption is estimated to be 160,200 kWh lower than the DUML database indicates. Potential impact: High Actual impact: High Audit history: Twice Controls: Weak Breach risk rating: 9
Audit risk rating	**Rationale for audit risk rating**
High	The controls are rated as weak, because updates to the database are only occurring due to "local knowledge" by Eastland staff, not through a formal update process. The impact is assessed to be high, based on the kWh differences described above.

Actions taken to resolve the issue	Completion date	Remedial action status
Since the audit GDC has provided Eastland Networks with changes to lamp information that have been made to date and Eastland is in the process of validating and updating their database accordingly.	31 Dec 2019	Identified
Meridian will revise historic submission information once updates have been confirmed as complete.	31 Jan 2020	
Smaller discrepancies identified will be raised with Eastland for resolution.	31 Jan 2020	
Preventative actions taken to ensure no further issues will occur	**Completion date**	
We have arranged to meet with GDC ad Eastland networks in January to confirm a process for exchange of streetlight information between the parties so that the Eastland database can be kept up to date.	31 Jan 2020	

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

Three items of load do not have an ICP identifier recorded.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 2.2 With: Clause 11(2)(a) and (aa) of Schedule 15.3 From: 01-Oct-18 To: 25-Nov-19	Three items of load do not have an ICP identifier recorded. Potential impact: Low Actual impact: Low Audit history: Once Controls: Strong Breach risk rating: 1
Audit risk rating	**Rationale for audit risk rating**
Low	The controls are rated as strong, only three items of load do not have an ICP recorded. One is the same as recorded in the last audit. The impact is assessed to be low, based on the kWh differences described above.

Actions taken to resolve the issue	Completion date	Remedial action status
This will be raised with Eastland for resolution	31 Jan 2020	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

The database contains the nearest street address and gps coordinates.

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

Audit commentary

The lamp model is blank for 25 items of load.

The gear wattages are still to be added to the database to ensure all information is in the database as required by the code. The gear wattage is added by Eastland during the network billing process.

All items of load have a wattage recorded. One error is recorded in Sections 2.1, 3.1 and 3.2.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 2.4 With: Clause 11(2)(c) of Schedule 15.3 From: 01-Oct-18 To: 21-Nov-19	25 items of load have no lamp model or type recorded. Gear wattage is not recorded in the database. Potential impact: Low Actual impact: Low Audit history: Twice Controls: Weak Breach risk rating: 3
Audit risk rating	**Rationale for audit risk rating**
Low	The controls are recorded as weak because these issues were raised during the previous audit for the same lamps. The impact on settlement is low because submission is still accurate.

Actions taken to resolve the issue	Completion date	Remedial action status
These issues will be raised with Eastland for resolution	31 Jan 2020	Identified

Preventative actions taken to ensure no further issues will occur	Completion date	

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 215 lights using the statistical sampling methodology.

Audit commentary

The field audit findings are detailed in the table below.

Street/Area	Database Count	Field Count	Lamp no. difference	No of incorrect lamp wattage	Comments
ALDRED STREET	2	3	+1	-	1 x additional 70W HPS
Cobden Street	13	14	+1	12	1 x additional 27W LED 12 x 27W LED recorded as 70W HPS
Disraeli Street	13	12	-1	11	1 x 70W HPS not found 8 x 27W LED recorded as 70W HPS 3 x 27W LED recorded as 150W HPS
Gaddums Hill Road	7	8	+1	-	1 x additional 70W HPS
Hiruharama Road	6	6	-	2	2 x 27W LED recorded as 70W HPS
Iranui Road	14	15	+1	-	1 x additional 70W HPS
Jackson Street	4	5	+1	-	1 x additional 70W HPS
Library Road	7	7	-	2	1 x 27W LED recorded as 70W HPS 1 x 27W LED recorded as 250W HPS
Makorori Beach Road	11	12	+1		1 x additional 27W LED
Mckenzie Street	7	7	-	1	1 x 27W LED recorded as 70W HPS
Nelson Road	19	19	-	1	1 x 70W HPS recorded as 150W HPS
Pahura Road	2	2	-	1	1 x 27W LED recorded as 70W HPS
Park Road	3	2	-1	1	1 x 27W LED recorded as 70W HPS 1 x 27W LED not found
Sievwright Lane	3	5	+2	-	2 x additional 70W HPS
Tuparoa Road	11	10	-1	-	1 x 27W LED not found
Waiotu Road	4	4	-	1	1 x 27W LED recorded as 70W MV

This clause relates to lights in the field not recorded in the database. Eight additional lights were identified in the field.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 2.5 With: Clause 11(2A) of Schedule 15.3 From: 01-Oct-18 To: 25-Nov-19	Eight additional lights were identified in the field Potential impact: Low Actual impact: Low Audit history: None Controls: Weak Breach risk rating: 3
Audit risk rating	**Rationale for audit risk rating**
Low	The controls are rated as weak, because updates to the database are only occurring due to "local knowledge" by Eastland staff, not through a formal update process. The impact on settlement and participants is minor; therefore the audit risk rating is low.

Actions taken to resolve the issue	Completion date	Remedial action status
Since the audit GDC has provided Eastland Networks with changes to lamp information that have been made to date and Eastland is in the process of validating and updating their database accordingly.	31 Dec 2019	Identified
Preventative actions taken to ensure no further issues will occur	**Completion date**	
We have arranged to meet with GDC ad Eastland networks in January to confirm a process for exchange of streetlight information between the parties so that the Eastland database can be kept up to date.	31 Jan 2020	

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 ability of the database to track changes was assessed and the process for tracking of changes in the database was examined.

Audit commentary

The database functionality achieves compliance with the code.

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

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	Gisborne District Council
Strata	The database contains items of unmetered load in the Gisborne District Council area. The processes for the management of items of load are the same, but I decided to place the items of load into four strata, as follows: Street name A-D Street name E-K Street name L-P Street name Q-W
Area units	I created a pivot table of the ICP in each area and used a random number generator in a spreadsheet to select a total of 38 sub-units.
Total items of load	215 items of load were checked.

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

Audit commentary

Database accuracy based on the field audit

A field audit was conducted of a statistical sample of 215 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	89.1	Wattage from survey is lower than the database wattage by 10.9%
R_L	78.8	With a 95% level of confidence it can be concluded that the error could be between -0.4% and -21.2%
R_H	99.6	

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 0.4% lower and 21.2% lower than the wattage recorded in the DUML database. Non-compliance is recorded because the potential error is greater than 5.0%.

In absolute terms the installed capacity is estimated to be 37.0 kW lower than the database indicates.

There is a 95% level of confidence that the installed capacity is between 1.0 kW and 73 kW lower than the database.

In absolute terms, total annual consumption is estimated to be 160,200 kWh lower than the DUML database indicates.

There is a 95% level of confidence that the annual consumption is between 5,500 kWh p.a. lower to 312,100 kWh p.a. lower 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 %

Lamp description and capacity accuracy

Examination of the database found one 400W Mercury vapour lamp has an incorrect wattage of 800W recorded. This will be resulting in an estimated over submission of 1,708 kWh per annum.

The lamp model is blank for 25 items of load.

The gear wattages are still to be added to the database to ensure all information is in the database as required by the code. The gear wattage is added by Eastland during the network billing process.

NZTA lighting

NZTA lighting is included in the database and was checked as part of the field audit.

ICP accuracy

Three items of load do not have an ICP identifier recorded.

Location accuracy

The database contains fields for the street address and also GPS coordinates.

Change management process findings

All new streetlight circuits are required to be metered; therefore, the tracking of load changes is only relevant to the existing unmetered circuits. Eastland becomes aware of changes occurring due to local knowledge which leads to database updates, but as this happens on a discovery basis this can be sometime after the change has occurred. This is evident in the incorrect lamp count and wattage differences noted in **section 2.5**. The accuracy of the database is discussed in **section 3.1**

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 3.1 With: Clause 15.2 and 15.37B(b) From: 01-Oct-18 To: 25-Nov-19	In absolute terms, total annual consumption is estimated to be 160,200 kWh lower than the DUML database indicates. The lamp model is blank for 25 items of load. Three items of load do not have an ICP identifier recorded. Estimated over submission of 1,708 kWh due to incorrect wattage recorded in the database for one 400W MV lamp. Potential impact: High Actual impact: High Audit history: Twice Controls: Weak Breach risk rating: 9
Audit risk rating	**Rationale for audit risk rating**
High	The controls are rated as weak, because updates to the database are only occurring due to "local knowledge" by Eastland staff, not through a formal update process. The impact is assessed to be high, based on the kWh differences described above.

Actions taken to resolve the issue	Completion date	Remedial action status

Since the audit GDC has provided Eastland Networks with changes to lamp information that have been made to date and Eastland is in the process of validating and updating their database accordingly. Meridian will revise historic submission information once updates have been confirmed as complete. Smaller discrepancies identified will be raised with Eastland for resolution.	31 Dec 2019 31 Jan 2020 31 Jan 2020	Identified
Preventative actions taken to ensure no further issues will occur	**Completion date**	
We have arranged to meet with GDC ad Eastland networks in January to confirm a process for exchange of streetlight information between the parties so that the Eastland database can be kept up to date.	31 Jan 2020	

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

Audit commentary

Meridian reconciles this DUML load using the DST profile. The on and off times are derived from a data logger read by EMS. This information is used to create a shape file. Meridian supplies EMS with the capacity information and EMS calculates the kWh figure for each ICP and includes this in the relevant AV080 file. This process was examined during EMS's audit in June 2019 and compliance was confirmed. I checked the figures for October 2019, and I confirm the kW value matches the database extract.

The methodology for deriving submission information is compliant, but there is some inaccurate data within the database used to calculate submissions, and ballasts are applied outside of the database. This is recorded as non-compliance and discussed in **sections 3.1** and **3.2**.

Submission is based on a snapshot of the database at the end of the month and does not consider historic adjustments or the fact that lights can be livened before they are entered into the database.

As recorded in Section 3.1, In absolute terms, total annual consumption is estimated to be 160,200 kWh lower than the DUML database indicates.

There is some inaccurate data within the database used to calculate submissions as detailed in the table below. This is recorded as non-compliance and discussed in **sections 2.4, 3.1** and **3.2**.

Issue	Volume information impact (annual kWh)
1 x 400W Mercury Vapour lamp has a wattage of 800 recorded	1,708kWh over submission
Incorrect ballast of 12 watts instead of 13 watts applied in the monthly report from Eastland	7,534 kWh under submission.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 3.2 With: Clause 15.2 and 15.37B(c) From: 01-Oct-18 To: 25-Nov-19	Estimated over submission of 1,708 kWh due to incorrect wattage recorded for one 400W MV lamp in the database. Estimated under submission of 7,534 kWh per annum due to incorrect gear wattages applied in the monthly wattage report. In absolute terms, total annual consumption is estimated to be 160,200 kWh lower than the DUML database indicates. Potential impact: High Actual impact: High Audit history: Twice Controls: Weak Breach risk rating: 9
Audit risk rating	**Rationale for audit risk rating**
High	The controls are rated as weak, because updates to the database are only occurring due to "local knowledge" by Eastland staff, not through a formal update process. The impact is assessed to be high, based on the kWh differences described above.

Actions taken to resolve the issue	Completion date	Remedial action status
Since the audit GDC has provided Eastland Networks with changes to lamp information that have been made to date and Eastland is in the process of validating and updating their database accordingly.	31 Dec 2019	Identified
Meridian will revise historic submission information once updates have been confirmed as complete.	31 Jan 2020	
Smaller discrepancies identified will be raised with Eastland for resolution.	31 Jan 2020	
Preventative actions taken to ensure no further issues will occur	**Completion date**	

We have arranged to meet with GDC ad Eastland networks in January to confirm a process for exchange of streetlight information between the parties so that the Eastland database can be kept up to date.	31 Jan 2020	

CONCLUSION

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

An Access database is hosted and managed by Eastland and monthly reporting is provided to Meridian.

The audit found six non-compliances. No recommendations are made.

The field audit found the database was a lot less accurate than during the previous audit. There is no formal updating of field changes in place between Eastland and the Gisborne District Council. Changes are updated as they are discovered by Eastland's field contractors.

In absolute terms, total annual consumption is estimated to be 160,200 kWh lower than the DUML database indicates.

PARTICIPANT RESPONSE