ELECTRICITY INDUSTRY PARTICIPATION CODE
DISTRIBUTED UNMETERED LOAD AUDIT REPORT

For

WATERLOO PARK AND MERIDIAN ENERGY LIMITED

NZBN: 9429037696863

Prepared by: Steve Woods

Date audit commenced: 4 April 2022

Date audit report completed: 21 April 2022

Audit report due date: 1 May 2022

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EXECUTIVE SUMMARY

This audit of the **Waterloo Park** 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.

The lights covered by this audit are located in Waterloo Park, which is an industrial park in Islington, Christchurch. The database is managed by Orion. The streetlight data is held in Orion's GIS and an SQL database which interfaces with the GIS.

Meridian reconciles this DUML load using the DST profile. Submissions are based on the database information, with on and off times derived from data logger information.

I checked the March 2022 extract provided by Orion against the submission totals supplied by Meridian and found that submission matched the database.

A full field audit was undertaken and found additional lights and incorrect wattages. Analysis of these indicate that the database accuracy is estimated to be 22% higher than that recorded in the database. These findings are detailed in **section 2.5.** This will result in an estimated under submission of 3,118 kWh per annum (based on 4271 hours per annum).

This audit found four non-compliances and makes no recommendations.

The future risk rating of 15 indicates that the next audit be completed in 12 months. I have considered this in conjunction with Meridian's comments and recommend that the next audit be in 12 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	The data used for submission does not track changes at a daily basis and is provided as a snapshot. Database accuracy of 82% indicating estimated under submission of 3,118 kWh per annum.	Weak	Low	3	Identified
All load recorded in database	2.5	11(2A) of Schedule 15.3	Twelve additional lights found in the field.	Weak	Moderate	6	Identified
Database accuracy	3.1	15.2 and 15.37B(b)	The database has inaccuracies resulting in an over submission of 3,118 kWh per annum.	Weak	Low	3	Identified
Volume information accuracy	3.2	15.2 and 15.37B(c)	The data used for submission does not track changes at a daily basis and is provided as a snapshot. Database accuracy of 82% indicating estimated under submission of 3,118 kWh per annum.	Weak	Low	3	Identified
Future Risk Rating						15	

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	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

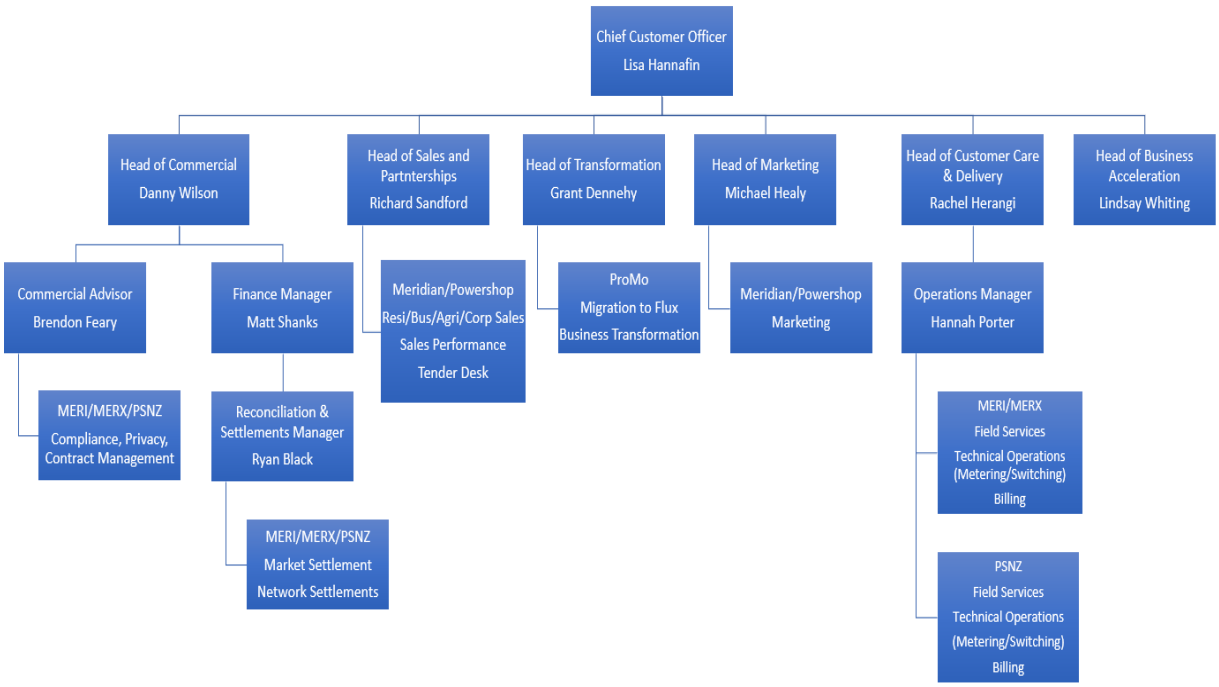
The Electricity Authority's website was reviewed to identify any exemptions relevant to the scope of this audit.

Audit commentary

There are no exemptions in place relevant to the scope of this audit.

1.2. Structure of Organisation

Meridian provided a copy of their organisational structure.



1.3. Persons involved in this audit

Auditors:

Name	Title
Steve Woods	Lead Auditor
Claire Stanley	Supporting Auditor

Other personnel assisting in this audit were:

Name	Title	Company
Amy Cooper	Compliance Officer	Meridian Energy
Danial Lau	Energy Data Analyst	Meridian Energy
Penny Lawrence	Operations Services	Orion

1.4. Hardware and Software

Orion use a purpose-built Oracle system for the management of the DUML information. Backup and restoration procedures are in accordance with normal industry protocols.

EMS and Meridian systems used in the process are discussed in their agent and 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

ICP Number	Description	NSP	Profile	Number of items of load	Database wattage (watts)
0007174608RN59A	Ref Orion Waterloo Business Park Street Lighting ICP	ISL0331	DST	70	3,308

1.7. Authorisation Received

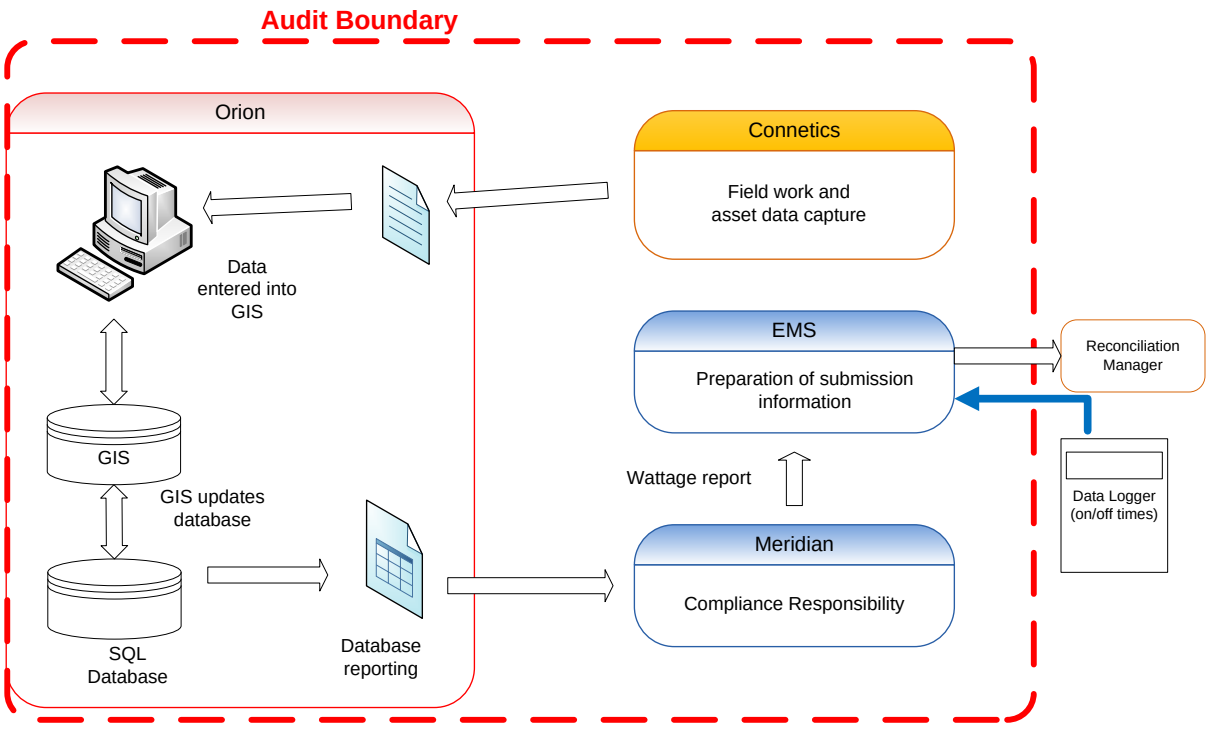
All information was provided directly by Meridian and Orion.

1.8. Scope of Audit

The lights covered by this audit are located in Waterloo Park, which is an industrial park in Islington, Christchurch. The database is managed by Orion. The streetlight data is held in Orion's GIS and an SQL database, which interfaces with the GIS. Orion provide a monthly report from the database to Meridian.

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

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.



1.9. Summary of previous audit

The previous audit was completed in May 2020 by Rebecca Elliot of Veritek Limited. Two non-compliances were identified, and no recommendations were made. The current status of the non-compliances is detailed below.

Table of Non-Compliance

Subject	Section	Clause	Non-Compliance	Status
Deriving submission information	2.1	11(1) of Schedule 15.3	The data used for submission does not track changes at a daily basis and is provided as a snapshot.	Still existing
Volume information accuracy	3.2	15.2 and 15.37B(c)	The data used for submission does not track changes at a daily basis and is provided as a snapshot.	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

Meridian 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.

Audit commentary

Meridian reconciles this DUML load using the DST profile.

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

I checked the March 2022 extract provided by Orion against the submission totals supplied by Meridian and found that submission matched the database.

A full field audit was undertaken and found additional lights and incorrect wattages. Analysis of these indicate that the database is estimated to be 22% higher than that recorded in the database. These findings are detailed in **section 2.5.** This will result in an estimated under submission of 3,118 kWh per annum (based on 4271 hours per annum).

On 18 June 2019, the Electricity Authority issued a memo confirming that 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 data used is a snapshot and this practice is non-compliant.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 2.1 With: Clause 11(1) of Schedule 15.3 From: 12-May-20 To: 04-Apr-22	Database accuracy is outside the allowable +/-5% threshold. Field audit findings indicate that there is 22% more load in the field than recorded in the database resulting in an estimated under submission of 3,118 kWh per annum. The data used for submission does not track changes at a daily basis and is provided as a snapshot. 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 recorded as weak as the database used for submission has a large number of discrepancies. 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
Meridian has advised ORION of the inaccuracies and they now confirm that they have been corrected. We are considering how we can redesign our processes to incorporate the calculation of volumes at a daily level rather than a monthly snapshot.	3/5/22 Ongoing	Identified
Preventative actions taken to ensure no further issues will occur	**Completion date**	
The majority of inaccuracies were due to lack of notification from the contractor (Connetics) regarding new installations and variations from initial designs. Meridian will work with Connetics to provide Orion with the install updates and changes to maintain the database in a timely manner	5/8/22	

2.2. ICP identifier and items of load (Clause 11(2)(a) and (aa) of Schedule 15.3)

Code reference

Clause 11(2)(a) and (aa) of Schedule 15.3

Code related audit information

The DUML database must contain:

- *each ICP identifier for which the retailer is responsible for the DUML*
- *the items of load associated with the ICP identifier.*

Audit observation

The database was checked to confirm an ICP is recorded for each item of load.

Audit commentary

All items of load have an ICP recorded against them.

Audit outcome

Compliant

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

Code reference

Clause 11(2)(b) of Schedule 15.3

Code related audit information

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

Audit observation

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

Audit commentary

The database contains the street name and number of each item of load. The GPS co-ordinates are recorded for each item.

Audit outcome

Compliant

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

Code reference

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

Code related audit information

The DUML database must contain:

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

Audit observation

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

Audit commentary

The assigned lamp ID for each item of load references to a wattage table that contains a total wattage. All of these lights are LED so there is no gear wattage to be added and all items of load had a light type and lamp wattage recorded.

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

A full field audit was undertaken of the 70 items of load on 6th April 2022.

Audit commentary

The field audit discrepancies found are detailed in the table below:

Street/Area	Database Count	Field Count	Lamp no. difference	No of incorrect lamp wattage	Comments
Enterprise Ave	25	31	+6	8	6 x additional 46W LED lamps not recorded in the database but located in the field 1 x 56W LED recorded in the database but 1 x 36W LED located in the field 2 x 45W LED recorded in the database but 2 x 46W LED located in the field 2 x 47W LED recorded in the database but 2 x 46W LED located in the field 3 x 58W LED recorded in the database but 3 x 50W LED located in the field
Industry Ave	6	10	+4	4	4 x additional 46W LED not recorded in the database but located in the field 4 x 28W LED recorded in the database but 4 x 30W LED located in the field
Innovation Road	22	24	2	10	1 x additional 45W LED not recorded in the database but located in the field 1 x additional 72W LED not recorded in the database but located in the field

					1 x 45W LED recorded in the database but 1 x 46W LED located in the field 3 x 58W LED recorded in the database but 3 x 50W LED located in the field 1 x 45W LED recorded in the database but 1 x 72W LED located in the field 5 x 58W LED recorded in the database but 5 x 98W LED located in the field
Islington Ave	17	17		1	1 x 58W LED recorded in the database but 1 x 50W LED located in the field
TOTAL	**70**	**82**	**+12**	**23**	

The field audit found twelve additional items of load found in the field of items of 70 load sampled. This is recorded as non-compliance below.

The accuracy of the database 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: 12-May-20 To: 04-Apr-22	Twelve additional lights found in the field (17% error rate). Potential impact: Low Actual impact: Medium Audit history: Once Controls: Weak Breach risk rating: 6		
Audit risk rating	**Rationale for audit risk rating**		
Medium	The controls are recorded as weak as the database used for submission has a large number of discrepancies. The impact is assessed to be medium due to the number of additional lights found in the field in relation to the overall count of the items of load.		
Actions taken to resolve the issue		**Completion date**	**Remedial action status**
Meridian has advised ORION of the inaccuracies and they confirm that they have been corrected.		3/5/22	Identified
Preventative actions taken to ensure no further issues will occur		**Completion date**	
The majority of inaccuracies were due to lack of notification from the contractor (Connetics) regarding new installations and variations from initial designs. Meridian will work with Connetics to provide Orion with the install updates and changes to maintain the database in a timely manner		5/8/22	

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 Orion 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

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

Audit outcome

Compliant

3. ACCURACY OF DUML DATABASE

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

Code reference

Clause 15.2 and 15.37B(b)

Code related audit information

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

Audit observation

A full field audit was undertaken.

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

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

Audit commentary

Database Accuracy and Lamp accuracy

A full field audit was undertaken and found additional lights and incorrect wattages. Analysis of these indicate that the database accuracy is estimated to be 22% higher than that recorded in the database. The database was not within the allowable +/-5% accuracy threshold. These findings are detailed in **section 2.5.** This will result in an estimated under submission of 3,118 kWh per annum (based on 4271 hours per annum).

Lamp description and capacity accuracy

The Orion database was found to have no inaccuracies when compared to the published standardised wattage table.

Change management process findings

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

Outage patrols are regularly conducted by Connetics. They notify Orion of any differences found. Orion then updates the GIS and database accordingly.

New streetlights require a proposed design to be provided which is then approved by the Orion contract manager. On completion of the work the contractor is required to supply the following documents:

- As-Built - Showing full design including pole and lamp specs,
- LVA – (Low voltage alteration sheet) Outlining Cable size, circuits, cable tests and date of testing etc,
- Test Certs - Lamp ID, Location, Tested, Livened (this date is used in the DB), GPS Co-ords,
- COC - Certificate of Compliance,
- ROI - record of inspection,
- Completion Cert from Contractor notifying Orion of completed works, and
- An Orion Completion Cert issued once all the above is complete.

Once all the above has been received, the As-built/LVA are inputted into GIS and the streetlight database.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 3.1 With: Clause 15.2 and 15.37B(b) From: 12-May-20 To: 04-Apr-22	Database accuracy is outside the allowable +/-5% threshold. Field audit findings indicate that there is 22% more load in the field than recorded in the database resulting in an estimated under submission of 3,118 kWh per annum. 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 recorded as weak as the database used for submission has a large number of discrepancies The impact is expected to be low based on the kWh variances identified.

Actions taken to resolve the issue	Completion date	Remedial action status
Meridian has advised ORION of the inaccuracies and they confirm that they have been corrected.	3/5/22	Identified
Preventative actions taken to ensure no further issues will occur	**Completion date**	
The majority of inaccuracies were due to lack of notification from the contractor (Connetics) regarding new installations and variations from initial designs. Meridian will work with Connetics to provide Orion with the install updates and changes to maintain the database in a timely manner	5/8/22	

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

Code reference

Clause 15.2 and 15.37B(c)

Code related audit information

The audit must verify that:

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

Audit observation

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

- checking the registry to confirm that all ICPs have the correct profile and submission flag, and

- 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 registry shows the DST profile for the Waterloo Park DUML ICP.

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

I checked the March 2022 extract provided by Orion against the submission totals supplied by Meridian and found that submission matched the database.

A full field audit was undertaken and found additional lights and incorrect wattages. Analysis of these indicate that the database is estimated to be 22% higher than that recorded in the database. These findings are detailed in **section 2.5.** This will result in an estimated under submission of 3,118 kWh per annum (based on 4271 hours per annum).

On 18 June 2019, the Electricity Authority issued a memo confirming that 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 data used is a snapshot and this practice is non-compliant.

Audit outcome

Non-compliant

Non-compliance	Description
Audit Ref: 3.2 With: Clause 15.2 and 15.37B(c) From: 12-May-20 To: 04-Apr-22	Database accuracy is outside the allowable +/-5% threshold. Field audit findings indicate that there is 22% more load in the field than recorded in the database resulting in an estimated under submission of 3,118 kWh per annum. The data used for submission does not track changes at a daily basis and is provided as a snapshot. 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 recorded as weak as the database used for submission has a large number of discrepancies. 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
Meridian has advised ORION of the inaccuracies and they confirm that they have been corrected. We are considering how we can redesign our processes to incorporate the calculation of volumes at a daily level rather than a monthly snapshot.	3/5/22 Ongoing	Identified
Preventative actions taken to ensure no further issues will occur	**Completion date**	
The majority of inaccuracies were due to lack of notification from the contractor (Connetics) regarding new installations and variations from initial designs. Meridian will work with Connetics to provide Orion with the install updates and changes to maintain the database in a timely manner	5/8/22	

CONCLUSION

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

The lights covered by this audit are located in Waterloo Park, which is an industrial park in Islington, Christchurch. The database is managed by Orion. The streetlight data is held in Orion's GIS and an SQL database which interfaces with the GIS.

Meridian reconciles this DUML load using the DST profile. Submissions are based on the database information, with on and off times derived from data logger information.

I checked the March 2022 extract provided by Orion against the submission totals supplied by Meridian and found that submission matched the database.

A full field audit was undertaken and found additional lights and incorrect wattages. Analysis of these indicate that the database accuracy is estimated to be 22% higher than that recorded in the database. These findings are detailed in **section 2.5.** This will result in an estimated under submission of 3,118 kWh per annum (based on 4271 hours per annum).

This audit found four non-compliances and makes no recommendations.

The future risk rating of 15 indicates that the next audit be completed in 12 months. I have considered this in conjunction with Meridian's comments and recommend that the next audit be in 12 months.

PARTICIPANT RESPONSE

The late submission of this report was due to an oversight which resulted in Meridian not receiving the draft report until 2 May.