ELECTRICITY INDUSTRY PARTICIPATION CODE DISTRIBUTED UNMETERED LOAD AUDIT REPORT

For

SOUTHLAND DISTRICT COUNCIL AND GENESIS ENERGY

Prepared by: Rebecca Elliot

Date audit commenced: 3 December 2019

Date audit report completed: 20 February 2020

Audit report due date: 1 March 2020

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EXECUTIVE SUMMARY

This audit of the Southland District Council (SDC) DUML database and processes was conducted at the request of Genesis Energy Limited (**Genesis**), 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.

Genesis gained the SDC database on 1/09/2019. The last audit showed that the data was recorded in an excel spreadsheet. This has been uploaded to RAMM and a monthly report from RAMM is provided to Genesis for reconciliation purposes.

This audit found a high level of accuracy. This is consistent with the last audit's findings and confirms that the processes in place are robust and that now that the LED roll out is complete I have confidence that the high level of accuracy will be maintained.

The future risk rating of three indicates that the next audit be completed in 24 months and I agree with this recommendation. Three minor non-compliances were identified, and one recommendation is made. 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 monthly database extract provided does not track changes at a daily basis and is provided as a snapshot.	Strong	Low	1	Investigating
All load recorded in database	2.5	11(2A) of Schedule 15.3	1 additional light found in the field audit sample. NZTA Edendale bypass lights not recorded in the database but as noted in section 2.1 these are being reconciled so this has no material impact.	Strong	Low	1	Identified
Volume information accuracy	3.2	15.2 and 15.37B(c)	The monthly database extract provided does not track changes at a daily basis and is provided as a snapshot.	Strong	Low	1	Investigating
Future Risk R	ating					3	

Future risk rating	0	1-4	5-8	9-15	16-18	19+
Indicative audit frequency	36 months	24 months	18 months	12 months	6 months	3 months

RECOMMENDATIONS

Subject	Section	Description	Recommendation
Tracking of load changes	3.1	Clause 15.2	Investigate festive lighting and record in the database if being connected to the unmetered streetlight circuit.

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

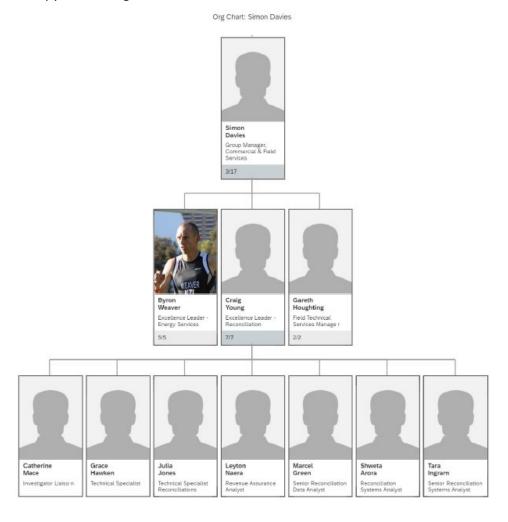
The Electricity Authority's website was reviewed to identify any exemptions relevant to the scope of this audit.

Audit commentary

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

1.2. Structure of Organisation

Genesis 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
Michael Duggan	Roading Asset Analyst Engineer	Southland District Council
Craig Young	Excellence Leader - Reconciliation	Genesis Energy
Grace Hawken	Technical Specialist - Reconciliations Team	Genesis Energy

1.4. Hardware and Software

The SQL database used for the management of DUML is remotely hosted by RAMM Software Ltd. The database is commonly known as "RAMM" which stands for "Roading Asset and Maintenance Management".

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

1.5. Breaches or Breach Allegations

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

1.6. ICP Data

ICP Number	Description	NSP	Number of items of load	Database wattage (watts)
0000302001HEF6B	HERITAGE ESTATE	HER0111	81	1,770
0008801031TP895	SDC LIGHTS - RURAL EDENDALE	EDN0331	17	690
0008801021TP238	SDC LIGHTS - URBAN EDENDALE	EDN0331	269	11,637
0008801033TP810	SDC LIGHTS - RURAL GORE	GOR0331	77	3,085
0008801023TP2BD	SDC LIGHTS - URBAN GORE	GOR0331	174	10,671
0008801032TP455	SDC LIGHTS - RURAL INVERCARGILL	INV0331	122	7,349
0008801034TP5DA	SDC LIGHTS - RURAL NORTH MAKAREWA	NMA0331	271	18,478
0008801024TPF77	SDC LIGHTS - URBAN NORTH MAKAREWA	NMA0331	2233	102662
Total			3244	156,342

ICP 0008801022TPEF8 was previously included as an ICP for this DUML database. Powernet confirmed to SDC in June 2018 that the load for this ICP is connected to NSP NMA0331 and the load is to be recorded against ICP 0008801024TPF77. Powernet do not want to decommission ICP0008801022TPEF8 in case the network is reconfigured in the future. It is recorded on the registry as status "inactive- reconciled elsewhere" being reconciled to ICP 0008801024TPF77 and has remained with Meridian.

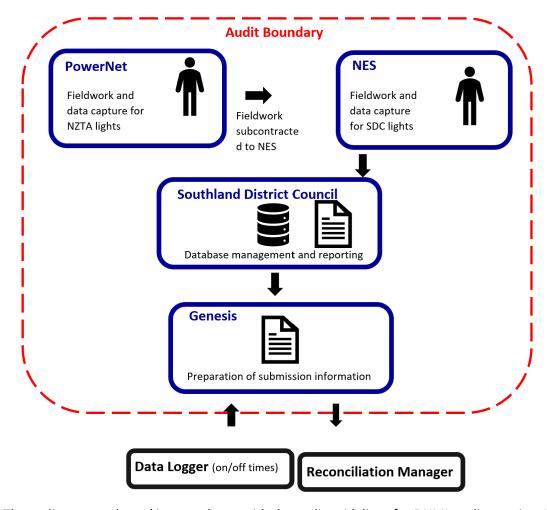
1.7. Authorisation Received

All information was provided directly by Genesis and SDC.

1.8. Scope of Audit

Genesis gained the SDC database on 1/09/2019. The last audit showed that the data was recorded in an excel spreadsheet. This has been uploaded to RAMM and a monthly report from RAMM is provided to Genesis for reconciliation purposes.

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. SDC have engaged NES to maintain their lights. PowerNet remain the contractor to maintain the NZTA lights. They have engaged NES to undertake the field work so effectively it is the one contractor undertaking the field work. The diagram below shows the audit boundary for clarity.



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

The field audit was undertaken of 213 items of load on 18-19 February 2020.

1.9. Summary of previous audit

The previous audit was completed in January 2019 by Rebecca Elliot of Veritek Limited. Three non-compliances were identified, and one recommendation was made. The statuses of the non-compliances and recommendations are described below.

Table of Non-compliances

Subject	Section	Clause	Non-compliance	Status
Tracking of load change	2.6	11(3) of schedule 15.3	The SDC spreadsheet does not track changes.	Cleared
Audit trail	2.7	11(4) of schedule 15.3	The SDC spreadsheet does not have an audit trail.	Cleared

Subject	Section	Clause	Non-compliance	Status
Database accuracy	3.1	15.2 and 15.37B(b)	Small number of incorrect ballasts and light descriptions were found with a very minor impact on reconciliation.	Cleared

Table of Recommendations

Subject	Section	Clause	Recommendations	Status
Tracking of load changes	2.6	Clause 11(3) of Schedule 15.3	Investigate festive lighting and record in the database if being connected to the unmetered streetlight circuit.	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

Genesis 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

Genesis reconciles this DUML load using the SST profile. Submissions are based on the database information, with on and off times derived from data logger information. I reviewed the submission information for December 2019 and confirmed that the calculation methodology was correct. I noted one variance for ICP 0008801031TP895. This is due to the NZTA Edendale bypass lights that are installed but have not yet been added to RAMM. SDC are manually adding these to the monthly wattage report as they are electrically connected. Therefore, submission is correct, but these lights are not yet recorded in the database. SDC are actively working to get these added but can't do so until the information is provided by NZTA. This is recorded as non-compliance in **section 2.5**.

The database was confirmed to fall within the database accuracy threshold as detailed in section 3.1.

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 monthly report is provided as a snapshot and is non-compliant. When a wattage is changed in the database due to a physical change or a correction, only the record present at the time the report is run is recorded, not the historical information showing dates of changes. Genesis completes revision submissions where corrections are required and has not yet updated their processes to be compliant with the Authority's memo.

Audit outcome

Non-compliant

Non-compliance	Des	cription				
Audit Ref: 2.1 With: Clause 11(1) of Schedule 15.3	The monthly database extract provided does not track changes at a daily basis and is provided as a snapshot. Potential impact: Low Actual impact: Low					
	Audit history: None					
From: 01-Feb-19	Controls: Strong					
To: 31-Jan-20	Breach risk rating: 1					
Audit risk rating	Rationale for	audit risk rating				
Low	Low The controls are rated as strong as they mitigate risk to an acceptable level as is indicated by the database accuracy. The impact is assessed to be low as the volume of change occurring is minimal.					
Actions to	aken to resolve the issue	Completion date	Remedial action status			
Genesis will be working w compliance requirements	vith SDC to find a solution enabling s to be met.	01/09/2020	Investigating			
Preventative actions take	en to ensure no further issues will occur	Completion date				
provide data extractions	g with the council which has started to from their database. Genesis will e council in order to see how both racking of changes.	01/09/2020				

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

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 examined to confirm the location is recorded for all items of load.

Audit commentary

Street addresses and GPS coordinates are recorded for all items of load.

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 they contained a field for lamp type and wattage capacity and included any ballast or gear wattage.

Audit commentary

A lamp type, lamp wattage, gear wattage and total wattage is included for each item of load in the database.

The accuracy of these is discussed in **section 3.1**.

Audit outcome

Compliant

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

Code reference

Clause 11(2A) of Schedule 15.3

Code related audit information

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

Audit observation

The field audit was undertaken of 213 items of load on 18-19 February 2020. The total population was divided into seven geographical strata.

Audit commentary

The field audit found a high level of accuracy. The three errors are detailed in the table below:

Address	Database Count	Field Count	Count differences	Wattage differences	Comments
STREET TO WHARF OFF JETTY ST	3	4	+1		1x extra LED found in the field
BRIDGE ST (SH 99)	7	7	-	1	1x 150W HPS in the field recorded as 70W HPS in the database
WALLACETOWN LORNEVILLE HWY (SH 99)	6	6	-	1	1x 150W HPS in the field recorded as 250W HPS in the database
Total lights	213	269	1	2	

One additional light was found in the field. This is recorded as non-compliance below.

The field audit found a high level of accuracy and the database falls within the acceptable accuracy threshold. This is discussed further in **section 3.1**.

As noted in **section 2.1**, the NZTA Edendale bypass lights electrically connected but have not yet been added to RAMM. SDC are manually adding these to the monthly wattage report to ensure this load is reconciled, therefore submission is correct, but these lights are not yet recorded in the database. SDC are actively working to get these added but can't do so until the information is provided by NZTA.

Audit outcome

Non-compliant

Non-compliance	Description		
Audit Ref: 2.5	1 additional light found in the field audit sample.		
With: Clause 11(2A) of Schedule 15.3	NZTA Edendale bypass lights not recorded in the database but as noted in section 2.1 these are being reconciled so this has no material impact.		
	Potential impact: Low		
	Actual impact: None		
From: 01-Feb-19	Audit history: None		
To: 31-Jan-20	Controls: Strong		
	Breach risk rating: 1		
Audit risk rating	Rationale for audit risk rating		
Low	The controls are rated as strong as they mitigate risk to an acceptable level as is indicated by the database accuracy.		
	The impact is assessed to be none as the database is within the variance threshold but none is not available as an option therefore I have recorded the impact as low.		
Actions taken to resolve the issue		Completion date	Remedial action status
Genesis will request the necessary corrections be completed.		01/05/2020	Identified
Preventative actions taken to ensure no further issues will occur		Completion date	
Genesis will advise the council of the field exceptions and have these amended. Genesis will work with the council to see if NZTA are can advise the council of new assets prior to livening.		01/05/2020	

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

Audit observation

The process for tracking of changes in the database was examined.

Audit commentary

The database functionality achieves compliance with the code.

The change management process is detailed in **sections 3.1**.

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 RAMM database has a complete audit trail of all additions and changes to the database information.

Audit outcome

Compliant

3. ACCURACY OF DUML DATABASE

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

Code reference

Clause 15.2 and 15.37B(b)

Code related audit information

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

Audit observation

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

Plan Item	Comments		
Area of interest	Southland District Council area		
Strata	The database contains items of load for the Southland District Council. The processes for the management of SDC of load are the same, but I decided to place the items of load into seven geographical strata of a similar size as follows:		
	 Five Rivers/Waikaia Riverton Te Anau Toestoes/Waihopi Wallace Winton Te Tipua/Tuatapere 		
Area units	I created a pivot table of the roads in each area and I used a random number generator in a spreadsheet to select a total of 61 sub-units.		
Total items of load	213 items of load recorded in the database were selected.		

Wattages were checked for alignment with the published standardised wattage table produced by the Electricity Authority against the database or in the case of LED lights against the LED light specification.

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 213 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	100.1	Wattage from survey is higher than the database wattage by 0.1%
RL	98.8	With a 95% level of confidence it can be concluded that the error could be between -1.2% and +1.4%
R _H	101.4	error could be between -1.2% and +1.4%

These results were categorised in accordance with the "Distributed Unmetered Load Statistical Sampling Audit Guideline", effective from 01/02/19. The table below shows that Scenario A (detailed below) applies, and the best available estimate indicates that the database is accurate within \pm 5%.

- The variability of the sample results across the strata means that the true wattage (installed in the field) could be between 1.2% lower and 1.4% higher than the wattage recorded in the DUML database.
- In absolute terms the installed capacity is estimated to be the same as the database indicates.
- There is a 95% level of confidence that the installed capacity is between 2kw lower and 2 kW higher than the database.
- In absolute terms, total annual consumption is estimated to be 800 kWh higher than the DUML database indicates.
- There is a 95% level of confidence that the annual consumption is between 7,800 kWh p.a. lower and 9,600 kWh p.a. higher than the database indicates.

Scenario	Description	
A - Good accuracy, good precision	This scenario applies if:	
	(a) R _H is less than 1.05; and	
	(b) R∟ 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	This scenario applies if:	
significance	(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 %	

Compliance is confirmed.

Light description and capacity accuracy

Wattages for all items of load were checked against the published standardised wattage table produced by the Electricity Authority supplemented with the Veritek wattage table for those wattages not included in the standardised wattage table. All were recorded correctly.

The three 22W LED lights recorded incorrectly with a HPS light type identified in the last audit have been corrected.

Change Management

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

Fault, maintenance and LED upgrade work is completed by NES as a contractor for SDC. When the work is complete they advise SDC, and SDC use this information to update RAMM. NZTA have engaged PowerNet to maintain their lights. PowerNet have engaged NES as a subcontractor to undertake this work. They in turn advise SDC of any changes and these are updated into RAMM.

SDC advised that there have been no new connections for at least five years for SDC lights. If a new connection is required a request will be issued to PowerNet. NZTA have installed new lights on the Edendale bypass. The information for these to be added to RAMM is still to be supplied by NZTA. SDC are adding this load to the monthly wattage report to ensure that the volume is reconciled as detailed in **section 2.1**. This is recorded as non-compliance in **section 2.5** as the load is technically missing from the RAMM database.

The LED upgrade is complete. This does not include the NZTA lighting but SDC maintain these lights in the database for submission purposes. SDC does not intend to use a central management system or dimming.

There outage patrols in place for the NZTA lights but not for the SDC lights as these are now LED and the failure rate is very low. Any failures are expected to be notified to the SDC via calls from the public.

Christmas lights are not thought to be installed on the unmetered circuits, but this has not been confirmed as yet. I have repeated the last audits recommendation to maintain visibility.

Recommendation	Description	Audited party comment	Remedial action
Regarding: Clause 15.2 of Schedule 15.3	Investigate festive lighting and record in the database if being connected to the unmetered streetlight circuit.	Genesis will speak with SDC as whether any investigation has been completed.	Investigating

Audit outcome

Compliant

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

Genesis reconciles this DUML load using the SST profile. Submissions are based on the database information, with on and off times derived from data logger information. I reviewed the submission information for December 2019 and confirmed that the calculation methodology was correct. I noted one variance for ICP 0008801031TP895. This is due to the NZTA Edendale bypass lights that are installed but have not yet been added to RAMM. SDC are manually adding these to the monthly wattage report as they are electrically connected. Therefore, submission is correct, but these lights are not yet recorded in the database. SDC are actively working to get these added but can't do so until the information is provided by NZTA. This is recorded as non-compliance in **section 2.5**.

The database was confirmed to fall within the database accuracy threshold as detailed in section 3.1.

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 monthly report is provided as a snapshot and is non-compliant. When a wattage is changed in the database due to a physical change or a correction, only the record present at the time the report is run is recorded, not the historical information showing dates of changes. Genesis completes revision submissions where corrections are required and has not yet updated their processes to be compliant with the Authority's memo.

Audit outcome

Non-compliant

Non-compliance	Description		
Audit Ref: 3.2 With: Clause 15.2 and 15.37B(c)	The monthly database extract provided does not track changes at a daily basis and is provided as a snapshot. Potential impact: Low		
	Actual impact: Low		
	Audit history: None		
From: 01-Feb-19	Controls: Strong		
To: 31-Jan-20	Breach risk rating: 1		
Audit risk rating	Rationale for audit risk rating		
High	The controls are rated as strong as they mitigate risk to an acceptable level as is indicated by the database accuracy. The impact is assessed to be low as the volume of change occurring is minimal.		
Actions taken to resolve the issue		Completion date	Remedial action status
Genesis will be working with SDC to find a solution enabling compliance requirements to be met.		01/09/2020	Investigating
Preventative actions taken to ensure no further issues will occur		Completion date	
Genesis has been working with the council which has started to provide data extractions from their database. Genesis will continue to liaise with the council to see how both parties can manage the tracking of changes.		01/09/2020	

CONCLUSION

Genesis gained the SDC database on 1/09/2019. The last audit showed that the data was recorded in an excel spreadsheet. This has been uploaded to RAMM and a monthly report from RAMM is provided to Genesis for reconciliation purposes.

This audit found a high level of accuracy. This is consistent with the last audit's findings and confirms that the processes in place are robust and that now that the LED roll out is complete I have confidence that the high level of accuracy will be maintained.

The future risk rating of three indicates that the next audit be completed in 24 months and I agree with this recommendation. Three minor non-compliances were identified, and one recommendation is made.

PARTICIPANT RESPONSE

Genesis will continue to work with the council to meet database requirements.