2017 Major Electricity Company BFM and ELC Audit

Audit Report

AusNet Services - Distribution

August 2017

CM-7236 (BFM)

CM-7246 (ELC)

Prepared by: Electrical Resource Providers for and on behalf of Energy Safe Victoria

Audit Report Details:

Client:	Energy Safe Victoria (ESV)
Auditee Network:	AusNet Services – Distribution (ANS (D))
Audit No:	MEC BFM & ELC Audits – EOI 2017
Regulation:	Electricity Safety (Bushfire Mitigation) Regulations 2013 Electricity Safety (Electric Line Clearance) Regulations 2015
Audit Topics	MEC Line Condition MEC Electric Line Clearance
Audit Date	14th to 25th August 2017 (Field Audits) 1st to 15th September 2017 (Desktop Review)
Audit Team	: ERP Senior Technical and Audit I : ERP Field Auditor (BFM) : ERP Field Auditor (ELC)
Sites Visited	Various Sites across AusNet Services Electrical Distribution network. Selected sites from following feeders: KLK1, KLK2, KLK3, KLO14, SMR5 and SMR8

Document Approval:

Signatories			
Title	**Name**	**Signature**	**Date**
Lead Auditor			8th January 2018
ERP Operations Manager / Project Director			8th January 2018

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V1.0	27/10/17	Draft Report			
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Executive Summary

This report presents findings and recommendations for the 2017 Bushfire Mitigation (Line Condition) and Electric Line Clearance (Clearance to Code) Audits conducted by Electrical Resource Providers on AusNet Services (Distribution) on behalf of Energy Safe Victoria.

The scope of the 2017 Bushfire Mitigation and Electric Line Clearance Audits was limited to:

- A general desktop review of relevant elements of the nominated MECs Bushfire Mitigation Plan (BFMP) and Electric Line Clearance Management Plan (ELCMP); and
- Field auditing of a number of sites selected by ESV against the requirements of the Electricity Safety (Bushfire Mitigation) Regulations 2013 and Electricity Safety (Electric Line Clearance) Regulations 2015, in particular asset condition and clearance to code.

A desktop review of AusNet's Bushfire Mitigation Plan, ELCMP and BFM and ELC sample database information was conducted by Peter Garlick of ERP in August 2017 and field based audits were conducted by Ralph Elsen (BFM) and Brett Lind (ELC) of ERP in conjunction with AusNet representatives between the 14th and 25th of August 2017.

Desktop Review – Key Findings:

- The desktop review of BFM and ELC reference documents provided at the time of audit found AusNet to have detailed and comprehensive management procedures in place to complement both its Bushfire Mitigation and Electric Line Clearance Management Plans.
- Database extracts for both BFM and ELC provided sufficient information for field auditors to validate recorded information against in-field asset assessments.
- The BFM desktop audit noted that not all "ZA" notifications within the BFM database contained a "ZAclosed" date however the records contained a SAP "System Status" consistent with being actioned.
- The ELC desktop audit noted that the field audit for vegetation clearance for feeders KLK1, KLK2 and SMR5 was to occur prior to their annual assessment. This has been noted in the report findings.

Field Audit – Bushfire Mitigation (Asset Condition):

- Field audits were carried out on 526 poles across the six feeders on the AusNet distribution network.
- The field auditor validated the location and previous inspection date information recorded for 526 poles from the database extract as accurate.
- The field audit recorded observations or additional defects across 84 sites visited, queried recorded priority ratings for items and identified a missing spreader at location adjacent to the audit area.
- additional line defect items were reported by the ELC auditor (x conductor damage, x detached spreader) and were referred to AusNet during the audit.
- observations recorded by the field auditor were classified as BFM items. The items relate to line/ ground clearance ( ), LV spreaders ( ), deteriorated fuse tubes ( ) and birds nest found on a pole type capacitor. of the items (low LV conductors) were previously recorded after inspection in September 2016 assigned a P6Y code. The remaining items were recorded during the audit. AusNet has reviewed the findings and confirmed the items have been allocated codes between "P30" and "P180" for action.
- Non-BFM related defects were allocated codes between "P180" and "P365" including sites missing possum guards which will be re-assessed by AusNet.
- remaining observations recorded related to items that would typically rectified by asset inspectors (e.g. signage) recorded as observations or minor maintenance items. AusNet has completed a review of these items and provided feedback indicating the items have been recorded and allocated appropriate maintenance codes ranging from P6Y / Observation to no further action required.

- The field audit observed previously recorded defect items at sites had been addressed. Rectification works included pole replacements, crossarm replacement, refitting and removal of hardware.

- Positive feedback was received from the field auditor in relation to observations conducted on two active asset inspectors.

Field Audit – Electric Line Clearance (Clearance to Code):

- Field audits were conducted on 764 spans across six feeders on the AusNet distribution network with the field verifying the accuracy of location data for each of the sites visited.

- It was the auditors opinion that the latest recorded assessment code for (%) was most likely accurate at the time of assessment. The auditor recorded, based on his observation, what he believed was the most likely span assessment code for the remaining (%) of spans at the time of assessment taking into account current span coding, regrowth and evidence of cutting/ pruning.

- There was evidence within the database, supported by field observations, to conclude that inspection activities are the catalyst for cutting activities. spans within the database had cut dates post their previous assessment and the auditor recorded comments of very recent cutting or vegetation removal activity at a further sites visited.

- The field auditor noted spans containing noncompliant vegetation for which AusNet was assessed as responsible for. It was noted all of these spans were currently due for annual assessment and would be rectified by follow-up pruning as per AusNet's vegetation management program.

- The field audit assigned a different span code rating to a further spans that differed from the latest recorded span code with the AusNet database. In reviewing this data it is noted that each of the spans was "compliant" and spans were currently due for annual assessment. AusNet feedback also confirmed spans had been cut between when the audit data was produced and the field audit completed.

- Positive feedback was received from the field auditor in relation to observations conducted on two active vegetation assessors.

SUMMARY OBSERVATIONS AND RECOMMENDATIONS:

The audit recorded the following observations and recommendations based on the information provided by AusNet and the observations recorded during field auditing:

Bushfire Mitigation (Asset Condition)

The audit has recorded observations and recommendations in relation to the Bushfire Mitigation (Asset Condition) audit.

Physical state of the assets:

- In general the audit found that AusNet assets audited were in a serviceable condition reflective of the data provided at the time of audit, in particular in relation to BFM related items. **(Observation)**

- The audit found in general that previously recorded BFM related defect items were reflective of the asset condition, accurately recorded and coded for action as required. **(Observation)**

- The audit found that general and minor maintenance items were recorded to a lessor extent. In the majority of cases the items recorded were allocated a non-priority maintenance code and were not considered an immediate risk. **(Observation)**

- A number of defects recorded during the audit (33) have been allocated priority ratings for follow-up ("P30" to "P365") and AusNet have indicated appropriate actions have been implemented to address these items. of these items have been classified as BFM items. non-BFM defect items have been allocated priority ratings for follow-up (P30 to P365) and AusNet have indicated appropriate actions have been implemented to address these items. **(Observation)**

- It is recommended AusNet review the additional BFM items recorded to determine corrective actions required and advise ESV of actions undertaken. **(Recommendation)**

- It is recommended AusNet review the additional non-BFM items recorded to determine corrective actions required and advise ESV of actions undertaken. **(Recommendation)**

- It is recommended AusNet review the line defects ( ) reported during the ELC audit and rectify as per their asset maintenance policies confirming details of corrective actions to ESV. **(Recommendation)**

MEC's knowledge about the state of the system:

- The audit found that for BFM related maintenance items the systems and processes provide AusNet with a reliable knowledge of the state of their system. **(Observation)**

- The audit found that information relating to general and minor (non-BFM) related maintenance items was recorded to a lessor extent. **(Observation)**

- As a potential opportunity for improvement it is recommended that AusNet review the findings in relation to the recording of general and minor maintenance items, in line with their AIM, and determine whether further corrective action is necessary. **(Recommendation)**

Compliance with current BFM plan:

- The audit found that AusNet was managing its inspection cycles and asset inspection processes as per its current BFM plan. **(Observation)**

- The audit found in general that maintenance items recorded within their database aligned to current priority ratings and requirements. The recorded items and rectification dates appeared to be being monitored and managed as per AusNet's BFMP and AIM. **(Observation)**

- The audit found in the majority cases previously recorded maintenance items had either been rectified (sites) or the recorded item and priority were consistent with AusNet's AIM requirements. **(Observation)**

- The audit found isolated instances of BFM related maintenance items not previously recorded, or assigned a higher priority to existing items. Of these items related to conductor/ ground clearance, related to LV spreaders, to deteriorated EDO fuse tubes and birds nest on a pole top capacitor. AusNet have provided initial feedback indicating the items have been assessed and allocated appropriate actions as per their internal maintenance processes. **(Observation)**

- There were a small number of BFM related maintenance items within the audit sample that were due for rectification prior to or during the upcoming fire season and it is expected AusNet will continue to manage these per it's internal processes and BFMI monitoring. **(Observation)**

Electric Line Clearance (Clearance to Code)

The audit has recorded observations and recommendation in relation to the Electric Line Clearance (Clearance to Code) audit.

The accuracy of inspection data and work recommendations

- AusNet's database information was in general validated as accurate in relation to span information, easy to follow and contained information consistent with the requirements of AusNet's ELCMP. **(Observation)**

- The field auditor recorded that in his opinion, and taking into account his observations at the time of the audit, the previously recorded Inspection Code for the spans he observed was most likely accurate in relation to AusNet responsible vegetation for the majority ( ) of spans assessed. **(Observation)**

- There was evidence within the database, supported by field observations, to conclude that inspection activities are the catalyst for cutting activities. 100 spans within the database had cut dates post their previous assessment and the auditor recorded comments of recent cutting or vegetation removal activity at a further sites visited spans on KLO14 and spans on SMR8).**(Observation)**

- spans previously assessed in 2017 were recoded by the auditor assigned as "P180". It is recommended that AusNet review these spans to determine whether action is required to ensure they remain compliant until their next assessment or planned cut. **(Recommendation)**

- The field auditor noted that technical assessment of a number of compliant longer spans may be required to assess "sag and sway" clearance requirements (side clearance). AusNet have indicated they utilise LiDAR assessment of longer spans in conjunction with ground based and technical assessments to ensure clearance spaces are maintained to code. **(Observation)**

- Audit notes indicate compliant spans (coded "720") contained within the above analysis recoded "PT365" ( ) and "PT180" ( ) by the field auditor were "long spans". AusNet has a program using LiDAR to assist with long span clearance monitoring to supplement field based visual assessments. spans are currently due for assessment and three have an assessment date recorded for 2017. **(Observation)**

- The audit has made a recommendation that AusNet review these spans to confirm LiDAR and / or technical assessment has been completed to validate their current span code. **(Recommendation)**

Vegetation clearance standards and compliance with the Code of Practice for electric line clearance

- Information within AusNet's database indicates it was progressing with it's pre-summer assessment program. Annual assessments were yet to be completed on feeders KLK1, KLK3 and SMR5 at the time the field audit was undertaken. **(Observation)**

- spans containing non-code compliant vegetation were recorded (% of the sample). The audit noted the non-compliant spans were on feeders currently due for annual inspection. **(Observation)**

- The audit recommends that AusNet manage the identified noncompliant spans as per its ELC procedures i.e. the spans are monitored and actioned as appropriate. **(Recommendation)**

- The audit recommends AusNet continues to utilise and develop procedures to ensure annual inspection programs are completed efficiently and vegetation clearance activities are undertaken to ensure ELC clearance standards are maintained. **(Observation)**

Vegetation management data reflects the status of field observations made at the time of the audit

- The field audit verified the span identification information was accurate for all sites audited and each of the records provided contained previous inspection date and coding details. **(Observation)**

- The field auditor recorded a different current span code based on his observations during the audit for spans within the audit sample. of these spans were previously assessed in 2016 and are currently due for assessment and spans were noted as being recently cut. **(Observation)**

- The field auditor noted a number of spans ( ) which had evidence of recent cutting activity where the latest recorded span code differed from the assigned code by the auditor. AusNet have reviewed this information and confirmed that cutting activity occurred post the provision of audit data. AusNet have also confirmed their VMS reflects the cut activity has been completed. **(Observation)**

- Taking into consideration the timing of the audit and the ongoing AusNet annual assessment program (noting feeders KLK1, KLK2 and SMR5 annual assessments were not completed as yet), variability of factors such as growth rates and challenges relating to making visual assessments of span clearances for "long spans" the analysis indicates, in general, that current assessment and span code recording reflects the status of the assets in the field. **(Observation)**

- The audit recommends that AusNet continue to utilise and develop its ELC procedures to ensure annual inspection programs are completed efficiently and vegetation database management is maintained to a high level of currency and accuracy. **(Observation)**

A complete analysis of audit observations and findings is contained in Section 2 (Bushfire Mitigation) and Section 3 (Electric Line Clearance) of this report. Field audit findings and observations are documented in the attached Appendices.

1. Audit Overview

1.1 Audit Context

Energy Safe Victoria (ESV) is responsible for the safety and technical regulation of electricity, gas and pipelines in Victoria. The role and functions of ESV are specified by the Energy Safe Victoria Act 2005.

An element of this responsibility is to regularly audit compliance of the Victorian Major Electricity Companies (MECs) to the various regulatory requirements. This particular audit focusses on compliance with the Electricity Safety (Bushfire Mitigation) Regulations 2013 and Electricity Safety (Electric Line Clearance) Regulations 2015.

1.2 Audit Scope

The scope of the 2017 Bushfire Mitigation and Electric Line Clearance Audits is limited to:

- A desktop review of relevant elements of the nominated MECs Bushfire Mitigation Plan (BFMP) and Electric Line Clearance Management Plan (ELCMP); and
- Field auditing of a number of sites selected by ESV against the requirements of the Electricity Safety (Bushfire Mitigation) Regulations 2013 and Electricity Safety (Electric Line Clearance) Regulations 2015.

The Bushfire Mitigation (BFM) audit will focus on:

- The physical state of the assets;
- The MEC's knowledge about the state of the system; and
- The MEC's compliance with their current BFM plan.

The Electric Line Clearance (ELC) audit will focus on:

- The accuracy of inspection data and work recommendations;
- Vegetation clearance standards and compliance with the Code of Practice for electric line clearance; and
- Vegetation management data reflects the status of field observations made at the time of the audit.

This particular audit report relates to the AusNet Services (ANS) distribution network.

The key elements of the audit include:

- A desktop review of Bushfire Mitigation Plan and Electric Line Clearance Plan expectations and associated data;
- Confirm asset and span inspections were completed as per the auditees plans;
- Validate the priority rating of both maintenance and line clearance items observed;
- Confirm that maintenance and/ or cutting activities were completed as per priority timeframes and work order expectations; and
- Validate the level of competency and understanding of field operatives engaged in BFM and ELC assessment and inspection activities.

1.3 Audit Duration

Audit information was provided to ERP between the 1st August and 9th August 2017.

Field auditing of the AusNet Services distribution network was conducted between 14th August 2017 and 25th August 2017. A total of 10 days field auditing of both BFM and ELC activities was completed.

Desktop review and analysis of field audit data in relation to the AusNet Services distribution network was conducted between 28th August 2017 and 8th September 2017.

1.4 Audit Methodology

The audit of AusNet (Distribution) compliance in relation to the Electricity Safety (Bushfire Mitigation) Regulations 2013 and Electricity Safety (Electric Line Clearance) Regulations 2015 was undertaken in accordance with the following methodology:

- Desktop review of AusNet Services BFMP and ELCMP and associated samples of asset inspection and electric line clearance database extracts;
- Field site audits across the AusNet Services distribution network accompanied by nominated AusNet distribution representatives;
- Field observations conducted on active asset and vegetation inspectors:
- Review of 2017 field audit data and submission of a draft audit report for review; and
- Submission of final audit report.

1.5 Audit Assessment Criteria, Findings and Recommendations

The audit report describes elements of the regulations pertaining to bushfire mitigation and electric line clearances as it relates to various asset management activities of the auditee including: asset inspection, vegetation assessment, data accuracy and completion of various works.

The audit report does not contain specific assessment criteria or grading's against each of the elements assessed but rather provides a synopsis of the desktop and field based audit observations.

The report is structured to provide:

- A summary of desktop and field based audit and assessment observations;
- Commentary in relation to the desktop and field based observations in relation to relevant regulations and the MECs own documented plans and strategies; and
- Where relevant, recommendations for follow-up or consideration with a focus on addressing identified issues or potential improvement opportunities.

1.6 Audit Limitations

The purpose of this report and the associated services performed by ERP, is to provide an audit of AusNet Services (Distribution) compliance with their submitted BFMP and ELCMP and the associated regulations as described within the above scope in accordance with the Terms and Conditions as described in ESVs document titled “Perform Audits of Major Electricity Companies Bushfire Mitigation (Asset Condition) and Electric Line Clearance (Clearance to Code)” reference: MEC BFM & ELC Audits – EOI 2017.

Field site auditing was limited to observations of a sample of sites from packages as determined by ESV, by undertaking physical observations. Additional information was obtained from AusNet Services (Distribution) responsible officers and via conducting field observations on active asset and line clearance inspectors.

Database information audited was provided to ERP between the 1st and 8th August 2017 with the field audit being conducted between the 14th and 25th August 2017 and therefore the following field audit observations in some cases may not be reflective of the current AusNet Services master asset and vegetation management databases if records contained within the sample have been recently updated.

It is noted that reporting of asset related defects on poles or spans outside the sites audited was outside of the scope of this audit although arrangements were made with AusNet Services (Distribution) should any of these issues be observed.

2. Audit Report – Bushfire Mitigation (Asset Condition)

2.1 Overview

As a requirement of the Electricity Safety Act 1998 AusNet Services is required to submit, for approval by ESV, a Bushfire Mitigation Plan (5-yearly). The Bushfire Mitigation Plan (BFMP), in part, describes procedures to manage the requirements as set out in the Electricity Safety (Bushfire Mitigation) Regulations 2013. At the date of the audit the version of the plan provided for reference was version "Version 24" of document BFM 10-01.

Section 9.1 of the BFMP describes the processes used by AusNet to monitor at risk assets (i.e. assets located in HBRA). An extract of Section 9.1 is provided below:

"The scheduling of works for 'at risk ' assets, which includes scheduled asset inspections and vegetation assessments, are monitored through the Bushfire Mitigation Index (BMI). The target during the declared fire season is for the completion of all works within the respective time based prioritisation schedule. Completion of scheduled works within the prioritised dates ensures the BMI produces a zero index. A zero index means that no works are outstanding beyond their scheduled dates."

The BFMP contains a table listing the activities monitored through the BMI and the timeframes for completion of identified works (Section 9, Table 9-1).

The following provides an overview of the key aspects of AusNet Services BFMP as they relate to the specific requirements of the BFM audit scope.

2.2 Bushfire Mitigation Inspection Cycles and Priority Coding

AusNet Services BFMP describes pole inspection cycles within Section 10.1.

Refer Table 2.1 for a summary of the current AusNet Distribution Inspection Cycles.

ERP was provided with a copy of AusNet Services "Asset Inspection Manual" (30-4111, Issue 10, 24/2/17) which provided both summaries of inspection cycles, maintenance codes allocated by asset inspectors and the corresponding action required (AIM, Section 2.1.1). The AIM also contains a detailed description of each asset type and the relevant maintenance coding and priorities (AIM, Section 11.1).

Item	Interval
Cyclic Inspection of all poles in HBRA	Maximum 37 months between inspections Ground line inspections at nominal 60 month intervals Aerial inspections at nominal 60 month intervals, approximately 30 months after Ground line inspections
Cyclic Inspection of all poles in non-HBRA	Maximum 61 month interval between inspections 60 month + 1 month float Ground Line inspection interval
Private Overhead Electric Lines HBRA Private Overhead Electric Lines non-HBRA	Maximum 37 months between inspections Maximum 61 months between inspections

TABLE 2.1: INTERVALS FOR INSPECTION CYCLES

Unserviceable poles require action with 90 days and limited poles 912 days.

LBRA assets have traditionally been inspected in cycles according to the pole material i.e. timber poles (63 months) and concrete (123 months). The AusNet BFMP acknowledges the requirements to ensure LBRA assets are inspected at intervals not exceeding 61 months and the BFMP references a transition plan and ESV exemption covering this requirement.

The AIM was utilised by the field auditor to validate information contained within the AusNet database extract provided and also any further observations made by the inspector during the field audits.

Priority coding for defect items (including BFM status) to be recorded against assets during the inspection cycle is described within various sections of the Asset Inspection Manual and summarised within Section 11. The BFMP (Section 9.1) also describes the relevant treatment of maintenance items, based on codes, relevant to the bushfire mitigation index.

Table 2.2 summarise the priority maintenance codes used and referenced during the audit.

Code	Priority text	Target Completion
1	P1	1 DAY
2	P2	2 DAYS
3	P7	7 DAYS
4	P30	30 DAYS
5	P90	90 DAYS
6	P180	180 DAYS
7	P365	365 DAYS
8	P900	900 DAYS
9	P6Y	6 YEARS

TABLE 2.2: AUSNET SERVICES ASSET MAINTENANCE PRIORITY CODES

2.3 Training and Competency of Asset Inspectors

AusNet's BFMP and Asset Inspection Manual describe the training and competency requirements for personnel required to undertake inspection of assets on their network. In relation to asset inspectors the following qualifications are listed:

- 22109VIC - Certificate II in Asset Inspection (up to 30th June 2015); and
- UET20612 - Certificate II in ESI – Asset Inspection (after 30th June 2015).

This is consistent with the Training Approval Statement issued by ESV in May 2015.

2.4 BFM Database Extract (Desktop Review)

ESV provided ERP with a sample of AusNet Services BFM Database inclusive of information relating sites across 6 feeders. ERP, in consultation with ESV, randomly selected sites for field assessment. Sites were located on both roadside easements and within private property. Table 2.3 below provides a summary of the sites selected for field assessment.

The database sample selected for field assessment contained 746 poles from the complete sample of 4,247 poles. Of the 746 poles selected for field audit:

- 715 were in HBRA fire zones; and
- 31 were in LBRA fire zones.

Of the 746 poles selected for audit a desktop assessment indicated:

- Where a defect item was recorded against an asset each item (100% of data provided) was allocated a priority code consistent with those provided in Table 2.2;
- Inspection cycles based on the database information for poles selected indicate each pole had a recorded last inspection date aligned with the requirements of AusNet's BFM Plan and AIM documented cycles;

MEC & Audit Reference:		AusNet Services – Distribution (CM-7236)		
Audit Sample	**Location**	**Feeder**	**Assets in Sample**	**# Sites Selected**
	Nagambie / Tabilk	SMR8	1,046	141 (13%)
	Yea / Murrindindi	SMR5	757	137 (18%)
	Kinglake West	KLK2	890	124 (14%)
	Glenburn	KLK1	430	142 (33%)
	Wandong	KLO14	851	126 (15%)
	Strathewen	KLK3	273	76 (28%)
		TOTAL	4,247	746 (18%)

TABLE 2.3: AUSNET BFM AUDIT SAMPLE SUMMARY

- A desktop review of "ZA" notifications indicated a small number from the sample had a completion date prior to the audit but no "ZAclosed" date recorded. A review of data provided by AusNet for these defect items indicated a "Status" of "ATCO NOCO ORAS" and/or "CANC" indicating the works had been generated and completed as per AusNet requirements.

  ATCO = All tasks are complete
  NOCO = Notification completed
  ORAS = Order assigned
  CANC = Cancelled (observation indicated this task applied following technical assessment or where repair item linked to other works e.g. pole replacement)

The audit noted that not all completed or cancelled "ZA" notifications contained a "ZAclosed" date within the data provided.

In summary the information contained within the database extract was generally easy to follow and contained sufficient details in relation to pole details, location, maintenance items and priorities and associated dates.

2.5 Overview of Field Audit and Sites Assessed

Field audits commenced in Nagambie on Monday 14th August 2017 and concluded in the Strathewen area on Friday 25th August 2017. A total of 10 field auditing days were undertaken during this period. The Field Auditor was accompanied by. l. (Technical Assessment Team Leader, Select Solutions) for the duration of the audit.

It was noted that the AusNet representative also provided electronic confirmation of previously recorded asset information via a hand-held PDA device which was utilised during the audit to further validate asset related information and location.

The field audits were undertaken as a non-invasive visual inspection of poles from ground level using typical asset inspection equipment and techniques, including a pole mounted camera to validate pole top asset and crossarm assessment details as required.

Figure 2.4 provides a summary of the poles attended and assessed during the field audit phase.

TABLE 2.4: AUSNET BFM FIELD AUDIT SUMMARY – SITES ATTENDED

MEC & Audit Reference:		AusNet Services – Distribution (CM-7236)		
Field Auditor	Ralph Elsen	**Audit Dates**	14/8/17 to 25/8/17	
Audit Sample	**Date**	**Location**	**Feeder**	**Audit Sample**
	14 & 15 Aug	Nagambie / Tabilk	SMR8	96
	16 & 17 Aug	Yea / Murrindindi	SMR5	126
	18 & 21 Aug	Kinglake West	KLK2	113
	22 Aug	Glenburn	KLK1	63
	23 & 24 Aug	Wandong	KLO14	75
	24 & 25 Aug	Strathewen	KLK3	53
			TOTAL	526

- A total of 526 poles were audited as part of the field audit process representing 12% of the complete database sample and 71% of selected sites.
- The field audit concentrated on validating pole information, previously recorded maintenance and defect items and recording additional items not contained within the database extract provided.
- The poles audited were located on both private and public land and spread across the feeders selected for audit.
- All poles audited were HBRA with the exception of 28 LBRA poles located on Feeder SMR005.

Table 2.5 below provides a further breakdown and summary of relevant database information relating to poles audited in the field.

Field Audit Results – Audit Sample Profile	Total	%
HBRA Poles within sample	498	95%
LBRA Poles within sample	28	5%
Total poles audited	**526**	**100%**
HBRA Pole defects allocated current defect code	310	100%
LBRA Pole defects allocated current defect code	19	100%
Total pole defects allocated a current defect code	**339**	**100%**
HBRA poles within BFMP inspection guidelines	498	100%
LBRA spans within BFMP inspection guidelines	28	100%
Total poles within BFMP inspection guidelines	**526**	**100%**

TABLE 2.5: AUSNET BFM FIELD AUDIT SUMMARY – DATABASE OVERVIEW

Site location, pole identification and inspection information was validated for of the sites audited.

Previous inspection dates were verified and crossed checked against inspection date tags on poles. With the exception of all inspection date tags were fitted and verified.

The field auditors findings agreed with the recorded database information for ( ) of the poles assessed. The auditor listed observations, additional defects or items at the remaining of sites.

The field audit observed previously recorded defect items at sites had been addressed. Rectification works included pole replacements, crossarm replacement, refitting and removal of hardware.

A complete list of all recorded audit findings is provided in Appendix 3.

The following analysis is provided to further explain the overall findings in relation to recorded outcomes of the field assessment. Table 2.6 provides a numerical representation of the field auditors finding.

TABLE 2.6: AUSNET BFM FIELD AUDIT SUMMARY – FINDINGS SUMMARY

	Poles Assessed	Audit Aligned with Database (100%) or Items Rectified	Additional Defects / Obs. - # Sites	Additional Defects / Obs.	Query Priority	Defect outside Audit Area
Total						

Of the 526 poles audited defects were recorded within the database against poles. Where previously recorded defect items were still present the field audit agreed with the recorded findings in the majority of cases. The auditor recorded comments against previously identified defects assigning a different priority rating to the recorded priority rating within the data provided.

Table 2.7 provides a summary of these findings.

TABLE 2.7: AUSNET BFM FIELD AUDIT SUMMARY – EXISTING PRIORITY DISCREPENCY

Pole #	Insp. Date	Item	ANS Pty	Comments (BFM – Action)

Of the items where existing priority ratings were queried AusNet have reassessed and provided feedback.

-
-
-

The field audit recorded defect relating to a missing LV spreader in a span outside the specific field audit sample which has subsequently been issued for rectification.

Pole #	Insp. Date	Item	ANS Pty	Comments (BFM – Action)

TABLE 2.8: AUSNET BFM FIELD AUDIT SUMMARY – EXISTING PRIORITY DISCREPENCY

The field auditor recorded additional defects or observations, per the requirements of the AusNet asset inspection manual, at sites (76 HBRA, 8 LBRA).

The majority of the additional defects recorded, related to minor items or defects and would be expected to be rectified onsite (e.g. signage) or reported as observations or future opportunistic maintenance items for assessment (e.g. "P6Y), if present at the time of inspection. These items would typically be recorded with a P6Y code or noted as observations at the time of inspection (if not rectified onsite).

The majority of the minor maintenance items or observations referenced above related to items such as:

AusNet provided feedback (8/9/2017) for of the recorded items which indicated assessment and action consistent with the audit finding. AusNet feedback (26/9/17) indicated agreement with the field audit findings relating to

.

It is expected AusNet will review, technically assess and monitor these items as per their normal business processes.

Table 2.9 provides an overview of the remaining items ( ) observed during the field audit which were assigned priority action codes between "P30" and "P365".

AusNet has provided subsequent responses which indicated alignment with the auditors observation and the appropriate priority rating assignment per the AusNet asset inspection manual for the items summarised in Table 2.9. It is noted that AusNet technical and risk assessment of a number of items (e.g. possum guards) could result in a down grade of the initially recorded AIM priority code.

TABLE 2.9: AUSNET SERVICES FIELD AUDIT CODE P30 TO P365

Pole #	Insp. Date	Item	ANS Pty (8/9/17)	Comments (BFM – Action)

Pole #	Insp. Date	Item	ANS Pty (8/9/17)	Comments (BFM – Action)

Of the 30 items summarised in Table 2.9, related to HBRA assets and LBRA. Of the 30 items listed above:

-

-

In total BFM items were assigned a priority action code during the audit. It is possible a number of items have deteriorated post their previous inspection or weren't present at the time their previous inspection was completed:

-

Further investigation to determine whether the remaining BFM items could have occurred post their previous inspection would be required to record a definitive finding:

-

It is expected, and AusNet have indicated, that these items will be managed as per their business as usual asset maintenance and bushfire mitigation processes.

Whilst the audit identified a small number of BFM related items there was a larger number of general and minor maintenance items recorded by the field auditor. AusNet have provided summarised feedback in relation to the minor maintenance items identified and indicated actions and priorities in line with their AIM requirements.

Feedback from AusNet indicated that the majority of minor items recorded have since been raised as observations (P6Y) within their maintenance system or require no further follow-up based on a technical assessment of the images provided.

As a possible opportunity for improvement it is recommended that AusNet review the observation in relation to the identification and reporting of general and minor maintenance items and consider whether any further corrective action is required.

2.6 Active Asset Inspector Observations

The field auditor completed observations on two active asset inspectors as part of the recent field audit. The following asset inspectors were observed by the field auditor:

- (2 sites)
- (2 sites)

In the auditors opinion each of the asset inspectors observed was very knowledgeable about the requirements of the Asset Inspection role, demonstrated a good work ethic and took pride in the work that they did. The auditor reported that the asset inspectors observed completed all tasks required at the assets being inspected, identified and recorded relevant information and had all relevant equipment to complete the tasks observed.

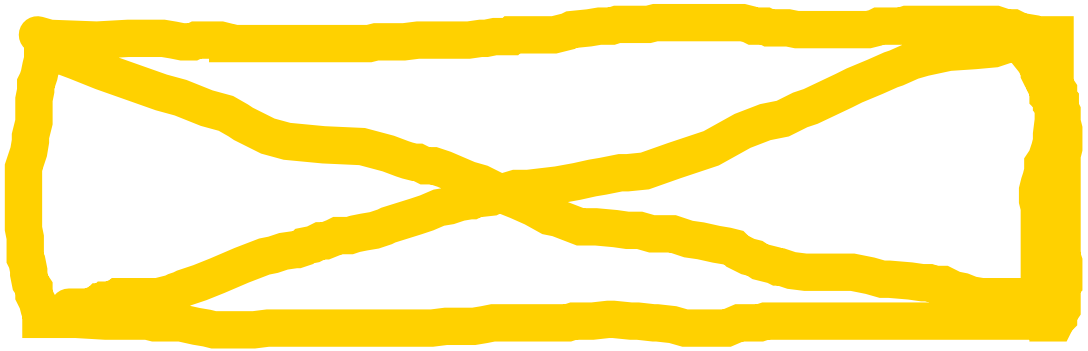
The field audit observed Network Passport information and confirmed the asset inspectors recorded defects observed as per AusNet's AIM requirements.

The field auditor reported no concerns in this area of the audit process.

A copy of the checklist used by the field auditor to undertake the Asset Inspector observations is attached in Appendix 5.

2.7 Asset Defects Recorded During ELC Audit

During the course of the Electric Line Clearance field assessment the auditor identified three defect items which were reported by the AusNet field representative at the time of the audit. Refer photo's below:



AusNet provided feedback on 30/10/17 indicating the action to assess and rectify the above items has been taken. The damaged conductor has since been repaired (P30), notification raised for detached spreaders (P90) and the line splice has been referred for technical assessment (most likely P6Y / Obs. If not heavily rusted).

2.8 Summary Observations and Recommendations

The BFM audit conducted a visual, ground based assessment of 526 poles on the AusNet distribution network validating recorded data for of the sample and recording observations or additional defects at of sites visited.

There was evidence that indicated a high level of accuracy between the type and location of assets in the field and the database information provided by AusNet. The field auditor recorded that the asset locations and details matched the assets visited for each of the sites.

additional defects items or observations were recorded at sites and existing priorities were queried at five sites. In addition to the sites audited recorded on a span adjacent to the audit area and additional line defect items recorded during the Electric Line Clearance audits have been forwarded to AusNet for review and rectification as required. From this analysis a total of 33 items were assigned action priority codes between "P30" and "P365".

Analysis of the additional maintenance items recorded by the field auditor, and subsequent feedback received from AusNet, indicates the majority ( ) of additional defect items and observations recorded related to general and minor maintenance items. A further items (non-BFM) were assigned priority action codes for rectification ("P180" to "P365").

Defects or observations recorded at sites (% of the sample) have been classified as BFM Items and AusNet have provided feedback including actions assigned to address. The items have been allocated priority coding's between "P30" and "P180" as per AusNet's priority classification system. Of these items it is likely that five either occurred or have deteriorated further post inspection.

Table 2.10 provides a summary overview of the post analysis statistics by feeder audited.

	Poles Assessed	Audit Aligned with Database (100%) or Items Rectified	Additional Defects / Obs. - # Sites	Additional Defects / Obs. (BFM)	Query Priority (BFM)	Defect outside Audit Area (BFM)

TABLE 2.10: SUMMARY OVERVIEW OF BFM AUDIT BY FEEDER

Physical state of the assets:

- In general the audit found that AusNet assets audited were in a serviceable condition reflective of the data provided at the time of audit, in particular in relation to BFM related items.
- The audit found in general that previously recorded BFM related defect items were reflective of the asset condition, accurately recorded and coded for action as required.
- The audit found that general and minor maintenance items were recorded to a lessor extent. In the majority of cases the items recorded were allocated a non-priority maintenance code and were not considered an immediate risk.
- A number of defects recorded during the audit ( ) have been allocated priority ratings for follow-up ("P30" to "P365") and AusNet have indicated appropriate actions have been implemented to address these items. of these items have been classified as BFM items.
- It is recommended AusNet review the additional BFM items recorded to determine corrective actions required and advise ESV of actions undertaken.
- A number of non-BFM defect items recorded during the audit ( ) have been allocated priority ratings for follow-up (P30 to P365) and AusNet have indicated appropriate actions have been implemented to address these items. It is recommended AusNet provide details confirming corrective actions to ESV.
- It is recommended AusNet review the line defects ( ) reported during the ELC audit and rectify as per their asset maintenance policies confirming details of corrective actions to ESV.

MEC's knowledge about the state of the system:

- The audit found that for BFM related maintenance items the systems and processes provide AusNet with a reliable knowledge of the state of their system.
- The audit found that information relating to general and minor (non-BFM) related maintenance items was recorded to a lessor extent.
- As a potential opportunity for improvement it is recommended that AusNet review the findings in relation to the recording of general and minor maintenance items, in line with their AIM, and determine whether further corrective action is necessary.

Compliance with current BFM plan:

- The audit found that AusNet was managing its inspection cycles and asset inspection processes as per its current BFM plan.
- The audit found in general that maintenance items recorded within their database aligned to current priority ratings and requirements. The recorded items and rectification dates appeared to be being monitored and managed as per AusNet's BFMP and AIM.
- The audit found in the majority cases previously recorded maintenance items had either been rectified (sites) or the recorded item and priority were consistent with AusNet's AIM requirements.
- The audit found isolated instances of BFM related maintenance items not previously recorded, or assigned a higher priority to existing items. Of these items

  AusNet have provided initial feedback indicating the items have been assessed and allocated appropriate actions as per their internal maintenance processes.
- There were a small number of BFM related maintenance items within the audit sample that were due for rectification prior to or during the upcoming fire season and it is expected AusNet will continue to manage these per it's internal processes and BFMI monitoring.

3. Audit Report – Electric Line Clearance

3.1 Overview

As a requirement of the Electricity Safety (Electric Line Clearance) Regulations 2015 [Clause 9. Management Plans] AusNet Services submitted its "Vegetation Management Plan" to ESV for review in March 2017. At the date of the audit it was noted that the version of the plan referenced was dated 24th March 2017, Version 23.1.

At the time of the audit AusNet Services engaged the services of Select Solutions as their Vegetation Management Company (VMC).

The following provides an overview of the key aspects of AusNet Services ELCMP as they relate to the specific requirements of the ELC audit scope.

3.2 ELC Activity Cycles and Priority Coding

AusNet Services ELCMP indicates that both HBRA and LBRA spans are assessed at least annually. Shorter inspection cycles are implemented if anticipated re-growth determines there is a likelihood of vegetation becoming noncompliant between assessment periods. (ELCMP, Section 4.2.2).

AusNet Services maintains clearance spaces surrounding distribution powerlines through cutting and pruning cycles with varying intervals according to location and anticipated regrowth rates. The maintenance intervals (ELCMP, Section 4.4) have the following ranges:

- HBRA – 6 months to 3 years, and
- LBRA – 6 months to 2 years.

AusNet Services also describe bushfire preparedness auditing programs (pre and during declared fire seasons) in procedure BFM 21-85.

AusNet describes assessment codes in its document titled VEM 20-03 "Assessment Procedures". Assessment codes are described as "Action Codes", "Non-Action Codes" and "ORP Action Codes".

A summary of the span codes typically recorded during AusNet vegetation assessment activities is provided in Table 3.1 below.

Code	Description
PT1 Action within 24hrs.	Vegetation *in contact with* (or has shown signs of contact with) HVABC, bare conductors (66kV, HV, LV) or other HV apparatus (e.g. ACRs, switches, transformers).
PT30 Action within 30 days.	Vegetation *clearly within the minimum clearance* requirements, but not contacting, HVABC, bare conductors (66kV, HV, LV) or other HV apparatus (e.g. ACRs, switches, transformers).
PT180	Vegetation cannot definitively be determined to be within the minimum clearance space to Bare Wire 66kV, HV or LV conductor/s, HV/ABC or Uninsulated Apparatus. *There is little or no risk that vegetation will pose a threat to AusNet Services' assets within the next 180 days.*
PT365	Vegetation is outside the minimum clearance space from any Bare Wire or HV/ABC conductor/s or Uninsulated Apparatus but *is 'highly likely' to encroach* upon it prior the end of the Declared Fire Period in the current assessment cycle.
PT720	Vegetation is outside the minimum clearance space, and *will not encroach upon it before the next annual assessment*.
CC	Vegetation throughout the span (adjacent/below) is *unlikely to require any action* to maintain the clearance space for a minimum period of *720 days*.
RE	Vegetation is outside the minimum clearance space to Bare Wire, HV/ABC conductor/s or Uninsulated Apparatus however there is some uncertainty whether or not it may encroach upon it prior to the next assessment cycle.

TABLE 3.1 – AUSNET VEGETATION ASSESSMENT SPAN CODE SUMMARY

3.3 Training and Competency of Vegetation Assessors

AusNet's ELCMP (Section 11.2) describes the training and competency requirements for vegetation assessors, in particular the qualification "Certificate II ESI – Powerline Vegetation Control (UET20312)".

This is consistent with ESV requirements in relation to competencies required to actively assess trees within an ESI environment.

3.4 ELC Database Extract (Desktop Review)

ESV provided ERP with a sample of AusNet Services ELC Database inclusive of information relating spans across 6 feeders. ERP, in consultation with ESV, randomly selected spans for field assessment which were located on both roadside easements and within private property. Table 3.2 below provides a summary of the sites selected for field assessment.

TABLE 3.2: AUSNET ELC AUDIT SAMPLE SUMMARY

MEC & Audit Reference:		AusNet Services – Distribution (CM-7246)		
Audit Sample	**Location**	**Feeder**	**Spans in Sample**	**# Spans Audited**
	Nagambie / Tabilk	SMR8	896	166 (19%)
	Yea / Murrindindi	SMR5	710	180 (25%)
	Kinglake West	KLK2	811	95 (12%)
	Glenburn	KLK1	378	137 (36%)
	Wandong	KLO14	741	149 (20%)
	Strathewen	KLK3	215	37 (17%)
		TOTAL	3751	764 (20%)

Table 3.3 below provides an overview of findings relating to the desktop review of the sample of AusNet Services Vegetation Management database as provided by ESV.

TABLE 3.3: AUSNET VEGETATION MGMT DATABASE SAMPLE OVERVIEW

Desktop Audit Results – Audit Sample Profile	Total	%
HBRA spans within sample	3168	85%
LBRA Spans within sample	583	15%
Total spans within sample	**3751**	**100%**
HBRA spans allocated current database code	3168	100%
LBRA spans allocated current database code	583	100%
Total spans allocated a current database assessment code	**3751**	**100%**
HBRA spans within ELCMP inspection guidelines	3168	100%
LBRA spans within ELCMP inspection guidelines	583	100%
Total spans within ELCMP inspection guidelines	**3751**	**100%**

The data audited indicated that 100% of the spans contained within the sample had an assessment date recorded between April 2016 and July 2017. With a number of areas currently due for pre-summer or annual vegetation assessment, providing the programs are completed as scheduled, this assessment indicates AusNet are managing vegetation assessment requirements as per Clause 4.4 of their "Vegetation Management Plan" in relation to annual assessment cycles.

In summary the information contained in the sample database was easy to follow, contained sufficient detail to identify spans, inspection, cutting and database coding and outstanding works.

3.5 Overview of Field Audit and Spans Inspected

Field Audits commenced in Nagambie on Monday 14th August 2017 and concluded in the Strathewen area on Friday 25th August 2017. A total of 10 field auditing days were undertaken during this period. The Field Auditor was accompanied by

(Program Planner, AusNet Services) for the duration of the audit.

Table 3.4 provides a summary of the spans attended and inspected during the field audit phase. A total of 764 spans were attended as part of the field audit process representing 20% of the total audit sample provided. Compliance and span coding data was captured for these spans.

MEC & Audit Reference:		AusNet Services – Distribution (CM-7246)		
Field Auditor	Brett Lind	**Audit Dates**	14/8/17 to 25/8/17	
Audit Sample	**Date**	**Location**	**Feeder**	**Audit Sample**
	14 & 15 Aug	Nagambie / Tabilk	SMR8	166
	16 & 17 Aug	Yea / Murrindindi	SMR5	180
	23 Aug	Kinglake West	KLK2	95
	24 & 25 Aug	Glenburn	KLK1	137
	18 & 21 Aug	Wandong	KLO14	149
	22 Aug	Strathewen	KLK3	37
			TOTAL	764

All spans attended in the field were located in HBRA with the exception of 5 spans in the Yea area which were zoned LBRA. There was no indication in the data provided that any of the spans were situated in council declared areas.

The field audit objective was to assess clearance to code via a detailed line clearance inspection across a wide geographic area. The field audit achieved the objective gathering data from a sample of spans from each feeder within the sample database.

The audit verified the accuracy of the site location details for each of the 764 sites attended.

(1) Latest recorded assessment code

The auditor undertook an assessment of the latest recorded assessment code and taking into account the time lapse, evidence of growth and cutting activities recorded an observation in relation to the latest recorded assessment code for the spans assessed.

It was the auditors opinion that the latest recorded assessment code for 678 (89%) was most likely accurate at the time of assessment. The auditor recorded, based on his observation, what he assessed was the most likely span assessment code for the remaining 86 (11%) of spans at the time of assessment. Table 3.5 below provides a summary of these observations.

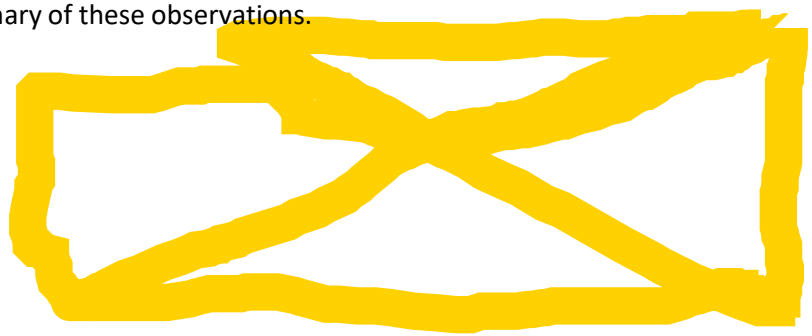


TABLE 3.5: AUSNET ELC AUDIT FIELD AUDIT SUMMARY – ASSESSMENT CODE DIFFERENCE

Each of the spans within this assessment were considered to be compliant at the time of the field audit.

Acknowledging the above summary is a retrospective view comparing observations at different points in time and under different conditions the observations, in general, indicate assessment and data recording processes are effective in managing vegetation compliance requirements with few significant differences recorded.

The database information also contained records indicating assessment activity was the catalyst for pruning activity with spans coded between P30 and P365 during their latest assessment being cut post assessment. The auditor also recorded evidence of recent cutting or vegetation removal activity against spans audited.

(2) Latest recorded cut code

The data recorded and analysed as part of this element of the audit aimed to validate the recorded "Latest Cut Code" for the span referenced against the field auditor's observation and current assessment of the span and associated assets in the field.

The field auditor's assessment considered the latest recorded cut code and compared it to the current span code taking into account observed clearance distance, time lapsed since cutting occurred and regrowth within the audited span.

This assessment focussed on spans where there was a latest cut code date recorded within 2016 / 2017 or) spans of the sample assessed. The following analysis provides a summary of spans with cut dates in 2016 or 2017 where there was a difference between the recorded cut code and the assessment of the field auditor.

- spans were coded as "C720" post their previous cut cycle. The cut dates for these spans was greater than 200 days prior to the field audit. Based on field observations of cutting evidence, regrowth and span characteristics the auditor, in his opinion, indicated span cut codes of "C180" (7 spans) and "C365" (15 spans) had possibly been achieved.

- spans coded as "C720" had recorded cut dates within the 100 days prior to the audit. The auditor recorded cut codes of "C180" (5 spans) and "C365" (4 spans).

The field auditor noted that recent cutting or vegetation removal activity was evident at spans where the latest cut information recorded in the database extract provided to ERP was dated prior to 2017. This may reflect a timing issue in terms of when initial data was provided for audit, the cutting activity was completed and the AusNet database was updated. This has been confirmed by AusNet (23/11/17).

It is difficult to make a definitive conclusion from the above findings given the variables involved and time lapse between cutting activity and audit. As a general observation cutting activities appear to be achieving and maintaining clearance compliance.

(3) Latest recorded span code

This analysis compares the "Latest Code" (span code) within the AusNet database compared to the field auditors current assessment of the span.

The field auditors assessment of the current span code aligned with the recorded latest span code for spans.

Of the spans where the auditors span code assessment differed from the latest recorded span code the following summary is provided:

- spans were previously assessed in 2016 – due for re-assessment – of which 8 spans contained non-compliant vegetation (PT30).

- spans were coded by the field auditor as either "CC" or "PT720" compared to latest recorded span code – 71 of which ranged from"PT30" to "PT365".

- spans previously coded "CC" or "PT720" were coded as currently "PT180" or "PT365" by the field auditor. These compliant spans are currently due for annual assessment and it is expected they will be reviewed as part of business as usual practices. This finding may be reflective of expected re-growth.

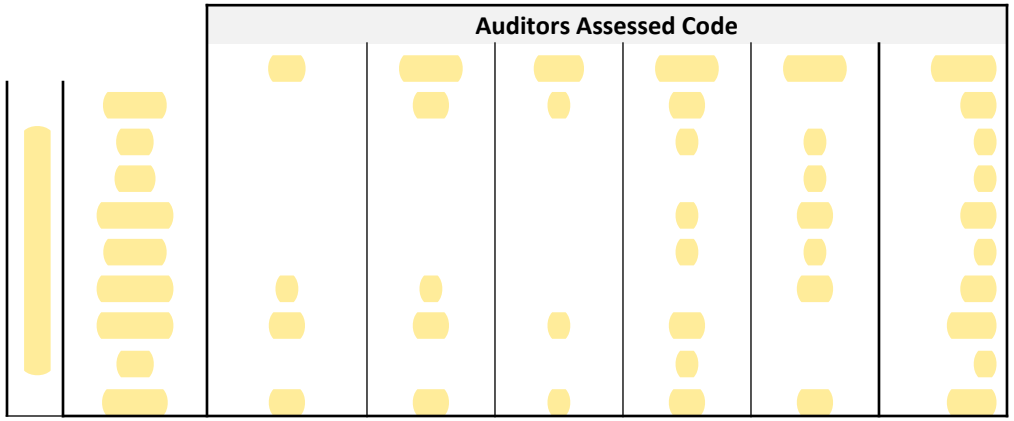
- spans coded as either "PT180" or PT"365" by the field auditor had been subject to assessment in 2017. Of these spans:

Details of the spans referenced in this analysis are provided in Appendix 4.

In total there were spans previously assessed in 2017 where the auditor assigned a code “P180”. It is recommended that AusNet review these spans to determine whether action is required to ensure they remain compliant until their next assessment or planned cut.

Table 3.6 provides a summary overview the recorded differences in terms of latest span code (database) and the field auditors recorded observations.

TABLE 3.6: AUSNET ELC FIELD AUDIT COMPARISON OF LATEST CODE INFORMATION



There were spans included in the above analysis where the field auditor recorded evidence of recent cutting of which spans were recoded differently to their latest recorded code. AusNet have confirmed active cutting was occurring in the areas audited (via email 23/11/17), which is supported by the audit observations, post the creation of the audit data. On the assumption that the latest recorded code for these spans was reflective of the auditors field observations this would increase the accuracy finding in relation to current database code to %.

In summary, the analysis indicated a high level of alignment between the field auditors current span assessment and the latest code within the AusNet Services database taking into consideration the timing of the audit in comparison to the recorded data.

Taking into consideration the timing of the audit and the ongoing AusNet annual assessment program (noting feeders KLK1, KLK2 and SMR5 annual assessments were not completed as yet), variability of factors such as growth rates and challenges relating to making visual assessments of span clearances for “long spans” the analysis indicates, in general, that current assessment and span code recording reflects the status of the assets in the field.

Audit notes indicated that compliant spans (currently coded “720”) contained within the above analysis recoded “PT365” (1) and “PT180” (9) by the field auditor were “long spans”. AusNet has a program using LiDAR to assist with long span clearance monitoring to supplement field based visual assessments. Seven spans are currently due for assessment and three have an assessment date recorded for 2017.

The audit has made a recommendation that AusNet review these spans to confirm LiDAR and / or technical assessment has been completed to validate their current span code.

3.6 Code Compliance Assessment

The current code compliance assessment of each of the spans audited provides a summary of the field auditors ground observation of the current vegetation clearance against the requirements of the Code of Practice “Minimum Clearance Space” required taking into account the area Fire Rating, voltage, expected re-growth, conductor / asset type and span distances.

The field auditor also assessed whether the responsibility for managing vegetation within the audited span was AusNet Services, a local council or other responsible person.

The field auditor observed spans as containing noncompliant vegetation. The field auditor determined responsibility for each of the non-compliant spans resided with AusNet Services.

There were no council declared spans identified within the data provided for audit and the field audit didn’t record any ORP non-compliant spans within the sample audited.

Table 3.7 provides a summary of the audit findings in relation to current span compliance.

TABLE 3.7: AUSNET ELC AUDIT FIELD AUDIT SPAN COMPLIANCE

Spans audited in the field	Audited	Vegetation Inside Minimum Clearance Space - Spans	%

The following table (Table 3.8) provides a summary of the observed non-code compliant spans. Photographs of the non-code compliant spans identified are attached in Appendix 4.

A summary of non-code compliant spans was forwarded to AusNet Services for comment on Monday 4th September 2017.

The non-code compliant spans identified during the recent field audit were all previously assessed in early to mid 2016 and AusNet Services have indicated they are due for assessment as part of scheduled annual works prior to the upcoming fire season. The finding may be reflective of more aggressive regrowth than anticipated.

The field auditor's observations supported by an analysis of the audit data indicate that the processes AusNet have in place to manage ELC are in general effective in managing clearance to code requirements. Isolated instances of non-code compliant spans were identified within the sample audited however this finding did not reflect a systemic issue in the management of electric line clearance.

It is expected that the non compliant spans identified during the recent audit will be managed per AusNet Services business as usual vegetation management processes.

TABLE 3.7: AUSNET ELC AUDIT FIELD AUDIT SPAN COMPLIANCE

TREE_ID	CAMMNO	FEEDERNAME	SUBURB_TOWN	FIREZONE	VOLTAGE	LATESTASSESSEDDATE	LATESTASSESSEDCODE	LATESTCUTCODE	LATEST_CODE	Audit Verified Current Span Code (Y/N)?	Auditors Assessed Span Code	GENERAL COMMENTS AND OBSERVATIONS

3.7 Active Vegetation Assessor Observations

During the audit the following experienced vegetation assessment personal (Field Officers) were observed by the field auditor:

- (Kinglake)
- (Limestone)

In the auditors opinion each of the assessors observed was very knowledgeable with the requirements of the Vegetation Assessment role, demonstrated a great work ethic and took pride in the work that they did. The field auditor also made comment that each of the Field Officers showed a genuine concern for the work they were undertaking and recognised the critical role they played.

The field auditor was also accompanied by Program Planner (AusNet Services). The field auditor also made comment in relation to knowledge, experience and high level of ownership for the ELC task.

The field auditor reported no concerns in this area of the audit process.

A copy of the checklist used by the field auditor to undertake the Vegetation Assessor observations is attached in Appendix 6.

3.8 Non-vegetation defects identified

During the course of the field assessment the auditor identified line defect items which were reported by the AusNet field representative at the time of the audit. These items related to:

-
-
-

These items have been referenced in Section 2 of this report.

3.9 Summary Observations and Recommendations

The Electric Line Clearance field audit assessed span clearances from vegetation at 764 sites across six feeders. With the exception of five spans all sites assessed were located in HBRA.

The field audit identified a small number of spans containing non-compliant vegetation. The Each of these spans was previously assessed in 2016 and are currently due for annual, pre-summer assessments.

The field audit assigned a different span code rating to a further spans that differed from the latest recorded span code with the AusNet database. In reviewing this data it is noted that each of the spans was "compliant" and spans were currently due for annual assessment. A number of the remaining spans had been recently cut – AusNet have cutting took place post data preparation for the audit.

In relation to cutting activity the database indicated that of the spans had a recorded cut date post their most recent inspection. The field auditor indicated a further spans had evidence indicating they had been cut, some recently. This finding has been validated with feedback from AusNet indicating the spans have been cut between the time audit was provided and the field audit being completed.

There were a small number of spans, where in the auditor's opinion the cutting could have been "harder" to ensure clearance spaces were maintained throughout the cycle – generally these observations related to longer spans or spans containing fast growing species.

Table 3.9 provides a summary overview of the audit findings

The accuracy of inspection data and work recommendations

- AusNet's database information was in general validated as accurate in relation to span information, easy to follow and contained information consistent with the requirements of AusNet's ELCMP.

	Spans Assessed	Location Information Correct	Spans - Vegetation inside Minimum Clearance Space	Spans – 2017 Assessed Code Different to Latest Code	Spans – Evidence of Cutting Post Assessment / Recent Activity

TABLE 3.9 – SUMMARY OVERVIEW OF ELC AUDIT BY FEEDER

- The field auditor recorded that in his opinion, and taking into account his observations at the time of the audit, the previously recorded Inspection Code for the spans he observed was most likely accurate in relation to AusNet responsible vegetation for the majority ( ) of spans assessed.
- There was evidence within the database, supported by field observations, to conclude that inspection activities are the catalyst for cutting activities. spans within the database had cut dates post their previous assessment and the auditor recorded comments of recent cutting or vegetation removal activity at a further i sites visited
- spans previously assessed in 2017 were recoded by the auditor assigned as "P180".It is recommended that AusNet review these spans to determine whether action is required to ensure they remain compliant until their next assessment or planned cut.
- The field auditor noted that technical assessment of a number of compliant longer spans may be required to assess "sag and sway" clearance requirements (side clearance). AusNet have indicated they utilise LiDAR assessment of longer spans in conjunction with ground based and technical assessments to ensure clearance spaces are maintained to code. (Observation)
- Audit notes indicate compliant spans (coded "720") contained within the above analysis recoded "PT365" ( ) and "PT180" ( ) by the field auditor were "long spans". AusNet has a program using LiDAR to assist with long span clearance monitoring to supplement field based visual assessments. Seven spans are currently due for assessment and three have an assessment date recorded for 2017. (Observation)
- The audit has made a recommendation that AusNet review these 10 spans to confirm LiDAR and / or technical assessment has been completed to validate their current span code.

Vegetation clearance standards and compliance with the Code of Practice for electric line clearance

- Information within AusNet's database indicates it was progressing with it's pre-summer assessment program. Annual assessments were yet to be completed on feeders KLK1, KLK3 and SMR5 at the time the field audit was undertaken.
- spans containing non-code compliant vegetation were recorded (% of the sample). The audit noted the 8 non-compliant spans were on feeders currently due for annual inspection.
- The audit recommends that AusNet manage the identified noncompliant spans as per its ELC procedures i.e. the spans are monitored and actioned as appropriate.
- The audit recommends AusNet continues to utilise and develop procedures to ensure annual inspection programs are completed efficiently and vegetation clearance activities are undertaken to ensure ELC clearance standards are maintained.

Vegetation management data reflects the status of field observations made at the time of the audit

- The field audit verified the span identification information was accurate for all sites audited and each of the records provided contained previous inspection date and coding details.

- The field auditor recorded a different current span code based on his observations during the audit for spans within the audit sample. of these spans were previously assessed in 2016 and are currently due for assessment.

- The field auditor noted a number of spans which had evidence of recent cutting activity where the latest recorded span code differed from the assigned code by the auditor. AusNet have reviewed this information and confirmed that cutting activity occurred post the provision of audit data. AusNet have also confirmed their VMS reflects the cut activity has been completed.

- Taking into consideration the timing of the audit and the ongoing AusNet annual assessment program (noting feeders KLK1, KLK2 and SMR5 annual assessments were not completed as yet), variability of factors such as growth rates and challenges relating to making visual assessments of span clearances for "long spans" the analysis indicates, in general, that current assessment and span code recording reflects the status of the assets in the field.

- The audit recommends that AusNet continue to utilise and develop its ELC procedures to ensure annual inspection programs are completed efficiently and vegetation database management is maintained to a high level of currency and accuracy.

4. Acknowledgement

Electrical Resource Providers would like to thank the AusNet Distribution Representatives who have assisted throughout this audit process by providing information, advice and their time to assist in a professional, productive and co-operative manner.

Particular thanks is forwarded to the following AusNet employees and representatives:

- (for assisting with each day with the BFM field audits).
- (for assisting with each day with the ELC field audits).
- (for assisting with audit preparations, follow-up and ensuring the required resources were available for the field audit to be efficiently executed).

Appendices

Appendix 1: Key Documents and References

Appendix 2: Audit Plans

Appendix 3: AusNet Services BFM Field Audit Database and Photo’s

Appendix 4: AusNet Services ELC Field Audit Database and Photo’s

Appendix 5: Asset Inspector Checklist

Appendix 6: Vegetation Assessor Checklist

Appendix 1: Key Documents and References

Document Title	Version	Date
Electricity Safety (Bushfire Mitigation) Regulations 2013	4	1 May 2016
Electricity Safety (Electric Line Clearance) Regulations 2015	1	28 June 2015
AusNet Services Bushfire Mitigation Plan – Electricity Distribution Network	24	23 March 2017
AusNet Services Asset Inspection Manual	10	24 February 2017
AusNet Services Vegetation Management Plan (Distribution)	23.1	24 March 2017
VEM 20-03 – Assessment Procedure: Vegetation and Easement Management (AusNet Services)	13.1	22 May 2017
AusNet Services Asset Management Database extract	-	1 August 2017 (from ESV)
AusNet Services Vegetation Management System Database extract	-	6 August 2017 (from ESV)

Appendix 2: Audit Plans

PROJECT AUDIT PLAN

ABN 28 089 981 215

P O Box 132
GOLDEN SQUARE 3555

PHONE: (03) 5442 8900
FAX: (03) 5443 3348
Email: admin@erppower.com

PROJECT: AUDIT PLAN – BUSHFIRE MITIGATION (ASSET CONDITION) AUDIT
DATE: 9 August 2017

Item #	Description	Details	
1	Client Client Contact	Energy Safe Victoria [redacted] Senior Engineer Safety Management Systems	
2	Auditee Auditee Contact	AusNet Services (Distribution) [redacted] - Technical Assessment Team Lead - [redacted]	
3	Auditor/s	[redacted] – ERP (Audit Lead) – [redacted] – ERP (Field Auditor) - [redacted]	
4	Audit Objective and Scope	Assess the level of conformance of AusNet Services (Distribution) BFM field activities with the requirements of the Electricity Safety (Bushfire Mitigation) Regulations 2013.	
5	Audit Criteria	Electricity Safety (Bushfire Mitigation) Regulations 2013	
6	Timeframes	Review Audit Data	8 August 2017
		Submit Audit Plan to ESV & DB	10 August 2017
		Confirm Audit Field Contact	10 August 2017
		Commence Field Audit	14 August 2017
		Complete Field Audit	25 August 2017
		Interim Audit Results to ESV	1 September 2017
		Interim Audit Results to DB	1 September 2017
7	Summary of relevant documentation	Electricity Safety (Bushfire Mitigation) Regulations 2013. Asset Inspection Manuals and database extract for AusNet Services (Distribution)	
8	Methodology	• Desktop audit of Asset Inspection Manuals and database extract • Discussions with Responsible Officer/s (as required) • Field audits against database contents • Field interview/ conversation with minimum 2 x field inspector/ assessors • Field observation of a 2 x field inspector/ assessors	

PROJECT AUDIT PLAN

ABN 28 089 981 215

P O Box 132
GOLDEN SQUARE 3555

PHONE: (03) 5442 8900
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PROJECT: AUDIT PLAN – ELECTRIC LINE CLEARANCE ASSESSMENT
DATE: 9 August 2017

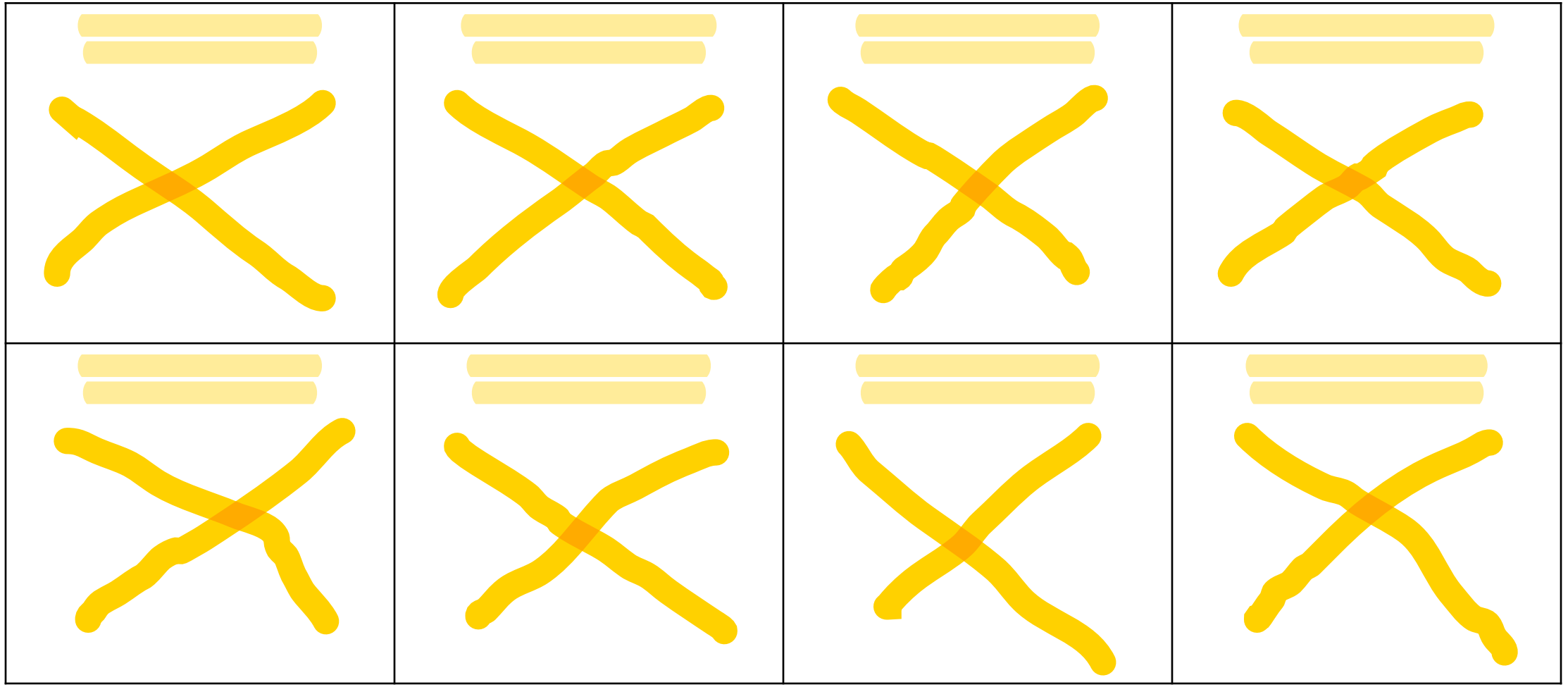
Item #	Description	Details	
1	Client Client Contact	Energy Safe Victoria [redacted] Senior Engineer Safety Management Systems	
2	Auditee Auditee Contact	AusNet Services (Distribution) [redacted] Vegetation Program Planner – [redacted]	
3	Auditor/s	[redacted] – ERP (Audit Lead) - ERP (Field Auditor) – [redacted]	
4	Audit Objective and Scope	Assess the level of conformance of AusNet Services (Distribution) ELCMP field activities with the requirements of Electricity Safety (Electric Line Clearance) Regulations 2015.	
5	Audit Criteria	Electricity Safety (Electric Line Clearance) Regulations 2015	
6	Timeframes	Review Audit Data	8 August 2017
		Submit Audit Plan to ESV & DB	10 August 2017
		Confirm Audit Field Contact	10 August 2017
		Commence Field Audit	14 August 2017
		Complete Field Audit	25 August 2017
		Interim Audit Results to ESV	1 September 2017
		Interim Audit Results to DB	1 September 2017
7	Summary of relevant documentation	Electricity Safety (Electric Line Clearance) Regulations 2015. ELCMP and ELC Database extract for AusNet Services (Distribution)	
8	Methodology	• Desktop audit of ELCMP and Database • Discussions with Responsible Officer/s (as required) • Field audits against database contents • Field interview/ conversation with minimum 2 x field inspector/ assessors • Field observation of a 2 x field inspector/ assessors	

Appendix 3: AusNet Services BFM Field Audit Database and Photo’s

See separate attachment.

Appendix 4: AusNet Services ELC Field Audit Database and Photo’s

Electric Line Clearance Field Audit – Sample Photo’s (Non-compliant Spans)



See separate attachment for Field Audit Database.

Appendix 5: Asset Inspector Checklist

ASSET INSPECTION QUALITY AUDIT CHECKLIST
2017 ESV ASSET INSPECTION PROGRAM (DISTRIBUTION)

Date:	Time:	Location:	
DB:			
LIS/ Pole Reference:		Auditors:	

Asset Inspection Compliance		Compliance				Action / Comments
		N/A	Yes	Corr. Act.	Non Conf	
1	Is species of pole recorded?	☐	☐	☐	☐	
2	Is disc year recorded?	☐	☐	☐	☐	
3	Is location description correct?	☐	☐	☐	☐	
4	Is LIS number fitted?	☐	☐	☐	☐	
5	Is pole disc data recorded?	☐	☐	☐	☐	
6	Are important structures recorded?	☐	☐	☐	☐	
7	Are surge diverters recorded?	☐	☐	☐	☐	
8	Are HV fuses recorded?	☐	☐	☐	☐	
9	Are voltages recorded?	☐	☐	☐	☐	
10	Are other users recorded?	☐	☐	☐	☐	
11	Is staking information recorded?	☐	☐	☐	☐	
12	Is inspection tag dated/ fitted?	☐	☐	☐	☐	
13	Has 300mm excavation been undertaken?	☐	☐	☐	☐	
14	Has a pole top inspection been undertaken using stabilised binoculars and telescopic camera?	☐	☐	☐	☐	
15	Has sounding been undertaken? (to be completed from 2m above ground line into excavation)	☐	☐	☐	☐	
16	Has below ground inspection been undertaken? (If pole has signs of decay all deteriorated material should be removed to see extend of decay)	☐	☐	☐	☐	
17	Is there an inspection hole?	☐	☐	☐	☐	
18	Has a 12mm inspection hole been drilled?	☐	☐	☐	☐	
19	Has back fill been completed?	☐	☐	☐	☐	
20	Has wood preservation been completed?	☐	☐	☐	☐	
21	Have private lines been inspected?	☐	☐	☐	☐	
22	Agree with Inspector on maintenance found?	☐	☐	☐	☐	
23	Are appropriate manuals and reference information available onsite?	☐	☐	☐	☐	
24	Other?	☐	☐	☐	☐	

Work Quality		Compliance				Action / Comments
		N/A	Yes	Corr. Act.	Non Conf	
25	Has correct amount of pole preserver been used?	☐	☐	☐	☐	
26	Have plugs been fitted?	☐	☐	☐	☐	
27	Has bio-guard been fitted correctly?	☐	☐	☐	☐	
28	Was work site clean and tidy?	☐	☐	☐	☐	

General Comments:

Work Party Members & Qualifications (Verified Onsite)	
Asset Inspection Personnel	Qualifications/ Authorities

Definitions:	
N/A	Not Applicable.
Yes	The item was found to be compliant (correct).
Corr. Act.	Corrective Action, corrective action was required to be taken at the time of the Field Inspection.
Non Conf.	Non Conformance - does not meet the minimum standard.

Photo's (attach photographs of site inspected)

Appendix 6: Vegetation Assessor Checklist

ELECTRIC LINE CLEARANCE INSPECTION QUALITY AUDIT CHECKLIST
2017 ESV ELECTRIC LINE CLEARANCE PROGRAM

Date:	Time:	Location:
DB:		
LIS/ Pole Reference:		Auditors:

Electric Line Clearance Assessment Compliance		Compliance				Action / Comments
		N/A	Yes	Corr. Act.	Non Conf	
1	Is correct location verified?	☐	☐	☐	☐	
2	Is location description correct?	☐	☐	☐	☐	
3	Is LIS/ Pole number fitted?	☐	☐	☐	☐	
4	Is correct voltage/ s recorded?	☐	☐	☐	☐	
5	Are DB spans identified?	☐	☐	☐	☐	
6	Are Council spans identified?	☐	☐	☐	☐	
7	Are PELs identified?	☐	☐	☐	☐	
8	Has all vegetation within the effected span (including customer services) been identified and recorded?					
9	Is vegetation type correctly identified?	☐	☐	☐	☐	
10	Is the assessed vegetation code correct?	☐	☐	☐	☐	
11	Agree with Assessor on inspection findings?	☐	☐	☐	☐	
12	Are appropriate manuals and reference information available onsite?	☐	☐	☐	☐	
13	Have any general pole or asset defects been identified and recorded?					
14	Other?	☐	☐	☐	☐	

Work Quality		Compliance				Action / Comments
		N/A	Yes	Corr. Act.	Non Conf	
15	Has the clearance between vegetation and electric lines been validated?	☐	☐	☐	☐	
16	Has all required information been recorded?	☐	☐	☐	☐	
17	Have appropriate customer notifications been carried out?	☐	☐	☐	☐	

General Comments:

Work Party Members & Qualifications (Verified Onsite)		
Assessment Personnel		Qualifications/ Authorities

Definitions:	
N/A	Not Applicable.
Yes	The item was found to be compliant (correct).
Corr. Act.	Corrective Action, corrective action was required to be taken at the time of the Field Inspection.
Non Conf.	Non Conformance - does not meet the minimum standard.

Photo's (attach photographs of site inspected)