Aurora ENERGY

ABN 85 082 464 622

MANAGEMENT PLAN 2011
VEGETATION MANAGEMENT

DOCUMENT NUMBER: NW-#30165991-V4B

DATE: 19 FEBRUARY 2011

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REV NO.	DATE	REVISION DESCRIPTION	APPROVALS	
0	19 Feb 2011	Original Issue.	Prepared by	ME
			Reviewed by	SB
			Approved by	AD

1. PURPOSE

The purpose of this Management Plan is to detail, for vegetation management:

1. Aurora's approach to vegetation management, as reflected through legislative and regulatory obligations, the Network Management Strategy and Vegetation Management Strategy;
2. An outline of the Vegetation Management Program for the period 2012/13 – 2016/17; and
3. Forecast expenditure, including the basis upon which these forecasts are derived.

2. OBJECTIVES

Aurora's Vegetation Management Program is designed to:

1. Comply with Chapter 8A of the Tasmanian Electricity Code (TEC), as well as the Electricity Supply Industry (ESI) Act and Electricity Industry Safety and Administration (EIS&A) Act as appropriate;
2. Control vegetation interaction with the network to:
   a. Minimise the probability of starting bush fires;
   b. Increase public safety; and
   c. Improve network reliability;
3. Satisfy customers and stakeholders; and
4. Ensure cost effectiveness.

3. SCOPE

This Vegetation Management Plan covers two activities associated with vegetation management:

1. Cyclic vegetation clearing; and
2. Internal services for system switching and Live Line work specifically for vegetation management

The Vegetation Management Plan delivers the objectives of the Vegetation Management Strategy through the following key components:

1. Full compliance with regulatory requirements, in particular Chapter 8A of the TEC, ensuring the minimum standards and practices are delivered.
2. Ensure appropriate risk mitigation measures for public safety, bushfire, and reliability are in the program.
3. Ensure that the program is aimed at achieving an efficient *maintenance cycle*, as opposed to a *trimming cycle*. Trimming Cycle refers to the practice of removing the minimum vegetation to comply with TEC 8A, whilst Maintenance Cycle removes additional vegetation reducing the cycle (and cost) over time despite its initial higher cost.
4. Deliver a Vegetation Management Program that delivers longer term cost reductions (includes input into system design, as set component selection and vegetation planting).

5. Continually review performance of the program, contractor efficiency, customer satisfaction and the business risks (including bushfire mitigation) associated with vegetation management

4. BACKGROUND

Aurora has the regulatory responsibility to manage trees growing near powerlines and mitigate risks associated with trees coming into contact with powerlines. The minimum standard to which Aurora must achieve is compliance with is Chapter 8A of the TEC - Distribution Powerline Vegetation Management.

Chapter 8A of the TEC also sets out principles for methods and practices associated with vegetation management around powerlines.

5. RELATIONSHIP TO OTHER MANAGEMENT PLANS

Vegetation management activities are also undertaken as part of other defined management plans within Aurora, in particular:

1. Reliability Management Plan; and
2. Management Plan - Overhead System and Structures.

The funding for these programs is identified at thread level as part of these threads, but the work is managed as part of the vegetation program.

6. HISTORY

Aurora has an ongoing responsibility to manage the interaction between the network and vegetation in accordance with good industry practice. Under the legislative responsibilities clearly defined within the TEC, Aurora has developed and improved upon its strategies for vegetation management in period – as outlined below.

6.1 Pre-Pricing Determination

- November 1999 – Aurora outsourced the management of vegetation cutting contractors through a competitive tender process to Maintenance Management Australia (MMA).

6.2 2002 – 2007 Regulatory Period

- July 2002 - the MMA contract was novated to their parent company Sinclair Knight Mertz (SKM).
- October 2003 – Consultant, Parsons Brinkerhoff & Associates were appointed to review Aurora's vegetation function against changed business focus, regulatory determinations and community expectations, to facilitate an Aurora decision on the Head Contract renewal with SKM and appropriateness of the vegetation strategy and the management style contract. Issues highlighted from this review included:
  - Aurora must take more ownership of the risks and manage risks to available funds
  - Aurora was distant from their customers interactions and responses
  - Contracts were not aligned with business Drivers and Customer Charter

- Contractors were not culturally aligned
- Board and Regulatory requirement for 'Certainty of Asset Condition' not fully realised
- Not all risks were included in the vegetation strategy
- Not all vegetation works were included in vegetation strategy
- Longer term Contracts were required to motivate for longer term objectives
- The vegetation strategy was not flexible enough to allow for changes in focus
- Solutions for reduction of ongoing cyclic cost were not being realised.

- May 2004 – Aurora made the decision to bring the management of the vegetation function back in-house (in-source) in order to address the highlighted deficiencies.
- August 2004 – Aurora developed a Steering Committee and a Project Team and appointed a Consultant Project Manager to manage the in-sourcing of the vegetation management function.
- April 2005 – Completion of the in-source project, including appointment of Aurora's internal structure, novation of SKM's Sub-Contracts to Aurora, and early expiry of SKM's Head Contract. Strategic direction for future management of the vegetation function developed.
- May 2005 – Review of Aurora's Vegetation Management Plan complete.
- September 2005 – Development of Aurora's Operational Plan - Vegetation Management complete.

6.3 2008 – 2012 Regulatory Period

- August 2007 – Development of 2008/2009 – 2011/2012 Pricing Determination Submission Business Case. A review of Chapter 8A of the TEC in October 2007 saw a reference of the Vegetation Code as being 'advisory' removed, ensuring ongoing application of Chapter 8A would effectively become 'mandatory'.

Aurora noted this change in the 2007 Pricing Submission and included a cost increase thought appropriate to achieve compliance. The increased cost put forward at the time was predominantly aimed at management of 'overhang' in 'high' and 'very high' fire risk areas and increasing the removal of such occurrences.

It was also noted during the development of the 2007 Pricing Determination that the quality of data available regarding vegetation clearing workloads and forecasts was poor and would need to improve prior to development of the next Regulatory Pricing Determination (2012-2017).

- Jan 2008 – Begin program under the outcomes of the 2008/2009 – 2011/2012 Pricing Determination.
- June 2010 – Review outcomes in preparation for 2012/2013 – 2016/2017 Pricing Determination, including a review and rationalisation of the documentation supporting Aurora's vegetation strategy.

7. VEGETATION MANAGEMENT AND RISK

7.1 General

Vegetation coming into contact with powerlines is known to cause:

1. Loss of power supply (outages);
2. Electrocution (by fallen powerlines); and
3. Bushfires from vegetation related faults.

Significant bushfire events associated with vegetation related faults include fires in Victoria in 1977, 1983 (Ash Wednesday) and 2009 (Black Saturday).

The risk of starting a bushfire caused by the interaction between vegetation and powerlines is one of Aurora's major risks and ranks among the top 10 in Aurora's Corporate Risk Framework.

Accordingly, Aurora undertook a review of the risks that could impact on the achievement of the Vegetation Management Strategy.

7.2 Summary of Identified Risks

The ten highlighted risks identified were:

1. A - Risk of not being able to secure or maintain resources to carry out the work.
2. B - Vegetation management works activities do not reflect approved strategy or are not conducted to a satisfactory standard.
3. C - Unable to deliver on existing vegetation management strategy or meet minimum requirements under the TEC Chapter 8A.
4. D - Vegetation management works program not maintained up to date for changes in the environment (e.g. bushfire season).
5. E - Changes to legislation (including TEC Chapter 8A and other legislation) may impose more stringent standards and/or requirements than the strategy allows for.
6. F - Lack of appropriate documentation to substantiate works activity undertaken and status of works program.
7. G - 'Good Electricity Industry Practices' may change within the industry making our strategy outdated or redundant.
8. H - Insufficient, unavailable or untimely information available to make informed decisions as they may relate to the execution of the vegetation management works activities.
9. I - Vegetation Management Strategy may not be effectively communicated to relevant personnel (in particular, staff, contractors, stakeholders).
10. J - Vegetation Management Strategy ineffective, not aligned with organisational objectives and/or legislative / TEC requirements.

For each of the identified risks, a Risk Record was developed to clarify and ensure that the detail of each risk was understood for further assessment utilising the corporate risk framework as detailed in the corporate risk management policy.

The outcomes of the assessment are shown in Figure 1.

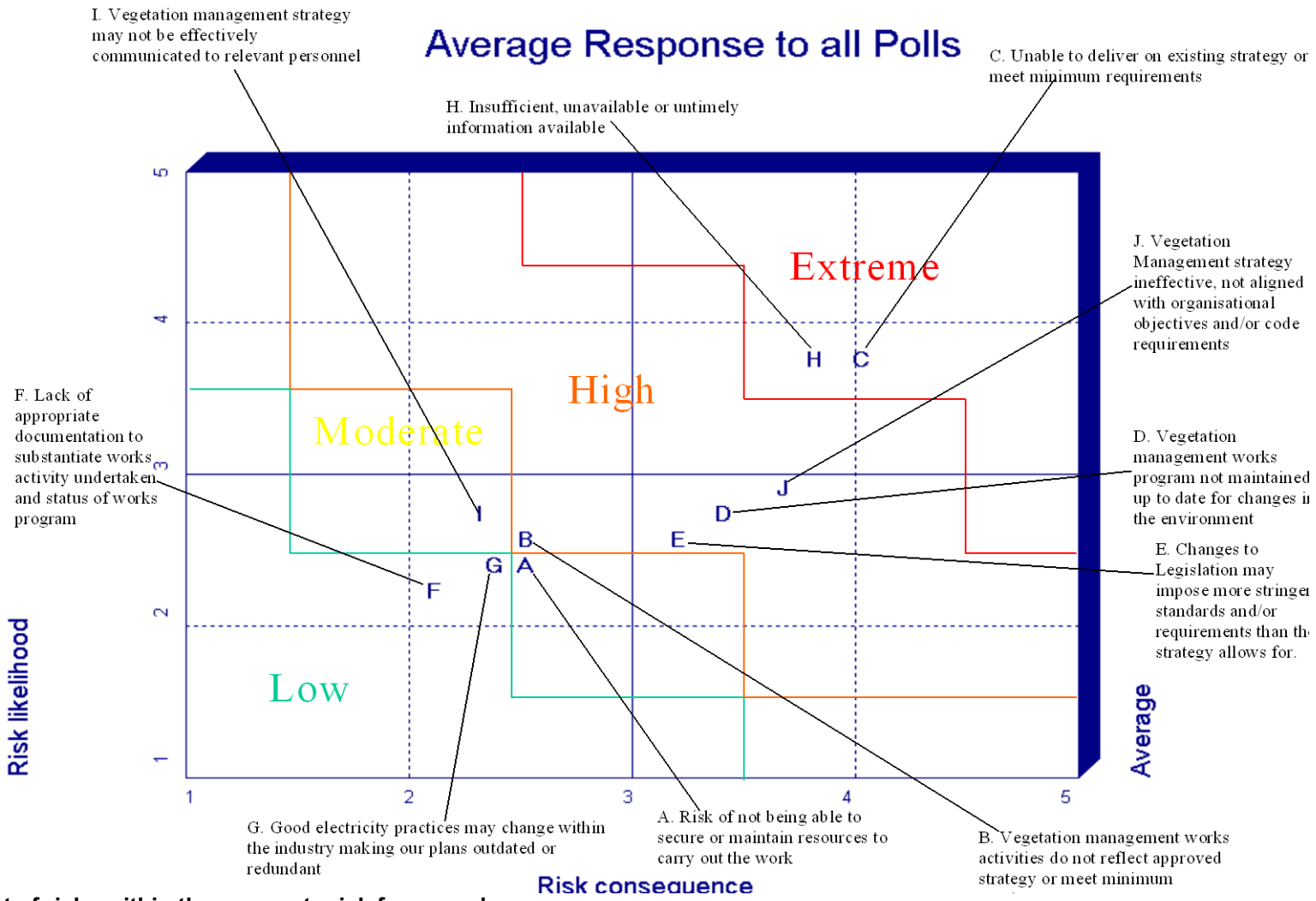

Figure 1: Assessment of risks within the corporate risk framework

7.3 Risk Treatment Plans

Risk treatment plans were developed for all risks rated as 'High' or 'Extreme'. Specifically, the two highest-ranking risks (rated as 'Extreme') were identified as:

1. H - Insufficient, unavailable or untimely information available to make informed decisions as they may relate to the execution of the vegetation management works activities; and
2. C - Unable to deliver on existing vegetation management strategy or meet minimum requirements under the TEC Chapter 8A.

Due to the relationship between these two risks, one Risk Treatment Plan was developed to address the mitigation requirements. Having sufficient and quality information about the vegetation management requirements will lead to improved decisions for meeting the Vegetation Management Strategy and compliance.

7.4 Risk Control Action

The objective of the risk control action was to prepare a suitable plan that would enable information on workloads and costs to be accurately modelled and forecast, and performance to be measured and tracked. This control action would lead to Aurora's improved ability to ensure the Vegetation Management Strategy was achieved and that sufficient data/knowledge was obtained to ensure on-going funding is matched to the strategy.

The primary action that came from the Risk Treatment Plan was the further development of the vegetation management information technology system (known as VEGEMITe) to include capabilities for forecasting works, modelling, and reporting requirements. These changes were required prior to the development of the 2012-2017 Pricing Determination.

Timelines for implementation were:

- December 2008: Operating prototype in place
- December 2009: System operational
- July 2010: Reporting available

All timelines have been met, and the improved quality and level of detailed information gained from VEGEMITe has provided key inputs into the cost/resource modelling used to quantify Aurora's financial and resource requirements for the 2012 – 2017 Pricing Determination.

8. STRATEGY IMPLEMENTATION

The Operational Plan – Vegetation Management is delivered through three key plans (consolidated into one document) that are closely linked to each other.

1. Vegetation Management Operational Plan;
2. Stakeholder Management Operational Plan; and
3. Contractor Management Operational Plan.

The following sections outline each of these plans.

8.1 Vegetation Management Operational Plan

The Vegetation Management Operational Plan includes:

1. The standards required to manage risk;
2. Work schedules and vegetation maintenance cycles;
3. Regulatory requirements (in line with the TEC Chapter 8A);
4. Specific vegetation considerations, such as encouragement of desirable species, selective removal of undesirable species and management of significant vegetation; and
5. Data management and information systems.

8.2 Stakeholder Management Operational Plan

The Stakeholder Management Operational Plan includes:

1. Gaining a clear understanding of expectations of all stakeholders;
2. Aurora's obligations to consult with customers and other relevant stakeholders;
3. Aurora's commitment to customer service, specifically in accordance with the Customer Charter;
4. The obligations of Aurora, and of customers, in relation to their property and the management of vegetation near powerlines; and
5. Details of the processes of customer negotiations and dispute resolution.

8.3 Contractor Management Operational Plan

The Contractor Management Operational Plan includes:

1. The distribution business structure to support the program;
2. The contracting model, and the business relationship between the Aurora and the contractor, including alignment of accountabilities, customer service expectations and culture;
3. A model that motivates Contractors to longer term objectives;
4. A model that best delivers Aurora's Vegetation Management Strategy; and
5. Key Performance Indicators (KPIs) including proven value for money.

9. TASMANIAN ELECTRICITY CODE (TEC) CHAPTER 8A CODE COMPLIANCE

9.1 Risk Management Methodology

Chapter 8A of the TEC states under Section 5.1 that:

> *A Distribution Network Service Provider should…*
>
> *a. implement a management plan that specifies an inspection cycle and/or pruning and clearing cycle which is designed to achieve, under normal growth conditions, the relevant clearance space prescribed in clause 8A.3.4. The management plan must include the Distribution Network Service Provider's risk assessment approach;*
>
> *b. decide which method to adopt to ensure that the clearance space remains free of vegetation taking account of the*

potential risk to the public, conservation and other values and avoided costs associated with the alternatives;

c. *if the method adopted is pruning or clearing, determine the regrowth space, hazard space and the pruning and clearing cycle.*

9.2 Clearance Standards

A key element embedded within the risk management strategies, and an overriding factor for the Vegetation Management Program, is the standard to which all vegetation clearing works is carried out.

The minimum standards are detailed in Chapter 8A of the TEC. Aurora also operates in line with its own Network Procedure for Vegetation Management (NPR EC 04).

Additionally, all works carried out must comply with Aurora's Health and Safety and Environmental policies and procedures set out in the AuroraSafe, AuroraHealth and AuroraGreen initiatives.

These documents form the guidelines and serve as the measurement tool to ensure compliance of the works program.

9.3 Key Drivers

The two key areas of TEC compliance and risk management have historically driven Aurora's Vegetation Management Program.

Recently however, Aurora has identified other work areas that have different drivers and requirements for vegetation clearing. These work areas are referred to in Aurora as Threads.

These additional Threads include the Supply Reliability Thread, the Overhead and Structures Thread. Each of these Threads not only has a different driver for actioning the works, but also requires the works to be undertaken to a different legislative or regulatory standard than that referred to in Chapter 8A of the TEC and consequently, requires the use of different work methods and practices. This different standard may exceed the minimum clearance standards outlined in the TEC.

The Vegetation Management Thread (OPEX), as outlined in this plan, exists predominately for the purposes of bushfire risk management and TEC compliance. This is the area focused upon historically and forms the bulk of the cyclic works undertaken.

The Supply Reliability Thread (OPEX and CAPEX) includes the requirement for vegetation clearing pertaining to reliability of supply issues (SAIDI, SAIFI, etc.). This work includes clearing/maintaining vegetation up to and greater than the Code requirement. The Targeted Reliability Improvement Program (TRIP) works for example require a higher level of maintenance due to the higher customer dependency, and concentrates primarily on the high voltage distribution network.

The Overhead and Structures Threads (OPEX and CAPEX) include vegetation issues pertaining to development and maintenance of tracks to provide access for inspections and fault response. These Threads also deals with health and safety issues surrounding provision of safe access for

employees. The majority of vegetation issues within this Thread are not specifically dealt with under the TEC Chapter 8a, as it may not impact upon the specified Clearance Spaces. Accordingly, the risk matrix used within this document to determine cyclic vegetation clearing workloads cannot apply to this category. The benefits of this program are also realised in the improved efficiency in the cyclic vegetation program.

These Threads have their own management plans outlining their vegetation management requirements.

10. RISK MANAGEMENT METHODOLOGY

Aurora utilises a risk management process that determines:

1. The risk ranking of each tree;
2. Which trees require risk treatment plans;
3. What the risk control options within the treatment plans will be; and
4. The timing of when the risk control option will take place.

Based upon the Australian Risk Management standard (AS/NZS ISO 31000), Aurora assesses the risk posed by each tree (The TEC Chapter 8A defines variations for case-by-case calculation of Clearance Space, Regrowth Space, and Hazard Space. See Appendix 1 – Definitions) against the 'likelihood/probability' of the tree entering the clearance space prior to the next clearing cycle, and the 'severity/consequence' of the event that the tree could cause as a result of it entering the clearance space. The assessment is in accordance with the Vegetation Management Risk Assessment Matrix shown in Figure 2.

			Severity				
		Definition	Continuity of supply: The impact may result in loss of supply to single customer. Environment: No fire damage Injury: Incident with no harm Assets: No damage to assets (The impact can be dealt with by routine operations)	Continuity of supply: The impact may result in loss of supply to single customer. Environment: Minor fire damage Injury: Incident with immediate remediation Assets: Minor damage (<$1,000) to assets (The impact would threaten the ability of the Distribution Business to achieve current year objectives)	Continuity of supply: The impact may result in loss of supply to multiple customers. Environment: Moderate fire damage Injury: Incident with moderate impacts Assets: Minor damage (between $1,000 & $10,000) to assets (The impact would threaten the ability of the Distribution Business to meet its strategic objectives in the short term)	Continuity of supply: The impact may result in loss of supply to multipl customers. Environment: Major fire damage Injury: Incident with major impacts Assets: Significant damage (between $10,000 & $100,000) to assets (The impact would threaten the ability of the Distribution Business to achieve its strategic objectives in the medium term)	Continuity of supply: The impact may result in loss of supply to entire feeder. Environment: Major fire damage Injury: Death / incident with major impacts Assets: Major damage (>$100,000) to assets (The impact is beyond the Distribution Business' ability to manage or resource and as such threatens the survival of the Distribution Business)
	Definition		**1 Low**	**2 Medium**	**3 High**	**4 Very high**	**5 Extreme**
Likelihood / Probability	Tree is inside Clearance Space (Is expected to occur in most circumstances)	**5. Almost certain**	Moderate	High	Extreme	Extreme	Extreme
	Tree is likely to grow inside Clearance Space within Cycle Period (within Re-Growth Space) (Will probably occur in most circumstances)	**4. Likely**	Moderate	High	High	Extreme	Extreme
	Tree may come inside Clearance Space within Cycle due to failure (Might occur at some time)	**3. Possible**	Low	Moderate	High	High	Extreme
	Tree may come inside Clearance Space within Cycle due to failure during extreme weather event (Might occur at some time)	**2. Unlikely**	Low	Low	Moderate	High	High
	Tree is in sound condition but may come inside Clearance Space in extreme weather event (May occur only in exceptional circumstances)	**1. Rare**	Low	Low	Low	Moderate	Moderate

Figure 2: Vegetation Management Risk Assessment Matrix

Risks that rate as 'high' or 'extreme' require a treatment plan to be developed in order to adequately mitigate the risk.

Risks that rate as 'extreme' must see the treatment plan actioned within the current clearing cycle.

Risks that rate as 'high' may see the treatment plan actioned over multiple cycles, as long as interim actions are available and can be put in place to adequately address short term requirements.

Aurora's field personnel use a risk assessment approach when entering data into VEGEMITe to decide which vegetation must be actioned, and when.

Risk control options are decided upon by using a predetermined hierarchy of controls as listed within the Risk Management Guidelines (AS/NZS ISO 31000) with the primary aim of risk control is to eliminate the risk and the best way of achieving this is to remove the hazard. If this is not possible the risk must be minimised by using one or more of the other control options from the hierarchy. The risk control measure selected must be the highest possible option within the hierarchy to minimise the risk to the lowest level as reasonably practicable.

In the vast majority of instances where vegetation is in close proximity to powerlines, the vegetation is assessed as having limited or no conservation value and rarely passes a cost/benefit analysis required in order to proceed with the option of powerline relocation or redesign options (capital expenditure options), and as such is generally trimmed or removed.

In isolated instances where the vegetation has high conservation value (such as an 'Avenue of Honour', historically significant, or rare & endangered species), or where cost/benefit analysis shows that it may be more prudent to relocate the powerline, works are assessed for inclusion into the Capital Works Program.

Instances such as these are not included in operational expenditure calculations unless some control measures that are lower control priorities are required to be until a permanent solution can be achieved.

The majority of Risk Treatment Options result in clearing the vegetation. These options are then assessed to determine the most efficient and effective method of treatment, e.g. (trim light, trim heavy, remove manually, remove via machinery, etc).

11. VEGETATION PROGRAM DEVELOPMENT

11.1 Vegetation Clearing Cycles

Aurora implements two vegetation-clearing cycles within Tasmania:

1. 24 months for Rural Areas; and
2. 12 months for Urban areas.

These cycles are determined by the clearances practicably obtainable for the regrowth space (regrowth space available as a calculation of regrowth rate over the cycle period until the vegetation clearances becomes non compliant) expected 'removal rates', and vegetation growth cycles experienced with Tasmania.

11.2 Vegetation Cut Type

Aurora has three defined vegetation cut types:

1. Full Cut – Involves widening of vegetation corridors where appropriate to achieve a Maintenance Cycle through application of various removal rates for different tree sizes (Work Categories). Generally, removal rates of small to medium sized trees are high, with moderate to low removal rates for larger trees. All works are done in accordance with regulatory requirements to remain clear for a full clearing cycle.
2. Speed Cut – Involves minimal removal rates (limited to smaller trees), with the majority of works including trimming to keep the vegetation clear of the lines for a full clearing cycle.
3. Fire Cut – applies only in high bushfire risk areas, and is minimal trimming required to keep vegetation out of the regulated clearance space for the duration of the on-coming fire season. The fire cut plan is discussed in the Management Plan - Bushfire Mitigation.

Aurora's clearing objective is to complete as many full cuts as time and budgetary considerations allow, undertake speed cuts only where necessary to ensure adherence to the clearing cycle, and over time minimise the fire cut as a result of a more effective full cut clearing. The decisions regarding the application of cut type are made utilising the risk management methodology outlined.

One of Aurora's key vegetation management objectives into the longer term is to move away from a trimming cycle (which largely utilises 'speed cuts' as its primary cut type, and is considered throughout the industry to be inefficient and ineffective) to the more efficient maintenance cycle.

A trimming cycle concentrates on short-term savings by trimming, thus delaying the more costly removal of vegetation. Longer term, this delay causes a 'hedging' effect whereby the number of trims increases every year due to customer plantings and natural seeding that occurs.

The core element of a maintenance cycle includes a sufficient removal rate of vegetation to ensure a decreasing workload in the future and whilst the workload will never decrease to zero, it will reach a level that ensures its maintenance and outcomes are sustainable in the long term.

Whilst the cost of implementing a maintenance cycle initially requires increased investment, it also delivers lowest cost outcome over the long term.

11.3 Program Building Blocks

All expenditure associated with Aurora's vegetation management program is classified as Preventative Maintenance (OPEX).

The vegetation management expenditure for the 2012 - 2017 Pricing Determination period was developed using data from two key sources:

1. The field recorded scoped work from VEGEMITe; and
2. Historical work volume and costing information from contractor timesheets.

From these a unit pricing approach can be applied to predict future expenditure requirements.

11.4 Calculations of Work Volumes

Data from VEGEMITe determines the volumes of work that will be required to be actioned over the next three clearing cycles, broken down into various units of work. The units of work are collected span-by-span based upon work types required for individual trees; namely:

1. Trim tree
2. Removal of tree between 100mm and 300mm Diameter at Breast Height (DBH)
3. Removal of tree between 300mm and 450mm DBH
4. Removal of tree between 450mm and 750mm DBH
5. Removal of tree greater than 750mm DBH
6. Removal of scrub (<100mmDBH) per m2

By overlaying a GIS vegetation classification thematic (the vegetation Classification is undertaken by the Department of Primary Industries, Wildlife and Environment (DPIWE), and provided to Aurora under licence) that separates Tasmania into nine different vegetation classifications, it is possible to determine the types of vegetation and extent that Aurora's distribution network is exposed to throughout the State.

The nine vegetation classifications used in the GIS model are:

1. Post European Cleared;
2. Grassland;
3. Mooreland/heathland Complexes;
4. Lake;
5. Wetland;
6. Woodland Wet;
7. Rainforest;
8. Woodland Dry; and
9. Scrub.

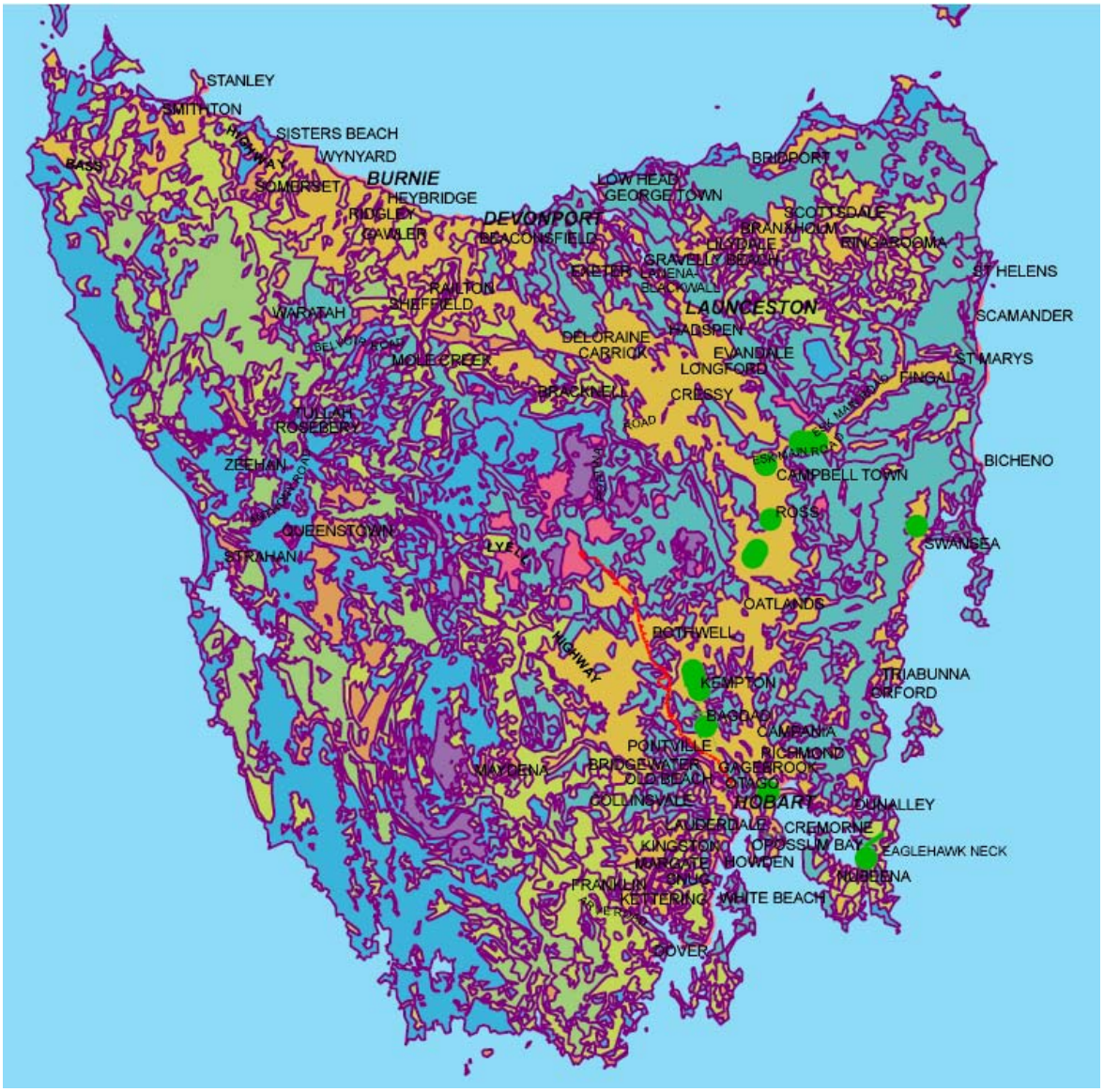

Figure 3: Vegetation Classification Thematic (GIS overlay developed by Kirk et al)

Aurora added a tenth classification of Urban Areas to the model to assist with the program development.

A breakdown of Aurora's distribution network across the classifications determines a view of the exposure of the system to the various classifications.

Table 1: Span counts across vegetation classifications (December 2010)

Vegetation Classification	Number of Spans HV and LV (No Services)	%	Number of Spans – TRIP spans extracted (Note 2)
Post European Cleared	*119,244*		
Grassland	*1,185*		
Cleared-Grassland	**120,429**	**57**	***119,293***
Urban (Cleared)	**29,049**	**14**	**28,776**
Moorland/Heathland	*6,688*		
Lake	*353*		
Wetland	*22*		
Moorland/Heathland Complex	**7,063**	**3**	**6,997**
Woodland Wet	*14,471*		
Rainforest	*695*		
Woodland Wet	**15,166**	**7**	**15,024**
Woodland Dry	*40,011*		
Scrub	*533*		
Woodland Dry	**40,544**	**19**	**40,161**
TRIP Spans		<1	2000
Total	**212,251**	**100**	**212,251**

Note:

1. Some classifications are grouped into like areas due to having minimal exposure to the network.
2. The 2000 spans identified as TRIP spans have been removed from the Vegetation Classification type (by area method) to ensure transparency that no 'double-up' has occurred with other work programs within Aurora (specifically, the Reliability works program).

11.5 Determination of Annual Work Loads

Using the classification of vegetation types for spans, the annual work cycles and workloads are determined.

As the data from VEGEMITE determines where the work is (on a span by span basis), it is also possible to determine the percentage of spans requiring works on a particular feeder, and within a particular vegetation classification.

Table 2:Annual work loads (December 2010)

Vegetation Classification	Number of Spans	Number of Spans Inspected per Year	Estimated % Inspected Spans Requiring Work	Number of Inspected Spans Requiring Work
Cleared – Grassland	119,293	59,647 (50%)	35	21,113
Urban (Cleared)	28,776	28,776 (100%)	35	10,072
Moorland / Heathland Complex	6,997	3,499 (50%)	42	1,477
Woodland Wet	15,024	7,512 (50%)	48	3,595
Woodland Dry	40,161	20,081 (50%)	35	7,114
Reliability Program (TRIP)	2,000	2,000 (100%)	100	2,000
Total	**212,251**	**121,514**		**45,369**

This data enables Aurora to calculate the average number of spans that will require works over the next three clearing cycles (or next 6 years).

Based upon these calculations Aurora will be required to action on average approximately 45,000 spans per year over the period of the Pricing Determination.

11.6 Pricing Methodology

Whilst the strategic and management activities of the vegetation program are determined within Aurora, all field works (requiring tree trimming or removal) is done through Aurora's external Tree Clearing Contractors.

The Competitive Tender process used by Aurora ensures prices are market tested and are the best available. It is envisaged that these contracts will be re-tendered again during 2011.

Additionally, through the introduction of improved reporting, Aurora has implemented a process that monitors contractor productivity by determining cost per unit of work in various work categories.

This process not only ensures Aurora has up to date information regarding the costs associated with individual tree related activities (such as '$ per trim', '$ per removal category'), but also allows Aurora to compare productivity between contracting companies, regions and feeders throughout the State.

By using the contractor time sheet information, it is possible to determine the costs for associated works categories. Works categories include:

1. $ per trim
2. $ per removal of tree between 100mm and 300mm DBH
3. $ per removal of tree between 300mm and 450mm DBH

4. $ per removal of tree between 450mm and 750mm DBH
5. $ per removal of tree greater than 750mm DBH
6. $ per removal of scrub (<100mm DBH) per m2

Although costs per work category will vary from week to week, State-wide averages calculated over an extended period of time allow for these variations and provides a stable basis for modelling calculations.

It is recognised that works in Urban areas is more expensive to undertake than in Rural areas due to additional costs associated with a variety of factors such as:

1. Traffic management
2. Pedestrian and worksite management
3. Confined workspaces (e.g.: trees in front yards and on nature strips)
4. Limited removal rates
5. Requirement for alternative cutting methods
6. Extended negotiations
7. Council and stakeholder requirements

Therefore average cost per work categories therefore have been separated into Urban and Rural areas.

Table 3: Average cost per work category

Work Category	Average Cost – Rural ($)	Average Cost – Urban ($)
Trees Trimmed	85.84	104.98
Trees Removed – 100mm < 300mm DBH	30.37	58.06
Trees Removed – 300mm < 450mm DBH	147.84	331.70
Trees Removed – 450mm < 750mm DBH	289.90	865.78
Trees Removed – >750mm DBH	655.84	1,479.70
Scrub Control	2.90	NA

11.7 Span-by-Span Costs

As discussed previously, the various 'Cut Type' implemented within each span will ultimately determine the cost for each span.

During 2010/2011, the cost to clear vegetation per span actioned ($7.55M divided by 45,000 spans actioned) has averaged approximately $170.

Aurora's Distribution Business has set a strategic objective of *not adding to an increase in customer prices as a result of our efforts*. It is envisaged that for the Vegetation Management Program, this goal will be achieved by efficiencies gained through:

1. Restructure of internal vegetation management team;

2. Restructure of the external vegetation management contract models;
3. Review of 'Cut Type' undertaken within each span; and
4. Review of current risk profiles associated with vegetation management.

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11.8 Additional Program Costs

Additional to the unit rates calculated above, Aurora also incurs annual internal costs due to works associated with:

1. System switchings – to de-energise the line for our vegetation contractors; and
2. Live Line – whereby the lines cannot be de-energised and specialist resources are used.

These costs are based upon historic work volumes and costs and are shown separately within Table 4.

12. RESPONSIBILITES

Maintenance and implementation of this management plan is the responsibility of the Bushfire Mitigation Manager.

Approval of this management plan is the responsibility of the Group Manager – Asset Performance and Information.

13. REFERENCES

1. NW-#30065608 - Network Management Strategy
2. NW-#10247841– Policy - Vegetation Management Near Powerlines NN R EC 04
3. NW-#30165740 - Vegetation Management Strategy
4. NW-#30146570 – Bushfire Mitigation Management Strategy
5. NW-#30170189 - Management Plan - Bushfire Mitigation – Vegetation
6. NW-#30043347 - Management Plan - Fire Mitigation (Asset Programs)
7. NW-#10265144 - Risk Treatment Management Plan
8. NW-#30057463 - Procedure – Safe Vegetation Management Near Overhead Powerlines – NP R EC 07
9. NW-#10149822 - Procedure - Inspection And Defect Rectification Of Privately Owned Powerlines NP R EC 23
10. NW-#10273136 – Policy - Distribution Technical Design, Construction and Maintenance Standards NP R AM 01
11. NW-#10277265 – Manual - Distribution Overhead Line Design and Construction Standard DS D OH 1
12. NW-#10149719 – Policy Inspection And Maintenance Of Overhead Lines - NN R AM 05
13. NW-#30161322- Management Plan 2011: Overhead System and Structures
14. NW-#30014040 – Procedure - Identification and management of overhead line defect components Procedure NP R AM 03

Appendix A Definitions

Extracts from TEC Chapter 8A Distribution Powerline Vegetation Management, Clause 8A.2.2 - Vegetation Management

Clearance Space	The *clearance space* varies with the type of *distribution powerline* installed and the risk of the ignition of fire at that location (refer clauses 8A.3.2 and 8A.3.3). The *clearance space* is designed to provide fire safety in *low to moderate fire risk areas* and *high to very high fire risk areas* and reliability and continuity of electricity *supply*. The dimensions of the clearance space have been determined following consideration of the effect of adverse environmental and weather conditions (refer clause 8A.3.4).
Regrowth Space	The *regrowth space* required varies with the species of vegetation, the quality of the pruning or clearing, the micro-environment and the *pruning and clearing cycle*. Determining the regrowth rate is a matter of considering the factors involved. It should be assessed with the support of expert knowledge in vegetation management and following consultation with affected persons.
Hazard Space	The *Distribution Network Service Provider* should take appropriate action in relation to trees and limbs in the *hazard space* to ensure the safety and reliability of the *distribution powerline*. The *hazard space* will vary with the species of vegetation and the extent of exposure to adverse weather conditions. The hazard space should be determined with reference to these factors and assessed with the support of vegetation management and arboriculture expertise, following consultation with affected persons.
Pruning and Clearing Cycle	The pruning and clearing cycle is based on practical factors which include cost, local growing conditions and the anticipated vigour of the regrowth of species involved, coupled with the use of the land, community values and the utility and amenity the vegetation provides to the area. The pruning and clearing cycle need not be the same for all areas, but will be determined according to conditions in a particular location.