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Our Ref:
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6 November 2014

Mr Glenn Appleyard
Chairman
Office of the Tasmanian Economic Regulator
GPO Box 770
HOBART TAS 7001

Attention: Mr Ray Chan

Dear Mr Appleyard,

CODE CHANGE REQUEST: CHAPTER 8A, BUSHFIRE MITIGATION

As a result of the outcomes of the 2009 Victorian Bushfires Royal Commission and the Powerline Bushfire Safety Taskforce released in 2011, Aurora undertook a review of its bushfire mitigation strategy in 2011-12. As a result of this review, TasNetworks now proposes a change to the operation of chapter 8A of the Tasmanian Electricity Code (TEC).

That review proposed the development of new bushfire risk areas relative to Aurora's distribution network (now TasNetworks' distribution network). The changed approach means that bushfire mitigation is no longer undertaken using a risk assessment based upon likelihood of a fire being sustained. It is now undertaken using a risk assessment based on the potential loss and damage caused by a fire as modelled.

The new risk areas are categorised using a method different to that presently prescribed by the TEC, but consistent with that used by other distribution businesses to manage their bushfire risks post 2011. Review and/or clarification of the TEC is therefore required to ensure alignment with the more contemporary assessment of TasNetworks' bushfire risk areas.

TasNetworks makes this application in accordance with clause 12.3.2 of the TEC (Code Change submissions) for consideration under clause 12.3.3 (General Code Change Procedure).

Yours sincerely,

Bess Clark
General Manager Strategy & Stakeholder Relations

Current Provisions – Text and History

Section 8A.3.2 currently defines two fire risk areas and reads:

> The risk of fire starting and spreading varies throughout Tasmania. To establish the *clearance space* required, Tasmania has been divided into two categories in which different *clearance space* dimensions apply:
>
> - *low to moderate fire risk areas* (predominantly urban); and
> - *high to very high fire risk areas* (predominantly rural).
>
> (Refer to Tables 1, 2 and 3)
>
> At the boundary of fire risk areas, the *clearance space* requirements of the *high to very high fire risk area* may be applied to the *low to moderate fire risk area* for a distance of 100 metres.
>
> The *Distribution Network Service Provider* should seek advice from the *fire control authority* as to the *fire hazard rating* of the area within which the *Distribution Network Service Provider* proposes to undertake vegetation management activity.
>
> A *high to very high fire risk area* is defined in the TEC as:
>
> - an area for which the *fire control authority* has allocated a fire hazard rating of "high" or "very high".
>
> A *low to moderate fire risk area* is defined in the TEC as:
>
> - an area which:
> - will not be given a *fire hazard rating* by the *fire control authority*; or
> - has been given a *fire hazard rating* of "low" or "moderate" by the *fire control authority*.

These fire risk areas were derived from raw vegetation and seasonal climatic conditions, and indicate the likelihood of a fire being sustained in that area. The four risk areas were last categorised by the Tasmanian Fire Service in 1995.

TasNetworks (formerly Aurora Energy) has historically focused all bushfire mitigation works in the high fire risk areas and very high fire risk areas which effectively means that TasNetworks operates within two bushfire risk areas state-wide, being:

- low bushfire risk areas (being the combined low fire risk areas and moderate fire risk areas); and
- high bushfire risk areas (being the combined high fire risk areas and very high fire risk areas), which contain approximately 65% of TasNetworks' poles.

The Tasmanian Fire Service and Aurora risk areas are illustrated in the diagrams below.

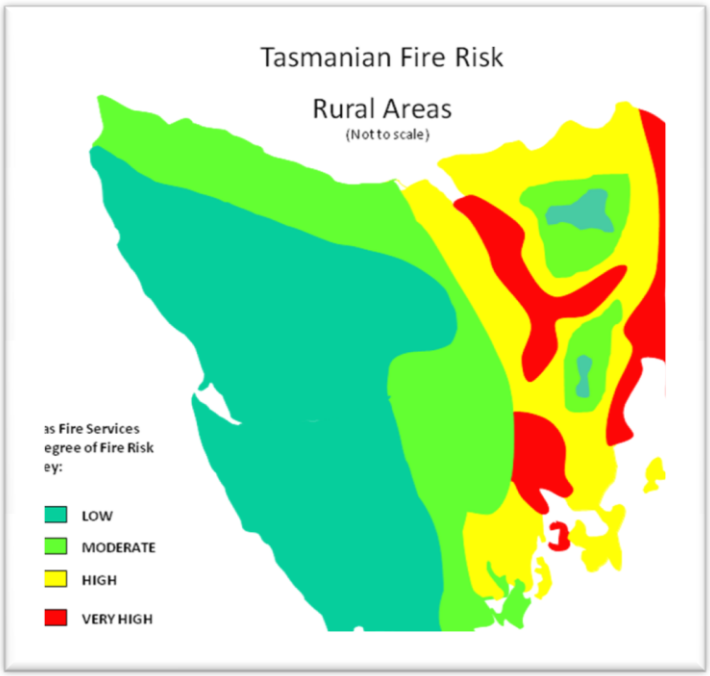

Figure 1: Bushfire Risk Areas (1995)

Figure 2: Combined Bushfire Risk Areas (1995)

Motivation for Change

The Victorian Bushfires Royal Commission (VBRC) was set up to inquire and report upon the Black Saturday bushfires of 2009, these fires resulted in unprecedented and catastrophic loss of life and property. The Powerline Bushfire Safety Taskforce was established to review all options to reduce the risk of catastrophic bushfires from the electricity supply in Victoria. The reports and PHOENIX Rapidfire tool endorsed by these two bodies have informed TasNetworks' approach to vegetation management.

New loss consequence categories

Whilst there has been no change to TasNetworks' (and previously Aurora's) risk framework, the PHOENIX Rapidfire bushfire tool (PHOENIX) has added the ability to generate models of specific fire events and allocate loss consequence categories which directly relate to Tasmania specific circumstances.

How PHOENIX models fire behaviour

PHOENIX operates in a landscape divided into uniform sized square cells. Each cell has 31 attributes which are either used as inputs or outputs to the simulation. Changes to those inputs, such as fire management practices or topography, are then modelled using a spread algorithm for impact based on point rate of spread, flame height, and fireline intensity.
The results of the scenarios as modelled by PHOENIX are assessed for impact and consequence and are then fed into the bushfire mitigation strategies of the business.

Modelling and input data

PHOENIX has been applied to Tasmania, looking specifically at the potential loss caused by a fire starting at a known point near the electricity distribution network on a day of extreme localised climatic predictions.

The inputs to the model include fuels, weather, topography, fire suppression levels, assets and their values and scenario conditions. Fuel types across Tasmania are based on a classification of the native vegetation types, tree plantations and agricultural types mapped across the State.

- Fire history and plantation age is used to estimate the state of the fire fuels used in the modelling process.
- Roads and rivers were used to identify areas of fuel breaks, with approximate widths of fuel-free areas assigned according to the classification of specific roads and rivers.
- Grass curing information was not readily available, so all grass was assumed to be cured to the same degree. Two levels were used – 80% cured[1]* and 100% cured.
- Residential areas were mapped from a combined set of data. One set was based on house locations; the other based on smaller settlements, with a combined residential data layer showing approximate house density.
- Weather data was based on gridded weather forecast data from the Bureau of Meteorology (BoM) for the 25th and 26th February 2012. This represented a severe run of fire weather which was considered by experienced Tasmanian Parks and Wildlife Service staff to adequately represent the 95 percentile of bushfire weather events for Tasmania.
- Ignition points were based on a two kilometre grid across the whole State where the grid points were within one kilometre of a power transmission line. The grid, containing 5,694 ignition points across the State, was prepared by TasNetworks.

TasNetworks submitted the following scenarios for modelling:

- Grassland 80% cured (standard weather)
- Grassland 100% cured (standard weather)
- Relative Humidity 50% lower, 80% cured (lower RH values by 50%, grassland curing 80%)
- Relative Humidity 50% lower, 100% cured (lower RH values by 50%, grassland curing 100%)
- Wind speed + 50 km/hr/ 80% cured (increase wind speed by 50%, grassland curing 80%)
- Wind speed + 50 km/hr/ 100% cured (increase wind speed by 50%, grassland curing 100%)
- Wind speed + 50 km/hr (increase wind speed by 50 km/hr)

All modelling was based upon the ignition source being a TasNetworks asset. There was no modelling conducted for those areas where there are no TasNetworks assets.

[1] Cured means dried and either dead or dormant

Results and determining consequence

The results of the modelling performed by PHOENIX estimates the probability of fire and its impact depending on the input values. The assessment of 'consequence' is relative term which is not determined by those results, but rather by TasNetworks ascribing value to an asset that can be affected by fire. The results show that many of the most potentially damaging fires can start up to 30 kilometres from high loss consequence communities, because of the large stretch of fuel required to build up sufficient size and energy to cause harm.

In respect of TasNetworks' bushfire strategy, 'bushfire loss consequence' means the loss of community houses as a correlation of potential lives lost.

The results modelled from the scenarios described above have been categorised in terms of bushfire loss consequence:

- 'Extreme' being the worst 50% of modelled fire starts in terms of damage ;
- 'Very High' being the next 30% of modelled fire starts in terms of damage;
- 'High' being the next 20% of modelled fire starts in terms of damage.

For comparison purposes, a further model was developed to capture 98% of the Extreme and Very High consequence categories by moving the boundary of the Very High ranking:

- 'Extreme' being the worst 50% of modelled fire starts in terms of damage ;
- 'Very High' being the next 48% of modelled fire starts in terms of damage;
- 'High' being the next 2% of modelled fire starts in terms of damage.

Modelled bushfire loss consequence areas

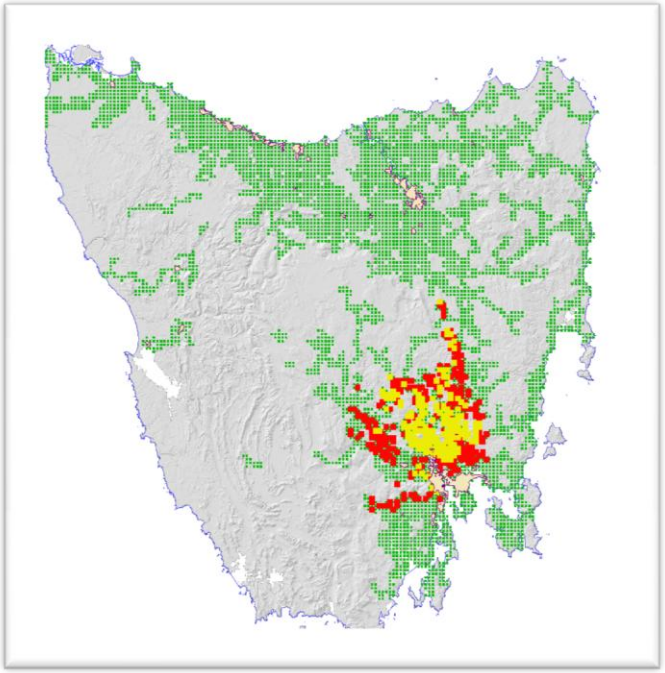

Figure 3: Fire Loss Consequence Model 80%

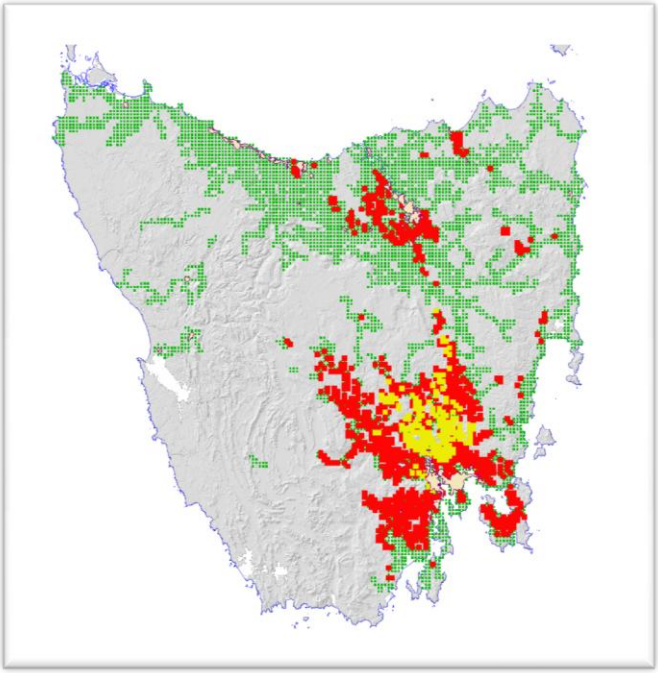

Figure 4: Fire Loss Consequence Model 98%

A buffer of two kilometres was then added to the network at each data point. The resultant polygons ensure that all Extreme and Very High bushfire loss consequence fire start point have a buffer of at least that distance.

Modelled bushfire loss consequence areas including additional buffer zone

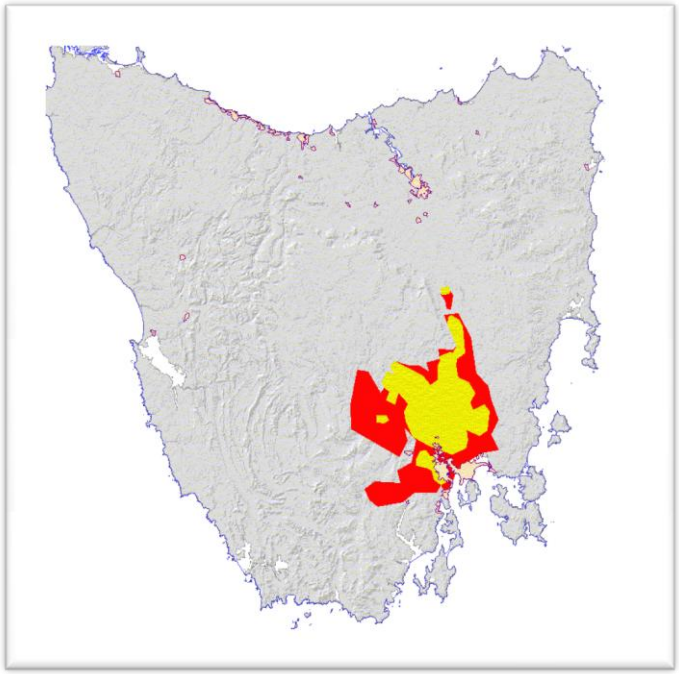

Figure 5: Fire Loss Consequence Model 80%

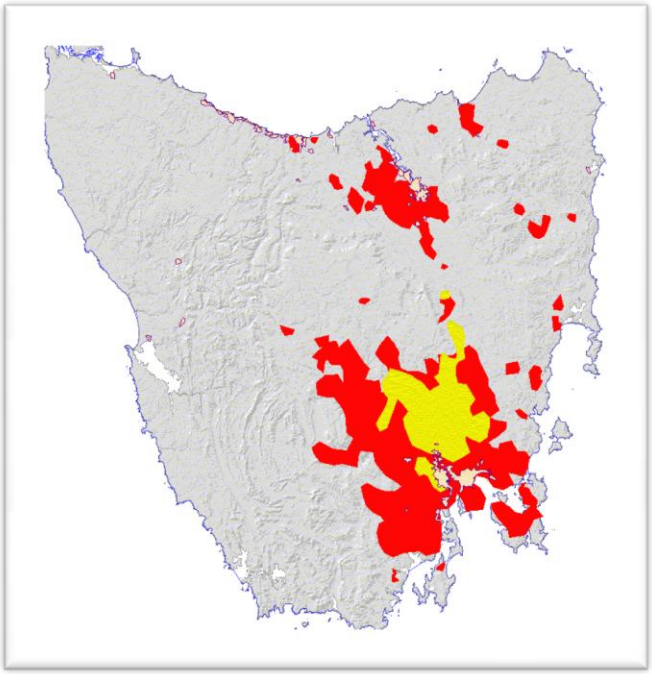

Figure 6: Fire Loss Consequence Model 98%

The modelled fire loss consequence areas were then compared to the original 1995 Aurora fire risk areas. These are shown in the following figures with the 1995 areas shown in pink.

Geographical comparisons with 1995 fire risk areas

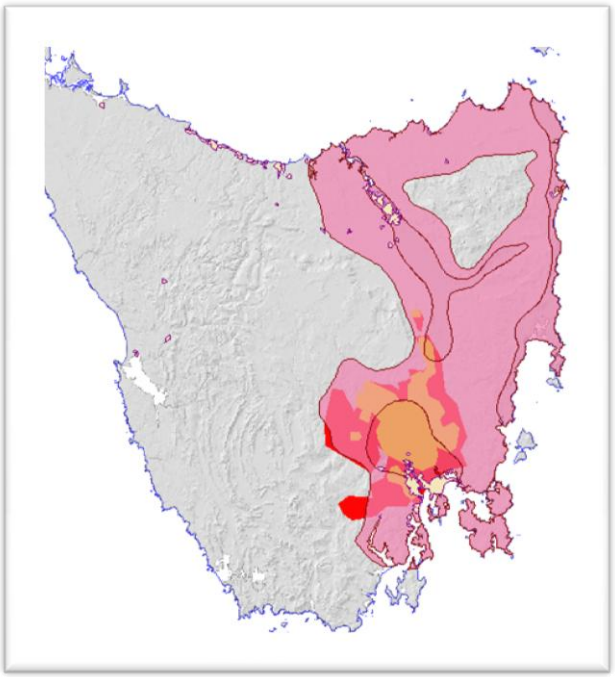

Figure 7: Fire Loss Consequence Model 80%

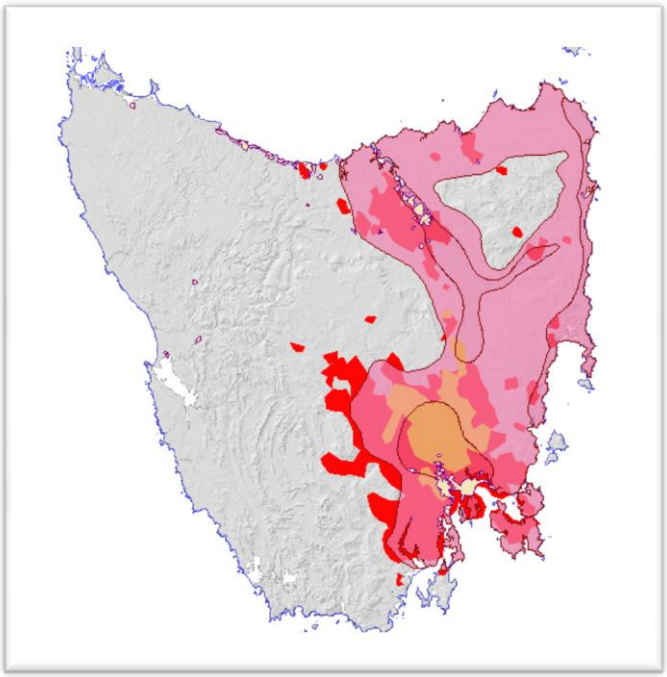

Figure 8: Fire Loss Consequence Model 98%

Asset comparisons

The reduction in geographical area has resulted in a corresponding reduction of the pole population considered in the Extreme or Very High loss consequence categories.

Table 1: 1995 and 2012 modelling pole population and geographical area comparison

Schema	Poles within the Area	Area
1995 Fire Risk Area	143,648	22,851 km^2
2012 Fire Loss Consequence (80 %)	33,353	6,879 km^2
2012 Fire Loss Consequence (98 %)	80,272	12,329 km^2

Application and implementation

The result of the modelling indicates that a large proportion of the State's fire loss consequence can be mitigated by targeting a relatively small proportion of assets. This will result in efficiencies in TasNetworks' bushfire mitigation program that will result in savings to TasNetworks' customers.

Whilst the nature and function of TasNetworks' bushfire mitigation activities has not changed, using these new loss categories means that TasNetworks' activities are prioritised in different areas than if the current TEC fire risk categories were used to prioritise this work.

Whilst a considerable percentage of the areas covered by the 1995 model are still included in the 80% model, there are new areas outside those identified in 1995 that are identified using the 98% model. These new areas are to the west of Hobart and in some new isolated small pockets.

<u>Cyclic cutting practices</u>

Bushfire mitigation activities are additional to the cyclic cutting activities that are performed by TasNetworks to reduce interruptions to supply and minimise potential fire hazards caused by vegetation and distribution powerline interaction. This program has been based upon the fire risk categories within the TEC and has resulted in the adoption of two cutting areas.

These two areas can be predominantly classified as either 'urban' (low and moderate fire risk) or 'rural' (high and very high fire risk) and for efficiency TasNetworks has implemented a standard cutting practice based upon these distinctions. This practice means that TasNetworks only adopts the low to moderate fire risk cutting standards in 'urban' areas and adopts the higher standard in all other parts of the state.

Interaction between cyclic cutting and bushfire mitigation cutting practices

TasNetworks vegetation management therefore has two aspects:

1. Regular cyclic cutting will take place across Tasmania: urban regions will be cut to low risk area specifications and rural regions will be cut to high risk area specifications.
2. During that cutting cycle, bushfire mitigation cutting will also take place: after the initial cyclic cut is made to the applicable specification for the area, documentation of overhang will be assessed and documented by a suitably qualified person, and cut where appropriate.

Changes proposed

TasNetworks proposes that the TEC is modified to reflect the efficiencies that have been identified by TasNetworks with the adoption of urban and rural vegetation practices whilst also maintaining a higher standard for vegetation practices that recognise the risk of fire starts that are in line with contemporary practices.

TasNetworks proposes that private overhead powerlines are also subject to regulation in respect of safe clearances of vegetation by the TasNetworks' Service and Installation Rules which apply to customers through either their Deemed Supply Contract or another supply contract the customer has with TasNetworks.

There are also a number of subsequent administrative changes that TasNetworks recommends.

TasNetworks proposes that the Note to **Clause 8A.1.1** is amended as follows:

> ***Note***
> ~~*Aurora*~~ *TasNetworks* is the licensed *Distribution Network Service Provider* on mainland Tasmania and the *Hydro-Electric Corporation* is the licensed *Distribution Network Service Provider* on the *Bass Strait Islands*.

TasNetworks proposes that **Clause 8A.2.2** is amended at (a) as follows:

> (a) 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).

TasNetworks proposes that **Clause 8A.2.4** is amended at paragraph 3 as follows:

> Before commencement of pruning and clearing the *Distribution Network Service Provider* should identify where the maintenance of the *clearance space*, the *regrowth space* and the *hazard space* may be detrimental to important vegetation. The *Distribution Network Service Provider* should seek advice from the relevant authorities, for example the Department of Primary Industries, Parks, ~~and~~ Water and Environment, and local government, as well as land care and community groups as advised by the relevant authorities, to identify 'important vegetation'.

TasNetworks proposes that **Clause 8A.2.5** is amended at paragraph 2 as follows:

> Before commencement of pruning and clearing the *Distribution Network Service Provider* should identify where the maintenance of the *clearance space*, the *regrowth space* and the *hazard space* may be detrimental to an important location. The *Distribution Network Service Provider* should seek advice from the relevant authorities, for example the Department of Primary Industries, Parks, ~~and~~ Water and Environment, and local government, as well as community groups as advised by the relevant authorities, to identify 'important locations'.

TasNetworks proposes that **Clause 8A.3.2** is amended as follows:

> The risk of fire starting and spreading varies throughout Tasmania. To establish the clearance space required, Tasmania has been divided into two categories in which different clearance space dimensions apply:
>
> - *low* ~~*to moderate*~~ *fire risk areas* (predominantly urban); and
> - *high* ~~*to very high*~~ *fire risk areas* (predominantly rural).
>
> At the boundary of fire risk areas, the *clearance space* requirements of the ~~*high to very high fire risk area*~~ may be applied to the *low* ~~*to moderate*~~ *fire risk area* for a distance of 100 metres.
>
> ~~The *Distribution Network Service Provider* should seek advice from the *fire control authority* as to the *fire hazard rating* of the area within which the *Distribution Network Service Provider* proposes to undertake vegetation management activity.~~

TasNetworks proposes that **Clause 8A.3.4** is amended as follows:

8A.3.4 Clearance Space Dimensions

(a) The dimensions of the clearance space in *low ~~to moderate~~ fire risk* areas and *~~high to very~~ high fire risk areas* for *high voltage* and *low voltage distribution powerlines* constructed with *aerial bundled cable* and *insulated service cable* are those prescribed in Table 1. For *low ~~to moderate~~ fire risk areas* only, the clearance space for aerial bundled cable at the pole as specified in column 1 of Table 1 may be reduced where tree trunks and limbs near the aerial bundled cable present no risk of abrasion. For *low ~~to moderate~~ fire risk areas* only, the clearance space between aerial bundled cable and foliage may also be reduced to allow foliage, which has insufficient strength to abrade the cable for the duration of the pruning and clearing cycle, to remain in contact with the aerial bundled cable.

(b) The vertical dimensions of the *clearance space* for *low ~~to moderate~~ fire risk areas* and *~~high to very~~ high fire risk areas* for *distribution powerlines* other than those constructed with *aerial bundled cable* and *insulated service cable* and for the operating voltages given are those prescribed in Table 2.

(c) The horizontal dimensions of the *clearance space* for *low ~~to moderate~~ fire risk areas* and *~~high to very~~ high fire risk areas* for *distribution powerlines* other than those constructed with *aerial bundled cable* and *insulated service cable* and for the operating voltages given are those prescribed in Table 3.

Notes Relating to the Tables

1. All dimensions given in the Tables are from a *distribution powerline* conductor in still air and account for the sag and sway of the conductor. For slender vegetation species and other unique situations, additional allowances may be necessary.

2. In *low ~~to moderate~~ fire risk areas* allowing limbs and foliage to grow over the *distribution powerline* from adjacent vegetation is ~~strongly~~ discouraged, but permitted. Healthy and stable limbs may remain as shown in Figure 3 provided the tree does not readily provide access to the *distribution powerline* ~~and the voltage of the distribution powerline does not exceed 22,000 volts~~.

3. In ~~*low to moderate*~~ *high fire risk areas* where the *voltage* of the *distribution powerline* is equal to or exceeds ~~22~~ 11,000 volts ~~and in *high to very high fire risk areas*~~ foliage overhang of the *distribution powerline* from adjacent vegetation is strongly discouraged.

   Foliage overhang of the *distribution powerline* may only occur where such cases have been assessed by a suitably trained and qualified person as safe.

Within *High Bushfire Loss Consequence Areas* a suitably trained and qualified person shall additionally inspect overhanging limbs and foliage and where hazards are identified a risk assessment shall be undertaken and recorded. This risk assessment shall form the basis of the action necessary to manage or remove the hazard.

Figure 4 shows the ideal situation for ~~*high to very *~~*high fire risk areas*.

4. For *aerial bundled cable* and *insulated service cable* the *clearance space* can generally be in the form of a circle in *low ~~to moderate~~ fire risk areas* and ~~*high to very *~~*high fire risk areas*.

TasNetworks proposes that **Clause 8A.4.2** is amended as follows:

~~Clause 8.6.2(a)(9) of this Code requires that a~~ A *Distribution Network Service Provider* must ensure that the ~~tariff~~ *Service and Installation Rules* applicable to a *Customer* or an *individual contract* between a *Customer* and a *Distribution Network Service Provider* provides that a *Customer* must, at its own expense, maintain safe clearances between vegetation on the *Customer's* property and *electrical infrastructure* providing *supply* to the *Customer's electrical installation*.

For the purpose of this clause 8A.4.2, safe clearances between vegetation on the *Customer*'s property and *electrical infrastructure* providing *supply* to the *Customer*'s *electrical installation* must be consistent with the relevant *clearance space* prescribed in clause 8A.3.4 with the exception that Note 3. does not apply.

TasNetworks proposes that the heading for **Figure 1** is amended as follows:

Figure 1 LOW ~~TO MODERATE~~ & ~~HIGH TO VERY~~ HIGH FIRE RISK AREAS

TasNetworks proposes that the heading for **Table 1** is amended as follows:

Table 1: Low ~~to Moderate~~ and ~~High to Very~~ High Fire Risk Areas

TasNetworks proposes that the heading for **Figure 2** is amended as follows:

Figure 2 LOW ~~TO MODERATE~~ & ~~HIGH TO VERY~~ HIGH FIRE RISK AREAS

TasNetworks proposes that the heading for **Table 2** is amended as follows:

Table 2: Low ~~to Moderate~~ and ~~High to Very~~ High Fire Risk Areas

TasNetworks proposes that the heading for **Figure 3** is amended as follows:

Figure 3 LOW ~~TO MODERATE~~ FIRE RISK AREAS

TasNetworks proposes that the heading for **Table 3** is amended as follows:

Table 3: Low ~~to Moderate~~ and ~~High to Very~~ High Fire Risk Areas

TasNetworks proposes that the heading for **Figure 4** is amended as follows:

Figure 4 ~~HIGH TO VERY~~ HIGH FIRE RISK AREAS

The definitions of *low to moderate fire risk area* and *high to very high fire risk area* in Chapter 14 of the TEC will need to be amended and it suggested that the following definitions are inserted in their place:

> *Low fire risk area* is an area that is listed as an 'Urban' area in accordance with the TASVEG 3.0 vector of The List online service, produced by the Department of Primary Industries, Parks, Water and Environment, or as succeeded from time to time.
>
> *High fire risk area* is an area that is not a *low fire risk area*.

TasNetworks proposes that the following additional definitions are also included in Chapter 14 of the TEC.

> *Bushfire loss consequence* means the loss of community houses as a correlation of potential lives lost.
>
> *Extreme Loss Consequence* means the worst 50% of modelled fire starts in terms of damage utilising a *fire control authority* endorsed bushfire hazard assessment tool.
>
> *High Bushfire Loss Consequence Area* is an area categorised as *Extreme Loss Consequence* or *Very High Loss Consequence*.
>
> *Service and Installation Rules* means the Service and Installation Rules published by a *Distribution Network Service Provider*.
>
> *TasNetworks* – Tasmanian Networks Pty Ltd ACN 167 357 299
>
> *Very High Loss Consequence* means the second worst 30% of modelled fire starts in terms of damage utilising a *fire control authority* endorsed bushfire hazard assessment tool.