

Transmission Category Analysis RIN, 2018-19

Basis of Preparation

Introduction

TasNetworks (Tasmanian Networks Pty Ltd, ABN 24 167 357 299) is the owner and operator of the electricity transmission network in Tasmania.

This Basis of Preparation (BoP) forms part of the response of TasNetworks to the Regulatory Information Notice (RIN) issued in March 2014 by the Australian Energy Regulator (AER), under Division 4 of Part 3 of the National Electricity (Tasmania) Law, for the purposes of collecting information for category analysis.

The information and explanatory material included in this BoP relate to TasNetworks' activities as Tasmania's licensed Transmission Network Service Provider (TNSP) during the 2018-19 Regulatory Year (referred to throughout this document as the current reporting period).

AER's Instructions

The AER's instructions in completing the category analysis RIN is to provide a BoP that demonstrates how the information provided in response to the RIN request complies with the requirement of the RIN. The minimum requirements of the BoP as per schedule 2 of the notice are set out below

Table 1 - AER Requirements of the BoP

1.2 (a)	demonstrate how the information provided is consistent with the requirements of the notice.
(b)	explain the source from which we obtained the information provided.
(c)	explain the methodology we applied to provide the required information, including any assumptions made.
(d)	explain, in circumstances where we cannot provide input for a variable using actual information and therefore must provide input using estimated information: (i) why an estimate was required, including why it was not possible to use actual information; (ii) the basis for the estimate, including the approach used, assumptions made and reasons why the estimate is our best estimate, given the information sought in the notice.

Definitions and interpretation

AER	Australian Energy Regulator
CAM	Cost Allocation Method
DM	TasNetworks' Electronic Document Management System
DNSP	Distribution Network Service Provider
Gentrack	TasNetworks' Electronic Document Management System
GTech	Intergraph G/Technology geographic information system
OTTER	Office of the Tasmanian Economic Regulator
POW	Programme of Work
RIN	Regulatory Information Notice
SAIDI	System Average Interruption Duration Index
SAIFI	System Average Interruption Frequency Index
SAP	TasNetworks' asset management, finance, procurement, human resources and payroll system
SCS	Standard Control Services
SDW	Spatial Data Warehouse
SOM	TasNetworks' Service Order Management system
WASP	TasNetworks' program-of-work management system (Works, Assets, Solutions and People)
UG	Underground (cable)
Telecommunications	Encompasses any telecommunications related asset
Secondary Systems	Encompasses protection systems, SCADA and Network Control
Substations Primary Systems	Encompasses power transformers, switchbays, transmission cables and reactive plant
Transmission Lines	Encompasses towers, support structures and conductors
TasNetworks	Refers to Tasmanian Networks Pty Ltd, acting in its capacity as a licensed Transmission Network Service Provider in the Tasmanian jurisdiction of the National Electricity Market.

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Template 2.1 Expenditure summary

Table 2.1.1: Prescribed transmission services capital expenditure	Consistency of information with the requirements of the RIN The prescribed transmission services capital expenditure information is calculated from worksheets within the RIN with a separate balancing items spreadsheet included and is reported on an 'as-incurred' basis as per the requirements of the RIN.
	Source of information <ul style="list-style-type: none"> Worksheets 2.2 – 2.10 of the RIN.
	Methodology and assumptions made <ul style="list-style-type: none"> Information provided in template 2.1.1 has been reconciled to the amounts reported in the Regulatory financial statements and a list of balancing items has been prepared to clarify differences between the RIN and regulatory financial statements.
	Use of estimates No estimates have been required in the collation and presentation of this information.
Table 2.1.2: Prescribed transmission services operating expenditure	Consistency of information with the requirements of the RIN The prescribed transmission services operating expenditure information is calculated from worksheets within the RIN on an 'as-incurred' basis as per the requirements of the RIN.
	Source of information <ul style="list-style-type: none"> Worksheets 2.5 - 2.10 of the RIN.
	Methodology and assumptions made Information provided in template 2.1 has been reconciled to the amounts reported in the Regulatory financial statements and a list of balancing items has been prepared to clarify differences between the RIN and regulatory financial statements.
	Use of estimates No estimates have been used in the collation and presentation of this information.

Template 2.2 Replacement expenditure

Table 2.2.1: Expenditure and replacement volumes by asset category	Consistency of information with the requirements of the RIN <ul style="list-style-type: none"> Information presented has been split in accordance with the categories in the templates. The corresponding asset age profile has been provided as required. As per the requirement of the RIN, the replacement volumes and expenditure are consistent with data provided in table 2.2.2 and 2.1.1. Assets of categories not owned by TasNetworks has been marked as '0' as required by the RIN instructions.
	Source of information <p><i>Financial</i></p> <p>All financial information was sourced from SAP and the Regulatory Financial Statements.</p> <p><i>Substation switchbays, Power Transformers, Reactive Plant and Transmission cables</i></p> <p>Substation Primary Systems replacement data has been sourced from the SAP Asset Register and failure information has been sourced from the SAP defects register and confirmed against failure reports.</p> <p><i>Conductors</i></p> <p>Transmission Lines asset replacement data has been sourced from TasNetworks' asset register and asset failure information has been sourced from SAP. Where source data was inadequate, conductor replacement values have been inputted manually based on local knowledge.</p> <p><i>SCADA, network control and protection systems</i></p> <ul style="list-style-type: none"> Telecommunications data has been sourced from operational drawings, the Telecommunications Asset Registers and the Telecommunications Network Management System. This information includes Telecommunication bearers, Ethernet and telephony assets. Secondary Systems asset replacement and failure information has been sourced from the SAP.
	Methodology and assumptions made <p><i>Financial</i></p> <ul style="list-style-type: none"> The financial data in Table 2.2.1 has been apportioned across categories using financial information for that year from SAP and the volumes of replacements. <p><i>Transmission Lines - general</i></p> <ul style="list-style-type: none"> TasNetworks' owned asset replacements were sourced from SAP, filtering by assets with a commissioning date in the current reporting period. Due to changes in asset systems 2016/17 tower and conductor data has been updated based on replacement projects completed in 2017/18. Asset replacements resulting from augmentation projects were excluded. Where TasNetworks has strung a single circuit in a double circuit configuration, this has been classified as double circuit, due to the increased operational cost resulting from such an arrangement. Optical Ground Wire (OPGW) data was taken from TasNetworks' geographical information systems. Assets of categories not owned by TasNetworks has been marked as '0' as required by the RIN instructions. Transmission conductor length is represented as circuit length, this is due to it being previously recorded as such. Failure data is sourced from SAP. Where no failures have been recorded a zero is recorded against the respective asset classes.

Transmission tower support structures

The support structures category includes only the following: anodes, foundations, insulators and danger signs. SAP values detail the number at each tower.

Transmission line conductor

Transmission conductor length is represented as circuit length (in metres), this is due to it being previously recorded as such.

Transmission Lines Other

- This category consists of: dampers, tracks, support structures and weather stations. This is due to these assets not being represented elsewhere in the REPEX section of the RIN. Replaced volume is not reported in the RIN due to the different nature of the items included.

Transmission cables

There were no transmission cable replacements or failures in the reporting period.

Substation Reactive Plant

There were no reactive plant replacements or failures in the reporting period.

Substation switchbays

- Historical information has been sourced from the SAP asset register using Business Intelligence reporting sorted for assets that have been commissioned during the current reporting period. Only assets that were identified as replacement were included in the asset count. This was confirmed against section 2.3 and 5.2.
- We are reporting against two criteria, expected to align with what is believed other utilities adhere to. That is to group into GIS switchgear and air insulated switchgear:
- GIS switchgear is typically indoor sealed units with SF6 gas insulation encompassing the switch gear mechanism including bus bar chambers and instrument transformers (all encased).
- Air insulated switchgear in higher voltage levels (>44kV) is typically outdoor with separate disconnectors and instrument transformers although dead tank circuit breakers do have integral CT's. Voltage levels less than 44 kV are typically indoor and can have oil, vacuum, air or SF6 gas insulation medium with separate instrument transformers but within the same "air insulated" enclosure. As a result of this the following summated asset counts has been prepared.

Asset Category	Asset replacements for current reporting period
< = 33 kV ; AIR INSULATED CIRCUIT BREAKER	0
< ≈ 33 kV; VACUUM INSULATED CIRCUIT BREAKER	34
< ≈ 33 kV; OIL INSULATED CIRCUIT BREAKER	0
< ≈ 33 kV; SF6 INSULATED CIRCUIT BREAKER	0
<i>Reported as</i> < = 33 kV ; AIR INSULATED CIRCUIT BREAKER	34
> 33 kV & < ≈ 66 kV ; OIL INSULATED CIRCUIT BREAKER	0

	> 33 kV & < ≈ 66 kV ; SF6 INSULATED CIRCUIT BREAKER	0
	<i>Reported as > 33 kV & < = 66 kV; AIR INSULATED CIRCUIT BREAKER</i>	0
	> 66 kV & < ≈ 132 kV ; OIL INSULATED CIRCUIT BREAKER	0
	> 66 kV & < ≈ 132 kV ; SF6 INSULATED CIRCUIT BREAKER	0
	<i>Reported as > 66 kV & < ≈ 132 kV; AIR INSULATED CIRCUIT BREAKER</i>	0
	> 132 kV & < ≈ 275 kV ; OIL INSULATED CIRCUIT BREAKER	0
	> 132 kV & < ≈ 275 kV ; SF6 INSULATED CIRCUIT BREAKER	0
	<i>Reported as > 132 kV & < ≈ 275 kV; AIR INSULATED CIRCUIT BREAKER</i>	0
	<ul style="list-style-type: none"> The number of asset failures has been taken from information extracted from SAP 'defects' register using Business Intelligence reporting and confirmed against failure reporting and discussion with substation engineers. An asset failure was summarised to be an event which results in an un-planned outage of plant. Substation other expenditure value comprises assets not specifically captured in other 2.2.1 asset categories. It includes substation specific ancillary and minor assets including battery systems, AC distribution systems, security systems, fences, oil containment systems, etc. Substation other is not recorded in 5.2.1 as it does not constitute a major asset class. Due to historical asset delineation between previous separate transmission and distribution companies, assets ≤44kV at a transmission substation are classed as transmission assets. Assets connected downstream from the load side connection of a transmission asset are assumed to be a distribution owned assets. 	
	SCADA, telecommunications, network control and protection systems <ul style="list-style-type: none"> The telecommunications replacements for the financial year use installed dates and removal dates in the SAP master data and in legacy asset registers. There is a transition period from these legacy registers to SAP master data. Currently the SAP master data was not complete enough to use in the current submission, therefore the legacy asset registers was used instead. The number of asset failures for Telecommunications Network / Systems has been sourced from fault records extracted from the TasNetworks Telecommunications Network Management Systems. These failures are either automatically reported by self-monitoring assets/site supervisory systems or manually by routine/non-routine asset inspections. Asset failure counts do not include failures caused by human error/maloperations. The data extract was filed for the current financial year and a count of the number of failures was derived. Schemes identified as augmentation have been excluded from the total number of schemes commissioned in this financial year. The asset register has an attribute to capture the date a protection or SCADA scheme was commissioned. Existing schemes that were commissioned within the last financial year are counted as asset replacements. Schemes identified as augmentation have been excluded from the total number of schemes commissioned in that financial year. 	

	<ul style="list-style-type: none"> Protection and SCADA device failures are derived from defects or corrective work allocated to assets in the asset register. The number of protection or SCADA scheme failures is the number of defect notifications registered to protection and SCADA equipment in SAP that are deemed as equipment failures only and not related to human error. TasNetworks reports systems and schemes at an aggregate level and therefore does not report these assets at granular level in the templates. This is applicable for the Protection schemes / systems and the Station SCADA and control systems functions only. The other functions listed in the template under this category such as 'Master Station Assets', 'Control equipment / systems', 'Infrastructure: protection and control', 'Metering systems', 'Site establishment', 'communications network assets' and 'Total secondary systems' are assumed to be additional functions that have been added to the template by other participating NSP's and are considered to have already been included in TasNetworks' Protection schemes / systems and the Station SCADA and control systems. <p>Use of estimates</p> <p>No estimates have been used in the collation and presentation of this information.</p>
Table 2.2.2: Selected assets characteristics	<p>Consistency of information with the requirements of the RIN</p> <p>Information presented has been split in accordance with the categories in the templates consistent with the requirements of the RIN.</p> <p>Source of information</p> <ul style="list-style-type: none"> Substations Primary Systems Current commissioned assets numbers have been sourced from SAP <p>Methodology and assumptions made</p> <p>Conductors</p> <ul style="list-style-type: none"> Historical asset replacements were sourced from 2017/18 data has been updated based on replacement projects completed in 2018/19. Asset replacements resulting from augmentation projects were excluded. The following transmission lines were excluded from calculations as they are not owned by TasNetworks: <ul style="list-style-type: none"> TL473 – Bluff Point-Smithton TL474 – Studland Bay Spur TL485 – Musselroe Bay-Derby Assets of categories not owned by TasNetworks has been marked as '0' as required by the RIN instructions. Parallel lines were counted separately, however the values for EB (T) 3.5.1.1 were calculated with parallel lines counted as a single circuit and as such the values in table 2.2.2 and 3.5.1.1 do not reconcile. <p>Substation reactive plant</p> <p>Asset total MVAR was determined by search criteria for assets currently commissioned.</p> <p>Use of estimates</p> <p>No estimates have been used in the collation and presentation of this information.</p>

Template 2.3 Augmentation expenditure

Table 2.3.1: Augex asset data – Substations	Consistency of information with the requirements of the RIN Information has been provided regarding augmentation expenditure in accordance with the requirements and definitions of the RIN.
Table 2.3: Augex asset data – Lines	Source of information Information on the augmentation projects completed in 2018–19 was obtained from the TasNetworks Annual Planning Report 2019. Information on augmentation projects completed in earlier years were copied directly from the 2017–18 RIN template 2.3.
Table 2.3.4: Total Augex expenditure	Methodology and assumptions made Augmentation expenditure is included for the periods required by the RIN as follows: <ul style="list-style-type: none"> • initial regulatory years (2008–09 to 2012–13) • final year of the current regulatory period (1 July 2013 to 30 June 2014 of the 1 July 2009 to 30 June 2014 regulatory control period) • forthcoming regulatory period (1 July 2014 to 30 June 2019) No augmentation projects in the transmission network reached project close in 2018–19. As such, there is no augmentation expenditure additional to the 2017–18 RIN. Use of estimates No estimates have been used in the collation and presentation of this information.

Template 2.5 Connections expenditure

Table 2.5.1: Expenditure on connection projects	Consistency of information with the requirements of the RIN Information has been presented for connections expenditure in accordance with the definitions and requirements of the RIN.
	Source of information Actual incurred connections expenditure has been extracted from the trial balance in the finance system.
	Methodology and assumptions made <ul style="list-style-type: none"> • Total project costs and total labour costs incurred in connections expenditure were extracted from the trial balance in the finance system. Total material costs were derived by taking total labour costs from total project costs. • Contract labour has been considered to be material costs, and only internal labour costs are considered to be labour costs for the purposes of populating table 2.5.1.
	Use of estimates No estimates have been used in the collation and presentation of this information.
Table 2.5.2: Description of connection projects	Consistency of information with the requirements of the RIN Information has been presented for connections expenditure in accordance with the definitions and requirements of the RIN.
	Source of information <ul style="list-style-type: none"> • The descriptions of connection projects undertaken have been sourced from the Certificates of Operational Completion for each project. • Connection point rating information has been sourced from the asset management information system (AMIS).
	Methodology and assumptions made <ul style="list-style-type: none"> • Descriptions of connection projects align with the Regulatory Assets Register and the asset management information system. • The connection MVA ratings provided are based on 'cyclic rating' as required by the RIN. Substation ratings are typically based on nameplate rating from the equipment manufacturer. As TasNetworks does not currently have thermal models of the transformer loading capacity, connection ratings (MVA) provided are a 20% increase of nameplate continuous rating.
	Use of estimates No estimates have been used in the collation and presentation of this information.

Template 2.6 Non-network expenditure

Table 2.6.1: Non-network expenditure	<p>Consistency of information with the requirements of the RIN</p> <p>The information provided for non-network expenditure is consistent with the requirements of the RIN in that we have reported on all asset classes required in table 2.6.1 as well as any asset classes for which we have incurred more than \$1 million or more in nominal capital expenditure over the last five regulatory years.</p> <p>Source of information</p> <ul style="list-style-type: none"> • SAP • Fleet Reports <p>Methodology and assumptions made</p> <p><i>IT and Communications</i></p> <ul style="list-style-type: none"> • Client device expenditure is expenditure that relates to a hardware device that accesses services made available by a server. Items included in this category are the costs associated with our IT service provider, plus all capital expenditure associated with the purchase of desktop computers, laptops, tablets etc. • Recurrent expenditure relates to expenditure that occur on a regular on-going basis and would include the operating labour costs of the IT department, plus all costs associated with landlines, mobile phones, software, data communications etc. • Expenditure included in the non-recurrent expenditure category are items that occur on a non-recurring basis. <p><i>Motor vehicles</i></p> <ul style="list-style-type: none"> • All motor vehicles are split into the relevant RIN category per the category designation generated from the SAP. Costs are then allocated on a proportionate basis per the number of vehicles within each category for determining Opex expenditure. Capex expenditure is the value of additions within the financial year, split into the relevant motor vehicle category. <p>Use of estimates</p> <p>No estimates have been used in the collation and presentation of this information.</p>
Table 2.6.2: Annual descriptor metrics – IT and communications expenditure	<p>Consistency of information with the requirements of the RIN</p> <p>The information provided for non-network expenditure is consistent with the requirements of the RIN.</p> <p>Source of information</p> <p>The descriptor metrics relating to TasNetworks IT & Communications expenditure has been sourced from SAP at the end of the financial year. The numbers provided are as per the TasNetworks' published accounts.</p> <p>Methodology and assumptions made</p> <p>Employee numbers represent total TasNetworks employee numbers as published in the annual accounts.</p> <p>Use of estimates</p> <p>No estimates have been used in the collation and presentation of this information.</p>

Table 2.6.3: Annual descriptor metrics – Motor vehicles	Consistency of information with the requirements of the RIN The information provided for non-network expenditure is consistent with the requirements of the RIN.
	Source of information Information regarding TasNetworks' vehicle fleet has been sourced from <ul style="list-style-type: none"> • SAP • Fleet Reports
	Methodology and assumptions made <i>Kilometres travelled</i> The opening and closing odometer readings for each vehicle were used to calculate the kilometres travelled in the current reporting period, with the kilometres travelled then sorted by category of vehicle and aggregated.
	<i>Proportion of fleet expenditure</i> <ul style="list-style-type: none"> • The proportion of fleet expenditure was derived by: <ul style="list-style-type: none"> ○ gathering motor vehicle expenditure for each vehicle; ○ allocating each motor vehicle to the appropriate asset category as per the RIN template; ○ calculating the total expenditure for each category of motor vehicle; ○ splitting out the cost of each category of vehicle into prescribed and non-prescribed expenditure; and ○ calculating the Regulatory Percentage by dividing prescribed expenditure by total expenditure.
	Use of estimates No estimates have been used in the collation and presentation of this information.

Template 2.7 Vegetation management

Table 2.7.1: Descriptor metrics by zone	<p>Consistency of information with the requirements of the RIN</p> <p>The information provided for vegetation management is consistent with the requirements of the RIN.</p> <p>As part of its licence requirements, TasNetworks produces and maintains an Easement Management Plan and Transmission System Management Plan (TSMP). TasNetworks is not subject to any other external regulatory requirements for vegetation management.</p> <p>TasNetworks internally mitigates its bushfire risk through the implementation of recommendations made within the Easement Management Plan and TSMP. It also undertakes periodic external audits of its vegetation management and bushfire mitigation practices to minimise risk, liability and insurance costs.</p> <p>All vegetation management costs submitted within this RIN can be considered to be the cost associated with TasNetworks' compliance with the TSMP and other, self-imposed standards.</p> <p>A high percentage of TasNetworks transmission lines are located in forested and other rural areas that are populated with rapidly growing species of vegetation.</p>
	<p>Source of information</p> <p><i>Route line length within zone</i></p> <p>The total route line length, is the sum of all the spans and has been sourced from GIS data. It includes all TasNetworks-owned transmission lines, even if not currently in service.</p> <p><i>Number of maintenance spans</i></p> <p>Information has been sourced from completed work orders (from our asset management system) which have been issued to vegetation management contractors.</p> <p><i>Total length of maintenance spans</i></p> <p>Information has been sourced from the asset management information system.</p> <p><i>Average number of trees per maintenance span</i></p> <ul style="list-style-type: none"> • Information regarding the total number of vegetation maintenance spans has been sourced from completed work orders which have been issued to vegetation management contractors; and • Information for the quantification of vegetation density categories was sourced internally through experience of TasNetworks' easements and the types of vegetation typically encountered. • TasNetworks has chosen one vegetation zone across Tasmania. <p><i>Length of vegetation corridors</i></p> <p>Information has been sourced from the geographical information system.</p> <p><i>Average width of vegetation corridors</i></p> <p>Information has been sourced from the geographical information system.</p> <p><i>Average frequency of cutting cycle</i></p> <p>Information has been sourced from the Transmission Line Easement Asset Management Plan.</p>

Methodology and assumptions made

The assumption has been made that the entire network is in one zone only.

Route line length within zone

The total route line length is the sum of all the spans and has been sourced from GIS data. It includes all TasNetworks-owned transmission lines, even if not currently in service.

Number of maintenance spans

- Information has been extracted from the asset management system for completed work orders.
- Where a span has been maintained more than once in the current reporting period, only one maintenance span has been counted.

Total length of maintenance spans

- Information has been sourced from the asset management information system.
- The length of the forward looking span has been used in the calculation of total length of the maintenance span.

Average number of trees per maintenance span

- The density of vegetation within the spans has been determined:
 - using vegetation density data collected by contractors approximately 10 years ago; and/or;
 - By viewing the spans via an online medium (e.g. Google Earth) and, through experience, assigning a particular density to the vegetation in like areas;
 - using data provided by Forestry Tasmania in quantifying 'Medium' vegetation density;
 - By quantifying other vegetation density categories internally through experience of TasNetworks' easements and the types of vegetation typically encountered;
- TasNetworks has interpreted the definition as requiring TasNetworks to report the total number of trees that could require maintenance within a span in which one or more vegetation defects have been identified;
- The average number of trees per vegetation maintenance span has been arrived at by multiplying the span length (for the span where the maintenance was completed) by the easement width by the determined density of vegetation within each of the spans (as discussed in the estimates used section below);
- Historically, TasNetworks' field works management processes, asset information systems and reporting tools have not collected information regarding geography and the height of trees, and hence TasNetworks has not considered these in the calculation of its average number of trees per maintenance span; and
- Where TasNetworks does not have access to vegetation density data, it has excluded those vegetation maintenance spans from its calculations.

Length of vegetation corridors

Information has been sourced from the geographical information system. Where more than one transmission line runs parallel, only one length has been counted as a vegetation corridor.

Average width of vegetation corridors

- The total area of all corridors has been sourced from the geographical information system, applying a 50m or 60m easement width depending on voltage, with these then being merged to create a single area. This area (of all corridors) was then divided by the

	<p>total length of the vegetation corridors as sourced from the geographical information system.</p> <ul style="list-style-type: none"> It has been assumed that 110 kV transmission lines have an easement width of 50m, and 220 kVA lines have a width of 60m and that this width is consistent across our network. <p>Use of estimates</p> <p>Unless specified below, no estimates have been used in the collation and presentation of this information.</p> <p><i>Average number of trees per maintenance span</i></p> <p>The determined density factor has been broken down into four bands, and an estimate has been required to determine the number of trees in each band of density (through practical experience and through an assessment of aerial photos for each easement where vegetation maintenance has occurred). This estimate has been required as information has historically been impracticable to collect and maintain.</p> <ul style="list-style-type: none"> Pasture = 5 trees per Ha Low = 50 trees per Ha Medium = 1300 per Ha (approximately equal to typical Forestry Tasmania plantation density) High = 2000 per Ha <p><i>Average width of vegetation corridors</i></p> <p>TasNetworks has applied standard easement widths in the calculation of this value (as physically maintained by TasNetworks in the field), rather than utilising actual easement widths. In the majority of cases these will be the same. TasNetworks considers the effort required to determine these actual widths to be excessive for the benefit achieved in terms of accuracy and for comparative purposes.</p>
<p>Table 2.7.2: Expenditure metrics by zone</p>	<p>Consistency of information with the requirements of the RIN</p> <p>The information provided for vegetation management is consistent with the requirements of the RIN.</p> <p>As part of its licence requirements, TasNetworks produces and maintains an Easement Management Plan and Transmission System Management Plan (TSMP). TasNetworks is not subject to any other external regulatory requirements for vegetation management.</p> <p>TasNetworks internally mitigates its bushfire risk through the implementation of recommendations made within the Easement Management Plan and TSMP. It also undertakes periodic external audits of its vegetation management and bushfire mitigation practices to minimise risk, liability and insurance costs.</p> <p>All vegetation management costs submitted within this RIN can be considered to be the cost associated with TasNetworks' compliance with the TSMP and other, self-imposed standards.</p> <p>A high percentage of TasNetworks transmission lines are located in forested and other rural areas that are populated with rapidly growing species of vegetation.</p> <p>Source of information</p> <p>The reported vegetation management information has been sourced from SAP.</p> <p>Methodology and assumptions made</p> <ul style="list-style-type: none"> Information was sourced from the general ledger in the finance system by extracting costs by contractor to ascertain the amount spent for contracted services for the current

	<p>reporting period. Work orders were obtained to confirm the nature of the contracted service provided.</p> <ul style="list-style-type: none"> No contractor liaison costs were able to be sourced from contractor work orders. As such, any contractor liaison costs that were incurred are included within other vegetation management costs.
	<p>Use of estimates</p> <p>No estimates have been used in the collation and presentation of this information.</p>
Table 2.7.3: Descriptor metrics for unplanned vegetation events	<p>Consistency of information with the requirements of the RIN</p> <p>Information reported has been provided in accordance with the definitions provided in the RIN.</p>
	<p>Source of information</p> <p>Information from SAP is based on actual outages recorded for the current reporting period</p>
	<p>Methodology and assumptions made</p> <ul style="list-style-type: none"> Review of outage reports was undertaken to determine the cause of outage. Wind borne debris, (e.g. Bark) was not considered as an outage caused by vegetation.
	<p>Use of estimates</p> <p>No estimates have been used in the collation and presentation of this information.</p>

Template 2.8 Maintenance

Table 2.8.1: Descriptor metrics for routine and non-routine maintenance	Consistency of information with the requirements of the RIN <p>The information provided for maintenance is consistent with the requirements of the RIN. Information was not able to be sourced for the asset track maintenance and decommissioned assets. The highest value asset type in each asset group is used as the basis for the average age.</p>
	Source of information <p><i>Telecommunications network / Systems</i></p> <p>Information has been sourced from the internally maintained telecommunications asset register, the Telecommunications RIN Data MS Excel spreadsheet, and from the asset management plan.</p> <p><i>Access track maintenance and decommission assets</i></p> <p>Information was not able to be sourced for these assets. Many of these assets are not owned by TasNetworks and the collation of such information would be impracticable.</p> <p><i>Substation equipment (including Transmission cable) and property maintenance</i></p> <ul style="list-style-type: none"> Information has been sourced from the asset management information system and the asset management plan; and Asset 'inspection/maintained' data was obtained from the asset management information system. <p><i>Substation Secondary assets</i></p> <p>Asset quantities and average age is derived from SAP and the number of protection schemes maintained is derived from a log of maintenance test reports stored in TasNetworks' document management system The ZoNe. Asset maintenance cycles are derived from TasNetworks' Transmission Protection and Control Asset Management Plan.</p> <p><i>All other assets</i></p> <p>Information has been sourced SAP and the asset management plan.</p>
	Methodology and assumptions made <p><i>General</i></p> <p>Asset quantities in this table have been collected for those assets that have undergone either routine or non-routine maintenance.</p> <p><i>Transmission Towers</i></p> <ul style="list-style-type: none"> The number of towers and the line lengths owned, inspected and maintained were extracted from the asset management information system; and The number of transmission towers maintained includes commissioned, decommissioned and out of service towers whereas quantities reported in table 5.2 only includes commissioned towers.
	<p><i>Transmission Tower Support Structures</i></p> <p>No value has been entered against transmission tower support structures as all towers and associated fittings (i.e.: insulators, foundations, dampers, anodes etc.) have been deemed to be accounted for in the transmission towers quantity. This is different to data reported in table 5.2</p>

where the individual replacement assets (i.e.: insulators, foundations, signs etc.) are included in the transmission tower support structures numbers.

Substation equipment and property maintenance

- Switch bays, transmission cables and transformers are visually inspected several times per year as part of substation inspections (quarterly) and hence TasNetworks has specified that all assets are inspected on a similar inspection cycle;
- In calculating the number of switch bays maintained, TasNetworks has assumed that a switchbay comprises a *Circuit Breaker + Disconnecter + CT + VT*. As such, the switchbay count is taken to be the number of circuit breakers only. This point needs to be considered when comparing to asset age profile data provided in table 5.2;
- Additional switchbays from previous years (count of 5) attributed to HV switchgear replacements where feeder bays have been included and used initially for station service transformer connections.
- In calculating the number of transformers maintained, TasNetworks has included those transformers where tap changer maintenance has been completed, and excluded those transformers where only condition monitoring was undertaken (e.g. bushing and/or oil testing); and
- Average age has been calculated as follows:
 - *Transmission cables average age* = $\frac{\text{age} \times \text{length}}{\text{total length}}$
 - *substation property* = $(\Sigma \text{ of current date} - \text{commissioning date}) / \text{number of properties}$
 - *Power transformers* = $(\Sigma \text{ of current date} - \text{commissioning date}) / \text{number of transformers}$
 - *Switchbays* = $(\Sigma \text{ of current date} - \text{commissioning date}) / \text{number of switchbays}$

SCADA and network control maintenance

- The SCADA systems quantity includes the number of SCADA schemes registered in SAP with a commissioned date prior to the end of the period. SCADA schemes are defined as one or more SCADA Gateways on a per site basis, and excludes Bay Controllers.
- The average SCADA scheme asset age is derived from the average of the SCADA scheme commissioned dates. The number of SCADA schemes inspected/maintained is derived from the systems involved when protection schemes have been inspected/maintained. This is because the SCADA scheme forms part of the protection scheme tests during the inspection/maintenance.

Protection systems maintenance

- Protection system asset count includes Bus Coupler, Bus Zone, Capacitor Bank, HV Feeder, System Protection, Station Services Transformer, Transformer and Transmission Circuit schemes with a commissioned date prior to the end of the period;
- The average protection scheme asset age is derived from the average of the protection scheme commissioned dates; and
- Maintenance cycle is as per the relevant asset management plans.

	<p>Other maintenance</p> <p>The telecommunications routine/preventative asset maintenance cycles have been estimated to be done on 0.5 yearly, 1 yearly and 2 yearly cycles as per the TasNetworks Telecommunications Asset Management Plans.</p> <p>The entries in the 2.8 Maintenance tab for "INSPECTION CYCLE (YEARS)" and "MAINTENANCE CYCLE (YEARS)" are the inspection and maintenance cycle for the minimum period 0.5 yearly as per the TasNetworks Telecommunications Asset Management Plans.</p> <p>Use of estimates</p> <p>Unless otherwise specified, No estimates have been used in the collation and presentation of this information.</p> <p>Telecommunications Assets</p> <p>The telecommunications routine/preventative asset maintenance cycles have been estimated to have be done on 0.5 yearly, 1 yearly and 2 yearly cycles as per the TasNetworks Telecommunications Asset Management Plans.</p> <p>This is not the count of actual maintenances performed from the TasNetworks' SAP based Asset Management System.</p>
<p>Table 2.8.2: Cost metrics for routine and non-routine maintenance</p>	<p>Consistency of information with the requirements of the RIN</p> <p>The information provided for maintenance is consistent with the requirements of the RIN.</p> <p>Source of information</p> <p>Information has been sourced from the finance system, asset management information system and the asset management plan.</p> <p>Methodology and assumptions made</p> <ul style="list-style-type: none"> • Information was sourced from SAP. • TasNetworks, by policy, inspects every pole every year. • Other inspection cycles are defined by the asset management plan. • Maintenance cycles are condition based and not defined by asset age. <p>Use of estimates</p> <p>No estimates have been used in the collation and presentation of this information.</p>

Template 2.10 Overheads

Table 2.10.1: Network overheads expenditure	Consistency of information with the requirements of the RIN <p>The information provided for overheads is consistent with the requirements of the RIN in that it includes all expenditure that cannot be directly attributed to a work activity, project or work order.</p>
Table 2.10.2: Corporate overheads expenditure	Source of information <p>Historical information has been extracted from the audited Regulatory financial statements for both network and corporate overhead expenditure.</p>
	Methodology and assumptions made <ul style="list-style-type: none"> • For both network and corporate overhead expenditure: <ul style="list-style-type: none"> ○ Prescribed overhead expenditure has been extracted from the audited Regulatory financial statements; ○ Non-prescribed overhead expenditure has been extracted from the finance system, which is broken down into the required expenditure subcategories; • TasNetworks capitalises overheads to ensure that all costs directly attributable to bringing an asset to the location and condition necessary for its use are capitalised; and • The overhead costs included in this worksheet include both capital and operational overheads in table 2.1. <p><i>Negotiated Services & Unregulated Services Overhead Expenditure</i></p> <p>Each category reflects the gross cost incurred in that category, prior to the application of overheads recovered.</p>
	Use of estimates <p>No estimates have been used in the collation and presentation of this information.</p>

Template 2.11 Labour

Table 2.11.1: Cost metrics per annum Table 2.11.2: Descriptor metrics	Consistency of information with the requirements of the RIN <p>The information provided for labour is consistent with the requirements of the RIN in that only labour costs allocated to the provision of prescribed transmission services have been reported in the labour costs tables.</p>
	Source of information <p>This data is sourced from TasNetworks finance system and directly from TasNetworks payroll system.</p>
	Methodology and assumptions made <ul style="list-style-type: none"> Information regarding the full time equivalent average staffing level has been determined with reference to the staff list at year end, which details staff headcount by department and by labour classification level. The total labour costs per average staffing level have been determined using the cost allocated to prescribe services based on TasNetworks CAM and the payroll report per classification levels. The average productive work hours per average staffing level have been determined based on a standard working week for all employees, with allowances made for leave. The average productive work hours hourly rate per average staffing level is the labour cost divided by the average productive work hours per average staffing level. Overtime includes only salary and wage costs as per the definition in the RIN and not any related oncosts.
	Use of estimates <p>No estimates have been used in the collation and presentation of this information.</p>

Template 2.12 Input tables

Table 2.12: Input tables	Consistency of information with the requirements of the RIN The information provided is consistent with the requirements of the RIN.
	Source of information Information presented on the Input tables worksheet has been sourced from other worksheets in the RIN templates.
	Methodology and assumptions made The split of costs into the categories required by the RIN was based on actual expenditure in the year from the finance system, with a percent of costs to each actual category (i.e. direct materials) then applied across the line items in the RIN.
	Use of estimates No estimates have been used in the collation and presentation of this information.

Template 5.2 Asset age profile

Table 5.2.1: Asset age profile	Consistency of information with the requirements of the RIN <p>The information provided for asset age profile is consistent with the requirements of the RIN in that the expenditure and asset replacement / asset failure volumes for each sub-category reconcile to the higher level asset category.</p>
	Source of information <ul style="list-style-type: none"> • The economic lives of assets and the age of assets currently in commission have been sourced from information maintained within SAP and based on <i>SKM Assessment of Proposed Regulatory Asset Lives</i> report produced in 2013. • The economic lives and age of telecommunications assets currently in commission were sourced from the telecommunications asset register, telecommunications operational drawings and asset management plans.
	Methodology and assumptions made <p>General</p> <ul style="list-style-type: none"> • Information was extracted from the asset management information system. Information was filtered on commissioned status to exclude assets not currently in commission. Year of commissioning used and not year of manufacture. Where a parent asset has multiple child assets, the age of the parent asset has been presented. • The mean age presented is the useful life of the assets for each category. • The standard deviation has been calculated as the square root of the mean for each asset category, in accordance with the definitions included within the RIN. <p>Transmission towers</p> <p>The volumes were extracted from SAP data and updated due to the known volumes based on the projects completed in 2018/19. This figure differs from section 2.8.1 where the number of towers maintained includes commissioned, decommissioned and out of service towers.</p> <p>Economic ages and standard deviation data is sourced from the relevant Asset management Plan (AMP).</p> <p>Transmission tower support structures</p> <p>The values entered for the support structures category includes the following: anodes, foundations, insulators and danger signs on existing Transmission Towers. This is different to table 2.8 where all these components have been counted as part of the Transmission Towers.</p> <p>Transmission line conductor and OPGW</p> <p>Transmission conductor length is represented as circuit length in metres whereas OPGW is represented in kilometres, this is due to it being previously recorded as such.</p> <p>Transmission Cables</p> <p>Transmission cables length is represented as circuit length in kilometres (km).</p> <p>Substation switchbays</p> <ul style="list-style-type: none"> • Substation switchbay asset grouping has been categorised according to either GIS module or air insulated categories where: <ul style="list-style-type: none"> ○ GIS switchgear is typically indoor sealed units with SF6 gas insulation encompassing the switch gear mechanism including bus bar chambers and instrument transformers (all encased); and

- Air insulated switchgear in higher voltage levels (>44kV) is typically outdoor with separate disconnectors and instrument transformers although dead tank circuit breakers do have integral CT's. Voltage levels less than 44 kV are typically indoor and can have oil, vacuum, air or SF6 gas insulation medium with separate instrument transformers but within the same "air insulated" enclosure. When cross referencing to data recorded in 2.8 it is noted that for an individual switchbay it is taken to be the number of circuit breakers only as a switchbay can comprises a circuit breaker + disconnector+ CT+ VT as applicable.
- Due to historical asset delineation between previous separate transmission and distribution companies, assets <=44kV at a transmission substation are classed as transmission assets. Assets connected downstream from the load side connection of a transmission asset are construed to be a distribution owned assets.

SCADA, network control and protection systems

- The data from the telecommunications information sources has been collated into a spreadsheet to enable calculation of asset age profile. The source data was based on the information collated for the development of the asset management plans with the data brought into a single asset list in the template;
- The telecommunications asset suite includes assets with 45 year, 10 year and 5 year economic lives. The mean economic life is the weighted average of all telecommunications assets;
- The commissioned date attribute of the associated protection and SCADA schemes has been used to determine the quantities of schemes installed per year; and
- TasNetworks report systems and schemes at an aggregate level and therefore do not report these assets at granular level in the templates. This is applicable for the Protection schemes / systems and the Station SCADA and control systems functions only. The other functions listed in the template under this category such as 'Master Station Assets', 'Control equipment / systems', Infrastructure: protection and control', 'Metering systems', 'Site establishment', communications network assets and 'Total secondary systems' are assumed to be additional functions that have been added to the template by other participating NSP's and are considered to have already been included in TasNetworks' Protection schemes / systems and the Station SCADA and control systems.

Other

- The assets categories included as 'other' are:
 - 66 kV & <= 132 kV; Coupling Capacitors;
 - 132 kV & <= 275 kV; Coupling Capacitors;
 - 66 kV & <= 132 kV; Wave Traps; and
 - 132 kV & <= 275 kV; Wave Traps.
- When cross referencing to "substation other" data recorded in 2.2.1 it is noted that Substation other assets covers specific ancillary and minor assets including battery systems, AC distribution systems, security systems, fences, oil containment systems, etc. These minor assets are not included in 5.2.1 and as such no direct comparison to 2.2.1 can be made. Zeros have been provided where appropriate to reflect that they have been considered but no meaningful data is recorded.

Use of estimates

Unless specified below, no estimates have been used in the collation and presentation of this information.

Transmission tower support structures

Incomplete data regarding installation dates of transmission tower support structures has been estimated by using the next most appropriate parent dates linked to that asset.

Template 5.3 Maximum demand at network level

Table 5.3.1: Raw and weather corrected coincident MD at network level	<p>Consistency of information with the requirements of the RIN</p> <p>Information has been provided regarding maximum demand at network level in accordance with the requirements and definitions of the RIN.</p> <p>Source of information</p> <p>Information has been sourced from:</p> <ul style="list-style-type: none"> • (TasNetworks) NEM Metering and billing system (MABS) tool <ul style="list-style-type: none"> ○ Raw demand data • (TasNetworks) Probability of exceedance and diversity factor data preparation tool <ul style="list-style-type: none"> ○ Temperature corrected data • (TasNetworks) Distribution metering tool <ul style="list-style-type: none"> ○ Embedded generation data <p>Methodology and assumptions made</p> <p>Assumptions</p> <ul style="list-style-type: none"> • 8.3 Seasonality of maximum demand <p>The seasonality of transmission network maximum demand does not correspond with regulatory years. The transmission network maximum demand occurs during winter, whereas regulatory years are financial years. Therefore the 2018–19 maximum demand reported is that from 2018 winter (across April–September, as per RIN definitions)</p> <ul style="list-style-type: none"> • 8.4 Network level <p>The network level maximum demand is defined as the maximum demand on the transmission network. It is the maximum demand recorded at network entry points (i.e. generator connection points) and therefore includes network losses and contributions to inter-regional transfers.</p> <ul style="list-style-type: none"> • 8.5 Embedded generation <p>Embedded generation is included for private large HV medium voltage connections. All embedded generation is non-scheduled generation.</p> <ul style="list-style-type: none"> • 8.6 Weather corrected data <p>Weather corrected data is calculated through our business-as-usual methodology and calculated in the TasNetworks Probability of exceedance and diversity factor data preparation tool.</p> <p>Methodology</p> <ul style="list-style-type: none"> • Raw generation and TQT3 load (being Lake Margaret with CMT offline) data (Import kWh) for winter period is downloaded • Maximum demand value, date, time, and season recorded • POE values obtained from TasNetworks Probability of exceedance and diversity factor data preparation tool – this is load (exit point, incl. interconnection) values, however time of maximum demand does align with that at entry point. Network POE value methodology is to correct each exit point value using local weather data (seasonal relationship, effective temperature a relationship of $0.8x$ (current day minimum) + $0.2x$ (previous day maximum)) to the POE value, then summated to the network total. POE exit point values converted to entry point using losses value at time of MD (entry point MW to exit point MW). • Embedded generation contribution at time of maximum demand is downloaded. <p>Use of estimates</p> <p>No estimates have been used in the collation and presentation of this information.</p>
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Template 5.4 Maximum demand and utilisation at spatial level

Table 5.4.1: Non-coincident and coincident maximum demand	Consistency of information with the requirements of the RIN Information has been provided regarding maximum demand at spatial (connection point) level in accordance with the requirements and definitions of the RIN.
	Source of information Information has been sourced from: <ul style="list-style-type: none"> • (TasNetworks) transmission circuit rating sheets <ul style="list-style-type: none"> ○ Connection point ratings • (TasNetworks) Probability of exceedance and diversity factor data preparation tool <ul style="list-style-type: none"> ○ Non-coincident and coincident demand data (via TasNetworks NEM Metering and billing system (MABS) tool) ○ Temperature corrected data • (TasNetworks) Distribution metering tool <ul style="list-style-type: none"> ○ Embedded generation data
	Methodology and assumptions made
	Assumptions <ul style="list-style-type: none"> • 8.3 Seasonality of maximum demand <p>The seasonality of connection point maximum demands does not necessarily correspond with regulatory years. The majority of connection point maximum demands occur during winter, whereas regulatory years are financial years. Therefore the 2018–19 connection point maximum demands reported are from 2018 winter or 2018–19 summer seasons. Winter is reported from June–August and summer from December–February only as weather correction data is calculated for these periods—the vast majority of connection point maximum demands in these periods.</p> <ul style="list-style-type: none"> • 8.7 Connection points <p>In providing information for connection points, these have been grouped to the substation (connection site) level. In the Tasmanian network, transmission-distribution connection points are where each distribution line connects to the substation feeder circuit breaker, i.e. there are a number at each substation. To make the information purposeful, we collate connection points to the substation level and refer to as connection sites.</p> <ul style="list-style-type: none"> • 8.11 Connection point rating <p>Connection point rating is given as normal cyclic rating, as defined in the RIN requirements. For connection points at substations, this the minimum of the transformer (total, i.e. non-firm) four-hour short-term rating, and transformer HV and LV bay ratings (bay ratings do not provide short-term ratings). For connection points at transmission lines, this is the winter (15°C ambient) or summer (25°C ambient) workbook ratings. It is acknowledged in operation of the power system that real-time transmission line ratings are used.</p> <ul style="list-style-type: none"> • 8.12 Embedded generation <p>Embedded generation is included for private large HV medium voltage connections. All embedded generation is non-scheduled generation.</p> <ul style="list-style-type: none"> • 8.13 Weather corrected data <p>Weather corrected data is calculated through our business-as-usual methodology and calculated in the TasNetworks Probability of exceedance and diversity factor data</p>

preparation tool. Weather corrected data maximum demand figures are based on raw adjusted maximum demand.

- **8.14 Coincident data**

In reporting coincident data, the system (network) peak is taken as that reported in RIN Template 5.3.

Methodology

- Seasonal connection point demand profile extracted from Probability of exceedance and diversity factor data preparation tool (which had already extracted data from the MABS). Summate the demands for connection points where demand has multiple recording points
- Identify column reference, data point (as used by POE tool for connection points), and substation or transmission line connection for each connection point raw data 'lookups'
- Lookup non-coincident and coincident connection point ratings from raw data (as per assumption provided above)
- Lookup non-coincident maximum demand (MW) from winter and summer seasonal raw data
- Calculate MVA at time of MW maximum demand from lookup MW and associated MVA_r value
- Lookup date and time of MW maximum demand from raw data, separated to date, time, and season. Date and time of system (network) maximum demand taken directly from value obtained in RIN Template 5.3
- Lookup embedded generation contribution at times of non-coincident and coincident maximum demand from raw data
- Lookup weather-corrected MW data from raw data. Weather-corrected MVA values are determined by applying the raw data power factor to the weather-corrected MW value – this is done as we do not weather-correct reactive (MVA_r) demand.
POE values obtained from TasNetworks Probability of exceedance and diversity factor data preparation tool. For both non-coincident and coincident data, each connection point is corrected using local weather data (seasonal relationship, effective temperature a relationship of $0.8x$ (current day minimum) + $0.2x$ (previous day maximum)) to the POE value.

Additional data to be provided in BOP

The RIN requires data be published in the basis of preparation that is additional to that provided in the regulatory templates. Those data requirements are published here.

8.7 (a) Network segments decommissioned

This requirement is to note instances where components of the network belonging to network segments—i.e. load connection points—have been decommissioned.

We have not decommissioned any load connection points in initial or subsequent regulatory years.

8.8 MVA maximum demand

This requirement is to enter MVA maximum demands where they occurred at a different time to the MW maximum demand. MVA at the time of MW maximum demand is included in the regulatory template.

These are as follows:

Connection point	Regulatory year 2018–19	
	MVA at time of MW maximum demand	MVA maximum demand
Arthurs Lake	6.76	6.77
Railton	47.2	47.9
Use of estimates No estimates have been used in the collation and presentation of this information.		

