Transmission Category Analysis Regulatory Information Notice, 2019-20

Basis of Preparation

CONTACT

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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 2019-20 Regulatory Year (referred to throughout this document as the current reporting period).

AER's Instructions

The AERs 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
AMP	Asset Management Plan
CAM	Cost Allocation Method
DM	TasNetworks' Electronic Document Management System
DNSP	Distribution Network Service Provider
EMP	Easement Management Plan
Gentrack	TasNetworks' billing and market system (including customer and NMI management)
GTech	Intergraph G/Technology geographic information system
MABS	Metering and Billing System
OPGW	Optical Ground Wire
OTTER	Office of the Tasmanian Economic Regulator
POE	Probability of Exceedance
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
TSMP	Transmission System Management Plan
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.
VMS	Vegetation Management System

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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 (**Capex**) information is calculated from worksheets within the RIN. A separate balancing items spreadsheet is included and is reported on an 'as-incurred' basis as per the requirements of the RIN.
	Source of information Worksheets 2.2 – 2.10 of the RIN.
	Methodology and assumptions made Information provided in template 2.1.1 has been reconciled to the amounts reported in the Regulatory Financial Statements. A list of balancing items has been prepared to clarify differences between the RIN and the 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 (**Opex**) information is calculated from worksheets within the RIN on an 'as-incurred' basis as per the requirements of the RIN.
	Source of information 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. 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.

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** 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 2.1.1 and 2.2.2. Assets of categories not owned by TasNetworks has been marked as '0' as required by the RIN instructions.

Source of information

Financial

All financial information was sourced from SAP and the Regulatory Financial Statements.

Substation switchbays, Power Transformers, Reactive Plant and Transmission cables

Substation Primary Systems replacement data has been sourced from SAP. Failure information has been sourced from the SAP defects register and confirmed against failure reports.

Conductors

Transmission Lines asset replacement data and asset failure information has been sourced from SAP.

SCADA, network control and protection systems

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 SAP.

Methodology and assumptions made

Financial

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.

Transmission Lines - general

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 (**GIS**).

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. Replacement volumes are a combination of SAP values and completed replacement programs and 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. Earthing conductor replacement has been recorded as a total length of conductor replaced under the conductor other category. Total length is recorded due to a combination of twin and single earthing spans dependent on the transmission tower configuration.

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 replacement expenditure (**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.

Substations General

A two-stage approach was adopted to determine the number of asset replacements for switchbays, reactive plants and transformers. This was necessary as this information is not explicitly defined in SAP. The first stage was to identify all assets commissioned in the 12 month period and confirm which ones were new assets, and which ones were replacements of existing assets. The second stage was to verify this in SAP for each set of commissioned assets:

- SAP transaction IH08
  - Status = DCOM/OUTS/DISP/OPSP/STSP
  - Technical Object = Asset class of interest
  - Catalog Profile = Sub-asset class of interest
  - Object Description = List of assets identified as having been commissioned in the period. eg. *LF-T1*, *LF-T2*, *LF-T3* etc.

After running this transaction it was confirmed that each asset had existed at that location previously, and had been replaced in the period.

The number of asset failures has been taken from the Field Engineering incident register, and confirmed against SAP 'defects' register.

An asset failure is defined as a fault outage arising from the failure of an asset.

Substation switchbays

We are reporting against two criteria, gas insulated switchgear and air insulated switchgear:

Gas insulated 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 we have grouped all assets with these insulant types together under the 'Air insulated circuit breaker' category. 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

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 (**TNMS**). 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. Protection and SCADA schemes that were previously registered in SAP but have had the commissioned date attribute updated for the last financial year are counted as asset replacements. If the SAP record was not existing, these schemes are identified as augmentation and excluded from the total number of replacements for that financial year. Protection and SCADA device failures are derived from defects 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 or schemes 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, 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.
	Use of estimates No estimates have been required in the collation and presentation of this information.
Table 2.2.2: Selected assets characteristics	**Consistency of information with the requirements of the RIN** Information presented has been split in accordance with the categories in the templates consistent with the requirements of the RIN.
	Source of information Substations Primary Systems. Current commissioned assets numbers have been sourced from SAP.
	Methodology and assumptions made ***Conductors*** Conductor lengths are recorded in km and are based on historical asset records which have been updated based on replacement projects completed in 2019/20. Asset replacements resulting from augmentation projects were excluded. The following transmission lines were excluded from calculations as they are not owned by TasNetworks: • 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. ***Substation reactive plant*** Asset total MVAr was determined by summing the total capacity for each capacitor bank in SAP that is owned by TasNetworks and with commissioned ('COMM') status.
	Use of estimates No estimates have been required in the collation and presentation of this information.

Template 2.3 Augmentation expenditure

Table 2.3.1: Augex asset data – Substations
 	
Table 2.3.2: Augex asset data – Lines
 	
Table 2.3.4: Total Augex expenditure
	Consistency of information with the requirements of the RIN
	Augmentation expenditure has been provided in accordance with the requirements and definitions of the RIN.
	
	Source of information
	Transmission augmentation expenditure in 2019–20 was sourced from SAP.
	Information on augmentation projects completed in earlier years were copied directly from the 2018–19 RIN template 2.3.
	
	Methodology and assumptions made
	Assumptions
	Augmentation expenditure is included for the periods required by the RIN as follows:
	• 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)
	• the 2020 to 2024 regulatory years (this is not explicitly required by the RIN notice, however AER acknowledged this omission as a drafting error, and TasNetworks is required to include information for this period)
	Augmentation expenditure is reported from the following functional areas (TasNetworks expenditure classifications):
	• 2.3.1 – Augex asset data – Substations: AUGSB
	• 2.3.2 – Augex asset data – Lines: AUGTL
	• 2.3.4 – Augex – Total expenditure:
	  ○ Substations: AUGSB
	  ○ Lines: AUGTL
	  ○ Other assets: AUGMP
	Functional areas CONSB (Substations), CONTL (Transmission line), and CONMP (Other assets) are included as augmentation where the expenditure is on *existing connections* (expenditure under these functional areas on *new connections* is considered Connections expenditure in template 2.5)

	Augmentation expenditure is presented as *direct costs*, i.e. exclusive of *network overheads.* ***Methodology*** • Transmission augmentation expenditure data for last regulatory year is sourced from SAP. • Expenditure allocated to tables as per functional area classification (as noted in Assumptions). • Projects assessed for total cumulative expenditure over the life of the project of greater than or equal to $5 million. • Tables updated with data from last regulatory year, as required (whether project greater than or equal to, or less than, $5 million).
	Use of estimates No estimates have been required 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** Connection expenditure has been provided in accordance with the definitions of the RIN (nb. RIN notice template reference is to **2.4**).
	Source of information Connection expenditure in 2019–20 was sourced from SAP.
	Methodology and assumptions made ***Assumptions*** • Labour expenditure considers internal labour costs only • Materials expenditure considers all other costs (material, general, equipment, sub-contractor) Expenditure is presented as *direct costs only*, i.e. exclusive of *network overheads* Connection expenditure is reported from the following functional areas (TasNetworks expenditure classifications): **CONSB, CONTL, CONMP**. Expenditure is considered Connections where it is on *new connections* – where expenditure is on *existing connections* it is considered Augmentation expenditure (and included 2.5 Augex). ***Methodology*** • Connections expenditure data for last regulatory year is sourced from SAP. • Expenditure allocated to tables as per assumptions above.
	Use of estimates No estimates have been required in the collation and presentation of this information.
Table 2.5.2: Description of	**Consistency of information with the requirements of the RIN** Connection expenditure information has been provided in accordance with the definitions of the RIN (nb. RIN notice template reference is to **2.4**).

connection projects	**Source of information** Description of connection projects was sourced from the project technical specifications.
	Methodology and assumptions made ***Assumptions*** • **Connection rating:** is given as normal cyclic rating, as defined in the RIN requirements for Maximum demand at spatial level (Template 5.4). 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 shortterm ratings). • **Connection voltage:** the connecting voltage. • **Underground / overhead:** the mode of the outgoing connection. • **Year connection project completed:** the actual or forecast date (as required) of operational completion. ***Methodology*** • Connection project descriptions for projects identified in Table 2.5.1 are sourced directly from the project technical specifications.
	Use of estimates No estimates have been required in the collation and presentation of this information.

Template 2.6 Non-network expenditure

Table 2.6.1: Non-network expenditure	**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 • SAP. • Fleet Reports.
	Methodology and assumptions made ***IT and Communications*** • Client device expenditure 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. ***Motor vehicles*** • 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. Capex is the value of additions within the financial year, split into the relevant motor vehicle category.
	Use of estimates No estimates have been required in the collation and presentation of this information.
Table 2.6.2: Annual descriptor metrics – IT and communications expenditure	**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 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.
	Methodology and assumptions made Employee numbers represent total TasNetworks employee numbers as published in the annual accounts.
	Use of estimates No estimates have been required in the collation and presentation of this information.
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 • SAP. • Fleet Reports.
	Methodology and assumptions made ***Kilometres travelled*** The opening and closing odometer readings for each vehicle were used to calculate the kilometres travelled in the current reporting period. The kilometres travelled are then sorted by category of vehicle and aggregated. ***Proportion of fleet expenditure*** The proportion of fleet expenditure was derived by: • 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 required in the collation and presentation of this information.

Template 2.7 Vegetation management

Table 2.7.1: Descriptor metrics by zone	**Consistency of information with the requirements of the RIN** The information provided for vegetation management is consistent with the requirements of the RIN. As part of its licence requirements, TasNetworks produces and maintains an Easement Management Plan (**EMP**) and Transmission System Management Plan (**TSMP**). TasNetworks is not subject to any other external regulatory requirements for vegetation management. TasNetworks internally mitigates its bushfire risk through the implementation of recommendations made within the EMP and TSMP. It also undertakes periodic external audits of its vegetation management and bushfire mitigation practices to minimise risk, liability and insurance costs. 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.
	Source of information ***Route line length within zone*** The total route line length, is the sum of all the spans and has been sourced from the GIS. It includes all TasNetworks-owned transmission lines, even if not currently in service. ***Number of maintenance spans*** Information has been sourced from completed work orders from our vegetation management system (VMS) which have been issued to vegetation management contractors. ***Total length of maintenance spans*** Information has been sourced from SAP. ***Average number of trees per maintenance span*** Information regarding the total number of vegetation maintenance spans has been sourced from completed work orders which have been issued to vegetation management contractors. 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 one vegetation zone across Tasmania. ***Length of vegetation corridors*** Information has been sourced from the GIS. ***Average width of vegetation corridors***

	Information has been sourced from the GIS. ***Average frequency of cutting cycle*** Information has been sourced from the Transmission Line Easement Asset Management Plan.
	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 SAP. 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 by: • using vegetation density data collected by contractors approximately 10 years ago; and/or • viewing the spans via an online medium (e.g. Google Earth); and/or • using data provided by Forestry Tasmania in quantifying 'Medium' vegetation density. 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. 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. The determined density factor has been broken down into four bands. The assumption of the number of trees in each band is (developed through an assessment of aerial photos for each easement where vegetation maintenance has occurred). • 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 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 GIS. 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 GIS, 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 total length of the vegetation corridors as sourced from the GIS. 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.
	Use of estimates No estimates have been required in the collation and presentation of this information.
Table 2.7.2: Expenditure metrics by zone	**Consistency of information with the requirements of the RIN** The information provided for vegetation management is consistent with the requirements of the RIN. As part of its licence requirements, TasNetworks produces and maintains an EMP and TSMP. TasNetworks is not subject to any other external regulatory requirements for vegetation management. TasNetworks internally mitigates its bushfire risk through the implementation of recommendations made within the EMP and TSMP. It also undertakes periodic external audits of its vegetation management and bushfire mitigation practices to minimise risk, liability and insurance costs. 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. A high percentage of TasNetworks transmission lines are located in forested and other rural areas that are populated with rapidly growing species of vegetation.
	Source of information The reported vegetation management information has been sourced from the vegetation management system (VMS) and SAP.
	Methodology and assumptions made Information was sourced from SAP by extracting costs by contractor to ascertain the amount spent for contracted services for the current reporting period. Work orders were obtained to confirm the nature of the contracted service provided. 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.
	Use of estimates No estimates have been required in the collation and presentation of this information.

Table 2.7.3: Descriptor metrics for unplanned vegetation events	**Consistency of information with the requirements of the RIN** Information reported has been provided in accordance with the definitions provided in the RIN.
	Source of information Information from SAP is based on actual outages recorded for the current reporting period
	Methodology and assumptions made 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.
	Use of estimates No estimates have been required in the collation and presentation of this information.

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** 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.
	Source of information ***Telecommunications network / Systems*** Information has been sourced from the internally maintained telecommunications asset register, the Telecommunications RIN Data MS Excel spreadsheet, and from the Asset Management Plan (**AMP**). ***Access track maintenance and decommission assets*** 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. ***Substation equipment (including Transmission cable) and property maintenance*** Information has been sourced from SAP and the AMP. Asset 'inspection/maintained' data was obtained from SAP. ***Substation Secondary assets*** Asset quantities and average age is derived from SAP. The number of protection schemes maintained is derived from a log of maintenance test reports stored in TasNetworks' document management system (**DM**) and confirmed against work orders in SAP. Asset maintenance cycles are derived from TasNetworks' Transmission Protection and Control Asset Management Plan. ***All other assets*** Information has been sourced SAP and the AMP.

Methodology and assumptions made

General

Asset quantities in this table have been collected for those assets that have undergone either routine or non-routine maintenance.

Transmission Towers

The number of towers and the line lengths owned, inspected and maintained were extracted from SAP. 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. It is TasNetworks policy to inspect the entire transmission network through a number of inspections and thus assets are inspected twice annually as a minimum.

Transmission Tower Support Structures

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 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 quarterly substation inspections. TasNetworks has specified that all assets are inspected on a similar inspection cycle.

In calculating the number of switchbays maintained, TasNetworks has assumed that a switchbay comprises a circuit breaker, disconnector, current transformer and voltage transformer. As such, the switchbay count is taken to be the number of circuit breakers only. There is also a single recloser at Arthurs Lake Substation that is included in this category. This point needs to be considered when comparing to asset age profile data provided in table 5.2.

Where 5.2.1 separates switchbays from reactive plant (capacitor banks), it should be noted that in 2.8.1 the RIN requires these to be combined.

In 2019-20 we have used 'Manufacture' date (instead of 'Commissioned' date as we did in 2018-19) to calculate average asset age for the following assets:

- Switchbays
- Transformers

Property (i.e. substation and switching station) inspections were calculated from SAP work orders for the transmission 'PMSBI' functional code, with an Inspection Type of 'Switchyard Inspection'

Transformer and switchbay inspections were calculated via the asset register in SAP by determining how many of each asset type were installed at each 'Property', and then summing (all properties were inspected in 2019-20).

Inspection and maintenance cycles were sourced from the respective AMPs for each asset type. Where multiple inspect/maintain regimes apply with differing frequencies, we have recorded the most frequent cycle.

Average age has been calculated as follows:

- $Transmission\ cables\ average\ age = \frac{age\ x\ length}{total\ length}$
- $Substation\ property = (\Sigma\ of\ current\ date - commissioning\ date)/\ number\ of\ properties$
- $Power\ transformers = (\Sigma\ of\ current\ date - manufactured\ date)/\ number\ of\ transformers$

	• $Switchbays = (\Sigma\ of\ current\ date - manufactured\ date)/ number\ of\ switchbays$ ***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 each site system involved within the financial year when protection schemes have been inspected/maintained. This is because the SCADA system forms part of the protection scheme tests during the inspection/maintenance. The SCADA maintenance cycle is derived from the protection scheme maintenance cycle given that every protection scheme test will also include a test of the relevant SCADA signalling to the TasNetworks control centre. ***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. Maintenance cycle is as per the relevant AMP. ***Telecommunications Assets*** The inspected/maintained count is the total number of maintenance activities performed not the total number of telecomunications equipment maintained. ***Other maintenance*** The telecommunications routine/preventative asset maintenance cycles have been assumed to be completed on 0.5 yearly, 1 yearly and 2 yearly cycles as per the TasNetworks Telecommications Asset Management Plans. 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.
	Use of estimates No estimates have been required in the collation and presentation of this information.
Table 2.8.2: Cost metrics for routine and non-routine maintenance	**Consistency of information with the requirements of the RIN** The information provided for maintenance is consistent with the requirements of the RIN.
	Source of information Information has been sourced from SAP and the AMP.
	Methodology and assumptions made • Information was sourced from SAP. • TasNetworks inspects every structure every year.

	• Other inspection cycles are defined by the AMP. • Maintenance cycles are condition based and not defined by asset age.
	Use of estimates No estimates have been required in the collation and presentation of this information.

Template 2.10 Overheads

Table 2.10.1: Network overheads expenditure **Table 2.10.2: Corporate overheads expenditure**	**Consistency of information with the requirements of the RIN** 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.
	Source of information Historical information has been extracted from the audited Regulatory Financial Statements for both network and corporate overhead expenditure.
	Methodology and assumptions made For both network and corporate overhead expenditure: • Prescribed overhead expenditure has been extracted from the audited Regulatory Financial Statements; • Non-prescribed overhead expenditure has been extracted from SAP, 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. ***Negotiated Services & Unregulated Services Overhead Expenditure*** Each category reflects the gross cost incurred in that category, prior to the application of overheads recovered.
	Use of estimates No estimates have been required in the collation and presentation of this information.

Template 2.11 Labour

Table 2.11.1: Cost metrics per annum	**Consistency of information with the requirements of the RIN** 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.
	Source of information

Table 2.11.2: Descriptor metrics	This data is sourced from SAP.
	Methodology and assumptions made 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 prescribed services based on TasNetworks cost allocation method (**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 No estimates have been required in the collation and presentation of this information.

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 The data is 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 SAP, 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 required 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** The information provided for asset age profile is consistent with the requirements of the RIN. The expenditure and asset replacement / asset failure volumes for each sub-category reconcile to the higher level asset category.

Source of information

The economic lives of assets and the age of assets currently in commission have been sourced from information maintained within SAP and based on *SKM Assessment of Proposed Regulatory Asset Lives* 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 the AMP.

Methodology and assumptions made

General

Information extracted from SAP. was filtered on commissioned status – to exclude assets not currently in commission – and by ownership – to ensure only TasNetworks' assets were included. To determine asset age, year of commissioning has been used and not year of manufacture, except for the following assets where the year of manufacture has been used:

- substation switchbays;
- substation power transformers; and
- substation reactive plant.

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.

Transmission towers

The volumes extracted from SAP were updated to the known volumes based on the projects completed in 2019/20. This figure differs from section 2.8.1 where the number of towers maintained includes commissioned, decommissioned and out of service towers.

Where individual phases of a transmission line are supported by individual poles, these assets are counted as seperate structures. Where a pole structure is physically joined (e.g. 'H Pole') thes structures are counted as individual structures.

Economic ages and standard deviation data is sourced from the relevant AMP.

Transmission tower support structures

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.

Where there are incomplete installation dates for transmission tower support structures, the date of the next most appropriate parent dates linked to that asset is used.

Transmission line conductor and OPGW

Transmission conductor length is represented as commissioned circuit length in metres whereas OPGW is represented in kilometres, this is due to it being previously recorded as such.

No age profile is reported for earthwire conductor due this asset not being recorded in the asset management systems. There will be discrepancy with earthwire asset replacements reported in 2.2.1 as a result.

Transmission Cables

Transmission cables length is represented as circuit length in kilometres (km).

Substation switchbays

Substation switchbay asset grouping has been categorised according to either gas insulated switchgear module or air insulated categories where:

- Gas insulated 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, current transformar and voltage transformer. There is also a single recloser at Arthurs Lake that is included in this category.

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 AMP 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 life. 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. Therefore these assets are not reported at granular level in the templates. This is applicable for the Protection schemes/systems, 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 No estimates have been required in the collation and presentation of this information.

Template 5.3 Maximum demand at network level

Table 5.3.1: Raw and weather corrected coincident MD at network level	**Consistency of information with the requirements of the RIN** Information has been provided regarding maximum demand at network level in accordance with the requirements and definitions of the RIN.
	Source of information Information has been sourced from: TasNetworks NEM Metering and billing system (**MABS**) tool. • Raw demand data. TasNetworks Probability of exceedance (**POE**) data preparation tool. • Temperature corrected data. TasNetworks Distribution metering tool. • Embedded generation data.
	Methodology and assumptions made ***Assumptions*** **8.3 Seasonality of maximum demand** 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 2019–20 maximum demand reported is that from 2019 winter (across April–September, as per RIN definitions). **8.4 Network level** 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. **8.5 Embedded generation** Embedded generation is included for private large high and medium voltage connections. All embedded generation is non-scheduled generation. **8.6 Weather corrected data** Weather corrected data is calculated through our business-as-usual methodology and calculated in the TasNetworks POE data preparation tool, used in our load forecast process. Where there is a negative relationship between temperature and demand (i.e. demand increases with increasing—rather than decreasing—temperature) it is assumed there is no temperature relationship, and weather correction is not applied. ***Methodology*** 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 POE 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.
	Use of estimates No estimates have been required in the collation and presentation of this information.

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: TasNetworks transmission circuit rating sheets. • Connection point ratings. TasNetworks POE data preparation tool. • Non-coincident and coincident demand data (via TasNetworks NEM MABS tool). • Temperature corrected data. TasNetworks Distribution metering tool. • Embedded generation data.
	Methodology and assumptions made ***Assumptions*** **8.3 Seasonality of maximum demand** 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 2019–20 connection point maximum demands reported are from 2019 winter or 2019–20 summer seasons (across April-September and October-March respectively, as per RIN definitions). **8.7 Connection points** Connection points include supply to all load types: auxiliary, distribution, and transmission-connect customers. 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 them as connection sites. Substations with different voltage connection points are accounted separately (except for Rosebery Substation). Substations with different load types at the same voltage level are combined to a single connection point. **8.11 Connection point rating** 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.

8.12 Embedded generation

Embedded generation is included for private large high and medium voltage connections. All embedded generation is non-scheduled generation.

8.13 Weather corrected data

Weather corrected data is calculated through our business-as-usual methodology in the TasNetworks POE data preparation tool used in our load forecast process. Weather corrected data maximum demand figures are based on raw adjusted maximum demand. Where there is a negative relationship between temperature and demand (i.e. demand increases with increasing—rather than decreasing—temperature) it is assumed there is no temperature relationship, and weather correction is not applied.

8.14 Coincident data

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

Methodology

Connection point demand is downloaded. Summate the demands for connection points where demand has multiple recording points.

Identify column reference, TNI, 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 raw data.

Calculate MVA at time of MW maximum demand from lookup MW and associated MVAr 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 (MVAr) demand. POE values obtained from TasNetworks POE 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 Basis of Preparation

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 2019–20*	
	MVA at time of MW maximum demand	MVA maximum demand
Burnie	59.17	59.21
Derby	6.82	6.87
Kermandie	7.12	7.15
Queenstown (22 kV)	5.39	5.49
Railton	49.55	50.39
Triabunna	6.86	6.87

* Note some may be in 2018–19 regulatory year, as this template uses winter seasonality of maximum demand that sits outside the 2019–20 regulatory year (i.e. calendar winter month, as described in Assumptions, above)

Use of estimates

No estimates have been used in the collation and presentation of this information.


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