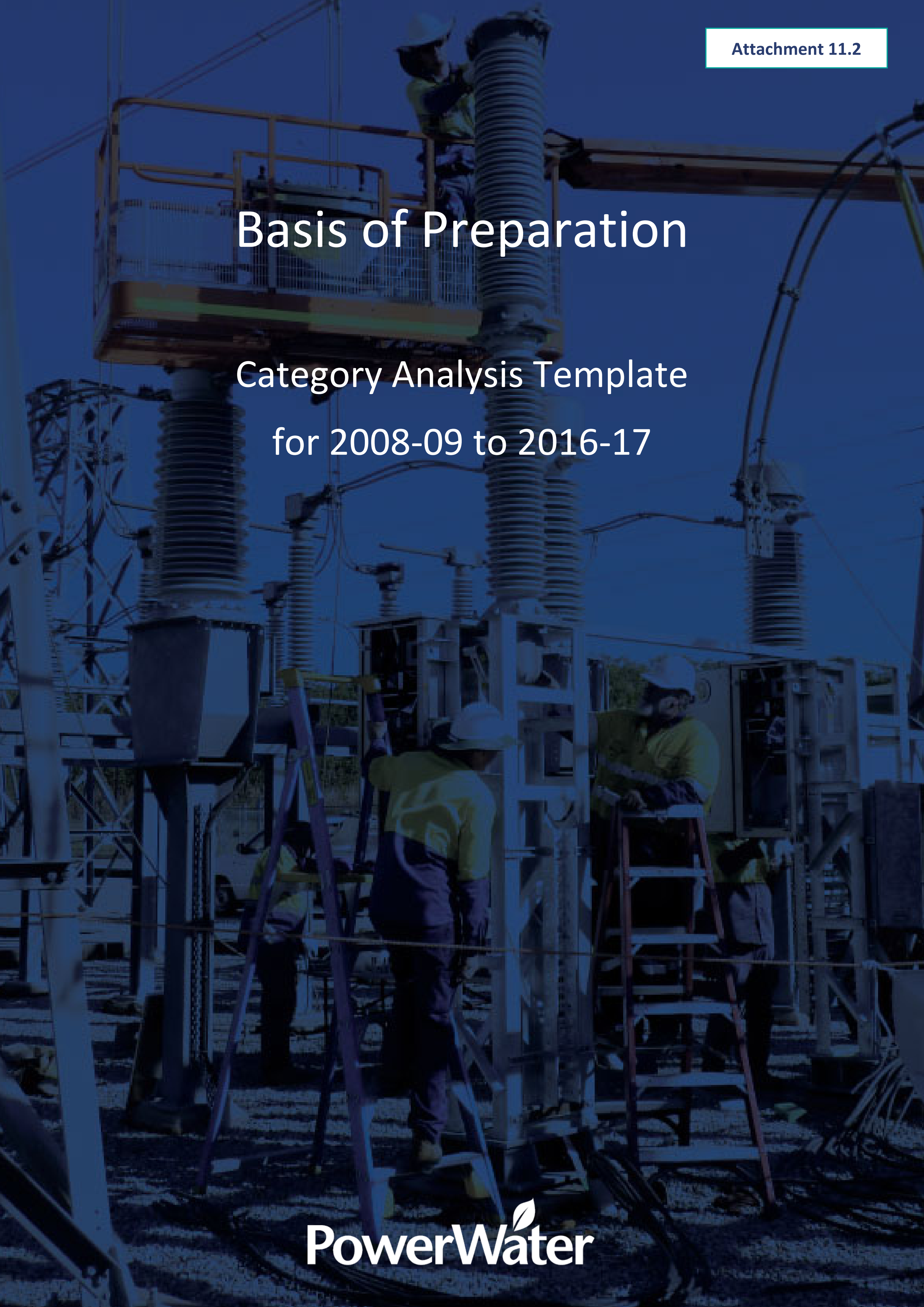
Attachment 11.2



Basis of Preparation

Category Analysis Template

for 2008-09 to 2016-17

PowerWater

Contents

Overview

On 9 November 2017, the Australian Energy Regulator (AER) issued Power Water Corporation (Power and Water) with a Regulatory Information Notice (RIN) under Division 4 of Part 3 of the National Electricity (Northern Territory) Law. Clause 1.3 of Schedule 1 of the RIN requires:

> *1.3 For all information, other than forecast information, provide in accordance with this notice and the instructions in Appendix E, a basis of preparation demonstrating how we have complied with this notice in respect of:*
>
> *(a) the information in each regulatory template in the Microsoft Excel Workbooks attached at Appendix A; and*
>
> *(b) any other information prepared in accordance with the requirements of this notice.*

This Basis of Preparation relates to the information provided in the regulatory template "Workbook 3 – Category Analysis”.

Structure

This document was written using the same structure in the regulatory template. Each chapter of this document corresponds to a particular template and then sections within each chapter are used to explain the tables within each template.

For all information in the template we have explained:

1. how we have complied with the RIN requirements;
2. the methodology and assumptions we used to calculate the information;
3. whether the information is estimated or actual (based on the RIN definitions);
4. the source of the information; and
5. whether the information contains confidential information.

Expenditure overview

The RIN required us to report our historic expenditure in a range of interrelated tables across all three RIN templates (the Category Analysis, Economic Benchmarking and Regulatory Determination templates). Consequently, several tables of data were prepared using the same three methodologies, which are described in the appendices to this document:

- Appendix A: Capex backcasting methodology
- Appendix B: Repairs and maintenance backcasting methodology.
- Appendix C: Operating expenditure backcasting methodology

Each of these methodologies are referred to throughout this basis of preparation and are individually explained in Appendix A, Appendix B and Appendix C, respectively.

Limitations of our data

We expect that the AER will publish the final form of the basis of preparation and the associated data template with our information. Further, we expect that the AER and third parties will use this information for different purposes. We recommend that anyone using this information should do so at their own risk. We do not provide any warranty that this information is fit for the purpose of other parties.

We do, however, acknowledge that the information provided was collected and provided in good faith, and was based on every effort to comply with the requirements of the RIN. In doing so, we have had to estimate some data because we did not have the capability to report the information specified by the RIN.

Best estimates

We developed our best estimate in good faith, with the objective of providing the most accurate data given the RIN requirements. For all estimated information, the RIN requires we provide reasons for why we consider the estimate to be our best estimate. In our circumstances our estimate was ‘best’ because:

1. we were only able to develop a single method for the majority of estimated information; and

2. the estimated information was prepared and reviewed by appropriate subject matter experts.

In all instances where PWC have provided estimated rather than actual information, PWC have assessed the available alternatives to determine the most appropriate estimation technique. All estimated information included in the RIN are PWC’s best estimates and we have explained how the estimate has been calculated in the relevant section of the Basis of Preparation.

1. Template 2.1 – Expenditure summary

1.1 Templates 2.1.1 to 2.1.7 Expenditure Summary

1.1.1 Consistency with the RIN requirements

Appendix E Requirements	Consistency with the RIN requirements
Clause 4.11: PWC must calculate the expenditure for each capex and opex category reported in Workbook 3 – Category analysis, regulatory templates 2.2 to 2.10 and 4.2 to 4.4 and report these amounts in the corresponding rows in tables 2.1.1 to 2.1.6.	We calculated the expenditure for each category in templates 2.2 to 2.10 and 4.2 to 4.4 and reported the total of these amounts in the corresponding rows in tables 2.1.1 to 2.1.6. Where we do not provide a particular service, we have reported these amounts with zero values.
Clause 4.12: Subject to paragraph 4.6, and any capital contributions reported, the total expenditure for the capex and opex for each service classification in tables 2.1.1 to 2.1.2 in regulatory template 2.1 must be mutually exclusive and collectively exhaustive. Total expenditure for capex must be reported on an "as-incurred" basis.	The expenditure we reported in tables 2.1.1 to 2.1.2 is reported on an as incurred basis and is mutually exclusive and collectively exhaustive.
Clause 4.13: Where overhead expenditures are included in non-network expenditures in Workbook 3 – Category analysis, regulatory template 2.1, tables 2.1.1 or 2.1.2 a balancing item must be reported in tables 2.1.1 and 2.1.2 of regulatory template 2.1.	Our overhead expenditures are not included in non-network expenditures in 2.1.1 or 2.1.2.
Clause 4.14: Total capital contributions must be reported in Workbook 3 – Category analysis, regulatory template 2.1, table 2.1.1, and disaggregated in table 2.1.7. The total capital contributions in table 2.1.7 must reconcile with that reported in table 2.1.1.	Total capital contributions have been reported in table 2.1.1 and disaggregated in table 2.1.7. The total capital contributions in table 2.1.7 reconcile with that reported in table 2.1.1.
Clause 4.15: Disaggregated capitalised overheads must be reported in Workbook 3 – Category analysis, regulatory template 2.1, table 2.1.8. The total capitalised overheads in table 2.1.8 must reconcile with overheads reported in table 2.1.1.	We did not report capitalised overheads in the direct expenditure categories (augex, repex, etc) with the exception of alternative control services metering expenditure. These overhead costs were included in the metering variable in table 2.1.3 and 2.1.4. Therefore, we separately reported the metering capitalised overhead expenditure in table 2.1.8 and all other variables are reported as zero expenditure.

1.1.2 Methodology and assumptions

1.1.2.1 Template 2.1.1 Standard Control services capital expenditure

Replacement, connections, augmentation and non-network expenditure

The replacement, connections, augmentation and non-network capex were calculated using the capex methodology outlined in Appendix A. In summary, all work orders and projects were assigned a single service classification (i.e. standard control services) and a RIN expenditure category. We reported these variables as the sum of the expenditure for work orders and projects where the assigned services classification was standard control services and the expenditure category was replacement, connections, augmentation or non-network respectively.

Capitalised network and corporate overhead expenditure

We reported the cost of our Long Service Leave Levy as a capitalised overhead expenditure. Our expenditure on this levy is a cost we must incur when we work on construction projects and is therefore capitalised.[1] We allocated this amount to standard control services on a percentage basis. This amount was sourced from Maximo.

The other component of the capitalised overheads expenditure variable, for 2016-17, was based on our audited statutory accounts. The methodology we used to calculate the overhead expenditure and how much was capitalised is explained in Appendix B – Calculation of operating expenditure.

Overheads are discussed in more detail in this basis of preparation in our response to template 2.6.

Metering expenditure

The metering variable has been reported with zero values as we do not have any standard control expenditure associated with metering services, as metering services are classified in the Framework and Approach paper as alternative control services.

Public Lighting expenditure

The public lighting variable has been reported with zero values because the Framework and Approach paper (F&A) did not classify public lighting to be either standard control or alternative control services.[2] It should be noted that on 1 January 2018, we transferred the responsibility for public lighting services in the Northern Territory to local councils.

Balancing item

The balancing item variable is comprised of accounting adjustments and small variances between the audited statutory accounts and Maximo. The accounting adjustments in the balancing item relate to manual journals used to make corrections to the financial accounts. For example, the accounting adjustments included journals to reverse accruals, to cancel project expenditure and to move expenditure to the correct project.

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[1] http://www.ntbuild.com.au/

[2] https://www.aer.gov.au/system/files/AER%20-%20Final%20framework%20and%20approach%20for%20Power%20and%20Water%20Corporation%20-%20July%202017.docx

In 2016-17 the balancing item included expenditure on project PRD33086, which is a project created to capture the costs of assets reserved from the stores for vendor repairs. All costs on this project are to be reversed once the repaired assets are returned to the store.

The balancing item also includes small variances between the expenditure captured in Maximo and the audited statutory accounts. This difference was predominantly due to an error in the Maximo, which was assigning an incorrect general ledger account to a small number of transactions. The differences are immaterial and treated as a balancing item to ensure the RIN figures reconcile to the audited statutory accounts.

Capcons (included in the above)

The capcons variable is the sum of all capital contributions in accordance with the RIN definition. That is, this amount includes all capital contributions revenue received in the form of cash or gifted assets for standard control services. The capital contributions revenue was not added to the other expenditure category totals, however the capital expenditure variables already included the expenditure we incurred to deliver projects that were funded by capital contributions. The capcons variable is explained in this basis of preparation in relation to template 2.6.

The total capcons into financial contributions and gifted assets is shown in the table below.

Capital contributions ($m)	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17
Cash funding	$0.2	$0.3	$0.3	$3.0	$6.2	$2.3	$0.4	$2.0	$1.0
Gifted assets	$5.6	$2.4	$5.2	$7.7	$8.4	$5.5	$8.7	$7.8	$8.4
Total	$5.7	$2.7	$5.6	$10.7	$14.6	$7.8	$9.1	$9.8	$9.4

1.1.2.2 Template 2.1.2 – Standard control services opex

Vegetation management, maintenance and emergency response

The vegetation management, maintenance and emergency response variables were calculated based on work order data from our asset management system, Maximo. We collated the work order data in a Microsoft Excel model, which is fully explained in Appendix C – Repairs and maintenance backcasting.

Each work order was assigned to the RIN expenditure categories based on work order descriptions and other work order attributes. The annual amounts for each variable were calculated as the sum of all work order expenditure for each category.

Non-network, network overheads and corporate overheads

The non-network, network overhead and corporate overhead expenditures were primarily calculated from audited statutory accounts. We allocated each account from our audited statutory accounts to a service classification only if it could be completely attributed to the provision of a single service. Other accounts remained unallocated. Further, every account was attributed to the expenditure categories required by the RIN.

The non-network, corporate overhead and network overhead expenditures were calculated by adding the total expenditure for each account attributed to standard control services and the relevant expenditure category. We apportioned the unallocated accounts to standard control services based on the ratio of the amounts directly attributed to standard control services to the amounts directly attributed to all services.

We also identified that a number of repair and maintenance work orders involved works that were considered to be non-network or network overheads expenditures. We added these to the amounts identified from the audited statutory accounts to derive the total category expenditure.

Metering

The metering variable has been reported with zero values as we do not have any standard control expenditure associated with metering services, as metering services are classified in the Framework and Approach paper as alternative control services.

Public Lighting

The public lighting variable has been reported with a value of zero because the Framework and Approach Paper (F&A) did not classify public lighting to be either standard control or alternative control services.[3]

Balancing item

The balancing item includes small variances between the expenditure captured in Maximo and the audited statutory accounts. This difference was predominantly due to an error in the Maximo, which was assigning an incorrect general ledger account to a small number of transactions. The differences are immaterial and treated as a balancing item to ensure the RIN figures reconcile to the audited statutory accounts.

1.1.2.3 Template 2.1.3 – Alternative control services capex

Connections, metering, non-network, fee-based services and quoted services

The connections, metering, non-network, fee-based services and quoted services capex were calculated using the capex methodology outlined in Appendix A. In summary, all work orders and projects were assigned a single service classification and a RIN expenditure category. We reported these variables as the sum of the expenditure for work orders and projects where the assigned services classification was alternative control services and the expenditure category was connections, metering, non-network, fee-based services and quoted services, respectively.

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[3] https://www.aer.gov.au/system/files/AER%20-%20Final%20framework%20and%20approach%20for%20Power%20and%20Water%20Corporation%20-%20July%202017.docx

Capitalised network overheads and capitalised corporate overheads

We reported the cost of our Long Service Leave Levy as a capitalised overhead expenditure. Our expenditure on this levy is a cost we must incur when we work on construction projects and is therefore capitalised.[4] We allocated this amount to alternative control services on a percentage basis. This amount was sourced from Maximo.

The other component of the capitalised overheads expenditure variable, for 2016-17, was based on our audited statutory accounts. The methodology we used to calculate the overhead expenditure and how much was capitalised is explained in Appendix B – Calculation of operating expenditure.

Overheads are discussed in more detail in this basis of preparation in our response to template 2.6.

Public lighting

The public lighting variable has been reported with a value of zero because the Framework and Approach Paper (F&A) did not classify public lighting to be either standard control or alternative control services.[5]

1.1.2.4 Template 2.1.4 – Alternative control services opex

Connections

The only connections opex we incur in providing alternative control services is the energisation, disconnection and reconnection services reported in Table 4.3. We have only been required to report those services expenditure for 2013-14 to 2016-17, so we have reported the corresponding amounts in Table 2.1.4 as connections.

Metering, fee-based services, quoted services, non-network, network overheads and corporate overheads

The metering, fee-based services, quoted services, non-network, network overheads and corporate overheads expenditures were primarily calculated from the audited statutory accounts. We allocated each account from our audited statutory accounts to a service classification only if it could be completely attributed to the provision of a single service. Other accounts remained unallocated. Also, every account was attributed to the expenditure categories required by the RIN.

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[4] http://www.ntbuild.com.au/

[5] https://www.aer.gov.au/system/files/AER%20-%20Final%20framework%20and%20approach%20for%20Power%20and%20Water%20Corporation%20-%20July%202017.docx

The energisation, disconnection and reconnections expenditure reported as connections in Table 2.1.4 have been deducted from the Fee and Quoted Services opex to ensure there is no double counting of opex.

The non-network, corporate overhead and network overhead expenditures were calculated by adding the total expenditure for each account attributed to alternative control services and the relevant expenditure category. We apportioned the unallocated accounts to alternative control services based on the ratio of the amounts directly attributed to standard control services to the amounts directly attributed to all services.

We also identified that a number of repair and maintenance work orders involved works that were considered to be metering, fee-based services, quoted services, non-network and network overheads expenditures. We added these to the amounts identified from the audited statutory accounts to derive the total category expenditure.

Public lighting

The public lighting variable has been reported with a value of zero because the Framework and Approach Paper (F&A) did not classify public lighting to be either standard control or alternative control services.[6]

1.1.2.5 Template 2.1.5 – Dual function assets capex

We do not have any dual function assets so we have reported zero values for this table.

1.1.2.6 Template 2.1.6 – Dual function assets opex

We do not have any dual function assets so we have reported zero values for this table.

1.1.2.7 Template 2.1.7 – Standard control services capcons

Replacement expenditure, connections, augmentation expenditure

We identified two sources of capital contributions for standard control services. First, we have received financial contributions to carry out works in accordance with our capital contributions policy. Secondly, we have received gifted assets that were constructed by other parties, for which we did not incur any expenditure.

We extracted the financial contributions expenditure information from the financial system and linked the transactions to capital projects as part of capex methodology described in Appendix A. The expenditure categories that applied to the relevant projects were then

[6] https://www.aer.gov.au/system/files/AER%20-%20Final%20framework%20and%20approach%20for%20Power%20and%20Water%20Corporation%20-%20July%202017.docx

used to identify the expenditure category for the capital contribution amounts for each year.

In relation to gifted assets, we obtained the asset value from our fixed asset register and added the entire amount to the connections category. We did this because the only known source of gifted assets are developments relating to the connection of new customers or upgrades for existing customers.

Non-network

We are not aware of any capital contributions in the non-network category, so we reported this variable with values of zero.

Capitalised network overheads and capitalised corporate overheads

We are not aware of any capital contributions for the overheads categories, so we reported this variable with values of zero.

Metering

The metering variable has been reported with zero values as we do not have any capital contributions associated with metering services, which are classified as alternative control services.

Public Lighting

The public lighting variable has been reported with values of zero because the Framework and Approach Paper (F&A) did not classify public lighting to be either standard control or alternative control services.[7]

1.1.2.8 Table 2.1.8 – Standard control services capitalised overheads

We reported all variables in this table with values of zero. This is because we have reported all overheads in the overheads categories. We have not reported overheads in the expenditure categories listed in this table.

1.1.3 Estimated and actual information

All information reported in template 2.1 has been based on our financial system, audited statutory accounts, fixed asset register, asset management system or other systems. We have performed calculations and allocations to derive all of the amounts. If we used a

[7] https://www.aer.gov.au/system/files/AER%20-%20Final%20framework%20and%20approach%20for%20Power%20and%20Water%20Corporation%20-%20July%202017.docx

different method to calculate the results in this table it is likely that we would calculate very similar results. Therefore, the RIN defines this information to be actual information.

1.1.4 Confidential information

Template 2.1 does not contain confidential information.

1.1.5 Source of the data

Information	Source
Replacement, Connections, Augmentations and Non-network, Capitalised network and corporate overheads, vegetation management, connections	Maximo
Metering	Maximo and Framework and Approach paper classification
Public Lighting	Framework and Approach paper service classification
Metering, fee-based services, quoted services, non-network, network overheads and corporate overheads	Audited statutory accounts

2. Balancing Item and Reconciliation of Template 2.1

2.1.1 Consistency with the RIN

Appendix E Requirements	Consistency with requirements
Clause 4.16: PWC must provide an excel spread sheet that contains the calculation of balancing items reported in Workbook 3 – Category analysis, regulatory template 2.1. At a minimum, this spread sheet must: (a) for each instance where an expenditure item is reported more than once (i.e. double counted), identify: (i) where that instance is reflected in expenditure included in the regulatory templates; (ii) the value of that expenditure in each regulatory template.	We have provided a Microsoft Excel Spreadsheet that shows how the balancing item was calculated. No item has been double counted.
Clause 4.17: PWC must provide a reconciliation between the total capital and operating expenditure provided in the Workbook 3 – Category analysis, regulatory template 2.1 to the capital and operating expenditure recorded in PWC's regulatory accounting statements and audited statutory accounts.	We have provided a reconciliation between the total capex and opex reported in template 2.1 and the total capex and opex reported in the audited statutory accounts and the regulatory accounts.

2.1.2 Methodology and assumptions

Reconciliation of capex to audited statutory accounts and regulatory accounts

We provided a reconciliation of the expenditure reported in template 2.1 to the amounts reported in our audited statutory accounts and, also, to our regulatory accounts. Our reconciliation is shown in appendix E.

We started the reconciliation with the property, plant and equipment amount reported on the balance sheet as part of our statutory accounts. We then showed the variances to report the movement in property, plant and equipment, which is reported in the regulatory accounts.

Our reconciliation then identifies which amounts that have been excluded from the RIN capex reporting, including interest during construction, capitalisation of work in progress, accruals and other accounting entries.

Finally, we show the classifications of the total capex amount we applied to derive the total capex reported in template 2.1.

Reconciliation of opex to audited statutory accounts and regulatory accounts

We provided a reconciliation of the expenditure reported in template 2.1 to the amounts reported in our audited statutory accounts and, also, to our regulatory accounts. Our reconciliation is shown in appendix F.

We started the reconciliation with the operating expenses reported on the Profit & Loss statement as part of our statutory accounts. We then showed the variances to report the movement in expenses, which is reported in the regulatory accounts.

Our reconciliation then identifies which amounts that have been excluded from the RIN opex reporting, including interest expense, depreciation expense, tax expense and other accounting entries.

Finally, we show the classifications of the total capex amount we applied to derive the total opex reported in template 2.1.

2.1.3 Estimated and actual information

All information presented in the reconciliation is sourced from our Audited Statutory Accounts and our Regulatory Accounts. Therefore, the RIN defines this information as actual information.

2.1.4 Confidential information

The reconciliation does not contain confidential information.

2.1.5 Source of the data

All of the information used in this reconciliation was sourced from our audited statutory accounts.

3. Template 2.2 – Repex

3.1 Template 2.2.1 – Replacement expenditure, volumes and asset failures by asset category

3.1.1 Consistency with the RIN requirements

Appendix E Requirements	Consistency with requirements
Clause 4.29 (a): Where PWC provides asset sub-categories corresponding to the prescribed asset categories in table 2.2.1, PWC must ensure that the expenditure and asset replacement / asset failure volumes of these sub-categories reconcile to the higher level asset category. PWC is required to use the additional rows and provide a clear indication of the asset category applicable to any new sub-category in the yellow input cells labelled 'OTHER BY DNSP DEFINED'; or report new sub-categories against the asset category 'OTHER' in the relevant asset group.	All of our subcategories supplied in the 'OTHER BY DNSP DEFINED' section are independent of the higher level asset categories.
Clause 4.29 (b): In instances where PWC is reporting expenditure associated with asset refurbishments/ life extensions capex it must insert additional rows at the bottom of the table ('OTHER BY DNSP DEFINED'). PWC must provide the required data, applying the corresponding asset group and category name followed by the word "REFURBISHED".	We have added additional rows for refurbishments as required.
Clause 4.29 (c): In instances where PWC considers that both the prescribed asset group categories and the sub-categorisation provisions set out in (a) do not account for an asset on PWC distribution system, PWC must use the additional rows at the bottom of the table 'OTHER BY DNSP DEFINED'. PWC must provide the required data, applying a high level descriptor of the asset as the category name. PWC must ensure that the sum of the individual asset categories, including any additional sub-category, additional other asset category or asset refurbishment/ life extension asset category expenditure reconciles to the total expenditure of the asset group.	We added new rows in the table under 'OTHER BY DNSP DEFINED' and the required data has been provided for each. All sub-categories are mutually exclusive and reconcile to the total expenditure of the asset group.
Clause 4.29 (d): Any new categories defined by PWC in table 2.2.1 of regulatory template 2.2 must also be listed in table 5.2.1 in regulatory template 5.2, and PWC must provide corresponding asset age profile data in accordance with the instructions for regulatory template 5.2. The only exception to this is if the new categories are within the asset groups 'Pole top structures', or 'Staking wooden poles'.	We added new categories to table 2.2.1, and also added these to template 5.2 and age profile data.
Clause 4.29 (e): PWC must ensure that the replacement volumes by asset group is equal to the applicable replacement volume data provided in	We are not required to complete table 2.2.2 so this clause is not relevant.

Appendix E Requirements	Consistency with requirements
table 2.2.2.	
Clause 4.29 (f): PWC must ensure that the sum of the asset group replacement expenditures is equal to the total replacement expenditure contained in regulatory template 2.1.	The sum of asset replacement expenditures equals the replacement expenditure reported in template 2.1.
Clause 4.30 (a): PWC must provide total volume of assets currently in commission and replacement volumes of certain asset groups by specified aggregated metrics. In instances where this information is estimated PWC must explain how it has determined the volumes, detailing the process and assumptions used to allocate asset volumes to the aggregated metrics.	We are not required to complete table 2.2.2 so this clause is not relevant.

3.1.2 Methodology and assumptions

We calculated our replacement expenditure and volumes using the capex methodology described in appendix A. In summary, we first identified all capital expenditure projects that were repex projects by default. This included all our renewal/replacement projects excluding any that were known to be:

- customer connections;
- customer augmentation; and
- expenditure on the NT Build levy for long service leave for NT constructions workers.

There were many instances where our capital projects were not given the correct classifications in our asset management system and there were a number of projects which involved a combination of replacement and augmentation works. For these exceptions, we manually assigned the correct category for RIN reporting.

All repex projects were then further classified into the relevant categories in table 2.2.1 and we made the following assumptions:

- In some cases, we replaced assets in one repex category with assets belonging to another repex category. For example, some 500kVA distribution transformers replaced by 750kVA units. The repex category of the new asset was used to report the expenditure and volumes. We did not apply this assumption when the primary driver of the project was capacity rather than asset condition.
- Where an asset replacement resulted in a new asset in addition to the replacement asset, the new asset was included in the expenditure and quantity tables.

The table below outlines the treatment of each repex asset group and outlines where assumptions or estimates have been made.

Table 2.1.1 category	Our treatment
Poles	We included distribution poles, transmission poles and towers and we excluded refurbishments, which were reported under the ‘other’ category

Table 2.1.1 category	Our treatment
	as required by the AER.
Pole-top structures	Includes the replacement of a cross-arm or the replacement of all insulators on a pole-top. Applies to distribution and transmission pole-top structures.
Staking wooden poles	We do not have wooden poles so we have reported this variable with values of zero.
Overhead conductors	We included all overhead conductors except for service wires. We treated replacement of pole-top clamps with splices as replacement of 1m of conductor.
Underground cables	We included all underground cables except for service cables and we reported all quantities in kilometres.
Service lines	All service line replacements have all been reported in the category of less than 11kV, residential and simple type. We used this category because it represents the vast majority of service lines replaced and we do not have a systemised way to disaggregate into the various asset categories. We reported all quantities of service lines as the total number of services.
Transformers	We included power transformers, distribution transformers and zone substation auxiliary transformers.
Switchgear	We included high voltage distribution switchgear, high voltage circuit breakers and isolators, high voltage switchboards and gas insulated switchgear. We included expulsion drop out fuses as switches not fuses, in accordance with the RIN instructions which state that any fuse which is also capable of acting as a switch be treated as a switch. We included reclosers as circuit breakers.
Public lighting	The public lighting variable has been reported with values of zero because the Framework and Approach Paper (F&A) did not classify public lighting to be either standard control or alternative control services.[8]
SCADA network control and protection systems	
Field devices	We included protection relays and SCADA remote terminal units.
Local network wiring assets	We included the physical panels which house the protection relays and remote terminal units.
Communications network assets	We included microwave terminals, dense wavelength division multiplexing (DWDM) systems, multiplexors, ultra-high frequency (UHF) systems, telemetry systems and teleprotection systems.
Master station assets	We included our energy management system.

[8] https://www.aer.gov.au/system/files/AER%20-%20Final%20framework%20and%20approach%20for%20Power%20and%20Water%20Corporation%20-%20July%202017.docx

Table 2.1.1 category	Our treatment
Communications site infrastructure	We included battery systems, solar systems, shelters, towers/masts and server/equipment rooms.
Communications linear assets	We included fibre optic cables and pilot cables and reported quantities in kilometres.
AFLC	We do not have any AFLC so we reported this variable with values of zero.
Other	
Buildings	We included zone substation switchgear or control buildings.
Instrument transformers	We included current and voltage transformers.
Metering units	We included pole or ground mounted metering units for high voltage customers.
Pillars	We included distribution pillar boxes.
Substation auxiliary plant	We included battery systems and low voltage switchboards.
Voltage regulators	We included pole-mounted distribution voltage regulators.
Civil and Grounds	We included zone substation civil assets including roadway, earth grid, bunding and fencing.
Fire systems	We included zone substation fire systems.
Capacitor banks	We included zone substation capacitor banks.
Cable tunnels	We included cable tunnels for entry/exit from zone substations and for the distribution network in Darwin's central business district. We reported quantities in metres due to the relatively low lengths.
Power transformer refurbishment	We included major transformer overhauls, which includes bushing replacements, gasket replacements, protective devices, radiator replacement etc.
Power transformer spares	We included purchase of spare zone substation power transformers.
Pole refurbishment	We included plating and capping steel distribution poles.
Tower refurbishment	We included earth upgrades or re-coating transmission towers.
EDO refurbishment	We included one-off program to replace old expulsion drop out (EDO) fuses with a sparkless fuse type.

3.1.2.1 Expenditure

We calculated the annual expenditure by adding up the asset cost for those assets categorised as providing standard control services, and which were identified as repex and fit into the relevant repex category.

3.1.2.2 Asset replacements

We calculated the annual quantity of replacements by adding up the asset volumes associated with the above expenditure.

3.1.2.3 Asset failures

The volume of failures per year was calculated using the following two methods:

- Asset failure data from the Maximo Event module was used. This was our preferred source of failure data but it was not available for all categories. It was available for pole-top structures, conductors, cables, service lines, transformers, switchgear and field devices.
- Where failure data was not available from the Maximo Event module, we assigned asset replacements to a failure type category. Each replacement that was driven by a functional failure (the asset was replaced after failure) contributed to the failures reported.

Both data sources excluded externally-caused failures, as required by the appendix F definition of 'Asset failure (repex)'.

It should be noted that for cable and conductor failures in table 2.2.1, the volumes reported are quantity of failures, and not length of the failed asset.

3.1.3 Estimated and actual information

Information	Estimated and actual Information
Replacement expenditure and replacement quantities	The expenditure information was sourced from our asset management system and our financial system. There was a significant amount of categorisation, mapping allocation and assumptions applied. We applied rules primarily based on our system data and expenditure attributes. If we started again and applied different assumptions it is likely that we would report values that are not materially different. Therefore, the RIN defines this as actual information.
Asset failures in relation to pole-top structures, conductors, cables, service lines, transformers, switchgear and field devices.	This information is based on Maximo Event module data and is defined by the RIN to be actual information.
Other asset failures	This information was manually mapped and estimated. This information is defined by the RIN as estimated information.

3.1.4 Confidential information

Template 2.2 does not contain confidential information.

3.1.5 Source of the data

Information	Source
Replacement expenditure	The asset management system (Maximo) and the financial management system (FMS)
Replacement quantities	The asset management system (Maximo)
Asset failure quantities	The asset management system (Maximo)

3.2 Template 2.2.2 – Selected asset characteristics

We were not required to complete table 2.2.2.

4. Template 2.3 – Augex

4.1 General

We have described our understanding of the general requirements of templates 2.3(a) and 2.3(b) and our general approach used to populate the template below. We then provide more detail on our methodology and assumptions for each individual template, together with a description of whether the information is actual or estimate, and whether any information is confidential.

4.1.1 Consistency with the RIN requirements

Appendix E Requirements	Consistency with RIN requirements
Clause 4.32(a): PWC must include only projects and expenditure related to augmentation of the network.	We have only included projects and expenditure related to augmentation of our network.
Clause 4.32(b): Unless otherwise indicated, 'Rating' or 'MVA added' refers to equipment's normal cyclic rating (for substations) or thermal rating (for lines and cables). As specified in the respective definitions of normal cyclic rating (for substations) and thermal rating (for lines and cables), PWC must provide its definition(s) of 'normal conditions' in the basis of preparation.	We have used name plate ratings as our estimate of the normal cyclic ratings. When we use the term 'normal conditions', we mean that all items of plant are in service and the network is configured in its planned state.
Clause 4.32(c): PWC must not include information for gifted assets.	We have not included gifted assets.
Clause 4.32(d): PWC must enter related party and non-related party contracts expenditures in the 'All related party contracts' and 'All non-related party contracts' columns, respectively. (i) Expenditure figures inputted into the 'All related party contracts' and 'All non-related party contracts' columns do not contribute to the column that calculates the total direct expenditure on an augex project ('Total direct expenditure'). (ii) PWC must record all contract expenditure for augex projects under the 'All related party contracts' and 'All non-related party contracts' columns. PWC must then allocate such contract expenditure to the appropriate 'Plant and equipment expenditure and volume' and 'Other expenditure columns. For example, if a non-related party contract involves expenditure on civil works, PWC must record that expenditure under the 'All non-related party contracts' and 'Other expenditure – Civil works' columns.	We do not have any related parties, so we have reported all contract expenditure as 'All non-related party contracts'.
Clause 4.32(e): PWC must not include augmentation information relating to connections in this worksheet. Augmentations in relation to connections are to be inputted in the connections regulatory template 2.5.	We excluded connections augmentations from template 2.3(a) and 2.3(b).

4.1.2 Methodology and assumptions

We calculated our augmentation expenditure and volumes using the capex methodology described in appendix A. In summary, we first identified all capital expenditure projects that were augex projects by default. This included all our extensions projects excluding any that were known to be:

- customer connections;
- customer augmentation; or
- expenditure on the NT Build levy for long service leave for NT constructions workers.

There were many instances where our capital projects were not given the correct classifications in our asset management system and there were a number of projects which were a combination of replacement and augmentation works. For these exceptions, we manually assigned them to the correct category for RIN reporting.

All augex was then further classified into the relevant categories in table 2.3.1, 2.3.2, 2.3.3, 2.3.4, 2.3.5 and 2.3.6. Only those assets that were part of a project which closed in the 2013-14 to 2016-17 period were subject to detailed categorisation described further below.

4.1.2.1 Project type

We classified augmentation projects as either zone substation or subtransmission line projects for the purpose of template 2.3(a)&(b). Projects which had zone substation assets but no subtranmission line assets were classified as a zone substation project. Projects which had subtransmission line assets and no zone substation assets were classified as a subtransmission line project. Where a project had both types of assets, it was classified in accordance with the asset type which contributed the highest capital cost.

4.1.2.2 Asset category

We assigned an augmentation asset category to each augmentation project and we used our asset classes as the driver for this allocation. In some cases, we have single asset classes that were allocated to multiple augmentation asset categories, which were driven by asset voltage.

The table below outlines the asset classes comprising the augmentation asset category, together with additional rules we used to complete the mapping.

Augmentation asset category	Our asset classes	Additional rules
Zone substations	High voltage circuit breakers, power transformers, outdoor disconnectors and busbars, high voltage switchboards, gas insulated switchgear, substation auxiliary plant, civil and grounds, buildings, instrument transformers, capacitor banks, protection, fire systems.	No additional rule
Zone substations	Cables	Installed completely within the

Augmentation asset category	Our asset classes	Additional rules
		zone substation.
Subtransmission lines	Conductors, cables	≥ 66kv
Subtransmission lines	Transmission poles and towers	No additional rule
High voltage feeder	Conductors, cables, distribution poles, pole-tops	> 415v < 66kv
High voltage feeder	Distribution switchgear, voltage regulators, metering units, cable tunnels	No additional rule
Low voltage feeder	Conductors, cables, distribution poles, poletops	≤ 415v
Low voltage feeder	Pillars	No additional rule
Distribution substation	Distribution substations	No additional rule
Other assets	SCADA, communications	No additional rule

4.1.2.3 Asset type

Those assets assigned to the asset categories of high voltage feeder, low voltage feeder and distribution substation were further categorised with an asset type. The feeders were categorised as underground or overhead where expenditure was greater than $0.5m. The substations were categorised as pole, ground or indoor distribution substations regardless of the project value. This was a manual exercise however, and in most cases, we were able to determine the asset type from asset details in Maximo.

4.1.2.4 Added / upgraded

Those assets with assigned to the asset categories of high voltage feeder, low voltage feeder and distribution substation were further classified as upgraded or newly added. An added asset means that a new asset has been created in the Maximo asset management system, regardless of whether the asset replaces an existing asset or not. In contrast, an upgraded asset means that the existing Maximo asset remains. We did this for projects with a value greater than $0.5m.

4.1.2.5 Greenfield / reinforcement

All augmentation projects were categorised as either greenfield or reinforcement driven projects. In reinforcement driven projects, we included assets where an existing asset has had a capacity or functionality improvement or if there were already existing assets of a similar nature in the vicinity of the new asset. Some examples of reinforcements include:

- Installation of a new switch on an existing feeder.
- Inter-poling an existing feeder to raise clearances.
- New assets installed in an existing zone substation.
- Undergrounding overhead assets.
- Establishing remote control on an existing switch.
- Installing new switchgear to reconfigure an existing feeder.

Greenfield driven projects included establishment of new assets where there were no existing assets of a similar nature. Some examples include:

- Installation of a new zone substation in an established suburb.
- Installation a new tie between two feeders.
- Establishment of a new high voltage feeder from an existing zone substation.
- Establishment of a new transmission line between zone substations.

We did this manually based on the project description and a general understanding of the scope of each project. Where necessary, project documentation was used to assist.

4.1.2.6 Unmodeled augmentation

Augmentation was considered unmodeled, if the project driver was not directly related to addressing peak demand or capacity needs. Some examples of unmodeled augmentation include:

- Installation of a new dehumidifier in an existing zone substation.
- Installation of a new recloser to address reliability issues.
- Installation of a new pole to raise high voltage line clearances.

4.1.2.7 MVA added

For each asset within Asset Category of Distribution Substation, the RIN required us to specify the amount of capacity added. In accordance with the RIN Appendix E instructions, this was interpreted to mean the nameplate rating of the new transformer. No deduction was made to account for the decommissioned capacity of any existing transformers.

4.1.2.8 Calculations to convert nominal to real 2016-17 dollars

The following table provides the calculations and inflation rates we used to convert nominal to real expenditure values.

	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17
Nominal amount **(M)**	A	B	C	D	E	F	G	H	I	J
Inflation	1.42%	3.12%	3.55%	1.21%	2.39%	3.02%	1.51%	1.02%	1.93%	1.42%

	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17
Inflation index **(N)**	120.85%	119.16%	115.55%	111.59%	110.26%	107.68%	104.53%	102.98%	101.93%	100%
Real 2016-17 amount	M x N	M x N	M x N	M x N	M x N	M x N	M x N	M x N	M x N	M x N

4.2 Template 2.3.1 – Augex asset data – subtransmission substations, switching stations and zone Substations

4.2.1 Consistency with the RIN requirements

Appendix E Requirements	Consistency with RIN requirements
Clause 4.33(a): For projects with a total cumulative expenditure over the life of the project of greater than or equal to $5 million (nominal): (i) provide information requested for each augmentation project on a sub-transmission substation, switching station and zone substation owned and operated by PWC where project close occurred at any time in the years 2013-14 to 2016-17; and	We included zone substation projects with expenditure greater than $5 million (nominal) and project close between 2013-14 and 2016-17 as separate rows in table 2.3.1.
Clause 4.33(b): For projects with a total cumulative expenditure over the life of the project less than $5 million (nominal) (non-material projects): (i) provide the total expenditure for all non-material augmentation projects on a sub-transmission substation, switching station and zone substation owned and operated by PWC where project close occurred in the years 20013-14 to 2016-17 in the last row in the table, as indicated.	We included all zone substation projects with expenditure less than $5 million (nominal) and project close between 2013-14 and 2016-17 in the last row of table 2.3.1
Clause 4.33(c): Record all expenditure data on a project close basis in real dollars ($2016-17). (i) PWC must provide any calculations used to convert real to nominal dollars or nominal to real dollars for this purpose.	We converted nominal expenditure data to real 2016-17 expenditure data using inflation data from the Australian Bureau of Statistics. Our calculations are provided in the methodology section above.
Clause 4.33(d): For the avoidance of doubt, this includes augmentation works on any substation in PWC's network, including those which are notionally operating at transmission voltages. In such cases, choose 'Other' in the 'Substation type' category and describe the type of substation in the basis of preparation.	There were no augmentation projects identified on substations at transmission voltages.
Clause 4.33(e): Each row must represent data for an augmentation project for an individual substation. (i) If an augmentation project applies to two substations, for example, PWC must enter data for the two substations in two rows.	All projects represent data for an individual substation.
Clause 4.33(f): Where a substation augmentation project in this table is related to other projects (including those in other tables in regulatory	There are no projects related to those listed in table 2.3.1.

Appendix E Requirements	Consistency with RIN requirements
templates 2.3(a) and (b)), describe this relationship in the basis of preparation.	
Clause 4.33(g): Where PWC chooses 'Other' in a drop-down list, it must provide details in the basis of preparation.	‘Other’ was chosen for PRD39738, since this project related to the purchase of two mobile substations.
Clause 4.33(h): For 'Substation ID' and 'Project ID', input PWC’s identifier for the substation and project, respectively. This may be the substation/project name, location and/or code.	The substation name and project ID have been entered.
Clause 4.33(i): For ‘Project trigger’, choose the primary trigger for the project from the drop down list. Describe secondary triggers in the basis of preparation. Where there is no primary trigger (among multiple triggers), choose ‘Other’ and describe the triggers in the basis of preparation.	The project trigger has been chosen from the drop-down list.
Clause 4.33(j): For substation voltages, enter voltages in the format xx/xx, reflecting the primary and secondary voltages. For example, a transformer may have its voltage recorded as 500/275, where 500kV is the primary voltage and 275kV is the secondary voltage. (i) Where a tertiary voltage is applicable, enter voltages in the format xx/xx/xx. For example, a transformer may have its voltage recorded as 220/110/33, where 220kV, 110kV and 33kV are the primary, secondary and tertiary voltages, respectively.	Voltages have been entered as instructed.
Clause 4.33(k): For substation ratings, 'Pre' refers to the relevant characteristic prior to the augmentation work; 'Post' refers to the relevant characteristic after the augmentation work. Where a rating metric does not undergo any change, or where the project relates to the establishment of a new substation, input the metric only in the 'Post' column.	Substation ratings have been entered as instructed.
Clause 4.33(l): Under 'Total expenditure' for transformers, switchgear, capacitors, and other plant items, include only the procurement costs of the equipment. This must not include installation costs.	Procurement costs only have been reported under the ‘Total expenditure’ for transformers, switchgear, capacitors and other plant items.
Clause 4.33(m): Expenditure inputted under the ‘Land and easements’ columns is mutually exclusive from expenditure that appears in the columns that sum to the ‘Total direct expenditure’ column. In other words, the ‘Total direct expenditure’ for a particular project must not include expenditure inputted into the ‘Land and easements’ columns.	Land and easement costs are excluded from the ‘Total direct expenditure’.
Clause 4.33(n): If PWC records land and easement projects and/or expenditures as separate line items for regulatory purposes, select ‘Other’ and note ‘Land/easement expenditure’ in the basis of	Where costs directly attributable to land and easement costs were identified they were included in the ‘Land purchases’ and ‘Easements’ columns.

Appendix E Requirements	Consistency with RIN requirements
preparation. (i) PWC must input expenditure directly attributable to the land purchase or easement compensation payments in the 'Land purchases' and 'Easements' columns, respectively. These costs include legal, stamp duties and cost of purchase or easement compensation payments. (ii) PWC must input other expenditure attributable to land purchases and easements in the 'Other expenditure – Other direct' column.	
Clause 4.33(o): Definitions: Other plant item: (i) All equipment involved in utilising or transmitting electrical energy that are not transformers, switchgear, or capacitors.	This has been interpreted to include all supporting substation assets except for buildings and civil works, which are included in the civil works section.

4.2.2 Methodology and assumptions

To populate table 3.2.1, we first identified all augmentation projects with total expenditure greater than $5m using the general methodology described in the sections above. Where projects were identified that contained portions of substation works and transmission or distribution works, the project was only considered a material project if the substation component was greater than $5m. We only included projects which were closed in Maximo in the period 2013-14 to 2016-17 were included as material projects.

The table below outlines the methodology we used to populate the table 2.3.1 variables for material projects.

Field	Methodology
Project description and changes	We added this information on a project-by-project basis by our planning team using their knowledge of the projects.
Plant and equipment volume	We added this information on a project-by-project basis by our planning team using their knowledge of the projects.
Plant and equipment expenditure – transformers, switchgear and capacitors	We used project transactions reports to identify procurement costs (excluding installation) for transformers, switchgear and capacitors.
Plant and equipment expenditure – other plant item	We did not have actual information about the asset cost of the 'other plant' so we estimated this variable based on the proportion of assets capitalised against the project which were not transformers, switchgear or capacitors
Plant and equipment expenditure – installation labour	All internal labour costs against the project, as well as an estimated amount of contractor labour cost (total project contractor cost excluding procurement and civil works costs)
Other expenditure – civil works	We calculated the total costs capitalised against our 'civil and grounds and buildings' asset category. Land and easement costs have been subtracted from this category to avoid double counting.
Other expenditure – other direct	We did not identify any other expenditure for this variable.
Years incurred	We referred to our project expenditure data to identify the years

Field	Methodology
	incurred.
All related party contracts	We do not have any related parties so this variable was reported with values of zero.
All non-related party contracts	We used all contractor expenditure against the project.
Land and easements	We used project transactions data to identify land and easement costs.

For non-material projects, we:

- calculated the total zone substation augmentation expenditure only for projects that were closed in the 2013-14 to 2016-17
- deducted the material projects expenditure from the total to derive the final nominal amount.
- converted expenditure reported in table 2.3.1 into real 2016-17 dollars using inflation data from the Australian Bureau of Statistics.

4.2.3 Estimated and actual information

The underlying data is from Maximo, which is an internal system for capturing project costs. While we have made a number of adjustments to the data, we consider that alternative assumptions would not have derived a materially different outcome. On this basis, we consider the information is actual as defined by the RIN.

4.2.4 Source of information

The information on project costs assigned to an augex driver is sourced from Maximo.

4.2.5 Confidential information

Table 2.3.1 does not contain confidential information.

4.3 Template 2.3.2 – Augex asset data - subtransmission lines

4.3.1 Consistency with the RIN requirements

Appendix E Requirements	Consistency with RIN requirements
Clause 4.34(a): For projects with a total cumulative expenditure over the life of the project of greater than or equal to $5 million (nominal): (i) provide the required details for each augmentation project on a sub-transmission line owned and operated by PWC where project close occurred at any time during the years 2013-14 to 2016-17; and	We included sub-transmission projects with expenditure greater than $5 million (nominal) and project close between 2013-14 and 2016-17 as separate rows in table 2.3.2.
Clause 4.34(b): For projects with a total cumulative expenditure over the life of the project less than $5 million (nominal) (non-material projects):	We included all sub-transmission projects with expenditure less than $5 million (nominal) and project close between 2013-14 and 2016-17 in the

Appendix E Requirements	Consistency with RIN requirements
(i) input the total expenditure for all non-material augmentation projects on sub-transmission lines owned and operated by PWC where project close occurred in the years 2013-14 to 20016-17 in the last row in the table, as indicated.	last row of table 2.3.2.
Clause 4.34(c): Record all expenditure data on a project close basis in real dollars ($2016-17). (i) PWC must provide any calculations used to convert real to nominal dollars or nominal to real dollars for this purpose.	We converted nominal expenditure data to real 2016-17 expenditure data using inflation data from the Australian Bureau of Statistics. Our calculations are provided in the methodology section above.
Clause 4.34 (d): For the avoidance of doubt, this includes augmentation works on any sub-transmission line in PWC's network. If PWC owns and operates any lines or cables notionally operating at transmission voltages, record any augmentation expenditure relating to such lines or cables in this table.	We did not have any augmentation projects at transmission voltages to report in this table.
Clause 4.34(e): Each row should represent data for all circuits of a given voltage subject to augmentation works under the project ID. (i) If an augmentation project applies to two circuits of the same voltage, for example, PWC must enter data for the two circuits in one row. (ii) If an augmentation project applies to two circuits of different voltages, for example, PWC must enter data for the two circuits in two rows	We reported an individual sub-transmission line project on each row.
Clause 4.34(f): Where a sub-transmission lines augmentation project in this table is related to other projects (including those in other tables in regulatory template 2.3), describe this relationship in the basis of preparation.	We did not have any projects related to those listed in table 2.3.2.
Clause 4.34(g): Where PWC chooses 'Other' in a drop down list, provide details in the basis of preparation.	We did not use the 'Other' option.
Clause 4.34(h): For 'Line ID', input PWC's identifier for the circuit(s) subject to augmentation works under the project ID. This may be the circuit name(s), location and/or code.	We used our line name for the line ID.
Clause 4.34(i): For 'Project ID', input PWC's identifier for the project. This may be the project name, location and/or code.	We used our project number for the project ID.
Clause 4.34(j): For 'Project trigger', choose the primary trigger for the project from the drop down list. Describe secondary triggers in the basis of preparation. Where there is no primary trigger (among multiple triggers), choose 'Other' and describe the triggers in the basis of preparation.	We have selected the relevant project trigger.
Clause 4.34(k): For length metrics, 'km added' refers to the gross addition of the relevant length measure	We added the kilometres of line added and we did not net off the length of line removed.

Appendix E Requirements	Consistency with RIN requirements
resulting from the augmentation work. (i) This must not be net of line or cable removal. If the augmentation project includes line or cable removal, describe the amount in basis of preparation.	
Clause 4.34(l): Under 'Total expenditure' for poles/towers, include the procurement costs of the equipment and civil works. This must not include installation costs.	We have reported the procurement and civil works costs and under the 'Total expenditure' for poles/towers.
Clause 4.34(m): Under 'Total expenditure' for lines, cables and 'other plant item', respectively, include only the procurement costs of the equipment. This must not include installation costs.	We have reported procurement costs under the 'Total expenditure' for lines and other assets. Civil works costs for cables have also been included in this section in the absence of anywhere else to put them.
Clause 4.34(n): Under 'Total expenditure' for civil works, do not include civil works expenditure related to poles/towers. As a guide, expenditure PWC may input under 'Other expenditure – Civil works' includes (but is not limited to) construction of access tracks, construction pads and vegetation clearance.	We have not reported any costs under civil works expenditure, since these costs are contained within the poles/towers and cable assets above.
Clause 4.34(o): Expenditure inputted under the 'Land and easements' columns is mutually exclusive from expenditure that appear in the columns that sum to the 'Total direct expenditure' column. In other words, the 'Total direct expenditure' for a particular project must not include expenditure inputted into the 'Land and easements' columns.	We excluded land and easement costs from the 'Total direct expenditure'.
Clause 4.34(p): If PWC records land and easement projects and/or expenditures as separate line items for regulatory purposes, select 'Other' and note 'Land/easement expenditure' in the basis of preparation. (i) PWC must input expenditure directly attributable to the land purchase or easement compensation payments in the 'Land purchases' and 'Easements' columns, respectively. These costs include legal, stamp duties and cost of purchase or easement compensation payments.	No costs directly attributable to land and easement costs were identified.
Clause 4.34(q): PWC must input other expenditure attributable to land purchases and easements in the 'Other expenditure – Other direct' column.	No other costs directly attributable to land and easement costs were identified.
Clause 4.34(r): Definitions: Other plant item (i) All equipment involved in utilising or transmitting electrical energy that are not poles/towers (including pole top or tower structures), lines or cables.	We have included zone substation assets associated with the subtransmission project.

4.3.2 Methodology and assumptions

To populate table 3.2.2, we first identified all augmentation projects with total expenditure greater than $5m using the general methodology described in the sections above. Where projects were identified that contained portions of substation works and transmission or distribution works, the project was only considered a material project if the subtransmission component was greater than $5m. We only included projects which were closed in Maximo in the period 2013-14 to 2016-17 were included as material projects.

The table below outlines the methodology we used to populate the table 2.3.2 variables for material projects.

Template variable	Methodology
Project description and changes	We added this information on a project-by-project basis by our planning team using their knowledge of the projects.
Plant and equipment volume	We added this information on a project-by-project basis by our planning team using their knowledge of the projects.
Plant and equipment expenditure – poles/towers, overhead lines, underground cables	We used project transactions to identify procurement costs (including civil works but excluding installation) of poles & towers, conductors and cables.
Plant and equipment expenditure – other plant item	Project transactions were reviewed to identify procurement costs for other assets (excluding poles & towers, conductors and cables)
Plant and equipment expenditure – installation labour	All internal labour costs against the project, as well as an estimated amount of contractor labour cost (total project contractor cost excluding procurement costs)
Other expenditure – civil works	This has been left as zero, since all civil works are captured under the asset procurement costs
Other expenditure – other direct	No expenditure identified
Years incurred	Review expenditure data in the CAPEX model
All related party contracts	N/A
All non-related party contracts	Total contractor expenditure against the project
Land and easements	Project transactions were reviewed to identify land and easement costs

For non-material projects, we:

- calculated the total zone substation augmentation expenditure only for projects that were closed in the 2013-14 to 2016-17
- deducted the material projects expenditure from the total to derive the final nominal amount.
- converted expenditure reported in table 2.3.2 into real 2016-17 dollars using inflation data from the Australian Bureau of Statistics.

4.3.3 Estimated and actual information

The information reported in table 2.3.2 was materially dependant on our financial system and asset management system data.

Some of the augmentation expenditure was journaled from the previous financial management system to Maximo, and during the process data was aggregated and a level of detail was lost. In these cases, the procurement costs could not be separated from installation costs so the amounts were estimated. We consider that other alternative forms of estimation would not have yielded materially different outcomes, and for this reason the information is actual as defined by the AER's RIN.

4.3.4 Confidential information

Table 2.3.2 does not contain confidential information.

4.3.5 Source of the data

Information	Source
Augex Project List	20170517 Augex Projects list >$5m for Planning
Project Financial Transactions	Project transaction reports for 2.3 (a) augex
ABS Inflation Data	20171114 Summary of historic ABS inflation data
Weddell-Archer-Hudson Creek Line Capitalisation - 1	AS CONS B11-15089, B11-15090, B11-15091, B11-15093, B11-15099
Weddell-Archer-Hudson Creek Line Capitalisation - 2	AS CONS B08-3512, B09-3155 > B09-3162
PRD39102 civil contract breakdown	PXD39102/PRD39102 Expenditure/Capitalise Workings.xls
PRD30002 civil contract breakdown	PRD30002 Project Transactions for CA RIN 2.3a

4.4 Template 2.3.3 – Augex data – HV/LV feeders and distribution substations

4.4.1 Consistency with the RIN requirements

Appendix E Requirements	Consistency with the RIN requirements
Clause 4.35 (a): Complete the table by inputting the required details.	We completed the entire table.
Clause 4.35 (b): For HV feeders owned and operated by PWC at any time during the years 2013-14 to 2016-17: (i) for projects with a total cumulative expenditure over the life of the project of greater than or equal to $0.5 million (nominal) complete both the cost metrics table and the descriptor metrics table by inputting the required details; (ii) for projects with a total cumulative expenditure over the life of the project of less than or equal to $0.5 million (nominal) complete only the cost metrics table by inputting the required details.	We calculated this data for high voltage feeders as described in the methodology section below.
Clause 4.35 (c): Record all expenditure data on an	We calculated the expenditure on an as-incurred

Appendix E Requirements	Consistency with the RIN requirements
'as-incurred' basis in nominal dollars.	basis in nominal dollars.
Clause 4.35 (d): For projects that span across regulatory years, input figures for the 'Circuit km added' and 'Circuit km upgraded' columns according to the final year in which expenditure was incurred for the project.	We added circuit kilometres based on the installation year based on the methodology described below, which in turn is based on the final year of expenditure as required.
Clause 4.35 (e): PWC must not include expenditure related to land purchases and easements in the 'Total direct expenditure' column. Land purchases and easements expenditure related to augmentation works on all HV feeders owned and operated by PWC must be inputted in table 2.3.4.	We did not include costs relating to land purchases or easements.

4.4.2 Methodology and assumptions

We calculated the units added and units upgraded per annum as the sum of all asset quantities using the categorisation described in the general methodology section above. For example, the circuit line length units added and units upgraded were calculated for overhead high voltage feeder augmentations based on all of the following criteria:

- Service classification was standard control services.
- Expenditure category was augmentation.
- Added/upgraded was added.
- Asset type was overhead.
- Asset category was high voltage feeder.
- Asset class was conductor.
- Project expenditure was greater than $500,000.

We calculated the expenditure per annum the same way, except summing on the asset expenditure rather than the asset quantity.

4.4.3 Estimated and actual information

The information was sourced from Maximo, which is an internal business system. For this reason the information is actual as defined by the AER's RIN.

4.4.4 Source of information

The information is sourced from Maximo.

4.4.5 Confidential information

We have not identified any confidential information in this template.

4.5 Templates 2.3.4 to 2.3.6 – Augex total expenditure, driver and greenfields

4.5.1 Consistency with the RIN requirements

Appendix E Requirements	Consistency with the RIN requirements
Clause 4.36 (a): Complete the tables by inputting the required details for: (i) the rows that summarise all augmentation works on the specified types of distribution substations owned and operated by PWC undertaken at any time during the years 2013-14 to 2016-17.	Details have been entered as instructed.
Clause 4.36 (b): Record all expenditure data on an 'as incurred' basis in nominal dollars.	Expenditure is reported as-incurred in nominal dollars.
Clause 4.36 (c): For projects that span across regulatory years, input figures for the 'Units' column according to the final year in which expenditure was incurred.	Details have been entered as instructed.
Clause 4.36 (d): "Greenfield" driven augmentation expenditure refers to expenditure that will increase the size of the network by creating new physical assets, where no facilities currently exist (for example, expansion of the network into a new industrial estate, or housing subdivision).	Projects have been reviewed individually and categorised as "Greenfield" or "Reinforcement"
Clause 4.36 (e): Reinforcement driven augmentation expenditure refers to expenditure that meets the definition of augmentation expenditure but is not greenfield driven augmentation (for example, increasing network capacity or functionality due to power quality and safety reasons).	Projects have been reviewed individually and categorised as "Greenfield" or "Reinforcement"
Clause 4.36 (f): Expenditure in table 2.3.6 should reconcile with total of greenfield driven and reinforcement driven augmentation expenditure in table 2.3.5.	Expenditure in table 2.3.6 reconciles with total greenfield and reinforcement expenditure.

4.5.2 Methodology and assumptions

We calculated the total expenditure in table 2.3.4 by adding the asset expenditure for each augex asset category that we assigned to standard control services and augmentation. We did this calculation using the categorisation described in the general methodology section above.

We calculated the total expenditure in table 2.3.5 by adding the greenfield and reinforcement asset expenditure for augmentation projects that we assigned to standard control services and augmentation. The calculation was based on the categorisation described in the general methodology section above.

We calculated the total expenditure in table 2.3.6 by adding the greenfield asset expenditure for augmentation projects that we had assigned to standard control services, augmentation and the relevant asset category. The calculation used the categorisation described in the general methodology section above.

4.5.3 Estimated and actual information

Information	Estimated and actual information
Asset quantities and costs for projects in progress	No capitalisation data was available for these projects so the asset quantities and cost allocations were estimated. An alternative method may have resulted in a materially different estimate. It is therefore defined by the RIN to be estimated information,

4.5.4 Source of the information

The information in tables 2.3.4, 2.3.5 and 2.3.6 was sourced from our asset management system and our financial management system.

4.5.5 Confidential information

Table 2.3.4, 2.3.5 and 2.3.6 do not contain confidential information.

5. Template 2.5 – Connections

5.1 General

We have described our understanding of the general requirements of the templates comprising 2.5 and our general approach to populate the templates. We then provide more detail on our methodology and assumptions for each individual template, together with a description of whether the information is actual or estimate, and whether any information is confidential.

5.1.1 Consistency with the RIN requirements

Appendix E Requirements	Consistency with the RIN requirements
Clause 4.48: PWC must ensure that the data provided for connection services reconciles to internal planning models used in generating PWC's proposed revenue requirements.	This basis of preparation relates to the historic information for the years 2013-14 to 2016-17. Our internal planning models apply for the forecast period and therefore cannot be reconciled.
Clause 4.55: PWC must only report augmentation for connections in Workbook 3 – Category analysis, regulatory template 2.5, relating to customer connection requests, as per the definition of connection expenditure. PWC must not double count augmentation requirements by twice reporting augmentation data in Workbook 3 – Category analysis, regulatory templates 2.3 and 2.5.	Projects have been given expenditure categories which are mutually exclusive. That is we did not categorised projects as both connections and augmentation.
Clause 4.52: PWC must not report data in relation to negotiated connection services or connection services which have been classified as contestable by the AER.	Negotiated services have not been included in template 2.5. Power and Water does not have any contestable connection services.
Clause 4.59: For each table in Workbook 3 – Category analysis, regulatory template 2.5, PWC must record expenditures and volumes in only one subcategory and connection classification (i.e. connection classifications are mutually exclusive).	Expenditure and volumes have been reported against a single subcategory and connection classification as instructed.

5.1.2 Methodology and assumptions

We calculated our connections expenditure and volumes using the capex methodology described in appendix A. In summary, we first identified all capital expenditure projects that were connection projects by default. This included all our customer connections and customer augmentation capital projects. We excluded expenditure associated with the NT Build levy for long service leave for NT constructions workers.

There were many instances where our capital projects were not given the correct classifications in our asset management system and there were a number of projects which were a combination of replacement and augmentation works. For these exceptions, we manually assigned them to the correct category for RIN reporting.

All connections expenditure was then further classified into the relevant categories in table 2.5.1, 2.5.2 and 2.5.3. Only those assets that were part of a project which closed in the 2013-14 to 2016-17 period were subject to detailed categorisation described further below.

Other quantities required for 2.5 include volumes of overhead and underground connections, GSL breaches and payments, and customer complaints which were not based on the capex methodology. Our methodology for these variables is discussed in detail in the below sections for the relevant RIN tables.

5.1.2.1 Asset category

A Connection Asset Category was first assigned to each asset in the CAPEX model by mapping from the Power and Water Asset Class. In some cases a single Power and Water Asset Class can belong to multiple Asset Categories, so the asset voltage was required in these cases. The table below outlines the Connection Asset Categories and the Power and Water Asset Class together with any additional rules needed to complete the mapping.

Connection Asset Category	Power and Water Asset Class	Additional Rules
HV Feeder	Conductors, Cables, Distribution Poles	> 415V and < 66kV
HV Feeder	Distribution Switchgear, Metering Units	No additional rule applied
LV Feeder	Conductors, Cables, Distribution Poles	≤ 415V
LV Feeder	Pillars	No additional rule applied
Distribution Substation	Distribution Substations	No additional rule applied
Distribution Substation	Distribution Poles	Substation poles only
Distribution Substation	Distribution Switchgear	Kiosk substations only

5.1.2.2 Subcategory

The AER's RIN required us to report connections expenditure and volumes by the subcategories RESIDENTIAL, COMMERCIAL/INDUSTRIAL, SUBDIVISION and EMBEDDED GENERATION. There was no systemised way to perform this categorisation, so each project was manually reviewed and assigned to the appropriate Subcategory by our staff that had a detailed knowledge of the projects.

5.1.2.3 Connection Classification

We were further required to assign a Connection Classification for each subcategory. Similar to above there was no systemised way to perform this categorisation. Consequently, we used other methods to categorise the connection classification including by Power and Water Asset Classes and Connection Asset Categories present in each project.

The intention was to choose the appropriate Connection Classifications in accordance with the definitions in the Reset RIN Appendix F. The methodology used to achieve this is outlined in the table below.

Subcategory	Connection classification	Project rules
RESIDENTIAL	Simple connection LV	Customer Connection program or all assets are LV Feeder Asset Category
RESIDENTIAL	Complex connection LV	All assets are LV Feeder Asset Category
RESIDENTIAL	Complex connection HV	Has asset with HV feeder Asset Category
COMMERCIAL / INDUSTRIAL	Simple connection LV	Customer Connection program or all assets are LV Feeder Asset Category
COMMERCIAL / INDUSTRIAL	Complex connection HV (customer connected at LV, minor HV works)	Has asset with HV Feeder or Distribution Substation Asset Category
COMMERCIAL / INDUSTRIAL	Complex connection HV (customer connected at LV, upstream asset works)	As above but with significant upstream works (> 500m HV Feeder)
COMMERCIAL / INDUSTRIAL	Complex connection HV (customer connected at HV)	Manual review to identify those with HV customers
COMMERCIAL / INDUSTRIAL	Complex connection sub-transmission	Not applicable in our circumstances.
SUBDIVISION	Complex connection LV	Customer Connection program or all assets are LV Feeder Asset Category
SUBDIVISION	Complex connection HV (no upstream asset works)	Has asset with HV Feeder or Distribution Substation Asset Category
SUBDIVISION	Complex connection HV (with upstream asset works)	As above but with significant upstream works (> 500m HV Feeder)

5.1.2.4 MVA added

For each asset with Asset Category of Distribution Substation we were required to specify the amount of capacity added. In accordance with the RIN Appendix E instructions, this was interpreted to mean the nameplate rating of the new transformer. No deduction was made to account for the decommissioned capacity of any existing transformers.

5.1.2.5 Cost per lot

For each project with Subcategory of SUBDIVISION we were required to specify the number of lots established by the project. This is entered against only one asset for each project, to avoid double counting.

The number of lots was manually calculated for each project by reviewing our internal record management system (TRIM) and checking Development Consent Authority (DCA) correspondence.

5.2 Table 2.5.1 – Descriptor metrics – volumes and expenditure – all

5.2.1 Consistency with the RIN requirements

Appendix E Requirements	Consistency with the RIN requirements
Clause 4.49: PWC is not required to distinguish expenditure for connection services as either capex or opex in Workbook 3 – Category analysis, regulatory template 2.5, table 2.5.1.	Capex and Opex have not been distinguished.

Appendix E Requirements	Consistency with the RIN requirements
Clause 4.50: PWC must report expenditure data as a gross amount, by not subtracting customer contributions from expenditure data in Workbook 3 – Category analysis, regulatory template 2.5, tables 2.5.1. and 2.5.2.	Customer contributions have not been subtracted from the expenditures in tables 2.5.1 and 2.5.2
Clause 4.51: PWC must report data for non-contestable, regulated connection services in Workbook 3 – Category analysis, regulatory template 2.5, tables 2.5.1 and 2.5.2. This includes work performed by third parties on behalf of PWC.	We reported data for non-contestable, regulated connection services, including work performed by third parties on behalf of Power and Water .
Clause 4.53: In Workbook 3 – Category analysis, regulatory template 2.5, table 2.5.1 for augmentation metrics, 'km added' refers to the net addition of circuit line length resulting from the augmentation work of complex connections. Record values for total connections (standard control and alternative control) for each regulatory year in table 2.5.1 and values for standard control connections only for each regulatory year in table 2.5.1.	'km added' has been reported as instructed. Power and Water does not have any connections CAPEX defined as alternate control services, so the CAPEX components in EXPENDITURE – ALL and EXPENDITURE – STANDARD CONTROL SERVICES are the same.
Clause 4.54: The definition of complex connections provides guidance on the types of augmentation works which must be reported as connection services, as descriptor metrics for table 2.5.1 and as cost metrics for table 2.5.2.	We reviewed these definitions and applied them when calculating the data.
Clause 4.56: PWC must report the MVA added for distribution substations installed for connection services. Where MVA added must be calculated by PWC as the sum of the nameplate rating of all the distribution substations installed for the relevant year.	Data has been entered as instructed.

5.2.2 Methodology and assumptions

5.2.2.1 Total spend by asset category

The total expenditure was calculated by summing the asset expenditure for the corresponding year for those assets with Service Classification of "SCS", Expenditure Category of "Connection" for each Connections Asset Category and Subcategory.

For example, the expenditure per year for Augmentation HV would be calculated using the following field values:

- Service Classification = "SCS"
- Expenditure Category = "Connections"
- Asset Category = "HV Feeder"
- Subcategory = "RESIDENTIAL"

5.2.2.2 Volumes added by asset category

The total volumes added (MVA and net circuit km) was calculated in a similar way to total spend by asset category. For Distribution Substation MVA added, the total was the sum of the "MVA Added" field described above. For Augmentation HV and Augmentation LV, it was the sum of the asset quantity for each year for those assets with the Power and Water Asset Class of Cables or Conductors.

5.2.2.3 Cost per lot

The cost per lot per year is calculated by dividing the total SUBDIVISION expenditure each year by the number of lots connected in that year.

The number of lots for each project was applied in the year that the project was completed (i.e. the same year as the corresponding asset install date).

5.2.2.4 Underground & overhead connections

The volume of connections was not able to be extracted from the CAPEX methodology, since bulk projects are used to capture all new connections for each region and each year. A separate dataset was created that contains every work order raised against a customer connections project.

It was found that there was inconsistency in the way that work orders had been raised over time and in different regions, so the work order list was manually reviewed by our connections staff. The connection officers nominated all work orders which corresponded to a new connection or connections, and for each of these allocated:

- The number of new connections resulting from the work order.
- Whether the new connections were overhead or underground.
- The Subcategory of the new connections (e.g. RESIDENTIAL, COMMERCIAL/INDUSTRIAL).

Each work order was then assigned a financial year on the basis of the date the work order was created, and the quantity of overhead and underground connections per year was extracted for each subcategory.

We note that there were no recorded new connections in the “EMBEDDED GENERATION” subcategory, as PV connections are almost always done as an upgrade to an existing connection. The number of overhead and underground connections reported in the EMBEDDED GENERATION subcategory was the number of existing connections which have been upgraded to PV metering. There are no costs recorded against these connections in RIN 2.5, since upgrade to PV metering is considered a fee-based cost and is allocated to RIN 4.3.

5.2.2.5 GSL breaches and payments

The GSL scheme was established in 2013/14, however data issues prevented GSL breaches from being accurately recorded and no GSL payments were made in that year. The small number of breaches identified as occurring in 2013/14 were paid in 2014/15. We made 66 payments in 2014/15 for breaches that occurred in 2013/14.

GSL payments are tracked in spreadsheets and the total for each financial year was simply summed from the associated spreadsheet. The quantity of breaches was calculated by dividing the payments by the standard GSL cost per customer.

All GSL types have been included in the calculation of breaches and payments, including unplanned interruptions, connection/re-connections and notice of planned interruptions. We note that the vast majority of GSL breaches and payments are to residential customers.

5.2.2.6 Customer complaints

The volume of customer complaints was extracted by interrogating our internal record management document system (TRIM), and counting the number of complaints relating to connection services for each year.

5.2.2.7 Mean days to connect residential customer

The "mean days to connect" was calculated from the same dataset as the Overhead/Underground connections. Each work order which had been nominated as a new connection was analysed to determine a start date and a finish date.

The start date was calculated as the scheduled start date (SCHEDSTART) if populated, and the work order creation date (REPORTDATE) if not. The reasoning is that often the customer will request a connection after a particular date, so it makes sense to measure against this date rather than the date the work order was created.

The finish date was calculated as the earlier of the actual finish date (free text entered by user) and the physical completion date (date the work order status was changed to complete). The reasoning is that the use of these fields has changed over time and the earlier date is likely to be closest to the actual completion of the job.

The "days to connect" for each work order is calculated as the difference between the start date and the finish date.

There are many instances where the work order was incorrectly left open for long periods, and others where the finish date is before the start date due to human error. These errors result in exaggerated or negative values for "days to connect". To remove these outliers, only results where the value was between 0 and 10 were included in the calculation of the mean.

5.2.2.8 Standard control services

The numbers reported under Standard Control Services are the same as those reported under "All". There are some Alternative Control Services related to connections such as Energisation and De-Energisation, however no appropriate section for these could be found in Table 2.5.1 so these have not been included.

5.2.3 Estimated and actual information

While the aggregate information has been sourced from our financial systems, we have made a number of assumptions to report the data in the form required by the AER. Alternative assumptions and methods could have been used to derive materially different outcomes. On this basis, the information is estimated information under the RIN definitions.

5.2.4 Source of information

Data	Source
Total volumes, spend and costs	Maximo
Underground and overhead connections and mean days to connect customer	Internal dataset
GSL breaches	Internal spreadsheet
Customer complaints	Internal document

5.2.5 Confidential information

We have not identified any confidential information in this template.

5.3 Template 2.5.2 – Cost metrics by connection classification

5.3.1 Consistency with the RIN requirements

Appendix E Requirements	Consistency with the RIN requirements
Clause 4.50: PWC must report expenditure data as a gross amount, by not subtracting customer contributions from expenditure data in Workbook 3 – Category analysis, regulatory template 2.5, tables 2.5.1. and 2.5.2.	Customer contributions have not been subtracted from the expenditures in tables 2.5.1 and 2.5.2.
Clause 4.51: PWC must report data for non-contestable, regulated connection services in Workbook 3 – Category analysis, regulatory template 2.5, tables 2.5.1 and 2.5.2. This includes work performed by third parties on behalf of PWC.	We reported data for non-contestable, regulated connection services, including work performed by third parties on behalf of Power and Water.
Clause 4.54: The definition of complex connections provides guidance on the types of augmentation works which must be reported as connection services, as descriptor metrics for table 2.5.1 and as cost metrics for table 2.5.2.	We reviewed these definitions and applied them when calculating the data.
Clause 4.57: PWC must report information on connections cost metrics in Workbook 3 – Category analysis, regulatory template 2.5, table 2.5.2 that records standard control services connections expenditure by connection type for each regulatory year.	Standard control services expenditure has been included as instructed in the EXPENDITURE – STANDARD CONTROL SERVICES table.
Clause 4.58: PWC must report information on connections cost metrics in Workbook 3 – Category analysis, regulatory template 2.5, table 2.5.2 that records standard control services connections expenditure recovered through customer contributions. (The amount reported in this table must reconcile with that reported in table 2.1.7 for connections.)	Customer contributions relating to customer connections projects have been reported in the EXPENDITURE – STANDARD CONTROL SERVICES – CAPITAL CONTRIBUTIONS table and these figures reconcile with table 2.1.7 for connections.

5.3.2 Methodology and assumptions

The total expenditure was calculated by summing the asset expenditure for the corresponding year for those assets with Service Classification of “SCS”, Expenditure Category of “Connection” for each Connections Subcategory and Connection Classification.

For example, the expenditure per year for RESIDENTIAL Simple Connection LV was calculated using the following field values:

- Service Classification = “SCS”
- Expenditure Category = “Connections”
- Subcategory = “RESIDENTIAL”
- Connection Classification = “Simple connection LV”

5.3.2.1 Standard Control Services

The numbers reported under Standard Control Services are the same as those reported under “All”. There are some Alternative Control Services related to connections such as Energisation and De-Energisation, however no appropriate section for these could be found in Table 2.5.2 so these have not been included.

5.3.2.2 Standard Control Services – Capital Contributions

There are two sources of Standard Control Service Capcons:

1. Financial contributions made in relation to capital project expenditure on a particular project, in accordance with the Capcons policy.
2. The asset value of assets gifted to Power and Water.

The dataset in (1) was obtained by extracting all contributions in the period of interest from the financial system, and linking these to actual projects in the CAPEX Backcasting Model. The project categorisation from the CAPEX Model was then applied to the corresponding Capcon transaction, which yielded a dataset of categorised financial contributions. The transactions which had an Expenditure Category of “Connection” were then summed by the Subcategory and Connections Classification as required by RIN Table 2.5.2.

The dataset in (2) was also obtained by compiling monthly gifted asset reports into a single dataset for the 2013/14 to 2016-17 period. All gifted assets were categorised as “Connections”, since the only source of gifted assets are developments relating to the connection of new customers or upgrades for existing customers. The subcategory was manually assigned based the project description and the Connections Classification was set in accordance with the table in section 5.1.2.3. There was a minor discrepancy between the monthly gifted asset reports and the asset values in the Fixed Asset Register. To address this, the values from the monthly reports were adjusted to meet the Fixed Asset Register values.

The values in table 2.5.2 are the sum of the output from the two data sources.

5.3.3 Estimated and actual information

The information was sourced from an internal financial system (Maximo). However, there was no systemised way to determine whether a connection or a connections project relates to RESIDENTIAL, SUBDIVISION etc or Simple Connection LV, Complex Connection LV etc. These were allocated manually as accurately as possible, but the resulting data is considered estimated data. There may have been alternative assumptions that could have resulted in materially different outcomes, so the information is defined as estimate in the RIN.

5.3.4 Source of information

The source of the information is Maximo.

5.3.5 Confidential information

Table 2.5.2 does not contain confidential information.

5.4 Template 2.5.3 – Volumes by Connection Classification – New Connections

5.4.1 Consistency with the RIN requirements

Appendix E Requirements	Consistency with the RIN requirements
Clause 4.60: PWC must report all new connections in Workbook 3 – Category analysis, regulatory template 2.5, table 2.5.3.	We have entered this data as required.
Clause 4.61: PWC must report the total stock of connections as at 1 July 2013 in Workbook 3 – Category analysis, regulatory template 2.5, table 2.5.3.	This section has been greyed out indicating this data was not required.

5.4.2 Methodology and assumptions

The total volume of new connections for each subcategory in Table 2.5.3 reconciles to the sum of the overhead and underground connection volumes in Table 2.5.1. To disaggregate further into the Connection Classifications, the total number of unique projects completed in each year was calculated for each combination of Subcategory and Connection Classification. This figure was subtracted from the total volume of new connections for that Subcategory. The remaining volume of new connections was then added to the simplest Connection Classification for each Subcategory.

For example, for the RESIDENTIAL Subcategory, the number of unique “Complex connection LV” and “Complex connection HV” projects completed in a particular year were subtracted from the total RESIDENTIAL connections in the same year in Table 2.5.1. The remaining value was assigned to the “Simple Connection LV” category, and their respective unique project counts assigned to the other Connection Classifications. The same methodology was used for the COMMERCIAL/INDUSTRIAL Connection Classification.

For the SUBDIVISION Connection Classification the same methodology was also used, except that the number of lots was used in place of the number of unique projects to allow for the fact that multiple customers could be associated with individual projects.

All EMBEDDED GENERATION new connections were assumed to be "Simple Connection LV", since all correspond to simple meter upgrades of LV customers.

5.4.2.1 Standard Control Services

The numbers reported under Standard Control Services are the same as those reported under "All". There are some Alternative Control Services related to connections such as Energisation and De-Energisation, however no appropriate section for these could be found in Table 2.5.3 so these have not been included.

5.4.3 Estimated and actual information

The underlying source of the information relates to the data we reported on underground and overhead connection volumes. An alternative method may have yielded a materially different outcome. On this basis, the reported data is also an estimate.

5.4.4 Source of information

The source of the information is an internal database for overhead and above ground connections, which have then been assigned manually to different classifications

5.4.5 Confidential information

The information in the template is not confidential.

5.4.6 Estimated and actual information

Information	Justification
2.5.1 Number of underground and overhead connections	There is inconsistency in the way that work orders had been raised over time and in different regions. In addition, it is not generally recorded whether a connection is overhead or underground. There may have been alternative assumptions that led to a materially different outcome, so the information is defined as estimate in the RIN.
2.5.1 Mean days to connect residential customer with LV single phase connection	As outlined above, the work order data had to be manually manipulated and is thus not considered actual data. There may have been alternative assumptions that led to a materially different outcome, so the information is defined as estimate in the RIN.
2.5.1 Volume of customer complaints relating to connection services	This data is not currently systemised. The data provided represents our best estimate based on ad-hoc searches of our document management systems. There may have been alternative assumptions that led to a materially different outcome, so the information is defined as estimate in the RIN.
2.5.1 Disaggregation between Connection Subcategories	There is no systemised way to determine whether a connection or a connections project relates to RESIDENTIAL, SUBDIVISION etc. These were allocated manually as accurately as possible, but the resulting data is considered estimated data. There may have been alternative assumptions that led to a materially different outcome, so the information is defined as estimate in the RIN.
2.5.1 Cost per lot ($)	The number of lots established by a project is not currently systemised. The data was provided by manually assigning numbers based on Development Consent Authority (DCA) correspondence for each project. There may have been alternative assumptions that led to a

Information	Justification
	materially different outcome, so the information is defined as estimate in the AER's RIN.
2.5.2 Disaggregation between Connection Subcategory and Connection Classification	There is no systemised way to determine whether a connection or a connections project relates to RESIDENTIAL, SUBDIVISION etc or Simple Connection LV, Complex Connection LV etc. These were allocated manually as accurately as possible, but the resulting data is considered estimated data. There may have been alternative assumptions that led to a materially different outcome, so the information is defined as estimate in the RIN.
2.5.3 Disaggregation between Connection Subcategory and Connection Classification	There is no systemised way to determine whether a connection or a connections project relates to RESIDENTIAL, SUBDIVISION etc or Simple Connection LV, Complex Connection LV etc. These were allocated manually as accurately as possible, but the resulting data is considered estimated data. There may have been alternative assumptions that led to a materially different outcome, so the information is defined as estimate in the RIN.

5.4.7 Information source

Most data was derived from the capex backcasting methodology described in appendix A , with additional sources as outlined in the table below.

Information:	Source file/screenshot:
List of customer connection work orders	Customer Connections NCC Work Orders
Capcons data	Capital Contribution data 2009FY to 2017FY
Gifted Assets data	Gifted Asset Data 2009FY to 2017FY
GSL costs and quantities and customer complaints	GSL - Amounts Paid and Customer Numbers
Distribution customer numbers	Power and Water 2006-17 - EB - historical - Template Version August 2017 Draft
Number of lots per subdivision	Review of number of lots for subdivision projects
Number of PV connections	PV Database Extract

5.4.8 Confidential information

Template 2.5 does not contain confidential information.

6. Template 2.6 – Non-network

6.1 Templates 2.6.1 and 2.6.4 – Non-Network Expenditure and ICT

6.1.1 Consistency with the RIN requirements

Appendix E Requirements	Consistency with the RIN requirements
Clause 4.62: If expenditure is directly attributable to a non-network expenditure category it is a direct cost for the purposes of this Workbook 3 – Category analysis, regulatory template 2.6. For the avoidance of doubt, only non-network capex and/or opex direct costs should be reported in table 2.6.1 and these amounts must reconcile to non-network capex and opex directs costs reported in Workbook 3 – Category analysis, regulatory template 2.1.	Only direct costs have been report as instructed. The expenditure in template 2.6 reconciles to the non-network expenditure in tables 2.1.1 to 2.1.4.
Clause 4.63: In relation to the non-network other expenditure category, if PWC has incurred $1 million or more (nominal) in opex or capex over the last five regulatory years for a given type or class of assets (e.g. mobile cranes), PWC must insert a row in the Workbook 3 – Category analysis, regulatory template 2.6, table 2.6.1 and report that item separately.	Test equipment capex had expenditure of over $1m and was reported separately.
Clause 4.65: Report ICT capex by purpose and asset category in Workbook 3 – Category analysis, regulatory template 2.6, table 2.6.4, in accordance with the definitions in this notice.	Data has been entered as instructed.

6.1.2 Methodology and assumptions

6.1.2.1 Non-network expenditure – opex

We used the historic operating expenditure methodology in appendix C to calculate the non-network opex for IT & communications, motor vehicles and buildings and property in table 2.6.1. We did not identify any 'other' non-network costs.

In the case of the motor vehicles expenditure, our accounts did not provide adequate information to disaggregate the expenditure information for the relevant vehicle type. However, we capture considerable information about our leased fleet, including vehicle, lease cost, fuel cost, kilometres travelled and more from the actual monthly fleet statistics report provided by PWC's Fleet Coordinator.

We used the fleet lease rate per vehicle and fuel costs to allocate the total motor vehicles cost into the vehicle categories in table 2.6.1.

6.1.2.2 Non-network expenditure – capex

We used the capex backcasting methodology in appendix A to establish the non-network capex costs in table 2.6.1. Using the capex backcasting methodology, we first identified the expenditure that was by default associated with the non-network category, which was based on our category of non-system expenditure.

There were many instances where non-network projects had not been given the correct classifications in our asset management system. In these cases, the relevant assets were manually assigned to the appropriate expenditure category.

There were also instances where non-network expenditure related to non-SCS expenditure such as metering or streetlights, and these were also corrected manually in the methodology.

All assets which had been classified as standard control services and non-network were subject to further categorisation to enable asset costs to be disaggregated into the non-network asset categories in table 2.6.1.

6.1.2.3 Service subcategory

We mapped all standard control services non-network projects the service sub category using the project descriptions as shown below:

Service subcategory	Project description rule
IT & communications	Computer hardware or software and communication equipment
Motor vehicles	Vehicle accessories or fitouts
Buildings and property	Storage systems, shelving, air conditioning, fencing etc. (for non-network facilities only)
Other – plant and equipment	Tools, test equipment, pumps, compressors, ladders etc.

6.1.2.4 Asset category

For standard control services non-network fleet, we mapped each project to the following asset categories based on work order information:

Asset category	Project description rule
Car	Sedan or smaller
Light commercial vehicle	4wd or van
Elevated work platform (LCV)	Not applicable as we do not have work platforms less than 4.5 tonnes
Elevated work platform (HCV)	EWP
Heavy commercial vehicle	Crane or crane truck

We had to undertake project-by-project reviews to identify the purpose of each non-network IT & Communications project. This analysis was done by reviewing each and assigning the most suitable category in accordance with the definitions in appendix F of the RIN.

For standard control services non-network IT & communications expenditures, we mapped each project to the following asset categories based on work order information using the project description rules set out in the table blow.

Asset category	Project description rule
GIS integration tools	Software tools relating GIS integration.
Outage management systems	Establishment of the new outage management system.
Business analytics	Software or systems to support business analytics.
Portable radio	Hand-held portable radios.
Audio visual	General audio-visual equipment such as projects, monitors, conference room equipment.
Mobility	Relating to mobile hardware and software tools to support network maintenance.
400mhz band relocation	Major project to relocate Power and Water mobile radios to a new frequency for regulatory compliance.

For standard control services non-network other expenditures, we mapped each project to the following asset categories based on work order information:

Asset category	Project description rule
Test equipment	"Tester" in description or a card/component/module associated with test equipment
Oil plant	Oil or fuel in description
Tools	Drills, crimpers, cutters and other tools
Other	All assets not fitting the above categories

The expenditure for each variable was calculated by summing the project expenditure associated with the relevant categories described above.

6.1.3 Estimated and actual information

The historic opex costs are based on the expenditure calculated in out historic operating expenditure methodology in Appendix C, which involved the labour recovery adjustment. As a result of this methodology, the non-network opex is defined by the RIN as estimated information.

The capex information used to calculate the non-network information was sourced from Maximo. For capex, our calculations and assumptions would not have a material impact on the overall outcome and therefore the RIN defines the capex information in tables 2.6.1 and 2.6.4 to be actual information.

6.1.4 Confidential information

Tables 2.6.1 and 2.6.4 do not contain confidential information.

6.1.5 Source of information

The information we used to calculate tables 2.6.1 and 2.6.4 were our asset management system (Maximo) and the trial balance and fleet records.

6.2 Template 2.6.3 – Annual descriptor metrics

6.2.1 Consistency with the RIN requirements

Appendix E Requirements	Consistency with the RIN requirements
Clause 4.64: Report volume data in Workbook 3 – Category analysis, regulatory template 2.6, table 2.6.3. Where a requested value is not constant across a year, calculate an approximate simple average based on the different values over the year and the period for which the different values applied. For example, if PWC had 12 vehicles for 8 months and 14 vehicles for 4 months, the average vehicles in the class over the year would be 12*(8/12) + 14*(4/12) = 12.67 vehicles.	Our employee numbers, user numbers and number of devices are not constant during the year. We have used a simple average for each of these amounts as required by the AER.

6.2.2 Methodology and assumptions

6.2.2.1 Employees

We sourced employee numbers as the total number of employees from template 2.11.

6.2.2.2 Number of devices and user numbers

Our total populations of users and devices were identified for each year. We identified the specific entity within the corporation that corresponded with the user and device, and whether the entity provided standard control services, at least to some degree.

Where the entities costs were partly attributed to standard control services opex we applied that percentage to allocate only part of the user or number of devices to standard control services. Finally, to establish the average number the amount entered into the template, we calculated the average over the year.

6.2.2.3 Motor vehicles metrics

Our fleet records namely, the monthly fleet statistics report, provided by the NT Fleet, contained adequate information for us to map every vehicle to the AER's categories. Further, the fleet data included periodic odometer readings for every vehicle and details of whether the vehicle was owned or leased. We used these records to calculate the annual averages for each metric being:

- Kilometres travelled
- Number purchased
- Number leased
- Number in fleet

- Proportion of total fleet expenditure.

6.2.3 Estimated and actual information

All the source data used in calculating the values for table 2.6.3 was from our fleet records, IT systems, HR records and general ledger. We made a number of allocations as described above, which could have been made a number of different ways and could have resulted in materially different values being reported. As a result of the assumptions, the RIN defines this information to be estimated information.

6.2.4 Source of information

The information used was from our fleet records, IT asset register, user directory and HR records.

6.2.5 Confidential information

Table 6.2.3 does not contain confidential information.

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7. Template 2.7 – Vegetation management

7.1 General

The section outlines the RIN requirements which apply to all vegetation management information in the RIN template 2.7. It also outlines our methodology to address those requirements and the key assumptions underlying the information provided. We then provide specific information for each individual template.

7.1.1 Consistency with the RIN requirements

Appendix E Instructions	Consistency with the RIN requirements
Clause 4.66: Identify one or more vegetation management zones across the geographical area of PWC's network. To do so consider: (a) areas where bushfire mitigation costs are imposed by legislation, regulation or ministerial order; and (b) areas of the network where other recognised drivers affect the costs of performing vegetation management work.	We established 4 zones to meet this requirement, being the Darwin Region, the Katherine Region, the Tennant Creek Region and the Alice Springs Region. Our regulated network is easily separated geographically into these zones. These zones exhibit different climatic and vegetation characteristics which are key drivers for vegetation management programs, so it is appropriate to report the vegetation management activities in these zones separately. We managed our vegetation program on a feeder basis with physical and financial data linked to feeders. These feeders have been linked to the above vegetation management zones in the relevant feeder categories for reporting in the RIN Tables. There are some limitations to the amount historical data recorded. These limitations are discussed in the sections below.
Clause 4.68: Accordingly, each part of the network will be covered by only one vegetation management zone.	The nominated zones are mutually exclusive and do not overlap.

7.1.2 Methodology and assumptions

Sub-transmission and transmission lines have been included in table 2.7.1 according to the predominant area through which they pass. That is, if the feeder predominately passes through an urban area, it has been included in the urban/CBD category, whereas feeders that pass predominately through rural areas or around the fringes of an urban area through a maintained corridor have been included in the rural category.

We manage service line vegetation for the first two metres in customers properties. Therefore, vegetation management for the two metres of each service line have been included in table 2.7.

Specific details on each of the variables reported in the RIN tables are provided in the following sections.

7.2 Template 2.7.1 – Descriptor metrics by zone

7.2.1 Consistency with the RIN requirements

Appendix E Requirements	Consistency with the RIN requirements
Clause 4.70: Fill in Workbook 3 – Category analysis, regulatory template 2.7, tables 2.7.1 and 2.7.2 for each vegetation management zone, adding additional tables where required.	We completed both tables using the methodology described below.
Clause 4.73: If PWC records poles rather than spans, the number of spans is the number of poles less one.	We captured spans rather than poles.
Clause 4.74: If PWC does not record the average number of trees per maintenance span, estimate this variable using one or a combination of the following data sources: (a) Encroachment defects (e.g. identified by ground or aerial inspections, or LiDAR) and/or records of vegetation works scoping, or GIS vegetation density data; (b) Field surveys using a sample of maintenance spans within each vegetation management zone to assess the number of mature trees within the maintenance corridor. Sampling must provide a reasonable estimate and consider the nature of maintenance spans in urban versus rural environments in determining reasonable sample sizes. (c) Vegetation data such as: (i) the Normalised Difference Vegetation Index (NDVI) and maps available from the Bureau of Meteorology (BOM); (ii) data from the National Vegetation Information System (VIS data) overlaid on network GIS data to assess the density of vegetation in the direct vicinity of the maintenance spans; or (iii) similar data from other sources such as Geoscience Australia or commercial suppliers of satellite imagery overlaid on network GIS data records. (d) Any other data source based on expert advice. (e) When completing the templates, if PWC can provide actual information for the average number of trees per maintenance span it must do so; otherwise PWC must provide estimated information.	We do not routinely record the average number of trees per span and do not have actual data for this variable. The methodology used to estimate the average number of trees per span is in the following methodology and assumptions section. It relies on contractor data consistent with “(d) Any other data source based on expert advice”.
Clause 4.75: If PWC performs vegetation management work on multiple cutting cycles in urban and CBD, or rural areas within its nominated vegetation management zones, provide a simple average of all the cutting cycles in the relevant area.	We have provided a guide to our different cutting cycles in the methodology and assumptions section below, including our derivation of a simple average.

7.2.2 Methodology and assumptions

We use external contractors to manage the majority of our vegetation management activities and the contractor’s data has been a key source in reporting the variables in table 2.7.1. The vegetation management contract has two parts:

- Part A – Routine cyclical maintenance of vegetation within the clearance space on all lines except transmission lines.

- Part B – Non-routine additional work as requested by us either on a quotation or schedule of rates basis. This includes work such as the trimming or removal of hazard trees, vegetation maintenance along transmission lines, the maintenance of power line corridors by slashing, mulching and/or ground line treatments.

Our contractor has recorded the vegetation management activity data associated with Part A (routine cyclical maintenance) of the contract for the full year from 2013-14 for the Darwin and Alice Springs regions and from 2014-15 for the Katherine and Tennant Creek regions. The primary data collected by the contractor includes:

- Inspection date.
- Feeder name.
- The GPS location for each inspection – This location is recorded in the general vicinity of the span but the same tree could be reported at different GPS co-ordinates based on the mobile technology used and the location of the inspector when the report is completed.
- The number of vegetation trims on mains and service lines and the number of removals under four different size categories. The number of Live Line trims were also recorded in inspector's comments. Each trim/removal recorded relates to a tree so this has enabled the total number of defects in the clearance space to be reported.

We assigned a unique identification number (SPAN_ID) to every span in its network in our Geographic Information System (GIS) and linked every inspection to a SPAN_ID by the GPS co-ordinates associated with the inspection/trim. This enabled key attributes of the span to be linked with each inspection. These attributes include our current feeder name, region, regulatory category, span type, voltage and length which were then merged with our inspection data. This combined data was used to complete each variable in Table 2.7.1 as discussed below.

We have minimal data for Part B of the contract relating to non-routine activities. Therefore, the reported data does not include quantities from any trimming or removal activities undertaken under Part B of the contract.

Also spans that had been decommissioned since inspections were undertaken were not associated with a feeder or regulatory category since no SPAN_ID was available in GIS. Therefore, these vegetation management activities have not been included in the data in Table 2.7.1. The error associated with this is small, typically no more than 1 to 2 % of the total in any period.

Data related to slashing and mulching activities completed under Part B of the contract was recorded in Power and Water's financial and work's management system – Maximo. This data was recorded against a feeder and this enabled slashing and mulching quantities to be associated with the reporting zones and is therefore included in table 2.7.1.

Specific details associated with the data for each variable in table 2.7.1 are described in the following sections.

7.2.2.1 Route line length within the zone

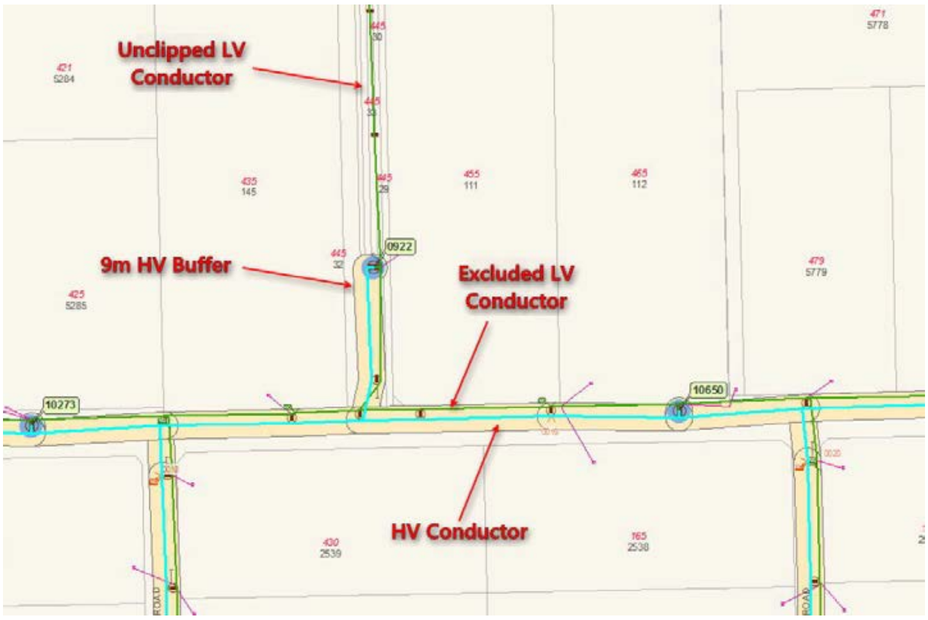
The route line length is the aggregate length in kilometres of transmission, sub-transmission, distribution and service lines. This is measured as the length of each span between poles and/or towers, where each span is counted only once irrespective of how many circuits it contains. The measurement does not include vertical components such as line sag. Service line length has only been included to account for the part of the service line that we are responsible for, that is, up to the point two metres beyond the property boundary.

Historical route length of the network is not recorded as our GIS is a live system, which only shows the current network. Prior years route lengths were calculated by scaling 2016-17 value back in accordance with circuit length proportions from age profile data. Our basis of preparation for the economic benchmarking template has a more detailed description of this process in the section that relates to template 3.7 - Operating Environment.

The following sections explain the detailed methodologies that are specific for individual types of circuits.

Methodology for HV and LV route length

LV conductors that share spans with HV are identified by buffering HV conductors 9 meters either side of the line (9m is the maximum separation between HV and LV conductors in shared HVLV spans). The identified LV conductors within the buffer are then clipped and excluded from length calculations. Length is calculated for HV conductors and the remaining unclipped LV conductors to get the route length. This avoids double counting and is illustrated in the following diagram.



Methodology for service lines

Service line lengths up to 2m within property boundaries were added to the HV and LV route length.

Methodology for transmission lines

Transmission lines apply a similar method as for HV and LV lines. Circuit lengths on dual circuit sections of line had the length of one circuit clipped to provide the actual route length.

7.2.2.2 Number of maintenance spans

The number of maintenance spans is the number of spans that were subject to active vegetation management practices in the relevant year, that is, spans that have had trimming or removal activity completed. This number does not include spans that were only inspected and required no further maintenance activity before the next cycle.

The Darwin and Katherine regions both have a planned six-monthly inspection cycle. Consequently, some spans have had vegetation treatment more than once within the same year. These spans were identified only once, so that no span was double counted in the total number of maintenance spans.

The process we used to assign SPAN_ID's to each span was unable to distinguish between adjacent spans in some cases. For example, if GIS does not have a record of a particular pole between a mains span and adjoining service span(s) only a single span was identified. In these instances, the adjacent spans were assigned the same SPAN_ID. This resulted in multiple inspections with the same SPAN_ID on the same date.

Our Analysis of the data for SPAN_ID's with multiple inspections on the same date and a treatment associated with each inspection has enabled us to correct the data for the number of maintenance spans. Where a SPAN_ID has more than one inspection on the same date and with treatment associated with each inspection, the number of maintenance spans has been corrected to reflect the total number of spans with treatment on the same date.

7.2.2.3 Total Length of Maintenance Spans

As described above, The total length of maintenance spans has been calculated as d the aggregate length in kilometres of all maintenance spans, measured as the length of each span between poles and/or towers, and where the length of each span is considered only once irrespective of how may circuits it contains.

Where multiple spans have been assigned the same SPAN_ID, the length associated with the SPAN_ID has been used for each span to calculate the total length of maintenance spans. This avoids double counting the length of any spans.

7.2.2.4 Length of Vegetation Corridors

The length of vegetation corridors is the aggregate length of corridors slashed and/or mulched in the relevant period regardless of the width of slashing or mulching. The width of the corridors slashed or mulched depends on the type and number of lines within the corridor.

7.2.2.5 Average Number of Trees per Maintenance Span

The average number of trees per maintenance span has been estimated by dividing the total number of trims and removals by the total number of maintenance spans.

We do not capture the height or species of trees, which is required by the RIN definition. However, this estimate assumes that all trees trimmed are consistent with the AER's definition which states:

> *For the purposes of calculating the average number of trees per maintenance span, a tree is a perennial plant (of any species including shrubs) that is:*
>
> - *equal to or greater in height than 3 metres (measured from the ground) in the relevant reporting period; and*
> - *of a species which could grow to a height such that it may impinge on the vegetation clearance space of power lines.*

7.2.2.6 Average frequency of cutting cycle

The average frequency of the cutting cycle is the average planned number of years (including fractions of years) between which cyclic vegetation inspection and maintenance is performed within the vegetation management zones.

Power and Water has been using the following planned cutting cycles:

Vegetation management zone	Cutting cycle
Darwin Region	0.5 year
Katherine Region	0.5 year
Tennant Creek Region	1.5 years
Alice Springs Region	1 year

7.2.3 Estimated and actual information

Information	Type of information
Number of maintenance spans Total length of maintenance spans Average number of trees per maintenance span	All data related to activities and volumes are materially based on historical data provided by our vegetation management contractor. This data has not been historically requested by us or provided by the contractor. This information is not sourced from our internal systems or other records. Alternative assumptions may have led to materially different results, and therefore the information is an estimate based on the RIN definition.
Length of vegetation corridors	Data was not available from our contractors as it is not supported by their systems. This was estimated based on text descriptions in Maximo

Information	Type of information
	Work Orders and Purchase Orders. This information is materially dependant on our systems and the assumptions used to calculate the length of the corridors are not considered to lead to materially different results. Therefore, this information is defined by the RIN to be actual information.
Route line length within zone	The 2016-17 route line length was calculated based on Power and Water's spatial asset management system ESRI and without the need to make significant assumptions. The RIN, therefore, defines this to be actual information. ESRI does not preserve historical information of assets. Therefore, route lengths for each zone have been scaled based on the age profile of line lengths within each zone. There are a number of ways this data could have been calculated and this could have resulted in materially different route lengths. Therefore, the route length information for 2013-14 to 2015-16 is defined by the RIN to be estimated information.

7.2.4 Source of the data

Information	Source
Vegetation management activity and task information (task type, location, date, etc).	External contractor
Feeder attributes (length, names, category)	GIS
Vegetation Management Expenditure	Asset management system

7.2.5 Confidential data

There is no confidential data in this template.

7.3 Template 2.7.2 – Expenditure Metrics by Zone

7.3.1 Consistency with the RIN requirements

Appendix E Requirements	Consistency with the RIN requirements
Clause 4.70: Fill in Workbook 3 – Category analysis, regulatory template 2.7, tables 2.7.1 and 2.7.2 for each vegetation management zone, adding additional tables where required.	We completed both tables as required.
Clause 4.76: If hazard tree clearance expenditures are not recorded separately, include these expenditures within tree trimming expenditure.	We identified hazard tree clearance expenditure where possible. Any expenditure not identifiable is included in tree trimming expenditure by default.
Clause 4.77: If ground clearance works are not recorded separately, include these expenditures within tree trimming expenditure.	We have identified ground clearance expenditure where possible. Any expenditure not identifiable is included in tree trimming expenditure by default.
Clause 4.78: Only include expenditure on inspections where PWC inspects solely for the purpose of assessing vegetation. Include inspection expenditure for inspections assessing both PWC's assets and vegetation under maintenance	We were not able to identify specific expenditure for these inspections and an allowance has been made as set out in Section 12.3.2.6.

Appendix E Requirements	Consistency with the RIN requirements
(Workbook 3 – Category analysis, regulatory template 2.8).	
Clause 4.79: If auditing of vegetation management work is not recorded separately, include these expenditures within inspection expenditure.	We were not able to identify specific expenditure for these inspections and an allowance has been made as set out in Section 12.3.2.7.
Clause 4.80: Annual vegetation management expenditure across all categories and zones must sum up to the total vegetation management expenditure each year. In Workbook 3 – Category analysis, regulatory template 2.7, table 2.7.2, add any other vegetation management expenditure not requested in any other part of Workbook 3 – Category analysis, regulatory template 2.7 (or added in Workbook 3 – Category analysis, regulatory template 2.8) in total annual vegetation management expenditure. In the basis of preparation, explain the expenditures that have been included in this table.	All vegetation management expenditure has been allocated to the defined variables in Workbook 3 – Category analysis, regulatory template 2.7, table 2.7.2.

7.3.2 Methodology and assumptions

7.3.2.1 General methodology

Our vegetation management expenditure information was extracted from our Asset Management System (Maximo), and attributed to the variables in table 2.7.2. For further details on how the total vegetation management expenditure was established refer to appendix B of this document. There are two components of vegetation management expenditure:

- Contractor expenditure: All financial transactions and associated information related to vegetation contracts were extracted. Each transaction has been categorised by the type of work required such as tree trimming, hazard tree cutting, ground clearance and vegetation corridor clearance based on the descriptions in the Purchase Order and Work Order. Where descriptions could be interpreted to be more than one category, the transaction was allocated to the category which our staff considered most suitable.

  Each transaction was also allocated to a specific feeder so that expenditure could be categorised by the vegetation zone based on feeder location. However, some feeder names and network configurations have changed during the reporting period. In the instances where financial information was initially allocated to feeders that no longer existed, that financial information was re- allocated to most suitable current feeder based on specific mapping rules.
- Internal expenditure: We capture time of internal staff for various activities, including to support the vegetation management contractor, in Work Orders within the AMS. Through this process, all work orders in AMS for the reporting period have a work category assigned, including Vegetation Management.

Some vegetation management work orders did not include adequate information to allocate the expenditure to the specific variables in table 2.7.1. Power and Water allocated these costs proportionally based on the direct contractor expenditure against each variable, which is consistent with the approved CAM.

7.3.2.2 Tree Trimming (excluding hazard trees)

Tree trimming expenditure includes expenditure incurred to trim or remove trees/vegetation, to remove dead or living parts so as to prevent parts of the tree or vegetation from growing into, falling onto, or blowing on to electricity assets. This expenditure was allocated using contractor data.

Expenditure associated with assets that have been subsequently decommissioned is included in the expenditure reported here.

This variable also excludes inspection and auditing costs which are reported separately in this table.

7.3.2.3 Hazard Tree Cutting

Expenditure associated with hazard tree cutting is associated with the trimming or removal of vegetation that is normally outside the clearance space, but its condition is such that it presents an unacceptable risk of trees, limbs or branches falling into electricity assets.

7.3.2.4 Ground Clearance

Expenditure associated with ground clearance work involves clearing of vegetation on power line corridors at ground level and application of herbicide where required by ground crews. This work is generally required in areas where other mechanical means are not possible such as on rocky ridges, around tower bases etc.

7.3.2.5 Vegetation Corridor Clearance

Expenditure associated with slashing and mulching activities to maintain powerline corridors has been reported under this variable. No other expenditure is included in this variable.

7.3.2.6 Inspection

Inspection costs have not been recorded separately. However, the vegetation contractor has advised that inspection costs are approximately 4% of the total tree trimming cost. This expenditure has therefore been estimated at 4% of the total tree trimming cost and reported under this variable.

7.3.2.7 Vegetation Audit

Vegetation audit costs have not been recorded separately. However, the vegetation contractor has advised that audit costs are approximately 1.5% of the total tree trimming cost. This expenditure has therefore been estimated at 1.5% of the total tree trimming cost and reported under this variable.

We do not record own audit costs separately. Our auditing is undertaken by the Vegetation Contracts Manager which has been allocated as discussed further below.

7.3.2.8 Contractor Liaison Expenditure

Contractor liaison expenditure is not separable from other activities undertaken by vegetation contract managers within Power and Water. Where possible, work orders to which contract managers allocate their time for vegetation related activities have been identified. However, these work orders do not separate auditing, contract liaison, contract administration and other activities related to the monitoring of vegetation condition and contractor performance. For these reasons, costs allocated to the work orders used to allocate time by contract managers have been spread proportionally across the other activities to which expenditure was able to be directly allocated.

7.3.2.9 Tree Replacement Program Costs

Power and Water does not have a tree replacement program so no costs have been incurred against this variable.

7.3.2.10 Other vegetation management costs not specified in sheet

No other vegetation costs have been identified. Costs other than direct vegetation management contractor costs have been allocated proportionally across the expenditure metrics. This includes supervision costs, traffic control and permit costs which all support the execution of the defined metrics/activities and would not be otherwise incurred.

7.3.3 Estimated and actual information

Information	Estimated and actual information
Detailed expenditure variables	The total vegetation management expenditure information is based on Maximo (Asset Management System) data and, while there was considerable data allocation, alternative approaches would not have resulted in a different total vegetation management expenditure. Therefore, the total vegetation management expenditure is defined by the RIN to be actual information. However, the individual variables within table 2.7.2 were materially dependant on our contractor's data and a number of allocations were made to calculate the information required in the Table. Alternative assumptions may have led to materially different data. Therefore, all information in this table 2.7.2 is defined by the RIN to be estimated information.

7.3.4 Source of the information

Information	Source
Vegetation management activity and task information (task type, location, date, etc).	Power and Water's external contractor
Feeder attributes (length, names, category)	GIS
Vegetation Management Expenditure	Maximo (Asset Management System)

7.3.5 Confidential information

Table 2.7.2 contains confidential information that relates to our contractor's costs.

7.4 Template 2.7.3 - Unplanned vegetation events

7.4.1 Consistency with the RIN requirements

Appendix E Requirements	Consistency with the RIN requirements
Clause 4.81: In Workbook 3 – Category analysis, regulatory template 2.7, table 2.7.3, fill out the unplanned vegetation events table once, providing the requested information across PWC's entire network.	We reported zero events because we do not have any records of these events occurring.
Clause 4.82: PWC is not required to provide information requested in Workbook 3 – Category analysis, regulatory template 2.7, table 2.7.3 where it does not currently have it.	As above, we have no events to report.
Clause 4.69: Provide, on separate A4 sheets, maps showing: (a) each vegetation management zone; and (b) the total network area with the borders of each vegetation management zone.	The maps of the nominated zones are provided in Appendix G.
Clause 4.72: For each vegetation management zone identified, provide in the basis of preparation: (a) a list of regulations that impose a material cost on performing vegetation management works (including, but is not limited to, bushfire mitigation regulations); (b) a list of self-imposed standards from PWC's vegetation management program which apply to that zone; and (c) an explanation of the cost impact of regulations and self-imposed standards on performing vegetation management work.	We not subject to any specific vegetation management legislation. As discussed below we have developed standards and procedures to carry out our vegetation management activities

7.4.2 Methodology and Assumptions

We have no records of vegetation events. We have recorded zero for this value based on our staff's knowledge.

We have developed our own standards and procedures for the clearances of vegetation from power lines because there are no specific legislative requirements governing the establishment of easements and the management of vegetation in the vicinity of power lines. In addition, work is carried out in accordance with the following Standards and Guidelines:

- AS4373-2007, Pruning of Amenity Trees.
- ENA DOC 023-2009, ENA Procedures for Safe Vegetation Management Work Near Live Overhead Lines.

We have also developed document NP021, *Easement Guidelines 2008*, to specify the requirements for and permitted activities on easements to secure right of access for the construction and maintenance of power lines on the corridor. This document specifies standard easement widths to facilitate the control of vegetation that potentially may contact conductors.

In addition, we also developed the clearance standards shown in the table below for the maintenance of vegetation in the proximity of power lines. An allowance for regrowth which depends on tree species and location is added to these distances to determine the actual clearance distance required for the cycle time being used. Compliance with these standards as far as possible is a requirement in vegetation management contracts.

Type of Powerline	Current Clearances in Use in Power and Water Contracts	Comments
Insulated Low Voltage (Services and ABC)	0.5m	
415V	3.0m	
11kV, 22kV	3.0m	No overhanging branches
66kV	4.0m	No overhanging branches
132kV	6.0m	No overhanging branches
High Voltage Aerial Bundled Cable	1.0m	

These standards have been developed to ensure sufficient clearance of vegetation from powerlines to allow for conductor sag and sway and to reduce the risk of vegetation related interruptions to supply.

In many cases, particularly in urban and semi-rural areas, there is limited regrowth space available in addition to these clearances because of the close proximity of property lines to the powerlines and the high density of customer vegetation along property lines. This coupled with high vegetation growth rates has resulted in the need for shorter cycle times (6 months currently) in these areas to maintain acceptable vegetation clearances. Customers generally will not grant approval for excessive trimming of their vegetation to enable longer cycle times to be implemented.

Our standards, as described above, establish the minimum clearance for routine and non-routine vegetation management and the cutting cycles for routine cutting. The cost impact of these cycles is as follows:

- The minimum clearance standard means a certain amount of vegetation needs to be removed or otherwise managed and disposed. With all else being equal, we would incur more expenditure if clearance standards were increased.

- The cutting cycles drive the number of times our contractor undertake patrols to perform routine vegetation cutting. With all else being equal, we would incur more expenditure if cutting cycles were more frequent.

7.4.3 Estimated and actual information

The estimate is based on staff knowledge but an alternative assumption may have derived a different value to zero.

7.4.4 Source of information

The information on vegetation events was based on staff knowledge.

7.4.5 Confidential information

Table 2.7.1 contains confidential information as indicated in our reported data. If the information was disclosed, it would undermine our tender process for vegetation management services.

8. Template 2.8 – Maintenance

8.1 Templates 2.8.1 and 2.8.2 - Routine and non routine maintenance

The following highlights the Regulatory Information Notice requirements that apply generally to the Category Analysis template for maintenance.

8.1.1 Consistency with the RIN requirements

Appendix E Requirements	Consistency with the RIN requirements
Clause 4.83: For expenditure incurred for the simultaneous inspection of assets and vegetation or for access track maintenance, report this expenditure under maintenance, not vegetation management.	We did not identify expenditure relating to the simultaneous inspection of assets and vegetation. Access track maintenance has been reported as maintenance and not vegetation management as instructed.
Clause 4.84: For each of the maintenance subcategories prescribed in the template, add rows for additional subcategories if these are material and necessary to disaggregate financial or non-financial data, for example, to disaggregate asset groups according to voltage levels or to specify inspection/ maintenance cycles	Additional lines have been added for Pillars and Communications, as these have material expenditure and unique maintenance cycles.
Clause 4.85: For each maintenance subcategory, provide in separate columns the data for inspection cycles and maintenance cycles.	Data has been entered as instructed.
Clause 4.86: For the inspection cycle for each maintenance subcategory, express this as 'n' in the statement 'every n years'. For example, if the inspection cycle is 'every 6 years', put '6' in the inspection cycle column.	Data has been entered as instructed. For maintenance cycles less than one year, the number entered is the fraction of the year. E.g. Power Transformers are inspected monthly, so the inspection cycle is 0.083.
Clause 4.87: Similarly, for the maintenance cycle for each maintenance subcategory, express this as 'n' in the statement 'every n years'. For example, if the maintenance cycle is 'every 3 years', put '3' in the maintenance cycle column.	As above.
Clause 4.88: For inspection and maintenance cycles, asset quantity, and average age of the asset group, use the highest-value (i.e. highest replacement cost) asset type in the asset group as the basis.	Data has been entered as instructed.
Clause 4.89: Where there are multiple inspection and maintenance activities, report the cycle that reflects the highest cost activity.	Data has been entered as instructed.
Clause 4.90: Adding rows for additional maintenance subcategories to indicate inspection or maintenance cycles (i.e. non-financial data) does not require disaggregating the corresponding financial data for those additional subcategories.	Additional rows have been disaggregated as these correspond to different asset classes with material maintenance expenditure.
Clause 4.91: For 'Asset Quantity', provide in separate columns: (a) the total number of assets (population) at the	The total number of assets at year end has been estimated from the asset age profile data. The number of assets actually inspected has been

Appendix E Requirements	Consistency with the RIN requirements
end of the regulatory year, for each asset category; (b) the number of assets actually inspected or maintained during the regulatory year, for each asset category.	estimated from work order counts and inspection/maintenance cycles. Where an asset has been inspected / maintained multiple times within a year, it has been counted multiple times.
Clause 4.92: For 'Other maintenance activity', add rows for maintenance expenditure subcategories if these are material and if these are not yet included in any other maintenance expenditure subcategory.	Additional lines have been added for Pillars and Communications, as these have material expenditure and unique maintenance cycles.

8.1.2 Methodology and assumptions

8.1.2.1 General methodology

The maintenance expenditures and volumes are an output of the R&M backcasting methodology described in appendix B. The high-level categorisation includes Service Classification, Expenditure Category and Asset Class were performed as described in appendix B.

The mapping from our work order details to the "Routine Maintenance" and "Non-routine Maintenance" Expenditure Categories are shown below.

AER Expenditure Category	Work Category	Work Type
Routine Maintenance	REPAIRSMAINTENANCE	PREVENTATIVEMAINT
Non-Routine Maintenance	REPAIRSMAINTENANCE	PLANNEDMAINTENANCE

As outlined above, work orders with Work Category of "REPAIRSMAINTENANCE" and Work Type of "PREVENTATIVEMAINT" or "PLANNEDMAINTENANCE" were defaulted to the "Routine Maintenance" and "Non-routine Maintenance" Expenditure Category respectively.

There were many instances where work orders had not been given the correct Power and Water classifications.

A Maintenance Asset Category was assigned to each "Routine Maintenance" and "Non-routine Maintenance" work order in the R&M methodology by mapping from the Power and Water Asset Class. In some cases a single Power and Water Asset Class mapped to multiple Maintenance Asset Categories, so other work order or asset details such as feeder category or work order description were used in these cases. The table below outlines the Maintenance Asset Categories and the Power and Water Asset Classes which map to each. The full set of mapping rules are outline in the "Mapping" worksheet of the R&M methodology.

Asset Class	Maintenance Asset Category
Buildings	ZSS Property
Cable Tunnels	DIST - CBD
Cable Tunnels	DIST - Non-CBD
Cables	DIST - CBD

Asset Class	Maintenance Asset Category
Cables	DIST - Non-CBD
Cables	Service lines
Cables	TRANS - CBD
Cables	TRANS - Non-CBD
Capacitor Banks	ZSS Other Equipment
Civil and Grounds	ZSS Property
Communications	Communications
Conductors	Poletop and OH line maintenance
Conductors	Service lines
Distribution Poles	Poletop and OH line maintenance
Distribution Substations	Distribution Substation Property
Distribution Substations	Distribution Substations Earth Mats
Distribution Substations	Distribution Substations Transformers
Distribution Switchgear	Distribution Substations Switchgear
Easements	Access tracks
Fire Systems	ZSS Property
GIS	ZSS Other Equipment
HV Circuit Breakers	ZSS Other Equipment
HV Switchboards	ZSS Other Equipment
Instrument Transformers	ZSS Other Equipment
Metering Units	Poletop and OH line maintenance
Outdoor Disconnectors and Busbars	ZSS Other Equipment
Pillars	Pillars
Poletops	Poletop and OH line maintenance
Power Transformers	ZSS Transformers
Protection	Protection
SCADA	SCADA
Substation Auxiliary Plant	ZSS Other Equipment
Transmission Poles and Towers	Poletop and OH line maintenance
Voltage Regulators	Distribution Substations Switchgear

There were many instances where a single work order was raised for works on multiple asset classes. These are referred to as “bulk” work orders, and typical scenarios are:

- Timesheet work orders for non-trades and administrative labour.
- Inspection work orders which cover multiple asset classes, such as zone substation inspections, feeder inspection and transmission patrols.

- Journal entries.

These were assigned a Maintenance Asset Category of “multiple”, with further disaggregation of these costs.

8.1.2.2 Methodology for Table 2.8.1 – Descriptor Metrics for Routine and Non-Routine Maintenance – Asset Quantity at Year End

The asset quantities and average age were mostly taken from the Asset Age Profile dataset described in section 16. The quantities used are the quantity of assets currently installed that were installed during or prior to the year in question. This results in a small understatement of the actual asset quantities at year end, since asset replacements which occurred in prior years are effectively not counted. E.g. if an asset was replaced in 2016-17, the dataset will not include the previous asset in the 2015-16 volumes. The effort required to address this gap was not considered appropriate given the immaterial inaccuracy over the 4 year reporting period.

Where possible the Asset Age Profile (REPEX) Asset Categories were used to map directly to a Maintenance Asset Class, and if this was not possible the mapping was performed at the Asset Class and lower levels. The final mapping is shown in the table below.

Maintenance Asset Category	Asset Age Profile Criteria
Communications	REPEX Asset Category = "Communications Network Assets" or "Master Station Assets" or "Communications Site Infrastructure"
Distr - CBD or Distr - Non-CBD	Asset Class = "Cables" Voltage <= 22 Type = "Cable"
Trans - CBD or Trans - Non-CBD	Asset Class = "Cables" Voltage > 22 Type = "Cable"
Distr - CBD or Trans - CBD	Asset Class = "Cables" Feeder Category = "CBD" Type = "Cable”
Distr - Non-CBD or Trans - Non-CBD	Asset Class = "Cables" Feeder Category != "CBD" Type = "Cable"
Distribution Substation Property	Asset Class = "Distribution Substations" Type = "Ground"
Distribution Substations Earth Mats	Asset Class = "Distribution Substations" Type != "Pole"
Distribution Substations Switchgear	Asset Class = "Distribution Switchgear" REPEX Asset Category = "< = 11 kV ; Switch" or "< = 11 kV ; Circuit Breaker" or "> 11 kV & < = 22 kV ; Switch" or "> 11 kV & < = 22 kV ; Circuit Breaker"
Distribution Substations Transformers	Asset Class = "Distribution Substations"
OH asset inspections	Used the Route Line Length from 3.7.3 - SERVICE AREA FACTORS

Maintenance Asset Category	Asset Age Profile Criteria
Pillars	Asset Class = "Pillars"
Pole inspections	Asset Class = "Distribution Poles" or "Transmission Poles and Towers"
Poletop and OH line maintenance	Asset Class = "Distribution Poles" or "Transmission Poles and Towers"
Protection	Asset Class = "Protection"
SCADA	Asset Class = "SCADA"
Service lines	Asset Class = "Cables" or "Conductors" Type = "Service"
ZSS Other Equipment	Asset Class = "HV Circuit Breaker" or "Outdoor Isolator and Busbar" or "Instrument Transformers" or "Substation Auxiliary Plant" or "Capacitor Banks"
ZSS Property	Counted regulated ZSS sites with any of GROUNDS/AC/PEST/ZSS inspection job plan each year in R&M Model
ZSS Transformers	Asset Class = "Power Transformers"

We note that where an asset's age was unknown, that asset has been assumed to be installed prior to 2013-14 for the volume at year end calculation, and has been excluded from the average age of asset group calculation.

We also note that the maintenance asset category "Service Lines" has been reported as number of service lines, not number of customers listed in the Asset Quantity. There are many instances where multiple customers are supplied by a single service and the number of service is considered the more appropriate quantity in this context.

The inspection cycles were assigned using our staff's knowledge, and can be verified in the Maximo PM module against the various asset classes.

8.1.2.3 Methodology for Table 2.8.1 – Descriptor Metrics for Routine and Non-Routine Maintenance – Asset Quantity Inspected / Maintained

The asset quantities inspected / maintained were an output of the R&M model. The data was aggregated from two sources.

The first source was a count by year of all the Routine Maintenance and Non-Routine Maintenance work orders against the Maintenance Asset Category in question. To avoid double counting, the inspection/maintenance task was only attributed to the year in which the expenditure first occurred, not in all years with expenditure.

Separate analysis was undertaken for assets which are inspected as part of bulk patrols or inspections (i.e. with Asset Class of "multiple"). In this case, the quantity inspected is the proportion of the asset quantity at year-end which was required to be inspected in accordance with the maintenance strategy of the year in question. For example, the feeder inspection strategy in 2013-14 required every pole to be inspected each year, so the asset quantity inspected is the same as the number of poles at year end in 2013-14. Where an asset has been inspected/maintained multiple times within a year, it has been counted multiple times.

The results of the two separate analyses were aggregated into table 2.8.1.

It should be noted that the asset quantities for cables were reported as number of maintenance events rather than kilometres of cable. Maintenance events on cables were typically unrelated to the length of the cable – typically repairing a fault or replacing a joint or termination – so there was no method to convert this into a cable length.

8.1.2.4 Methodology for Table 2.8.2 – Cost Metrics for Routine and Non-Routine Maintenance

The expenditure for Routine Maintenance was calculated in a similar fashion to the quantities, with two separate sources of expenditure calculated then aggregated.

The first source is calculated by summing the expenditure for the corresponding year for each Maintenance Asset Category in Table 2.8.2. For example, Pole tops and overhead lines expenditure used the following field values:

- Service Classification = “SCS”
- Expenditure Category = “Routine Maintenance”
- Maintenance Asset Category = “Pole tops and overhead lines”

Separate analysis was undertaken for work orders with a Maintenance Asset Class of “Multiple”. Inspection and patrol work orders were assigned weightings against each of the Maintenance Asset Categories in accordance with the types of activities involved. E.g. overhead feeder inspections were split across the “Pole Inspection” and “OH Asset Inspection” categories in proportions that represented the estimated amount of time spent on each. For bulk labour work orders the costs were simply apportioned to the Maintenance Asset Categories relevant to the owner of the work order, in proportion to known costs for those Maintenance Asset Categories.

The results of the two separate analyses were aggregated into Table 2.8.2. Refer to worksheet “2.8” in the R&M methodology for more details.

8.1.2.5 Table 2.8.2 – Cost Metrics for Routine and Non-Routine Maintenance – Non-Routine Maintenance

The expenditure for non-routine maintenance was calculated in the same way as described for Routine Maintenance.

8.1.3 Estimated and actual information

Information	Estimated and actual information
Asset Quantity at Year End	The asset quantity at year end is based on asset management system data for 2016-17 and is considered actual data. The prior years’ volumes are estimated using the 2016-17 source data and excluding assets installed in each year.
Asset Quantity Inspected / Maintained	The asset quantity inspected / maintained is a combination of estimated and actual data. The actual component is the quantity of maintenance events for the years 2013/14 to 2016-17, which comes directly from Maximo work order data. The quantity of assets inspected

Information	Estimated and actual information
	from 2013/14 to 2016-17 is an estimate, since there are no systemised records of each asset that is inspected. The estimate provided is based on the fact that a certain proportion of the asset base was inspected each year in line with the maintenance strategy at that time, which is considered a reasonable assumption.
Expenditure data	The expenditure information was sourced from our asset management system and our financial system. There was a significant amount of categorisation, mapping allocation and assumptions applied. We applied rules primarily based on our system data and expenditure attributes. If we started again and applied different assumptions it is likely that we would report values that are not materially different. Therefore, the RIN defines this as actual information.

8.1.4 Source of the data

Our data was derived using the R&M backcasting methodology described in appendix B and the data was sourced from Maximo and SCADA systems.

8.1.5 Confidential information

Template 2.8 does not contain confidential information.

9. Template 2.9 – Emergency Response

9.1 Template 2.9.1 – Emergency response

9.1.1 Consistency with the RIN

The following highlights the Regulatory Information Notice requirements that apply generally to the Category Analysis template and it also demonstrates how we have has complied with these requirements.

Appendix E Requirements	Consistency with requirements
Clause 4.93: Report the following expenditure for each regulatory year: 4.93 (a) total emergency response expenditure;	Total emergency response expenditure has been entered for the 2013-14 to 2016-17 regulatory years
4.93 (b) emergency response expenditure attributable to major events by identifying direct costs through a specific cost code for each major event or major storm. Major events most often refer to, but are not limited to, a major storm;	Total emergency response expenditure has been reported against each major event based on the expenditures on work orders related to the event.
4.93 (c) emergency response expenditure attributable to major event days by identifying daily operating expenditure incurred on each date of those major event days and summing up the expenditure for each event.	The expenditure by day of each major event has been reported.

9.1.2 Methodology and assumptions

9.1.2.1 General Methodology

The Emergency Response expenditures are an output of the R&M Backcasting Methodology described in appendix B. The mapping from the our work order details to the “Emergency Response” Expenditure Category is shown below.

Figure 1 AER Expenditure Category Mapping table

AER Expenditure Category	Work Category	Work Type
Emergency Response	REPAIRSMAINTENANCE	UNPLANNEDMAINTENANCE

As outlined above, work orders with Work Category of “REPAIRSMAINTENANCE” and Work Type of “UNPLANNEDMAINTENANCE” were defaulted to the “Emergency Response” Expenditure Category.

There were many instances where work orders had not been given the correct Power and Water classifications. In these cases the relevant work orders were manually assigned to the correct categories.

9.1.2.2 Table 2.9.1 – Emergency Response Expenditure (Opex) – (A) Total Emergency Response Expenditure

The expenditure for Emergency Response was calculated by summing the expenditure for the corresponding year using the following field values:

- Service Classification = "SCS"
- Expenditure Category = "Emergency Response"

9.1.2.3 Table 2.9.1 – Method for Emergency Response Expenditure (Opex) – (B) Major Events O&M Expenditure

There were only two major event days reported in template 6.3.

Date	Description
12/03/2014	Darwin System Black
10/05/2017	Lovegrove Switchboard Failure

Work orders relating to each event were located in Maximo by searching for Emergency Response work orders created on the day of the event. Any work orders which were obviously unrelated to the event were excluded.

The expenditure relating to each event was then calculated as the total costs on the related work orders. A small amount of expenditure which occurred in the 2017/18 financial year has been excluded.

9.1.2.4 Table 2.9.1 – Emergency Response Expenditure (Opex) – (C) Major Event Days O&M Expenditure

The expenditure per day was extracted from Maximo. A query was used to sum the transactions on the work orders identified by date. It should be noted that the expenditure incurred on each day in table 2.9.1 (c) is based on the date that work was undertaken and not the date of the financial transaction. In some cases, timesheets dates were incorrectly entered prior to the event – these costs were assigned to the day of the event. Again, a small amount of expenditure which occurred in the 2017-18 financial year has been excluded.

Refer to the R&M Methodology in appendix B for more information.

9.1.3 Estimated and actual data

All data provided in template 2.9 is considered actual data to the extent that it derives from our financial systems and that any manual adjustment is reasonable. An alternative method would not have resulted in materially different data.

9.1.4 Source of the data

We derived our data using the R&M methodology, which mainly relied on Maximo data, with additional sources as outlined in the table below.

Information	Source
Major Event Days	Outage Data for Reliability Analysis Purposes 1998-2017

9.1.5 Confidential information

Template 2.9 does not contain confidential information.

10. Template 2.10 – Network Overheads

10.1 Table 2.10.1 and 2.10.2 – Network and capital overheads expenditure

10.1.1 Consistency with the RIN requirements

Appendix E Requirements	Consistency with the RIN requirements
Clause 4.94: Report overhead expenditure before it is allocated to direct expenditure. Report the total amounts allocated to opex and capex for standard control services and alternative control services, and report total amounts allocated to negotiated services and unregulated services in each regulatory year.	We reported overhead expenditures that could not be directly attributed to another expenditure category. The overhead expenditures reported relate to standard control services, alternative control services and our unregulated activities. No overhead expenditure was attributed to the direct expenditure categories.
Clause 4.95 (a): For Workbook 3 – Category analysis, regulatory template 2.10, table 2.10.1 Network overhead – For other network overheads (opex and capex) provide details of the expenditures included in the category, and identify any expenditures that contribute greater than 5 per cent of total network overheads in any regulatory year.	Our other network overheads (capex and opex) do not exceed 5% of the total in any year. We have included an allocation of overheads to the unregulated networks and unregulated streetlighting services we provided over the reporting period.
Clause 4.95 (b): For Workbook 3 – Category analysis, regulatory template 2.10, table 2.10.2 Corporate overhead – For other corporate overheads (opex and capex) provide details of the expenditures included in the category, and identify any expenditures that contribute greater than 5 per cent of total network overheads in any regulatory year.	Our other corporate overheads (capex and opex) exceeded 5% of total corporate overheads in all years but one. We have included an allocation of overheads to the unregulated networks and unregulated streetlighting services we provided over the reporting period. The details about these expenditures were calculated are explained in the operating expenditure backcasting methodology.
Clause 4.96 (a): If there is any overhead expenditure that is capitalised by PWC report the total amounts allocated to standard control services and alternative control services in each regulatory year;	We have capitalised overhead expenditure and included them in template 2.10
Clause 4.96 (b): If there is any overhead expenditure that is capitalised by PWC explain, in the basis of preparation, why it is capitalised;	Our explanation why we have capitalised overhead expenditures is contained in our operating expenditure backcasting methodology in appendix C.
Clause 4.96 (c): If there is any overhead expenditure that is capitalised by PWC if there is a material change in reported expenditures due to a change in capitalisation policy, identify the expenditure categories and quantum of capex and opex that are affected and explain this in the basis of preparation.	A discussion about of capitalised overheads is contained in our operating expenditure backcasting methodology in appendix C.

10.1.2 Methodology and assumptions

10.1.2.1 Opex

We used our operating expenditure backcasting methodology outlined in appendix C to calculate the network overhead operating expenditure required for table 2.10.1 and 2.10.2. Our approach identified which of our financial accounts are associated with the corporate overheads or network overheads as defined by the RIN. After identifying the overhead costs we attributed some of these costs directly to standard control services. The remainder of unallocated overhead costs were allocated to standard, alternative control services and our unregulated services.

The basis of the allocation of overhead costs was the ratio of direct costs attributed to the individual service to the total direct costs of all services

10.1.2.2 Capex

Our capitalised network overheads prior to 2016-17 comprised a Long Service Leave Levy paid to the Northern Territory Government as well as the capitalised cost of the previous network pricing submission project.

The Long Service Leave Levy is legislated by the NT Government to be paid to NT Build, with the intent of providing transferable long service leave to construction employees. It is a levy which is incurred on all construction projects which meet particular criteria, and is paid annually as a lump sum. We capitalise these costs as the levy is an unavoidable cost of capital construction projects.

Our capitalised network overheads are, by default, allocated to standard control services. However, we allocated a portion of expenditure to alternative control services and our unregulated services, consistent with the allocations of opex overheads.

In 2016-17, we capitalised corporate and network overhead costs using the operating expenditure backcasting methodology outlined in appendix C. These costs were capitalised as they relate to overhead management costs associated with capital projects.

10.1.2.3 Other distribution services

A portion of the capitalised overheads has been applied to unregulated services. We do not provide any negotiated services so this variable was complete with values of zero.

10.1.3 Estimated and actual information

The information in template 2.10 is materially dependant on our financial accounts and asset management system data. To calculate the overhead expenditure we made a number of assumptions and allocations using our operating expenditure methodology described in Appendix C. These included the labour recovery adjustment, which has resulted in our associated operating expenditure information becoming estimated information under the RIN definition.

10.1.4 Source of the information

The information in template 2.10 is based on our financial accounts and asset management system data.

10.1.5 Confidential information

Tables 2.10.1 and 2.10.2 do not contain confidential information.

11. Template 2.11 – Labour costs

11.1 Table 2.11.1 – Cost metrics per annum

11.1.1 Consistency with the RIN requirements

Appendix E Requirements	Consistency with the RIN requirements
Clause 4.18: Only labour costs allocated to the provision of standard control services should be reported in the labour cost tables in Workbook 3 – Category analysis, regulatory template 2.11.	We have reported our standard control services labour costs in template 2.11.
Clause 4.19: Labour used in the provision of contracts for both goods and services, other than contracts for the provision of labour (i.e. labour hire contracts) must not be reported in these tables.	We have reported our internal labour and labour hire contractors in template 2.11.
Clause 4.20: PWC must break down its labour data (both employees and labour contracted through labour hire contracts) into the classification levels provided in the relevant table in the template. PWC must explain how it has grouped workers into these classification levels.	We have broken down the labour costs into the required categories.
Clause 4.21: Labour related to each classification level obtained through labour hire contracts may be reported separately on separate lines to employee based labour. If PWC wishes to do this they should add extra lines in the regulatory template below each classification level for which it wishes to separately report labour hire.	We have not reported labour hire separately.
Clause 4.22: The total cost of labour reported in Workbook 3 – Category analysis, regulatory template 2.11 must equal the total labour costs reported against the capex and opex categories relevant to standard control services listed in Workbook 3 – Category analysis, regulatory template 2.12.	We have reconciled the labour costs reported in templates 2.11 and 2.12.
Clause 4.23: Quantities of labour, or expenditure should not be reported multiple times across labour tables However, labour may be split between tables (for example one worker could have half of their time allocated to corporate overheads and half of their time to network overheads).	We have only reported labour costs and quantities once.
Clause 4.24: The ASLs for each classification level must reflect the average paid FTEs for each classification level over the course of the year.	Our ASL calculations are based on employee pay period data.

11.1.2 Methodology and assumptions

11.1.2.1 Average Staffing Level (ASL)

We used a report of full time equivalent employees, which was produced for every pay period of the reporting period. Our first step was to categorise all employee job codes to the

AER position classifications. Then we mapped every position to a business unit in order to link the position to the activity they perform, including whether each position provides standard control services.

For employees in our corporate entity and system control entity we allocated their time to Power Networks. This is because staff in those entities only commit part of their time to Power Networks. Our allocation was based on the portion of the costs of those entities allocated to Power Networks. For example, if 30% of the cost of the entity is allocated to Power Networks in the financial accounts, then 30% of the FTEs are attributed to Power Networks.

The next step in the allocation was to apply the percentages that were developed to allocate overheads to standard control services. For example, if 83% of overheads were allocated to standard control services, then 83% of the Power Networks FTEs were allocated to standard control services.

The ASL amounts reported were calculated as the average, over the year, of the standard control services FTE for Power Networks (including the portion of the Corporate and System Control staff) for each function and job category required.

11.1.2.2 Total Labour Expenditure

We calculated the labour expenditure using the mapping of FTE described above and their annual payroll cost to create a set of percentages of total salary for each job classification required.

We then applied the above percentages to allocate the total labour cost for standard control services into the table. The total labour cost for standard control services was calculated using our operating expenditure methodology outlined in appendix C.

11.1.2.3 Average Productive Work Hours per ASL

We were note required to complete this table.

11.1.2.4 Stand Down Occurrences per ASL

We were note required to complete this table.

11.1.3 Source of information

The 2014-15 to 2016-17 FTE information in template 2.11.1 was sourced from the reporting application for HR, Boxi-HR. Data from 2008-09 to 2013-14 was obtained from the Department of Corporate Information Services (DCIS) via our HR Services Department.

For the labour expenditure template the payroll information was provided by DCIS.

11.1.4 Estimated and actual information

We sourced all information used (FTE data, payroll data and total labour expenditure) from our internal systems. We made various allocations based on employee types and business units and we allocated each FTE to standard control services using actual cost data. These allocations are based on expenditure data, which is estimated information. Therefore, the average staffing level data is also defined as estimated information.

11.1.5 Confidential information

Template 2.11 does not contain confidential information.

11.2 Table 2.11.2 - Extra descriptor metrics for current year

We were not required to complete this table.

12. Template 2.12 – Input tables

12.1 Table 2.12 – Input tables

12.1.1 Consistency with the RIN requirements

Appendix E Requirements	Consistency with the RIN requirements
Clause 4.25: Only input costs allocated to the provision of direct control services should be reported in the input cost tables in Workbook 3 – Category analysis, regulatory template 2.12.	We reported all costs associated with Standard Control Services and Alternative Control Services to capture all Direct Control Services only.
Clause 4.26: PWC must break down its costs into labour, materials, contract and other costs. PWC must explain what inputs have been reported as other.	We have broken our costs into labour, material, contract and other costs as required.
Clause 4.27: Quantities of expenditure should not be reported multiple times across the labour, materials, contract and other tables and should not be reported multiple times across the capex and opex categories listed in Workbook 3 – Category analysis, regulatory template 2.12.	We have only reported amounts of expenditure once. No expenditure has been double counted in this table.
Clause 4.28: For contract expenditure, PWC must separately estimate the proportions attributable to labour, materials and other inputs for each capex and opex category listed in Workbook 3 – Category analysis, regulatory template 2.12.	We have made this estimate based on the proportion of our own costs. We consider this is a best estimate as there is no other way to calculate these amounts.

12.1.2 Methodology and assumptions

We have collated this data based on the categorisation of data contained in template 2.1 and the underlying analysis explained in the capex, R&M and opex backcasting methodology described in appendices A, B and C.

We do not capture information about the underlying cost type of our contract costs. Therefore, we made our estimate based on the proportions of our own internal costs. For example, if 30% of our ACS costs were labour, then 30% of the contract costs for ACS were determined to be labour costs. This proportion was calculated as the average over the four years being reported (2013-14 to 2016-17).

12.1.3 Source of information

The information contained in template 2.12 was sourced from Maximo and the financial accounts.

12.1.4 Estimated and actual information

The information presented in this template is based on a range of actual data from our financial and asset management systems. The main assumption we have made is that our contractors have the same underlying cost structure as PWC as we do not have actual contractor cost information. Other assumptions could be applied that would result in materially different values reported in the RIN. For example, we could prepare a hypothetical benchmark cost build up for each contract cost to determine the labour, materials, contract and other cost. This would be unduly burdensome and there would be no way to test whether it yields a more accurate estimate of the unknown actual costs. Therefore, our approach is our best estimate.

The assumptions made to disaggregate our internal direct standard control services activities into labour, materials and other costs is based on internal knowledge of financial and asset management systems and our internal activities. This information is considered to be actual information under the RIN definition.

The disaggregation of the other opex labour costs is based on the historic operating expenditure methodology described in Appendix C. As a result this information is defined by the RIN to be estimated information.

12.1.5 Confidential information

Template 2.12 does not contain confidential information.

13. Template 4.2 – Metering

13.1 Table 4.2.1 and Table 4.2.2 - Metering Descriptor and Cost Metrics

Our metering systems do not directly, enable us to accurately report population, expenditure and volume metering data by the sub-categories required in the RIN template. Our estimates have relied on high level assumptions, based on multiple sources. For this reason, a degree of caution should be applied to the data we have reported.

13.1.1 Consistency with RIN requirements

Appendix E Requirements	Consistency with the Requirements
Clause 4.102: PWC must ensure that the data provided for metering services reconciles to internal planning models used in generating PWC's proposed revenue requirements.	The information we have provided in this template is historic information, and therefore will not reconcile to our forecast estimate of costs for metering services.
Clause 4.103: PWC is not required to distinguish expenditure for metering services between standard or alternative control services in Workbook 3 – Category analysis, regulatory templates 4.2.	We can confirm that we have reported all metering costs, irrespective of whether the service is alternative or standard control.
Clause 4.104: PWC is not required to distinguish expenditure for metering services as either capex or opex in Workbook 3 – Category analysis, regulatory templates 4.2.	We have reported total expenditure as required by the AER.
Clause 4.105: PWC must report data for non-contestable, regulated metering services. This includes work performed by third parties on behalf of PWC.	We have reported data for non-contestable regulated metering services only.
Clause 4.106: PWC must not report data in relation to metering services which have been classified as contestable by the AER.	We have not reported data for metering services that are contestable.

13.1.2 Methodology and assumptions

In the sections below, we identify the methods and assumptions for each table in the template. We currently do not have Type 1 and Type 5 meters. For this reason, we have reported a zero value for these meter types in all tables except for 2013-14 when we still had a Type 1 meter in place.

Our general methodology for reporting data has relied on the following systems and sources to report the information for this template:

- Retail Management System (RMS) – This captures billing data for all our customers. It provides a basis for determining the total meter population at a point in time, and the characteristics of the meter. It also captures location information which has been used to determine if the meter is regulated or non-regulated. It should be noted that the regulated and unregulated locations are determined by the Utilities Commission Network Licence. RMS is also a system that logs service request information. These codes have enabled us to estimate volumes for different RIN sub-categories such as meter investigations.

- MV 90 – This is a system that captures annual consumption data for remotely read meters (ie: type 2, 3 and 4 meters). It provides an accurate basis for identifying the number of remote meters. It also provides information on energy consumption that enables us to determine the number of Type 2,3 and 4 meters, together with the phase and connection characteristics.
- Audited statutory accounts and regulatory accounts – At a high level we ensured that the sum of reported metering expenditure reconciled to template 2.1 of the RIN. Appendix A, B and C of this document provide details on this methodology.
- Maximo – We have used the work orders (replacement of meters, new metering installations etc) relating to metering in Maximo (our asset management system) to manually allocate expenditure to RIN sub-categories. As noted in the section below for Table 4.2.2, we had to apply an additional step to reconcile the sub-categories to the audited statutory accounts for metering.

13.1.2.1 Table 4.2.1 - Metering descriptor metrics

The RIN table requires us to identify the number of regulated meters by meter type. It then requires further categorisation of these meters into single phase or multi-phase, and by the number of meters that are current transformer connected or direct connected.

The RMS provides a reasonably accurate basis for identifying the total regulated meter population as at July 2017. The RMS provides location data, which has been used to determine if a meter is likely to be in a regulated or unregulated area.

The first step of our methodology was to assign the meter population to a Meter Type for 2016-17 based on an extract of the system data as at July 2017. We were unable to generate historic population data from RMS as it is a live system and the metering installation data changes to reflect the current population of meters. The MV 90 System records information on energy consumptions for remote read meters. The energy consumption data has been used to map meters to Type 1,2,3 and 4 meters. We estimated the number of regulated Type 6 meters in 2016-17 by deducting the number of meters in MV90 from the total regulated meter population identified in RMS (ie: a residual calculation approach).

The second step was to estimate the number of meters by meter Type for the 2013-14 to 2015-16 years. RMS is a live system which does not have the ability to take snapshots of the meter population over time. To estimate meter populations in 2013-14 to 2016-17 we sequentially deducted the number of new meters we installed in each of the years between 2013-14 and 2016-17. The number of new meter installations were based on a report query in RMS for regulated districts, which identifies the first installation date of a new premise.

The third step was to use RMS data in 2016-17 to determine the proportion of single phase to multi phase meters for each meter Type. This information is a direct reporting element in RMS as at July 2017. For 2013-14 to 2015-16 meter data, we applied the relative proportions of single phase to multi phase meters in 2016-17 to the meter populations we estimated in Step 2 above.

The final step was to use RMS data for 2016-17 to determine the proportion of current transformer connected meters to directly connected meters by meter ratings. We assigned meters with a rating of 0-1999 to the direct connected category and meters with a rating above 1999 to a current transformer connected category. The meter rating for 2016-17 was available in RMS. We applied the same proportions to report 2013-14 to 2015-16 data. Our staff undertook manual checks to determine whether manual adjustment was required based on the meter model. In some cases, a 50-50 split was applied for meters which fit both categories.

13.1.2.2 Table 4.2.2 - Cost metrics

This template requires us to provide expenditure and volumes on sub-categories of metering expenditure such as meter purchases and special meter tests.

We do not have a system in place for recording metering expenditure by the AER sub-categories in the RIN. For this reason, we used best endeavours to map the RIN metering sub-categories to total metering expenditure by reconciling our 'bottom up' project data information in Maximo and our audited accounts.

The first step was to use our audited statutory and regulatory accounts as the basis for determining the total expenditure in each year for metering services. The sum of reported metering expenditure in Table 4.2.2 reconciles to template 2.1 of the RIN. Appendix A, B and C of this document provide details on the methodology to identify capex and opex for metering services from our audited statutory and regulatory accounts.

The second step was to use work orders in Maximo (our asset management system) to manually allocate metering expenditure to RIN sub-categories. The codes in Maximo provide a basis for determining if expenditure relates to a metering service. Our staff then manually examined each work order to map the expenditure to the most relevant RIN sub-category activity.

The third step involved reconciling the total amount from work orders in Maximo to the audited accounts. This was because the work orders in Maximo did not reconcile completely to the reported amounts for metering in the audited statutory and regulatory accounts. For this reason, we used a benchmarking approach to allocate the residual amount to AER RIN sub-categories. The rationale was to ensure that the residual amount reflected the likely contribution of each activity to total metering costs. The benchmarking approach examined the estimated unit cost and volumes for each RIN sub-category to determine the likely proportion of expenditure related to that activity.

The RIN requires the expenditure on IT infrastructure and communications infrastructure to be reported. However, these terms are not defined in the RIN. We have understood these terms to relate to commissioning and maintaining infrastructure that is required for the provision of metering services. PWC outsources its IT and communications services and as such we do not own the associated infrastructure. As a result, we have reported all infrastructure costs as zero.

Our IT and communications expenditure has been reported as non-network – IT expenditure in table 2.6 Non-network. We have also not reported any overhead costs in table 4.2

Metering as all overhead expenditures have been reported in table 2.10 Network overheads.

As the RIN template did not include rows for meter replacement expenditure for meter types 1 to 3, we reported the replacement expenditure in the 'Other' category.

In respect of volumes, we used the following data source and estimation techniques for each sub-category:

- Meter purchase – We assumed that meter purchases are the sum of meter installations and replacements. The underlying data is explained in the dot points below relating to "new meter installations" and "meter replacements". A key assumption is that meter purchases occur in the year that the meter was installed or replaced. We used this assumption because we do not have accurate records on meter purchase in our asset management system or store inventory.
- Meter testing - We used an internal data source from our meter testing laboratory to identify the number of meters we tested. We have reported zero for all years except for 2016-17. This is because while the "network technical code" requires metering installation testing, there is no set period for the testing or a methodology for testing under the existing requirements. Subsequently, we only commenced testing of "returned" meters in 2016-17 since we purchased the new meter test bench.
- Meter investigations – Our RMS contains service requests for remote and non-remote read meters respectively, except for Type 2 meters. We have identified codes most relevant to meter investigations based on our staff's judgement. All service requests relating to non-remote read meters have been assigned to Type 6 meters. We have allocated remote meter investigations to Type 3 and 4 meter types based on the relative meter populations in each year.
- Scheduled meter reads – We have reported zero for Type 2 to Type 5 meters, as these are remotely read meters. The 2016-17 data for Type 6 meters is based on an internal spreadsheet of planned manual meter reads during the financial year of 2016-17. There were gaps in our planning spreadsheets for certain meter reading routes. We used the average number of reads for those routes to fill in the gaps. The 2013-14 to 2015-16 data was based on 2016-17 information, but the reported data is adjusted for new meter installations that occurred over this period.
- Special meter reads – We used a similar methodology to meter investigations, as described above. We have assumed that particular service request codes in RMS correspond to a special meter read. Similar to meter investigations, the data in RMS is available for remote read and non-remote read meters. For remote meters, we have assumed that there were no special meter reads for Type 2 or Type 3 meters based on staff knowledge. We have therefore assigned the special meter reads for remote read meters to Type 4 meters only.
- New meter installations – We used data in RMS to identify the number of new meters installed for each year between 2013-14 to 2016-17. This provides information on meter model which has been used to determine the meter Type.

- Meter replacements – We used RMS to identify reactive replacements for meters that have failed in service, or meters that require an upgrade for PV etc. We used Maximo to determine the number of meters that have been replaced proactively as part of a bulk replacement project.
- Remote reading - We used MV 90 data to determine the number of meters requiring remote reads. We then multiplied the population by the average estimated yearly reads for a remote meter. This was based on the assumption that we would read the meter on a weekly basis, final monthly bill, and 6 ad hoc periods, resulting in an average of 70 reads per year per meter.
- Remote configuration – The reported data for Type 4 meters was based on service request codes in RMS to convert existing meters to time of use or to enable PV.

13.1.3 Estimated and actual information

While much of the underlying data is based on systems and business records, we have had to use estimation methods to provide the population, expenditure, and volume data for metering units and metering activities in the sub-categories required by the AER. Alternative assumptions may result in materially different outcomes. On this basis, all data is estimated as defined by the RIN.

13.1.4 Source of the information

Data	Source
Type 2, 3 and 4 meter populations	MV 90
Type 6 meter population	RMS and MV 90
Volumes for meter purchase, installation and replacement volumes	RMS and Maximo
Volumes for meter investigation, scheduled meter reads and special meter reads	RMS
Remote reading and remote configuration volumes	MV90
Total expenditure for metering services	Audited statutory and regulatory accounts Maximo for capex

13.1.5 Confidential information

The expenditure and volumes associated with our metering activities have been marked as confidential.

14. Template 4.3 – Fee-Based Services

14.1 Table 4.3.1 – Cost Metrics for Fee-Based Services

14.1.1 Consistency with the RIN Requirements

Appendix E Requirements	Consistency with the RIN requirements
Clause 4.97: PWC must ensure that the data provided for fee-based and quoted services reconciles to internal planning models used in generating PWC's proposed revenue requirements.	We have provided the required data, however it is historic data and therefore cannot be reconciled with the forecast revenue requirements.
Clause 4.98: In Workbook 3 – Category analysis, regulatory templates 4.3 and 4.4, PWC must list all of its fee-based and quoted services.	All fee and quoted services have been listed.
Clause 4.99: In the basis of preparation, PWC must provide a description of each fee-based and quoted service listed in Workbook 3 – Category analysis, regulatory templates 4.3 and 4.4. In each services' description, PWC must explain the purpose of each service and detail the activities which comprise each service.	We have provided this description in section 19.2 of our regulatory proposal.
Clause 4.100: PWC is not required to distinguish expenditure for fee-based and quoted services between standard or alternative control services in Workbook 3 – Category analysis, regulatory templates 4.3 and 4.4.	All fee and quoted services are ACS.
Clause 4.101: PWC is not required to distinguish expenditure for fee-based and quoted services as either capex or opex in Workbook 3 – Category analysis, regulatory templates 4.3 and 4.4.	We have reported the total capex and opex associated with these services.

14.1.2 Methodology and assumptions

We collated the reported data from our financial accounts. Firstly, we identified fee-based services expenditure based on the relevant accounts. Secondly, we identified R&M work orders that were fee-based services, and we reconciled the amounts to ensure no costs were double counted or missed. This was based on our R&M methodology in appendix B and opex methodology in appendix C.

Prior to 2012-13, the ACS costs were not captured separately. instead they were captured in R&M as emergency response work orders. It was not possible to identify the costs accurately and therefore we estimated an amount to be removed from emergency response and added to fee-based services. We used the proportion of costs captured in 2013-14 to 2015-16, using customer numbers as the allocation driver.

The above method allowed us to capture the total cost of fee-based services. However, we do not have complete information about the number of activities we undertook. Therefore, the disaggregation of the fee-based expenditure and the volumes were estimated.

To estimate the volumes, all available service request data was collated. However, there were a number of activities that we had not charged for, and therefore did not have billing data or service request data to rely on. In these cases, the volumes were estimated by our staff who have experience in carrying out these activities. These volumes were multiplied by the relevant tariff to derive hypothetical revenue for these services, which was used as a driver to disaggregate the fee-based services expenditure into the individual services.

14.1.3 Source of information

The source of the information used was our financial management system and Maximo for financial data. The volumes were obtained in part from service requests and also estimated by our team.

14.1.4 Estimated and actual information

The majority of the information was sourced from our systems. However, the volumes used to disaggregate the data were based on staff experience and judgement. Further, the historic costs prior to 2013-14 were estimated as described above. Therefore, the RIN defines this information to be estimated information.

14.1.5 Confidential information

Template 4.3 does not contain confidential information.

15. Template 4.4 – Quoted Services

15.1 Table 4.4.1 – Cost Metrics for Quoted Services

15.1.1 Consistency with the RIN Requirements

Appendix E Requirements	Consistency with the RIN requirements
Clause 4.97: PWC must ensure that the data provided for fee-based and quoted services reconciles to internal planning models used in generating PWC's proposed revenue requirements.	We have provided the required data, however it is historic data and therefore cannot be reconciled with the forecast revenue requirements.
Clause 4.98: In Workbook 3 – Category analysis, regulatory templates 4.3 and 4.4, PWC must list all of its fee-based and quoted services.	All fee and quoted services have been listed.
Clause 4.99: In the basis of preparation, PWC must provide a description of each fee-based and quoted service listed in Workbook 3 – Category analysis, regulatory templates 4.3 and 4.4. In each services' description, PWC must explain the purpose of each service and detail the activities which comprise each service.	We have provided this description in section 19.2 of our regulatory proposal.
Clause 4.100: PWC is not required to distinguish expenditure for fee-based and quoted services between standard or alternative control services in Workbook 3 – Category analysis, regulatory templates 4.3 and 4.4.	All fee and quoted services are ACS.
Clause 4.101: PWC is not required to distinguish expenditure for fee-based and quoted services as either capex or opex in Workbook 3 – Category analysis, regulatory templates 4.3 and 4.4.	We have reported the total capex and opex associated with these services.

15.1.2 Methodology and assumptions

We collated this data from the financial accounts. Firstly, we identified quoted services expenditure based on the relevant accounts. Secondly, we identified a number of R&M work orders that were quoted services and we reconciled the amounts to ensure no costs were double counted or missed. This was based on our R&M methodology in appendix B and opex methodology in appendix C.

The above methodology captured expenditure associated with quoted services that were less than $5,000. Quoted services with costs greater than $5,000 were accounted for as work in progress. The work in progress associated with these services is expensed on completion.

As the RIN requires expenditure to be reported on an as incurred basis, we needed to report expenditure, when it was booked to the WIP account. Therefore, for the RIN purpose the expenditure is reported when incurred based on the WIP accounts not based on the amount that is reported on project completion.

The above method allowed us to capture the total cost of quoted services but we do not have complete information about the number of activities we undertook. Therefore, the disaggregation of the quoted services expenditure and the volumes were estimated.

To estimate the volumes all available service request data was collated. However, there were a number of activities that we had not charged for and therefore we did not have billing data or service request data to rely on. In these cases, the volumes were estimated by our staff who have experience in carrying out these activities. These volumes were multiplied by the relevant tariff to derive hypothetical revenue for these services, which was used as a driver to disaggregate the fee-based services expenditure into the individual services.

15.1.3 Source of information

The source of the information used was our financial management system and Maximo for financial data. The volumes were obtained in part from service requests and also estimated by our team.

15.1.4 Estimated and actual information

The majority of the information was sourced from our systems. However, the volumes used to disaggregate the data were based on managers' experience/judgement. Further, the historic costs prior to 2013-14 were estimated as described above. Therefore, the RIN defines this information to be estimated information.

15.1.5 Confidential information

Template 4.4 does not contain confidential information.

16. Template 5.2 – Asset Age Profile

16.1 Table 5.2 – Asset Age Profile

16.1.1 Consistency with the RIN

The following highlights the Regulatory Information Notice requirements that apply generally to the Category Analysis template and it also demonstrates how we complied with these requirements.

Appendix E Requirements	Consistency with requirements
5.2.1 (a) Where PWC provides asset sub-categories corresponding to the prescribed asset categories in table 5.2.1, PWC must ensure that the expenditure and asset replacement / asset failure volumes of these sub-categories reconcile to the higher level asset category. PWC is required to use the additional rows and provide a clear indication of the asset category applicable to each new sub-category in the yellow input cells labelled 'OTHER BY DNSP DEFINED'	This is not applicable as the asset-subcategories provided are independent of the high-level asset category (apart from refurbishments which are addressed below).
5.2.1 (b) Any new asset categories defined by PWC in table 5.2.1 of regulatory template 5.2 must also be listed in table 2.2.1 in Workbook 3 – Category analysis, regulatory template 2.2, and PWC must provide corresponding asset expenditure, replacement and failure metrics in accordance with the instructions for regulatory template 2.2	All asset categories defined in 5.2.1 have also been provided in template 2.2.
5.2.1 (c) If in Workbook 3 – Category analysis, regulatory template 2.2, PWC has provided estimated expenditure data on the basis of historical data that has included works across asset groups PWC must provide the asset age profile data in regulatory template 5.2 against the most elementary asset category. For example, where PWC replaces pole-mounted switchgear in conjunction with a pole-top structure it must report the asset age profile data against the relevant switchgear asset category. PWC must provide documentation of instances where backcast unit costs generated have involved allocations of historical records that include expenditure across asset groups.	The data provided in template 2.2 is based on actual expenditure from the asset management systems and financial management systems which has been allocated to the specified Asset Categories.
5.2.1 (d) In instances where PWC is reporting expenditure associated with asset refurbishments/ life extensions capex it must use the additional rows at the bottom of the table ('OTHER BY DNSP DEFINED'). PWC must provide the required data, applying the corresponding asset group and category name followed by the word "REFURBISHED".	Refurbished assets have been included in the 'OTHER BY DNSP DEFINED' section. An age profile has been provided on the basis of the refurbishment date, not the original installation date. It should be noted that refurbished quantities have not been subtracted from the prescribed asset categories in table 5.2.1.
5.2.1 (e) In instances where PWC considers that	New asset categories have been defined in the

Appendix E Requirements	Consistency with requirements
both the prescribed asset group categories and the asset sub-categorisation do not account for an asset on PWC's distribution system, PWC must use the additional rows at the bottom of the table ('OTHER BY DNSP DEFINED'). PWC must provide the required data, applying a high level descriptor of the asset as the category name.	"OTHER BY DNSP DEFINED' section.
5.2.1 (f) When reporting asset age profile of staked wooden poles, PWC must report by the year the pole was staked, not the year the underlying pole was installed.	This is not applicable as we do not have wooden poles.
5.2.1 (g) In instances where PWC wishes to provide asset sub-categories in addition to the specified asset categories in table 5.2.1, PWC must provide a weighted average asset economic life, including mean and standard deviation that reconciles to the specified asset category in accordance with the specified formula:	This is not applicable as the asset-subcategories provided are independent of the high level asset category (apart from refurbishments which are addressed above).

16.1.2 Methodology and Assumptions

16.1.2.1 General Methodology

The source for the majority of age profile data is the Maximo asset management system. While some asset data can be extracted from the Geographical Information System (GIS), the systems are integrated and configured such that asset data is supposed to be synchronised and identical in both systems. In practice this is not always the case, and there are ongoing issues with poor data quality and de-synchronisation of the systems, particularly with regard to rotating assets. Data cleansing and architecture improvements are ongoing and it is anticipated that over the next 12 months data quality will be significantly improved. In the meantime, we considered that Maximo provided a better source to report age profile data compared to GIS due to the following advantages:

1. Rotating asset data was more accurate.
2. Linear asset data was comparable.
3. There are many asset classes in Maximo not present in the GIS.
4. Using a single system allowed data to be extracted more consistently and efficiently.

Reports were created using SQL to extract the necessary asset specifications for each Power and Water Asset Class. These typically included fields such as installation date, capacity and voltage, though there were different requirements depending on the level of disaggregation required to achieve the REPEX Asset Categories.

The query used to extract the data can be found in the Asset Age Profile workbook. There is a separate worksheet for each Power and Water Asset Class, such as Power Transformers, Distribution Substations, Cables, and Conductors.

The SCADA, NETWORK CONTROL AND PROTECTION Asset Categories were not sourced from Maximo, since the Maximo asset data is currently not reflective of the true state of these assets. These were produced manually based on staff knowledge in the SCADA and Communications team together with internal spreadsheets that are used for ongoing management of the assets, and project documentation from the records management system.

The Buildings and Civil and Grounds categories were also not sourced from Maximo, due to issues with the data quality for these assets. The data source used for these was the RAB asset value datasheet.

We cleansed the raw Maximo data because of the large number of missing specifications, lack of consistent naming conventions and incorrectly classified assets.

Where critical data was missing, we manually updated information using sources such as field inspection results, maintenance sheets and test reports. If the actual value was not able to be located, we estimated the value based on similar assets and engineering judgement. In these cases, a comment was attached to explain our reasoning. Manual modifications can be traced and explained.

The asset age was difficult to determine in many cases due to inconsistency in the way installation and commissioning dates have been recorded historically. There are also many instances of asset replacements occurring without being updated in the system until many years later when asset details were obtained from audits. In these cases the installation dates were never recorded or updated.

Accordingly, we decided to use the year of manufacture as a proxy for the installation date. This value is typically stamped on asset nameplates and has been recorded during recent asset inspections, and so is considered the most accurate proxy for installation date. It could also be argued that the year of manufacture is the appropriate date to use when analysing asset life, since assets will begin to deteriorate immediately upon manufacture and are rarely more than superficially refurbished before being re-deployed. Where the year of manufacture was not available the installation and commissioning dates were used in respective order of precedence. If no dates were available for an asset, then the date was left as unknown.

There are also many distribution assets that have an installation date of 1 January 1975, coinciding with the year Cyclone Tracy occurred. It is apparent from the abnormally high quantity of these assets that this was caused by a bulk update in the asset data system at the time. It is expected that these assets were thought to be “Cyclone Tracy era” and thus all given a nominal date of around that time (Cyclone Tracy was 24-12-1974). The process of assigning dates to these assets and assets with unknown dates is discussed in section 16.1.2.2.

Each of the extracted assets were then categorised into one of the REPEX Asset Categories using the cleansed Maximo fields and specifications. The methodology differed slightly for each Power and Water Asset Class, but in principal the Asset Category was assigned by matching asset specifications against a lookup table. An example is the lookup table below for the switchgear section.

Asset Category	Type	Min Voltage	Max Voltage
< = 11 kV ; Switch	Fuse	10.9	11.1
< = 11 kV ; Switch	Switch	10.9	11.1
< = 11 kV ; Circuit Breaker	Circuit Breaker	10.9	11.1
> 11 kV & < = 22 kV ; Switch	Switch	11.1	22.1
> 11 kV & < = 22 kV ; Circuit Breaker	Circuit Breaker	11.1	22.1
> 22 kV & < = 33 kV ; Switch	Switch	22.1	33.1
> 22 kV & < = 33 kV ; Circuit Breaker	Circuit Breaker	22.1	33.1
> 33 kV & < = 66 kV ; Switch	Switch	33.1	66.1
> 33 kV & < = 66 kV ; Circuit Breaker	Circuit Breaker	33.1	66.1
> 66 kV & < = 132 kV ; Switch	Switch	66.1	132.1
> 66 kV & < = 132 kV ; Circuit Breaker	Circuit Breaker	66.1	132.1
> 132 kV ; Switch	Switch	132.1	9999000
> 132 kV ; Circuit Breaker	Circuit Breaker	132.1	9999000

All lookup tables are found in the Lookups worksheet in the Asset Age Profile workbook.

16.1.2.2 Method for Table 5.2.1 - Asset Age Profile – Installed Assets –Quantity Currently in Commission by Year

Once the data was cleansed and each asset categorised, the quantity of installed assets could be populated by simply counting the number of assets (or summing the length of each asset for linear assets - cables, conductors, communications linear assets and cable tunnels) of each Asset Category for each year of interest.

Some Asset Categories contained multiple Power and Water Asset Classes, so the final quantity is the sum of the quantities for each Asset Class. It should be noted that only assets with Entity = 21 were considered in the analysis, since these represent assets within the regulated network.

The table below shows the link between the REPEX Asset Group/Category and the Power and Water Asset Class.

REPEX Asset Group / Category	Power and Water Asset Class
POLES	Asset Class = “Distribution Structures” or “Transmission Poles and Towers” Entity = 21
OVERHEAD CONDUCTORS	Asset Class = “Conductors” Type != “Service” Entity = 21
UNDERGROUND CABLES	Asset Class = "Cables"

REPEX Asset Group / Category	Power and Water Asset Class
	Type != "Service" Entity = 21
SERVICE LINES	Asset Class = "Cables" or "Conductors" Type = "Service" Entity = 21
TRANSFORMERS	Asset Class = "Distribution Substations" or "Power Transformers" or "Auxiliary Transformers"[9] Entity = 21
SWITCHGEAR	Asset Class = "Distribution Switchgear" or "HV Circuit Breakers" or "Outdoor Disconnectors and Busbars" Entity = 21
PUBLIC LIGHTING	Not applicable, unregulated
SCADA, NETWORK CONTROL AND PROTECTION SYSTEMS	
Field Devices	Manually calculated. This is the sum of protection relays and SCADA RTUs
Local Network Wiring Assets	Manually calculated. This is the number of physical panels which house the protection relays and RTUs
Communications Network Assets	Manually calculated, consists of Microwave terminals, DWDM Systems, Multiplexors, UHF System, Telemetry Systems, Teleprotection Systems
Master Station Assets	Manually calculated - a single asset representing the Energy Management System
Communications Site Infrastructure	Manually calculated, consists of Battery Systems, Solar Systems, Shelters, Towers/Masts, Server/equipment room
Communications Linear Assets	Manually calculated, consists of fibre optic cables and pilot cables
AFLC	Not applicable, Power and Water has no AFLC
OTHER	
Buildings	Asset Class = "Building" Entity = 21
Instrument Transformers	Asset Class = "Instrument Transformers" Entity = 21
Metering Units	Asset Class = "Metering Units" Entity = 21

[9] Note that Auxiliary Transformers is not an Asset Class but a subset of Substation Auxiliary Plant. It has been included in the Transformer grouping in templates 2.2 and 5.2

REPEX Asset Group / Category	Power and Water Asset Class
Pillars	Asset Class = “Pillars” Entity = 21
Substation Auxiliary Plant	Asset Class = “Battery Banks”[10] Entity = 21
Voltage Regulators	Asset Class = “Voltage Regulators” Entity = 21
Civil and Grounds	Asset Class = “Civil and Grounds” Entity = 21
Fire Systems	Asset Class = “Fire Systems” Entity = 21
Capacitor Banks	Asset Class = “Capacitor Banks” Entity = 21
Cable Tunnels	Asset Class = “Cable Tunnels” Entity = 21
Power Transformer Refurbishment	Age profile is taken from the REPEX quantities in the CAPEX model. The year provided is the year the asset was refurbished, not the year of installation.
Power Transformer Spares	Age profile is taken from the REPEX quantities in the CAPEX model. The year provided is the year the asset was refurbished, not the year of installation.
Pole Refurbishment	Age profile is taken from the REPEX quantities in the CAPEX model. The year provided is the year the asset was refurbished, not the year of installation.
Tower Refurbishment	Age profile is taken from the REPEX quantities in the CAPEX model. The year provided is the year the asset was refurbished, not the year of installation.
EDO Refurbishment	Age profile is taken from the REPEX quantities in the CAPEX model. The year provided is the year the asset was refurbished, not the year of installation.

This process results in a completed table of asset quantities, but only for those assets with known dates.

The quantity of assets with unknown dates in each Asset Category was then calculated, and these were allocated to each year in proportion to assets from same category with known dates. There was no systematic way to predict the likely age of assets with unknown installation dates, therefore allocating in proportion with the known asset fleet was a reasonable method.

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[10] Battery Banks are not an Asset Class but are a subclass of Substation Auxiliary Plant. These have been used to represent the Substation Auxiliary Plant Asset Class since they are the most critical subclass and due to the lack of asset detail on the other subclasses such as LV Switchboards.

The assets with installation year of 1974-75 were then addressed by "smoothing" that year's quantity across an adjacent year range as outlined below.

Asset Class	Year Range
Distribution Poles	1960-61 to 1989-90
Conductors	1960-61 to 1989-90
Pole Transformers	1960-61 to 1989-90
Cables	1970-71 to 1989-90
Ground / Kiosk Transformers	1970-71 to 1989-90
Services	1970-71 to 1989-90
Switchgear	1960-61 to 1989-90
Pillars	1970-71 to 1989-90

The date range was chosen to represent the likelihood of assets being installed in that period. E.g. cables and kiosk transformers only began to be installed en masse in the 1970s whereas conductors and pole transformers have been around for much longer.

Finally, to correct any rounding errors resulting from the above manipulations, the total quantity of assets was corrected to its original value by adding or subtracting from the year with the most assets installed.

The asset quantities for SCADA, NETWORK CONTROL AND PROTECTION Asset Categories were not calculated using this process. These were calculated manually and entered directly into the Asset Age Profile workbook.

16.1.2.3 Method for Table 5.2.1 - Asset Age Profile – Economic Life – Mean

It is difficult to accurately determine the mean asset life of Power and Water assets. This is partly because the majority of the network was only established over the last 40 years, which is less than the expected life of most assets. For example, 96% of cables are less than 40 years old and 99.98% are less than their financial life of 55 years.

The other contributing factor is the limited historical failure data we can analyse. Only since the introduction of the Maximo asset management system in 2012-13 have asset failures and rotations been recorded in any meaningful way, and this process is still being embedded and improved over time. Prior to Maximo, when an asset was replaced it simply had its installation date updated to the replacement date, and the history of the previous asset was lost. This means that the age of assets for replacement have not been recorded for the bulk of historic asset replacements in our network. For this reason, we decided to use the Power and Water financial life of the asset as the mean economic life.

The Power and Water financial lives were derived from an Asset Valuation Report produced by SKM in 2013. This report produced a set of financial lives for all Power and Water network assets, based on NSW Treasury guidelines, SKM engineering judgement and Power and Water experience. The resulting financial lives have been used since 2013 to capitalise and depreciate Power and Water network assets.

We note that the Power and Water financial lives are not used to drive the replacement forecasts in the regulatory proposal. For asset classes suited to a replacement modelling approach (typically distribution assets with high volumes and replacement rates), a pooled asset replacement forecast model was used, which takes into account historical failures and unit costs. For other asset classes, replacement forecasts are driven by asset condition.

The Switchgear “< = 11 kV ; Circuit Breaker” and “> 11 kV & < = 22 kV ; Circuit Breaker” asset categories comprise Power and Water Asset Classes with different financial lives - distribution switchgear (35 years) and zone substation circuit breakers (45 years). In this case, the zone substation circuit breaker life has been used since they comprise the vast majority of the assets (418 out of 503 - approximately 83%).

16.1.2.4 Method for Table 5.2.1 - Asset Age Profile – Economic Life – Standard Deviation

As described above, there is insufficient data to determine the actual standard deviation from actual data, so the standard deviation was estimated by taking the square root of the mean, which is a reasonable mathematical method in the absence of any clear evidence based data.

16.1.3 Estimated and actual information

Estimated Data	Justification
5.2.1 INSTALLED ASSETS -> QUANTITY CURRENTLY IN COMMISSION BY YEAR	Many assets had installation dates which were unknown or incorrect. This means that alternative assumptions may result in different outcomes, so information is estimate as defined by the RIN
5.2.1 ECONOMIC LIFE (YEARS) – MEAN and STANDARD DEVIATION	Economic life and standard deviation for all asset categories is estimated data, as does not come from internal systems and alternative assumptions may result in materially different values.

16.1.4 Confidential information

We have not identified any confidential information.

16.1.5 Source of the data

Information:	Source file/screenshot:
Asset Age Profile	Asset Age Profile – Asset Data and Charts for Asset Management Plans
Asset Data queries for RIN 5.2	Asset Data queries for RIN 5.2
Asset Data extract for RIN 5.2	SRQ009885_DataExtraction
Protection Asset Data	ZSS Protection Relay Classification 31_05_2017
SCADA & Comms Asset Data	S&C Asset Age Profile
Asset Financial Lives	FMS Current Asset Category List

Information:	Source file/screenshot:
Asset Valuation Report	SKM Asset Verification & Valuation Report – Power Networks Regulated Electricity Network (September 2013)

17. Template 5.4 – MD & Utilisation-Spatial

17.1 Table 5.4.1 – Non-Coincident & Coincident Maximum Demand

17.1.1 Consistency with RIN

Requirement	Compliance with the requirement
Clause 4.37: PWC must enter figures in yellow-shaded cells. (a) PWC must enter figures in orange-shaded cells where it collects such information. Further instructions are provided for specific items below.	We have completed all yellow cells and orange cells where we have such data.
Clause 4.38: For the 'Winter/Summer peaking' line item, PWC is to indicate the season in which the raw maximum demand occurred by entering 'Winter' or 'Summer' as appropriate.	We have entered Winter or Summer as appropriate.
Clause 4.39: Where the seasonality of PWC maximum demand does not correspond with the form of its regulatory years, PWC must explain its basis of reporting maximum demand in the basis of preparation. For example, if PWC forecasts expenditure on a financial year basis but forecasts maximum demand on a calendar year basis because of winter maximum demand, PWC would state that it reports maximum demand on a calendar year basis and describe, for example, the months that it includes for any given regulatory year.	The time period for each reporting year is 1 April through to 31 March the following year. This is to encompass the November to March Wet Season period during which system peaks occur. This is also the period during which there is correlation between the daily system maximum demand and daily maximum temperature. For years prior to 2009-2010, we did not have a forecasting methodology in place and the data was saved based on calendar year and therefore analysed based on calendar year.
Clause 4.40: In Workbook 3 – Category analysis, regulatory template 5.4, table 5.4 PWC must input maximum demand information for the indicated network segments.	We have inputted the maximum demand information for the network segments.
(a) PWC must insert rows into the tables for each component of its network belonging to that segment. PWC must note instances where it de-commissions components of its network belonging to that segment in the basis of preparation.	The following zone substations were decommissioned in the years in brackets - Brocks Creek (2014-15), City (2015-16), McMinns (2016-17) and Snell Street (2013-14).
Clause 4.41: Where maximum demand in MVA occurred at a different time to maximum demand in MW, PWC must enter maximum demand figures for both measures at the time maximum demand in MW occurred. In such instances, PWC must enter the maximum demand in MVA in the basis of preparation, noting the regulatory year in which it occurred.	MW values were not available at the zone substation or feeder level due to the method of normalisation. MVA values have been used to calculate all maximum demands and as such there is only a single maximum demand MVA value.
Clause 4.42: If either the MW or MVA measure is unavailable, calculate the power factor conversion as an approximation based on best engineering estimates.	Where an MVA or MW measure was missing we used the average 66 kV line power factors for Darwin Katherine System and average 22 kV line power factors for Alice Springs and Tennant Creek Systems. Where we were missing MVA or MW values for

Requirement	Compliance with the requirement
	subtransmission substations we used average 66 kV line power factors to calculate the missing amount.
Clause 4.43: If PWC cannot use raw unadjusted maximum demand as the basis for the information it provides in Workbook 3 – Category analysis, regulatory template 5.4, table 5.4.1, it must describe the methods it employs to populate those tables.	We used raw unadjusted values were used for subtransmission substations. We used raw adjusted values to calculate zone substation maximum demands.
Clause 4.44: PWC must input the rating for each element in each network segment. For Workbook 3 – Category analysis, regulatory template 5.4, table 5.4.1, rating refers to normal cyclic rating.	We entered the relevant ratings.
(a) PWC must provide the seasonal rating that corresponds to the time of the raw adjusted maximum demand. For example, PWC must provide the summer normal cyclic rating of the network segment if the raw adjusted maximum demand occurred in summer.	We entered the relevant season ratings as required.
(b) Where PWC does not keep and maintain rating information (for example, where the TNSP owns the assets to which such ratings apply), it may estimate this information.	PWC keeps and maintain rating information and we have reported actual information in the template 5.4.
Clause 4.45: PWC must provide inputs for 'Embedded generation' if it has kept and maintained historical data for embedded generation downstream of the specified network segment and/or if it accounts for such embedded generation in its maximum demand forecast.	PWC does not keep any embedded generation historical data.
(a) PWC must allocate embedded generation figures to the appropriate element of the network segment under system normal conditions (consistent with the definition of raw adjusted maximum demand).	PWC does not keep any embedded generation historical data.
(b) PWC must describe the type of embedded generation data it has provided. For example, PWC may state that it has included scheduled, semi-scheduled and non-scheduled embedded generation in the tables for connection points. In this example, we would be able to calculate native demand by adding these figures to the raw adjusted maximum demand figures.	None provided.
(c) If PWC has not kept and maintained historical data for embedded generation downstream of the specified network segment, it may estimate the historical embedded generation data.	None estimated.
Clause 4.46: PWC must provide inputs for the appropriate cells if it has calculated historical weather corrected maximum demand.	We entered relevant historical weather corrected maximum demands.
(a) PWC must describe its weather correction process in the basis of preparation. PWC must	We explained this under the section "Methodology and assumptions" section below.

Requirement	Compliance with the requirement
describe whether the weather corrected maximum demand figures provided are based on raw adjusted maximum demand or raw unadjusted maximum demand or another type of maximum demand figure.	
(b) Where PWC does not calculate weather corrected maximum demand it may estimate the historical weather corrected data.	We have entered the data as required.
Clause 4.47: Tables requesting system coincident data are referring to the demand at that particular point on the network (e.g. zone substations) at the time of system (or network) peak.	We entered the relevant coincident maximum demands.
(a) Conversely, non-coincident data is the maximum demand at a particular point on the network (which may not necessarily coincide with the time of system peak). For example, table 5.4.1 (on regulatory template 5.4) requests information about non-coincident raw maximum demand at zone substations. In table 5.4.1, PWC must provide information about the maximum demand at each zone substation in each year, which may not correspond to demand at the time of system peak.	This is true. We entered the relevant non - coincident maximum demands.
(b) If PWC does not record and/or maintain spatial maximum demand coincident to the system maximum demand, PWC must provide spatial maximum demand coincident to a higher network segment. PWC must specify the higher network segment to which the lower network segment is coincident to in the basis of preparation. For example, if PWC does not maintain maximum demand data for zone substations coincident to the system maximum demand, PWC may provide maximum demand data coincident to the connection point. In this example, PWC would specify the relevant connection point in the basis of preparation.	Power and Water does maintain the maximum demand data at subtransmission substations and zone substations. Assumptions were demonstrated under the section "Estimated and actual information". Where neither MW or MVA values were available at the zone substation, the higher network segment data was used. Centre Yard substation SCADA data was incorrect so the data from Darwin zone substation for the 66kV line from Darwin to Centre Yard substation is used.

17.1.2 Methodology and Assumptions

17.1.2.1 Subtransmission Substation & Zone Substation

Substation Ratings

The normal cyclic ratings of the transformers at the Subtransmission Substations and Zone Substations were used as the Substation ratings unless other limitations (ie breaker rating) were the limiting factor. The Normal Cyclic rating is the maximum permissible peak daily loading for the given load cycle that a transformer can supply under normal conditions each day of its life, including through wet season ambient temperature without reducing the designed life of the transformer. Normal conditions are described as the system state where all plant is configured in its intended operational state, without planned or forced outages on any plant item. The given load cycle is the load cycle of the overall substation at which the transformer is located.

Non-coincident and coincident maximum demands

Feeder loads (in amps) are normalised by carrying out transfers for each time interval when switching and other events occurred. The transfers that occur at the feeder level are also applied at each time interval to the Zone Substation level with assumed nominal voltage to provide an MVA value. As all these calculations are carried out in MVA, the calculations of Zone Substation non-coincident and coincident maximum demands are also in MVA. The non-coincident maximum demand MW values were estimated based on the MVA maximum demand with average 66 kV line power factors applied to Darwin and Katherine Zone Substations and average 22kV line power factors applied to Alice Springs and Tennant Creek Substations (refer to Economic Benchmarking Basis of Preparation 3.4.3.5 – Power factor conversion between MVA and MW).

Subtransmission substation values are not normalised and the raw unadjusted MVA values were used in calculating maximum demands. MW maximum demand values were estimated by taking the MW value at the time the MVA peak demand occurred.

Where only one data point (eg only MW) was available, an assumed power factor was used to estimate the missing corresponding maximum demand value required (eg MVA) and vice versa. For example, for Centre Yard in 2015/16, the MW was available but not MVAR or MVA and an assumed power factor of 0.9611 was used to estimate the MVA maximum demand. Assumed power factor was based off average 66kV line power factors for Zone Substations.

Where neither MW or MVA values were available at the substation, the data used was in the following order of preference:

- next level of data was used. For example: Centre Yard Substation SCADA data in 2016-17 was incorrect so the data from Darwin Zone Substation for the 66kV line from Darwin to Centre Yard substation was used.
- Adjacent years peak demand for a single connection point where no other data was available.

Darwin Katherine, Alice Springs and Tennant Creek systems were treated as separate systems to calculate the coincident maximum demands at Subtransmission Substation and Zone Substations. This is different to our method for the Economic Benchmarking RIN templates where we were required to treat the three isolated networks as a single system.

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[11] 0.96 is the Darwin Katherine system average power factor during peak demands periods as per page 1, NPR1522 Estimation of Power Factors for PWC Systems 2014/15

The three systems maximum demands were calculated based on the generation data sourced from SCADA/Meter data.

The non-coincident and coincident maximum demand values (MVA & MW) for Subtransmission Substations and Zone Substations were calculated by AEMO for the year 2016/2017. These values were obtained from the document “AERReportForPWC_V3 and the methodology and source data is the same.

17.1.2.2 Weather Corrected maximum demands (10% POE and 50% POE)

The Northern Territory has very different weather conditions to the rest of Australia. It experiences only two seasons every year – wet season and dry season, not the traditional four seasons experienced by the other States.

There is no correlation between system demand and weather in the dry season (April to October). Therefore, weather correction is only valid in the wet season (November to March). For this reason, the maximum demand on Power and Water’s networks is assumed to only occur during the wet season and Power and Water’s data is based on wet season demand data.

We use weather data sourced from the following Bureau of Meteorology weather stations,

- Darwin Airport weather station for Darwin-Katherine system.
- Alice Springs Airport weather station for Alice Springs system.
- Tennant Creek Airport weather station for Tennant Creek system.

We undertake weather correction based on the difference between the daily maximum temperature for the region/system and the assumed POE 50% and POE 10% temperatures, which are based on studies of the correlation between temperature increase in each region and the demand increase in that same region.

For all zone substations, we undertake weather correction for each raw normalised demand value in MVA for every interval of the year. Then using the weather corrected demand values, we calculated the non-coincident and coincident MVA maximum demands consistently with the raw adjusted demand data requirement.

Weather corrected maximum demand MW values were calculated using the weather corrected MVA values and the average 66 kV power factors (refer to Economic Benchmarking Basis of Preparation - 3.4.3.5 – Power factor conversion between MVA and MW).

The weather correction was applied at each Subtransmission Substation interval for each raw (not normalised) demand MVA value. From these values the non-coincident and coincident MVA maximum demands were calculated. Weather corrected MW values were calculated using the weather corrected MVA values and the power factor for that substation at the time the MVA peak demand occurred.

For the year 2016-17 the weather corrected non-coincident and coincident maximum demand values (MVA & MW) for Subtransmission Substations and Zone Substations were calculated by AEMO. These values were sourced from the document "AERReportForPWC_V3"

17.1.3 Estimated and actual information

We routinely perform weather correction to demand data for planning purposes using the Bureau of Meteorology weather data. As the weather data is not materially dependant on our systems or other business records the weather corrected data is defined by the RIN as estimated information. Any data derived from the weather data are therefore estimated to the extent that alternative assumptions may have led to materially different outcomes.

The data used for subtransmission stations is not normalised for switching or other temporary events. The normalisation process at the subtransmission level would be a substantial amount of work which is not required as part of our normal business process. As such the resulting values are estimated.

17.1.4 Source of the information

Item	Source
Substation Rating	Network Management Plan 2015/2016 (Internal Version Network Management Plan 2013 14 to 2018 19 - January 2017 Information Update
Non-coincident maximum demand (MVA)	SCADA / Meter
Coincident maximum demand (MVA)	SCADA / Meter
Non-coincident maximum demand (MW)	SCADA / Meter
Coincident maximum demand (MW)	SCADA / Meter
Embedded generation	N/A
Weather Corrected MD 10% POE (MVA)	SCADA / Meter / Weather data
Weather Corrected MD 50% POE (MVA)	SCADA / Meter / Weather data
Weather Corrected MD 10% POE (MW)	SCADA / Meter / Weather data
Weather Corrected MD 50% POE (MW)	SCADA / Meter / Weather data

17.1.5 Confidential information

Where there are single customer substations, the information has been marked confidential.

18. Template 6.3 – Sustained interruptions

18.1 Table 6.3.1 - Sustained Interruptions to Supply (For 2008-09 to 2016-17)

18.1.1 Consistency with the RIN

The following highlights the Regulatory Information Notice requirements that apply generally to the Category Analysis template and it also demonstrates how we have complied with these requirements.

Appendix E Requirements	Consistency with requirements
Clause 4.107: Workbook 3 – Category analysis, regulatory templates 6.3 requires the input of both planned and unplanned interruptions to supply.	We have inputted both planned and unplanned interruptions.
Clause 4.108: A sustained interruption is any loss of electricity supply to a customer associated with an outage of any part of the electricity supply network, including generation facilities and transmission networks, of more than 0.5 seconds, including outages affecting a single premises. The customer interruption starts when recorded by equipment such as SCADA or, where such equipment does not exist, at the time of the first customer call relating to the network outage. An interruption may be planned or unplanned, momentary or sustained. Does not include subsequent interruptions caused by network switching during fault finding. An interruption ends when supply is again generally available to the customer.	We have used the AER's definition of sustained interruption.
Clause 4.110: An unplanned event is an event that causes an interruption where the customer has not been given the required notice of the interruption or where the customer has not requested the outage. Clause 4.111: An unplanned interruption is an interruption due to an unplanned event: (a) The following events may be excluded when calculating the revenue increment or decrement under the STPIS when an interruption on the PWC's distribution network has not already occurred or is concurrently occurring at the same time: (i) load shedding due to a generation shortfall; (ii) automatic load shedding due to the operation of under frequency relays following the occurrence of a power system under-frequency condition; (iii) load shedding at the direction of the Australian Energy Market Operator (AEMO) or a system operator; (iv) load interruptions caused by a failure of the	We have complied with the AER's definitions, including for excluded events.

Appendix E Requirements	Consistency with requirements
shared transmission network; (v) load interruptions caused by a failure of transmission connection assets except where the interruptions were due to inadequate planning of transmission connections and PWC is responsible for transmission connection planning; (vi) load interruptions caused by the exercise of any obligation, right or discretion imposed upon or provided for under jurisdictional electricity legislation or national electricity legislation applying to PWC.	
Clause 4.111 (b): An event may also be excluded where daily unplanned SAIDI for the PWC's distribution network exceeds the major event day boundary, as set out in Appendix D of the STPIS, when the event has not been excluded under clause 3.3(a).	We have excluded major event days when reporting the data.
Clause 4.112: In completing Workbook 3 – Category analysis, regulatory templates 6.3, table 6.3.1, PWC must select a reason from the list provided for in column G. PWC may, but is not required to, select a detailed reason from the list provided for in column G (marked with orange cells).	We have selected a reason in accordance with the AER's instructions.

18.1.2 Methodology and assumptions

The data source is an Excel spreadsheet data, which records details of each outage by the manually entered by the system operator in real time. The spreadsheet is audited monthly by our System Control staff and is as accurate as possible based on the limitations of the systems used to capture this data.

18.1.2.1 Interruption data

the spreadsheet data referred to above together with the resultant calculations of reliability indices (SAIDI/SAIFI) only apply to regulated areas of our network. These indices were calculated after excluding some interruptions as described in Clause 3.3 (a) of the STPIS. When calculating the SAIDI/SAIFI, the following events were excluded from the original dataset obtained from the outage data sources:

- Planned outages
- Generation-related outages
- Outages that were internal to customer premises
- Outages where public safety was the priority
- Cancelled outages with no failure cause code or those denoted with 'No Applicable'
- Outages in non-regulated areas of the network

- Outages where no customers were affected or where the number of customers that were affected when the event was recorded is not known
- Momentary outages that are equal to or less than one minute in duration
- Outages where the location of the event is not known AND there are no customer affected by the interruption

The data for the template was populated with the following outage-related data (recorded by System Control) that was obtained from the spreadsheet: Date of event, Time of interruption, Asset ID, Average duration of sustained customer interruption.

In most cases the outage-related data was also used to provide the 'Number of customers affected by the interruption' as required in the RIN. However, in cases where this data was not provided, the customer count on an asset affected by the outage was obtained from GIS/ESRI.

The outage data recorded for the period up to 2012-13 was recorded only on feeder locations. Further, the number of customers affected by the outage took into account only those customers affected by the outage, and not necessarily the entire customers served by the feeder. These feeder locations on which the outages were recorded by then are used as 'Asset IDs' in this template.

For the period after 2012-13, we commenced recording outages on other assets including distribution transformers, reclosers, switches, pole fuses. And, these other locations on which the outages were recorded are used as 'Asset IDs' in this template. This change in process occurred due to the change in systems used to collect outage data i.e. from FIS to the Asset Management System, Maximo.

'Reason for interruption' data that is required in this template was populated after mapping our Low Level Failure Cause Codes to AER categories, as shown in Appendix D.

Our Failure Cause Code together with comments provided by System Control when recording the outage were collectively used to identify the 'Detailed Reason for Interruption' required in this template. For instance, where the failure cause code is 'Incident-Third Party' and the comment contains 'car' or 'vehicle', the 'Detailed Reason for Interruption' is 'Vehicle Impact'. Refer to Appendix D for more information on the approach followed to populate 'Detailed Reason for Interruption' in compliance this template.

18.1.2.2 Feeder classification

In order to provide feeder classification data required in this template, data was gathered on feeder loading and feeder length. We classified each by using the AER definition of feeder categories. Where no data existed for the feeder, feeder category was obtained by using the following (in order of precedence):

- The category of the new feeder that replaced the feeder that has been either decommissioned or renamed.
- the feeder category used in the ESAA surveys (same definitions as AER definition of feeder category.

- an estimate based on the category of the majority of the feeders out of the same zone substation.

In order to calculate the SAIDI impact of an outage event, the ‘Number of customers affected by the interruption’ together with the ‘Average duration of sustained customer interruption’ was obtained directly from the outage record.

the number of customers in a feeder category was obtained as follows:

- The customer count on individual feeder was obtained from GIS/ESRI.
- The individual feeder was allocated the feeder category (as described above).
- Customer count in each feeder category was then obtained by summing the customer counts on individual feeders.

to calculate the SAIFI impact of an outage event, the ‘Number of customers affected by the interruption’ was obtained directly from the outage record. The number of customers in a feeder category was obtained as described above.

It should be noted that the data provided in the Economic Benchmarking RIN did not require the number of customers on a feeder by feeder category. Instead we used the total number of customers in the regulated areas of NT. This total number of customers was obtained from the Retail Management System (RMS) on a monthly basis. The number of customers used for the calculation is the 12-month rolling average of this monthly data.

18.1.2.3 Major event days

For the purpose of calculating the Major Event Days (MED), the Power and Water network is divided into three systems, namely: Darwin-Katherine, Alice Springs and Tennant Creek. The approach followed to identify the MEDs is as follows:

- Starting with 2008/09, the exclusions allowed in line with Clause 3.3 (a) STPIS were applied and the MEDs were calculated using the 2.5 Beta Method described in IEEE Standard 1366.
- When calculating the MEDs for the years after 2008-09, all the days that have been identified as MEDs in the previous years together with other failure causes described in Clause 3.3(a) STPIS were excluded from the analysis before calculating the MEDs. For example, When calculating the MEDs for 2009/10, the data analysed excluded all the days that have been identified as MEDs in the previous 5 years.
- The step above was repeated for all the years, 2009/10 - 2016-17 (inclusive), and the Major Event Day Thresholds (T_{MED}) applicable in each financial year were identified.
- the MED threshold for 2015/16 was applied as the MED threshold for all years prior to and including 2015/16. The MED thresholds for 2016-17 were applied to 2016-17 only.
- Any daily SAIDI value that exceeded the MED thresholds was considered to be an MED and used in the AER submissions.

18.1.2.4 Limitations of data

Power and Water systems do not have the capability of recording outages where power supply to customers may have been restored partially after an outage. Where there is a partial restoration of power supply, the outage is recorded as if the all customers were interrupted for the entire duration of the outage. This results in some SAIDI/SAIFI figures being overestimated.

- In 2012-13 ,the systems used to collect outage data changed from FIS to Maximo. Since the changeover, no integration existed with the customer data management system, RMS. This results in inaccuracies between the billed customer numbers in the NT, and customers that exist in Maximo. It is not impossible to correct the data retrospectively as there is no source from where it can be extracted. Work was done to improve integration between Maximo and RMS in 2017, however there is an ongoing misalignment of data that is yet to be fully resolved.
- Outage information is collected by system operators in real time. For a significant proportion of data entered, not other information is recorded in systems such as SCADA. Auditing of data where SCADA information is available identifies anomalies that can be corrected. This opportunity does not exist for the records without associated SCADA data. Auditing is therefore limited to reviewing of free text comments where available.

18.1.3 Estimated an actual information

While the primary source of data was from an internal system, we have made a number of adjustments using assumptions. Alternative assumptions may have resulted in materially different outcomes and therefore the RIN defines this as estimated information.

18.1.4 Source of the information

Data on sustained outages for the period 2005/06 to 2012/13 was sourced from various excel spreadsheet files together with the customer count affected by the outage as provided in the outage record by then. The customer count on each feeder was obtained from 'FIS' Data.

Outage data for the period after 2012/13 was sourced from the Asset Management System (Maximo), which was established during the 2012/13 financial year. The customer count on individual feeder was obtained from the GIS/ESRI and saved into excel spreadsheet file. These excel spreadsheet files are used as the source of the customer count on feeders and in feeder categories.

For the period after 2014/15 customer count was obtained every quarter from the GIS/ESRI and the average customer count was used to calculate reliability indices.

18.1.5 Confidential information

We have not identified any confidential information.

19. Template 8.2 – Capex

19.1 Table 8.2.4 – Capex by Asset Class (Excluding Capital Contributions)

19.1.1 Consistency with the RIN

There are no specific requirements in Appendix E of the RIN.

19.1.2 Methodology and assumptions

Table 8.2.4 includes all SCS expenditure and all ACS Metering expenditure. The expenditure per year is calculated from the CAPEX model by summing the asset cost for the corresponding year and UC Category. For example, the transmission lines expenditure would use the following field values:

- Service Classification = "SCS"
- UC Category = "Transmission lines"

It should be noted that there are some Network Overhead CAPEX items that could not be attributed to an individual UC Category, such as the capitalised expenditure components of the previous regulatory proposal. In these cases the expenditure has been apportioned to the UC Categories in proportion to the known expenditures in each category.

The cash contribution amount for each UC Category has been deducted in each year, so that the summation of tables 8.2.4 and 8.2.5 will give the gross CAPEX including gifted assets.

Refer to worksheet "8.2" in the CAPEX model for more details.

19.2 Table 8.2.5 – Capital Contributions by Asset Class

19.2.1 Methodology and assumptions

There are two sources of Standard Control Service Capcons:

- Financial contributions made in relation to capital project expenditure on a particular project, in accordance with our Capcons policy.
- The asset value of assets gifted to Power and Water

The dataset for financial contributions was obtained by extracting all contributions in the period of interest from the financial system, and linking these to actual projects in the CAPEX Backcasting Model. The project categorisation from the CAPEX Model was then applied to the corresponding Capcon transaction, which yielded a dataset of categorised financial contributions. The transactions were then summed by the UC Asset Category as required by RIN Table 8.2.5.

The dataset for gifted assets was obtained by compiling monthly gifted asset reports into a single dataset for the 2013/14 to 2016-17 period. All gifted assets were categorised as "Connections", since the only source of gifted assets are developments relating to the connection of new customers or upgrades for existing customers. The UC Asset Category was assigned manually based the asset description. There was a minor discrepancy between the monthly gifted asset reports and the asset values in the Fixed Asset Register. To address this, the values from the monthly reports were adjusted to meet the Fixed Asset Register values.

The values in Table 8.2.5 are the sum of the output from the two data sources.

19.2.2 Estimated and actual information

Information is actual information from our financial systems.

19.2.3 Confidential information

Template 8.2.5 does not contain confidential information.

19.2.4 Source of the information

The actual data in table 8.2.4 was derived from the capex backcasting methodology as described in appendix A. The actual data in table 8.2.5 was derived from the gifted asset and capcon models as described in section 19.2.1.

Information	Source
Capcons data	Capital Contribution data 2009FY to 2017FY
Gifted Assets data	Gifted Asset Data 2009FY to 2017FY

19.3 Table 8.2.6 – Disposals by asset class (based on sale proceeds)

19.3.1 Methodology and assumptions

The disposals amounts reported in the RIN were sourced from our financial accounts (24317 and 24318), which account for the profit or loss on the disposal of an asset. These amounts were then allocated to the required asset categories based on the description within individual transactions.

There were amounts that could be attributed to substations or conductors, and there smaller amounts of disposals that we could not allocate to a specific category. These amounts were allocated to substations, distribution lines and transmission lines using the assumed proportions of 30%, 60% and 10% respectively. The basis for the allocation percentage was that the major assets being disposed of are the metals in substations and conductors.

19.3.2 Estimated and actual information

Information is actual information from our financial systems.

19.3.3 Confidential information

Template 8.2.6 does not contain confidential information.

19.3.4 Source of the information

The actual data in table 8.2.6 was sourced from our financial accounts.

20. Template 9.1 – TAB

20.1 Table 9.1.1.1 – Total business as assessed by ATO

20.1.1 Consistency with the RIN

There are no specific requirements in Appendix E of the RIN.

20.1.2 Methodology and assumptions

We have sourced this information from our working files used to prepare the annual tax returns.

20.1.3 Estimated and actual information

As this information is sourced from our tax return working files and we have not made any assumptions. The information is therefore 'actual' ad defined by the AER's RIN.

20.1.4 Confidential information

There is no confidential information presented in this table.

20.1.5 Source of the information

Information	Source
All values reported	Our working files for our income tax returns

20.2 Table 9.1.1.2 – Regulatory Asset Base

20.2.1 Consistency with the RIN

There are no specific requirements in Appendix E of the RIN.

20.2.2 Methodology and assumptions

Table 9.1.1.2 is a large table containing four different blocks of information including opening balances, disposals, tax depreciation and gross capex. The methodology applied varies for each of these sections and is discussed below.

20.2.2.1 Opening balances

The opening balances by Utilities Commission (UC) asset class for 2014-15 are sourced from PWC12.12 - Opening TAB - 31 Jan 18 - Confidential within our proposal. These values represent the sum of all the assets within the Power and Water Tax Asset Register (TAR) which have been mapped to each UC asset category.

For the periods between 2015-16 to 2018-19 the opening balances are calculated based on the following logic:

- Prior period opening balance + disposals + tax depreciation + actual gross capex (where 'disposals' and 'tax depreciation' are expressed as negative values)

20.2.2.2 Disposals

The values shown in the disposals block of the table are linked directly from table 8.2.6 within the worksheet "8.2 Capex" of the category analysis RIN.

20.2.2.3 Tax depreciation

We have populated template "9.1 TAB" using the same asset classes approved by the UC for the RAB for the 2014-19 regulatory period. However, we propose using different asset classes in our regulatory proposal, as explained in Attachment 1.11 (Establishing the opening RAB) and Attachment 1.12 (Establishing the opening TAB).

Therefore, to ensure that the closing TAB as at 30 June 2019 in this table matched that which inputted into our proposed SCS and ACS metering PTRMs (Attachments 12.1 and 12.2), we have had to allocate the tax depreciation that we calculated for the 2014-19 period for our regulatory proposal using our proposed roll-forward model (RFM) (Attachment 12.11) across the UC asset classes.

For these reasons tax depreciation has been estimated using a four-step process which are shown on "Input Depreciation" worksheet of the PWC11.15 - CA RIN | TAB Allocation Model - 31 Jan 18 – Public workbook and include:

1. Estimating depreciation relating to the opening balance by UC asset class by taking the opening balances as at 1 July 2014 and dividing them by the assumed remaining lives while ensuring the total depreciation did not exceeding the value of the opening balance;
2. Estimating depreciation relating to the incremental (i.e. new) capex over 2014-19 by UC asset class within the period by taking the cumulative capex for the period and dividing it by the assumed standard lives;
3. Calculating the combined estimated depreciation by UC asset class by adding the values from steps (1) and (2); and
4. Using the combined estimated depreciation from (3) to determine weights used to allocate the total depreciation sourced from the RFM across UC asset classes based on the relative contribution of each UC asset class in each year.

20.2.2.4 Gross capex

The values shown in the gross capex block of the table are linked directly from tables 8.2.4 and 8.2.5 within the worksheet "8.2 Capex" of the category analysis RIN. These values represent the sum of gross capex excluding capital contributions plus capital contributions.

20.2.2.5 Assumptions

There are three key assumptions impacting this table. Firstly, that the tax asset register is the best source of underlying information to determine the opening tax asset base (as at 1 July 2014) for standard control services (SCS) and alternative control metering services (ACS metering).

Secondly that the total tax depreciation from the RFM used in our proposal can be allocated to UC asset classes based on the methodology described above so that the closing TAB value as at 30 June 2019 in Table 9.1.1.2 matches the TAB values in our post-tax revenue models for SCS and ACS metering.

Finally, the table includes both SCS and ACS metering values as this table is reliant on '8.2 Capex values, which relate to the RFM. The total of the closing TAB value in the RFM is split between the opening values in the two post tax revenue models.

20.2.3 Estimated and actual information

The values relating to 2017-18 and 2018-19 are estimates as these years remain a forecast within the current period and the proposal.

Values prior to 2017-18 contain a mix of actual and estimated information. The following aspects of the 2014-15 to 2016-17 data are considered actual information:

- Disposals are calculated from reliable internal source systems such as Maximo; and
- Gross capex is calculated from reliable internal source systems such as Maximo.

The following aspects of the 2014-15 to 2016-17 data is considered estimates:

- Opening balances are calculated directly from a reliable internal source being the TAR however there is a reliance on estimated tax lives; and
- Tax depreciation given this data does not exist in an internal source system and has been calculated for presentation purposes.

20.2.4 Confidential information

There is no confidential information presented in this table.

20.2.5 Source of the information

Information	Source
Opening TAB balances	PWC12.12 - Opening TAB - 31 Jan 18 - Confidential
Total Tax Depreciation	PWC12.11 - SCS and ACS Metering Roll Forward Model - 31 Jan 18 - Public

20.3 Table 9.1.1.3 - Non-RAB Assets within NTER values

Power and Water has not populated table 9.1.1.3 as it is not a RIN requirement.

20.4 Table 9.1.2 – Tax Depreciation lives – RAB assets only

20.4.1 Consistency with the RIN

There are no specific requirements in Appendix E of the RIN.

20.4.2 Methodology and assumptions

The asset lives presented by UC asset class within table 9.1.2 are derived using an extract from the internal Power and Water TAR input to Attachment 12.12 (Opening TAB), which is also used to derive the remaining and standard life values by TAB asset class.

Each asset within the TAR has been mapped to both TAB asset classes and UC asset classes, which allowed us to undertake a detailed 'bottom up' approach to calculating asset lives.

More detail on standard tax asset lives can be found in Attachment 12.1 (SCS post-tax revenue model) for SCS and 12.2 (ACS metering post-tax revenue model) for ACS metering. These lives are explained in Attachment 1.12 (Establishing the opening TAB) and supported by Attachments 1.13 (Tax life validation letter) and 12.12 (Opening TAB).

20.4.2.1 Tax remaining life (Years)

Tax remaining lives have been calculated within "PWC12.12 - Opening TAB - 31 Jan 18 - Confidential". This is the primary source of information given:

- The extract of TAR data shows the number of years of service for each asset based on the date that the asset was placed in service;
- The remaining life is calculated as the standard life less the total of years already in service; and
- The remaining lives for each asset class are weighted based on the relative share of the closing TAB balances as at 30 June 2014.

20.4.2.2 Tax standard life (Years)

Tax standard lives have been calculated within "PWC12.12 - Opening TAB - 31 Jan 18 - Confidential". This is the primary source of information given that we:

- Determined standard lives by identifying the published ATO life that best corresponds to the asset description;
- Had these standard lives validated by Hayne & Co chartered accountants; and
- Weighted these standard lives based on the relative share of the closing TAB balances as at 30 June 2014.

20.4.2.3 Assumptions

Assumptions made relating to remaining lives include:

- Transmission terminal station and Zone substations standard lives are assumed to be equal to the standard life of the Substation TAB asset class. In other words, the new Substation asset class aggregates the two prior UC asset classes.

The following assumptions made relating to standard lives help align the values used for TAB asset classes and UC asset classes including:

- Transmission terminal station and Zone substations standard lives are assumed to be equal to the standard life of the Substation TAB asset class;

- Land and easements do not have a standard life as land is typically not depreciated;
- Other standard life is assumed to be equal to the metering non-network other TAB asset class due to the nature of the two asset classes being similar; and
- The Non-network other standard life is assumed to be equal to the metering non-network other TAB asset class due to the nature of the two asset classes being similar.

20.4.3 Estimated and actual information

The remaining life and standard life values are estimated values as they do not fit the definition of actual information. For example:

- Remaining life values have been calculated within "PWC12.12 - Opening TAB - 31 Jan 18 - Confidential based on the methodology described above; and
- Standard life values are based on published ATO standard lives for electricity-based utility companies with some general lives being replaced with more specific tax asset lives where appropriate.

20.4.4 Confidential information

There is no confidential information presented in this table.

20.4.5 Source of the data

Information	Source
Tax remaining life (Years)	PWC12.12 - Opening TAB - 31 Jan 18 - Confidential
Tax standard life (Years)	PWC12.12 - Opening TAB - 31 Jan 18 - Confidential

Appendix A: Capex backcasting

The RIN requires historic capital expenditure information to be provided in the CA Template, which Power and Water has not historically captured in its financial or other systems. Power and Water has prepared a CAPEX backcasting model to provide the historic CAPEX information in the template. In principle, this model uses project data from Power and Water's financial and asset management systems to assign capital expenditure and asset volumes to the AER's expenditure categories and service classifications. Where possible, existing Power and Water system data is mapped directly into RIN categories, however in many cases manual intervention was required to achieve the necessary disaggregation.

There are four primary data sources for the CAPEX model:

1. Project expenditure data for 2013/14 to 2016-17 was extracted from the TM1 financial reporting system. This dataset is a list of Power Networks' projects with expenditure by financial year, expenditure type and program
2. Project expenditure for 2008/09 to 2012/13 was provided by the finance department and is an extract from FMS. This dataset is a list of Power Networks' projects by financial year, expenditure type and program
3. Asset financial data, such as the installation date, quantity and cost of each asset capitalised on a project, was obtained from FMS.
4. Asset technical data, such as asset class, capacity, voltage, feeder ID and location was extracted from Maximo.

The datasets in (1) and (2) were combined to form a comprehensive list of project expenditure for the period of interest 2008/09 to 2016-17. This comprises the "Project Expenditure" sheet in the CAPEX model.

The datasets in (3) and (4) were combined to form a list of assets capitalised against each project that had expenditure during the 2008/09 to 2016-17 period. The relevant project and asset technical and financial details were also included. This data set formed the basis for the detailed RIN categorisation and is found in the "Analysis" sheet in the CAPEX model.

20.5 Manual Adjustments to CAPEX model

In many cases, the source data had to be manually adjusted to ensure that expenditure was properly attributed to the RIN expenditure categories, correct data errors or fill in missing information. All manual adjustments have been documented in the CAPEX model. The primary drivers of these manual adjustments are discussed below.

20.5.1 Repairs & Maintenance CAPEX

In many cases, expenditure that had been recorded in Maximo as Repairs & Maintenance (R&M) expenditure is considered to be augex or repex in the RIN. To address this, the instances of augex and repex being captured as R&M have been identified and classified as augex or repex for the purposes of this submission and thus included in the capex model.

20.5.2 High level approach to capitalisation

In 2016-17, Power and Water started performing its capitalisation process at a lower level of detail. For example, where previously any works on a pole, pole-top or conductor would be capitalised to ‘conductors’ as a group of assets. The more detailed approach results in capitalisation against a lower level of individual pole or conductor.

As a result of the past high-level approach many projects capitalised under the previous policy lack the level of disaggregation needed by the RINs. In many cases it was necessary to “split” the capitalised asset manually into multiple distinct assets in the CAPEX model.

20.5.3 Erroneous system data

There were several instances where capitalisation records appeared to be erroneous and were adjusted. For example, in some cases the costs of an entire project were capitalised on a single asset, when multiple assets had been installed.

There were also instances of dates and quantities being obviously incorrect. Where these were discovered they were corrected in the model.

20.5.4 Projects in progress

Many projects were in progress at the completion of the 2016-17 financial year, or they had been completed but not yet capitalised. These projects were treated as follows:

If they were complete at the end of 2016-17, the relevant assets were added to the model manually and costs and quantities allocated accordingly

- If they were incomplete at the end of 2016-17 but had significant expenditure, the assets were added manually and costs were attributed accordingly (the quantities remained zero)
- If they were incomplete at the end of 2016-17 and had insignificant expenditure, the entire project expenditure was allocated to the most appropriate category (the quantities remained zero).
- If they were incomplete at the end of 2016-17, but we knew the assets are commissioned, the project expenditure was allocated to the most appropriate category and the quantities were manually allocated.

20.5.5 Zero-sum projects

Zero-sum projects are projects where accounting adjustments, like reversals, result in a total project expenditure of zero over the life of the project. These projects were identified in the CAPEX model to avoid the aberrations in disaggregated data caused by the large negative expenditures.

Two sources of zero-sum projects were found in the project data:

1. The change of financial systems in 2011/12 resulted in a number of projects being closed at zero value, with costs being journaled to new project numbers in the new financial system.
2. Projects which were initiated and later cancelled, with all costs being journaled to OPEX.

Where scenario (1) could be identified, it was addressed by merging the old and new projects in the CAPEX model and treating them as a single project. Scenario (2) was addressed by quarantining any expenditure on these projects and treating it as a balancing item in table 2.1.1.

20.5.6 Non-network and Capitalised Network Overheads Allocations

Non-network expenditure, such as the purchase of tools and equipment, is by default allocated to standard control services. However, the non-network assets themselves may be used across all services and in the non-regulated network. Therefore, a portion of non-network expenditure has been allocated to alternative control services and non-regulated, in accordance with the percentage allocation table provided by Power and Water Network Regulation and shown in the table below.

The same is true for the Capitalised Network Overheads expenditure, and this has been treated the same way.

Figure Non-network and Capitalised Network overheads allocation table

AER Service Class	Percentage allocation
SCS	93.8%
ACS Metering	5.1%
ACS Fee	0.0%
ACS Quoted	0.4%
Unregulated	0.7%

20.6 High-Level Categorisation

The Power and Water technical and financial details were used to categorise each asset into the high-level RIN categories:

1. Service Class
2. Expenditure Category
3. RAB Category
4. UC Category

This was accomplished using a series of mapping tables to automatically assign the values where possible. For example, the AER Service Classification was mapped using the Power and Water categories “Entity”, “Program” and “Asset Class”.

Figure AER Service Classification Mapping table

AER Service Class	Entity	Program	Asset Class
METERING	21		Metering
STREETLIGHTS	21		Streetlights
QUOTED SERVICE	21	FULLY FUNDED	
SCS	21		
NON-REGULATED	22		

Similarly, the AER expenditure type was mapping using the Power and Water categories “Work Type”, “Work Category” and “Program” as outlined below.

Figure AER Expenditure Category Mapping table

AER Expenditure Category	Work Category	Work Type	Program
Replacement	CAPITAL	RENEWALREPLACEMENT	Not (CUSTOMER CONNECTIONS, CUSTOMER AUGMENTATION, NLS)
Augmentation	CAPITAL	EXTENSIONS	Not (CUSTOMER CONNECTIONS, CUSTOMER AUGMENTATION, NLS)
Connections	CAPITAL		CUSTOMER CONNECTIONS, CUSTOMER AUGMENTATION
Network Overheads	CAPITAL		NLS
Non-network	CAPITAL	NONSYSTEMASSETS	

The full set of mapping tables is defined in the “Mapping” worksheet.

If a direct mapping was not available, or it resulted in an incorrect outcome, the values were chosen manually. These manual corrections are recorded in the CAPEX model.

There were other high-level categorisations undertaken in the model that were not directly related to RIN requirements. The most critical of these is the Power and Water Asset Class, which aligns with the Asset Management Plans and is frequently used to assist in the detailed categorisation.

20.7 Detailed Categorisation

Once the high-level categories were assigned, further categorisation was performed in order to achieve the disaggregation required by each RIN table. For example, all assets categorised as Expenditure Category “Replacement” were required to be further categorised into one of the REPEX categories in RIN 2.2.

Separate sections in the model are defined for Augmentation, Replacement, Connections and Non-Network projects, and these are discussed further in the relevant sections of this document for each.

It should be noted that the AER provided dispensation for the detailed categorisation to only be provided for the period 2013/14 to 2016-17.

20.8 Asset Costs

The asset capitalised cost was typically used directly as the final asset cost. However, there were instances where this was not possible. In particular, if a project had expenditure prior to 2008/09, the project expenditure in the 2008/09 to 2016-17 period would not reconcile to the sum of the asset costs capitalised under that project. In these instances, the asset capital costs were simply scaled such that they reconciled to the reduced project expenditure in the same proportions.

$$\text{Asset Cost } = \text{Project Cost } * \frac{Asset\ Capital\ Cost}{\sum Asset\ Capital\ Costs\ for\ Project}$$

The RIN CAPEX tables typically require that expenditure be reported “as-incurred” by financial year. The CAPEX model input data has the project cost “as-incurred” by financial year, but the asset cost as a lump sum. To achieve an “as-incurred” asset cost, the asset costs were spread over the 2008/09 to 2016-17 period in proportion to the project expenditure over that period. For example the 2008/09 asset expenditure would be as follows:

$$2008/09 \text{ Asset Exp } = \text{Asset Cost } * \frac{2008/09\ Project\ Exp}{\sum 2008/09\ to\ 2016-17\ \ Project\ Exp}$$

20.9 Asset Quantities

The asset capitalised quantity was used directly as the final asset quantity, with the exception of any errors which were corrected as discussed in the Manual Adjustments to CAPEX Model section above.

The RIN CAPEX tables require that asset quantities be reported in the year of installation. Where possible, the installation date from the capitalisation data was used, however in some cases, particularly where the asset was upgraded under the old grouped capitalisation method (refer the Changes to Capitalisation Policy section above), this date was incorrect. Therefore the asset installation year was calculated as the greater of the installation year and the last year of expenditure against the project.

20.10 Source of the data

Information	Source file/screenshot
CAPEX Backcasting Model	20170124 CAPEX Asset Categorisation for backcasting 2009/10 to 2016-17
TM1 Data extract	20170808 TM1 extract new Data
Finance Data pre 2013	20170517 Barry's data Networks Project Lists 0304-2021 - Regulated and Unregulated 280417.xlsx
FMS Data extract	20170824 FMS Asset Capital Expenditure - oaprd2_PN_capitalised_assets_combined
Maximo Data Extract	SRQ009099 - Maximo - Data Extract - Power Networks - Query 3 Excel
Non-Network percentage allocation	Capex Cost Allocation Percentages working file

Appendix B: Repairs & maintenance backcasting

The RIN requires historic repairs and maintenance expenditure information to be provided in the CA Template, which Power and Water has not historically captured in its financial or other systems. Power and Water has prepared an R&M backcasting model to provide the historic R&M information in the templates.

The R&M model takes input data from Power and Water's financial and asset management systems, and converts this into the volume and expenditure data as required by the various RIN tables. The AER Expenditure Categories relating to R&M are "Routine Maintenance", "Non-routine Maintenance", "Emergency Management" and "Vegetation Management". Where possible, existing Power and Water system data is mapped directly into RIN categories using defined mapping tables, however in many cases manual intervention was required to achieve the necessary disaggregation.

There are four primary data sources for the R&M model:

1. Work order expenditure data for 2012/13 to 2016-17 was extracted from the TM1 financial reporting system. This dataset is a list of Power Networks' work orders with expenditure by financial year, work type, work category, service, region and maintainer
2. Inventory data, including the description and quantity of rotating assets reserved against each work order, was obtained from Maximo
3. Work order technical data such as asset number, location, asset class, work order priority, job plan etc were extracted from Maximo
4. R&M expenditure for 2006/07 to 2012/13 was extracted from FMS. This dataset is a list of Power Networks' projects with various project classifications

The dataset in (1) was used as the base for the model, and the fields from datasets (2) and (3) were referenced in using the work order number. The resulting dataset was a list of all Maximo work orders that had expenditure in the 2012/13 to 2016-17 period, with relevant work order technical details and inventory details to assist with categorisation. This data set formed the basis for the detailed RIN categorisation and is found in the "Analysis" sheet in the R&M model.

The dataset in (4) was required to complete the aggregated R&M data in Template 2.1 for the 2008/09 to 2012/13 period. Power and Water has been provided dispensation by the AER such that the detailed disaggregated data only needs to be provided for the 2013/14 to 2016-17 period, however the high level data in Template 2.1 still needs to be provided from 2008/09 to 2016-17. The 2008/09 to 2012/13 analysis was done in a separate FMS R&M workbook It should be noted that the 2012/13 year, being the year in which Maximo was established, has contributions of expenditure from the Maximo and FMS sources which are aggregated in Template 2.1.

20.11 Manual Adjustments to R&M model

In many cases, the source data had to be manually adjusted to ensure that expenditure was properly attributed to the RIN expenditure categories, correct data errors or fill in missing information. All manual adjustments have been documented in the R&M model. The primary drivers of these manual adjustments are discussed below.

20.11.1 R&M to CAPEX

In many cases, project expenditure that had been recorded in Maximo as Repairs & Maintenance is considered to be Augex or Repex in the RIN. To address this, the instances of Augex and Repex being captured as R&M have been identified and excluded from the R&M model.

20.11.2 R&M to ACS Fee Based

Due to an issue with the way the service request system in Maximo is configured to create work orders, the costs of ACS activities like disconnections and reconnections have been recorded as R&M expenditure in some cases. There are also work orders which have been correctly raised as R&M but were actually ACS Metering expenditure. These scenarios have been manually corrected in the model.

20.11.3 Unplanned Maintenance

Another issue with the service request system in Maximo led to many R&M work orders incorrectly being classified as "UNPLANNEDMAINTENANCE" rather than "PLANNEDMAINTENANCE". There were also manually corrected in the model, since this affects the mapping to the AER categories.

20.11.4 Journals not reflected in source data

As the financial data for the R&M model is taken from the Maximo asset management system, any transactions which occur directly in the financial management system are not recognised. Several examples of these were discovered, including:

- Accruals relating to R&M
- Travel Requisition System (TREQS) transactions relating to R&M
- Manual journals to address R&M transactions incorrectly recorded as OPEX
- Manual journals to assign labour costs to R&M prior to timesheeting being introduced

The costs relating to (1) were not brought into the R&M model. The effort involved in classifying these journals is expected to outweigh any benefit derived, and the impact is considered to be minimal since the costs will be reflected in the following year's expenditure anyway. These have been included in the balancing item in Table 2.1.2.

Items (2), (3) and (4) were all added to the R&M model as manual lines and categorised based on the GL codes and journal descriptions.

20.11.5 Other corrections

There were several other corrections to individual fields made in order to cleanse the data. All corrections are visible in the "Manual Updates" section of the model.

20.12 High-Level Categorisation

The Power and Water technical and financial details were used to categorise each work order into the high-level RIN categories:

1. Expenditure Type
2. Service Classification
3. Expenditure Category

This was accomplished using a series of mapping tables to automatically assign the values where possible. For example, the AER Expenditure Type was mapped directly to the Power and Water category "Resource Type".

AER Expenditure Type	Resource Type
Labour	INTERNAL LABOUR
Materials	MATERIALS PURCHASE, STORE STOCK
Contractor	SERVICES RESOURCE

The AER Service Classification was mapping using the Power and Water categories "Work Category", "Service" and "Entity".

AER Service Classification	Work Category	Service	Entity
SCS	REPAIRSMAINTENANCE	Not (ELECMTR, STRTLGHT)	21
METERING	REPAIRSMAINTENANCE	ELECMTR	21
STREETLIGHTS	REPAIRSMAINTENANCE	STRTLGHT	21
NON-REGULATED			22

Similarly, the AER Expenditure Type was mapping using the Power and Water categories "Work Type" and "Work Category" as outlined below.

AER Expenditure Category	Work Category	Work Type
Routine Maintenance	REPAIRSMAINTENANCE	PREVENTATIVEMAINT
Non-Routine Maintenance	REPAIRSMAINTENANCE	PLANNEDMAINTENANCE
Emergency Response	REPAIRSMAINTENANCE	UNPLANNEDMAINTENANCE

The full set of mapping tables is defined in the "Mapping" worksheet.

If a direct mapping was not available, or it resulted in an incorrect outcome, the values were chosen manually. These manual corrections are recorded in the R&M model.

There were other high-level categorisations undertaken in the model that were not directly related to RIN requirements. The most critical of these is the Asset Class, which aligns with the Asset Management Plans and is frequently used to assist in the detailed categorisation.

20.13 Detailed Categorisation

Once the high-level categories were assigned, further categorisation was performed in order to achieve the disaggregation required by each RIN table. For example, all work orders categorised as Expenditure Category "Routine Maintenance" or "Non-routine Maintenance" were required to be further categorised into one of the maintenance categories in Template 2.8. This is discussed further in the relevant sections of this document for each table.

It should be noted that the AER provided dispensation for the detailed categorisation to only be provided for the period 2013/14 to 2016-17.

20.14 Reconciliation

The total R&M expenditure for each financial year in the period of interest was reconciled against the trial balance. There are some outstanding differences, but these are considered immaterial and included in the balancing item in table 2.1.2.

20.15 RIN Requirements

Specific RIN and BOP requirements are discussed in the relevant section for each RIN Template.

20.15.1 Source of the data

Information	Source
R&M Backcasting Model	R&M Backcasting Model - TM1 Data for R&M Backcasting 2012/13 to 2016-17
TM1 Data extract	TM1 Source Data 2012/13 to 2016-17
Inventory data	List of rotating items issued to PN RM work orders
Work order technical data	PN RM work order details
FMS R&M workbook	FMS Data for R&M Backcasting 2008/09 to 2012/13
R&M expenditure for 2008/09 to 2012/13	Old FMS Data for Reporting - 2009.10, 2010.11, 2011.12, 2012.13
R&M reconciliation, R&M journals	2009 – 2017 R&M Recon Recap

Appendix C: Operating expenditure backcasting

The operating expenditure reported in the Category Analysis template and Economic Benchmarking template has been based on the financial accounts used to produce the annual Audited Statutory Accounts. Power and Water calculated the RIN opex categories in two different streams:

- Total operating expenditure was sourced from Power Networks Trial Balance.
- Disaggregated repairs and maintenance expenditure was sourced from a combination of financial cost information and work order details.

Work order information was required in addition to the Trial Balance because the Trial Balance did not contain adequate information to categorise expenditure into the RIN categories. It should be noted that some expenditure from work orders was categorised as 'Non-network' and 'Overheads' expenditures based on the work order description.

The historic operating expenditure analysis was reconciled with the repairs and maintenance methodology outlined in appendix B. This was achieved by replicating the allocation of the repairs and maintenance costs in the historic expenditure accounts.

After we replicated the allocations, the 'core activity' expenditure from calculated using this methodology was equal to the direct costs plus the balancing item in template 2.1. Fr standard control services the core activity expenditure is equal to the sum of vegetation management, emergency response, maintenance and the balancing item expenditure. This ensures there is no double counting of costs.

The remainder of this appendix explains how we allocated the total operating expenditure and the disaggregated repairs and maintenance expenditure into the RIN tables.

Account exclusions

The Trial Balance contains all expenditure for Power and Water for each year and is the basis for the Audited Statutory Accounts, which made it possible to determine the total expenditure to be reported in the RIN for distribution services. However, not all expense accounts relate to operating expenditure for distribution services, therefore a number of initial adjustments were made:

- All accounts that did not relate to 'Power Networks' were removed. This included removing the accounts for Water Services and the Corporate accounts. Corporate expenditure is accounted for within the Power Networks accounts as the Power Networks accounts include an allocation of Corporate expenditure.
- Assets, Liabilities & Equity related accounts were removed as they do not relate to operating expenditure. We also excluded other accounts that did not relate to expenditure, such as bad debts and asset revaluation expenses.

Labour cost adjustments

Our accounts include labour costs in a set of accounts that for salaries and remunerations expenses. Our labour costs are also booked to repairs & maintenance and capital projects accounts. Labour recovery accounts are used to ensure our labour costs are only accounted for once.

We used the labour accounts for salaries and remuneration and the repairs and maintenance accounts to report the labour costs in the RIN. To ensure labour costs were not double counted in the RIN, we proportionately reduced the salaries and remuneration accounts by the total amount of labour booked to repairs and maintenance and capital projects.

Account classifications

We classified all accounts with each one of the five classifications:

1. Service classification	2. Expenditure types	3. Cost type	4. Expense or capital	5. Allocation type
SCS	Core Activity	Labour	Opex	Direct
ACS - Metering	Non-network: IT	Materials	Capex	Indirect
ACS - FB	Non-network: Fleet	Contract	Corporate	
ACS - QS	Non-network: Buildings & Property	Other		
Unregulated	Network OH	Corporate OH		
Unallocated	Corporate OH			

Cost allocation

The unallocated accounts were allocated to the service classifications using the proportion of the expenditure directly attributed to each service to the total expenditure directly attributed to all services.

Labour costs

The costs allocated to Power Networks from the corporate entity do not currently distinguish a cost type so the individual accounts could not be assigned to a cost type category. So Corporate cost types were allocated based on analysis of the proportion of labour costs incurred in the corporate entity.

2016-17 Capitalisation of indirect costs and unallocated costs

Before 2016-17, our Statutory Capitalisation Policy capitalised labour, invoiced contract and service costs where they directly related to capital projects but did not include indirect support costs.

In 2016-17, we extended our application of the Statutory Capitalisation Policy to include the capitalisation of an allocation of indirect support costs where they were deemed to be integral to the acquisition or construction of capital assets, provided they complied with AASB 116 Property, Plant and Equipment.

We developed an accounting treatment and methodology for the capitalisation of these indirect support costs from 2016-17, in accordance with AASB 116. The extension of our existing methodology was not considered to be a change in accounting policy by either our Board or our external auditor. As a result, there were no prior year adjustments made.

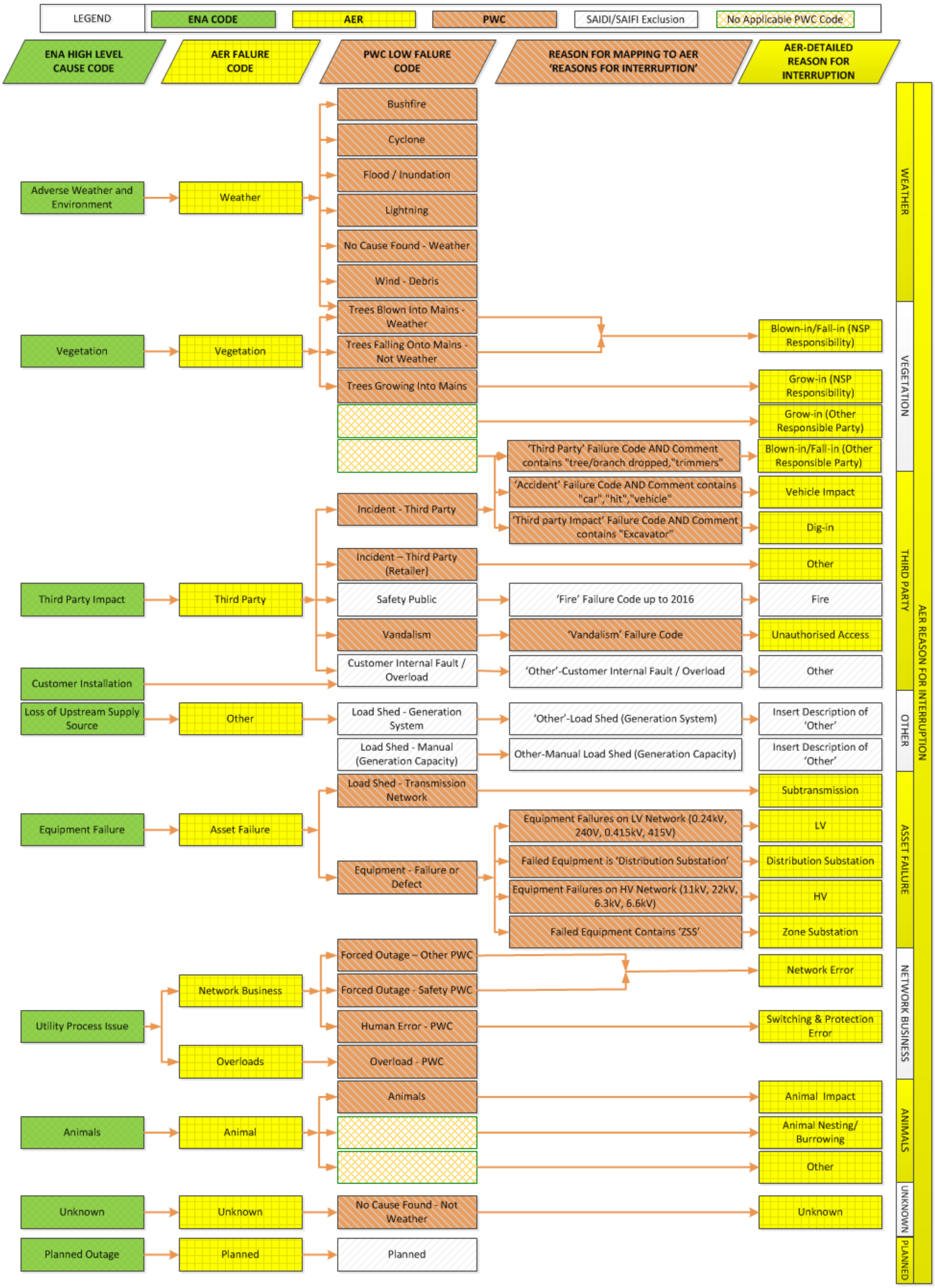
We capitalise the same corporate and network overhead accounts for regulatory purposes, but do so in proportion to the ratio of direct capex to total direct costs. If the ratio changes, the fraction of unallocated costs capitalised also changes. This is provided for in our CAM.

For comparison we capitalised $8.6m of overhead costs in 2016-17 in our Audited Statutory Accounts. In applying the approved CAM, we have calculated that a $11.4m of capitalised overhead expenditure.

Calculating total expenditures

The total expenditure provided in the RIN tables is the sum of the adjusted account balances after capitalisation and overhead allocation using the relevant classifications described above.

Appendix D: Process flow for interruptions data



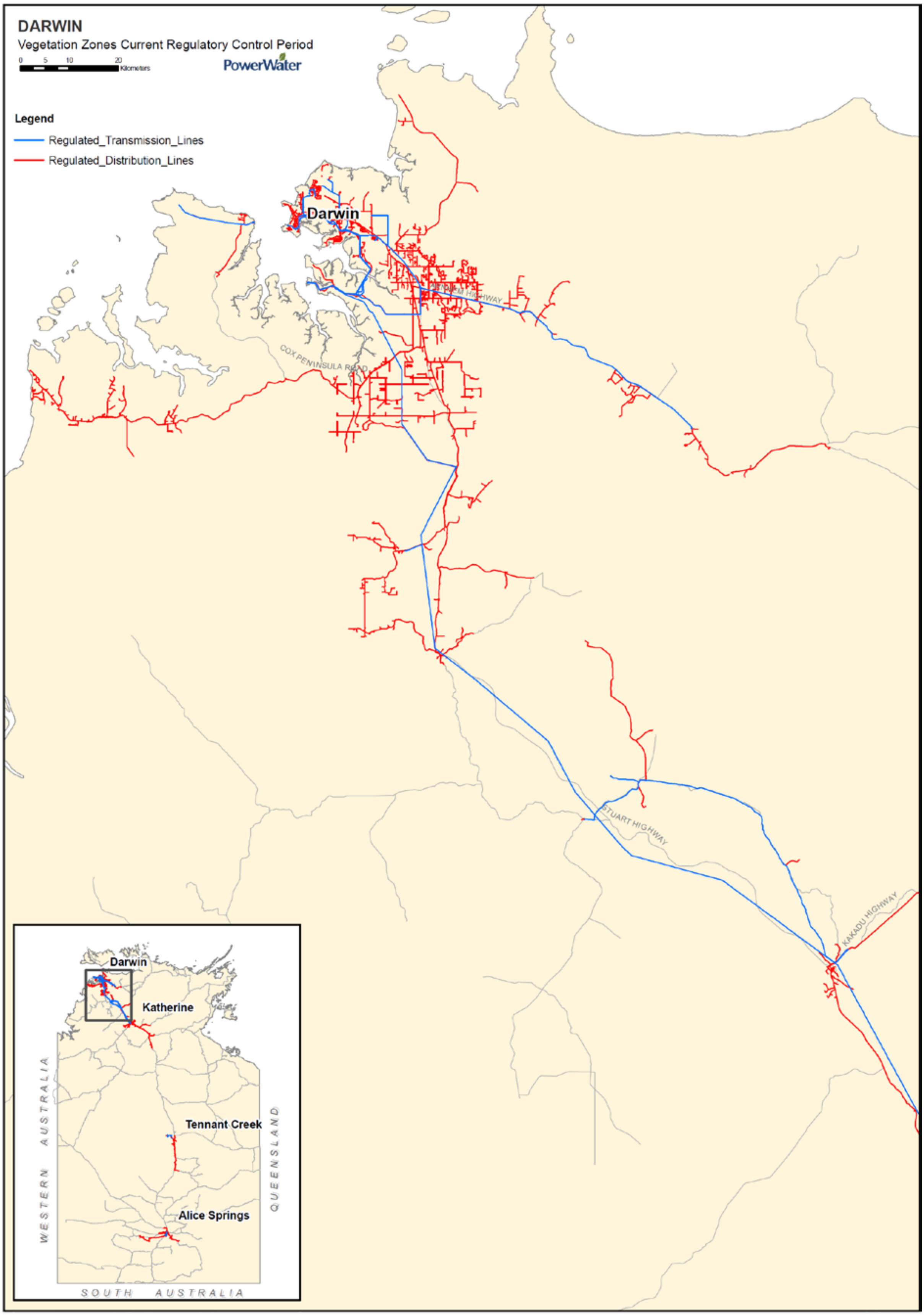
Appendix E: Capex Reconciliation

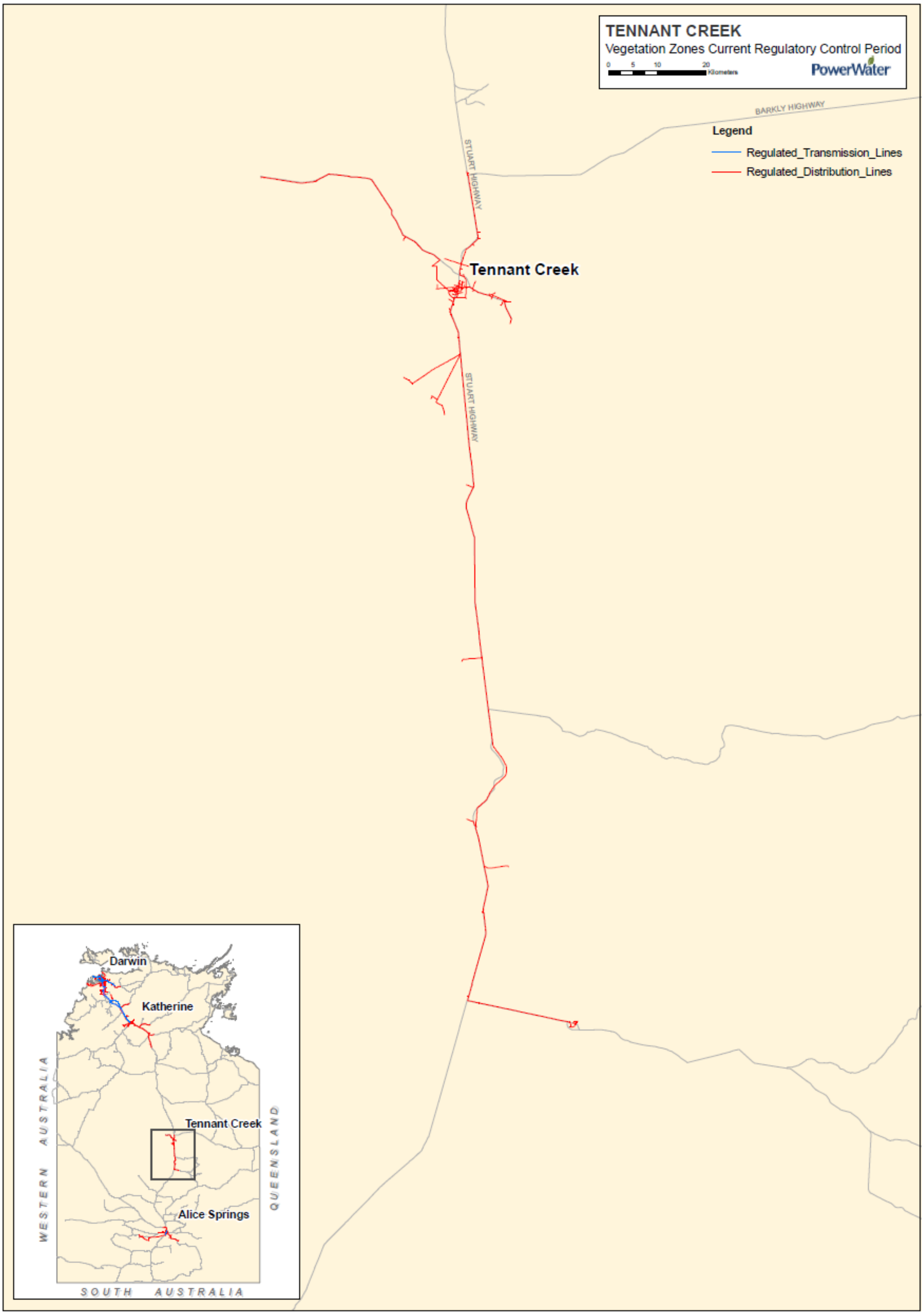
	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17
PPE (Statutory Accounts)	1,288,835,370	1,179,296,080	1,352,539,973	1,539,618,939	1,684,884,810	2,050,133,089	2,257,470,692	1,867,452,324	2,113,656,400
Exclude Non Power Networks PPE	-826,996,411	-839,259,622	-924,841,068	-1,037,583,032	-1,080,446,268	-1,225,728,838	-1,423,195,088	-986,800,040	-1,241,497,205
PPE (Power Networks)	461,838,959	340,036,458	427,698,905	502,035,907	604,438,542	824,404,251	834,275,604	880,652,285	872,159,195
Exclude Assets & Accumulated Depreciation	-333,260,555	-232,343,458	-260,512,799	-316,688,537	-458,667,881	-588,441,555	-641,458,211	-771,113,697	-749,702,066
Closing Balance 30 June	128,578,405	107,693,000	167,186,106	185,347,370	145,770,660	235,962,695	192,817,393	109,538,588	122,457,129
Opening Balance 1 July	-83,184,647	-128,578,405	-107,693,000	-167,186,106	-185,347,370	-145,770,660	-235,962,695	-192,817,393	-109,538,588
Statutory Accounts Net Movement	**45,393,757**	**-20,885,404**	**59,493,106**	**18,161,264**	**-39,576,709**	**90,192,035**	**-43,145,302**	**-83,278,805**	**12,918,541**
Regulatory Accounts									
UC Proforma Assets Disclosure - WIP	46,910,631	-21,449,269	60,140,086	20,747,515	-42,706,150	89,496,722	-43,389,765	107,556,997	112,337,144
Allocation of Corp. & Tech Services	-1,516,874	563,865	-646,980	-2,586,251	3,129,441	695,313	244,463	0	0
Accruals	0	0	0	0	0	0	0	1,981,591	10,119,985
Closing balance 30 June	0	0	0	0	0	0	0	109,538,588	122,457,129
Opening balance 1 July	0	0	0	0	0	0	0	-192,817,393	-109,538,588
Regulatory Account Totals	**45,393,757**	**-20,885,404**	**59,493,106**	**18,161,264**	**-39,576,709**	**90,192,035**	**-43,145,302**	**-83,278,805**	**12,918,541**
Adjustments									
Capital Accruals	1,458,049	1,946,997	804,617	2,338,122	0	0	3,791,159	0	0
Capitalisation of WIP	-28,406,882	-47,839,204	936,458	-65,534,856	-1,334,102	-80,008,919	-196,201,021	-206,015,152	-51,306,234
Correcting Entries	-226,998	-59,996,240	-28,718,660	-185,466	52,254,455	3,152,613	72,481,360	-1,770,806	25,239
Interest on borrowings	0	0	0	2,694,399	7,082,940	9,786,555	0	8,541,927	0
Reversal of Prior Year	7,562,004	0	-1,987,956		-205,674,758	73,152,873	94,098	46,388,915	-5,002,596
Other	0	0	0	0	0	0	0	0	19,167,421
Excluded Transactions	-19,613,827	-105,888,446	-28,965,541	-60,687,801	-147,671,465	6,083,122	-119,834,405	-152,855,116	-37,116,170
Capital expenditure classifications									
Capital Incurred - Projects	65,007,584	85,003,042	88,458,647	78,849,065	108,094,756	84,108,913	76,689,102	69,576,311	50,034,711
FMS vs Project data variance	159,673	97,482	53,519	-31,112	317,231	-87,728	-202,188	-89,595	7,730
Public Lighting	-33,077	0	-39,272	-215,545	-331,705	-285,589	-9,345	-13,014	-98,874
Unregulated to Capex	-32,400	-21,324	-11,729	-19,860	-30,998	-19,988	-10,182	-10,974	-26,260
RM to Capital	0	0	0	0	1,119,385	1,964,897	3,069,214	2,379,360	1,881,454
Capital Expenditure Model	**65,101,780**	**85,079,200**	**88,461,165**	**78,582,548**	**109,168,669**	**86,680,505**	**79,536,601**	**71,842,088**	**51,798,761**
Capitalised Overheads									
SCS	0	0	0	0	0	0	0	0	10,716,502
ACS - Metering	0	0	0	0	0	0	0	0	370,043
ACS - QS	0	0	0	0	0	0	0	0	235,339
ACS - FB	0	0	0	0	0	0	0	0	125,535
Total Capitalised Overheads	**65,101,780**	**85,079,200**	**88,461,165**	**78,582,548**	**109,168,669**	**85,680,505**	**79,536,601**	**71,842,088**	**63,246,180**
Standard Control Services Capex	49,079,977	76,027,941	85,381,775	76,860,055	108,071,528	84,456,646	77,287,746	67,782,095	59,167,930
Alternative Control Services Capex	16,021,795	9,051,223	3,079,390	1,722,493	1,097,141	1,223,858	2,248,857	4,059,994	4,078,251
RIN 2.1 Total Capex	**65,101,772**	**85,079,164**	**88,461,165**	**78,582,548**	**109,168,669**	**85,680,504**	**79,536,603**	**71,842,089**	**63,246,181**

Appendix F: Opex Reconciliation

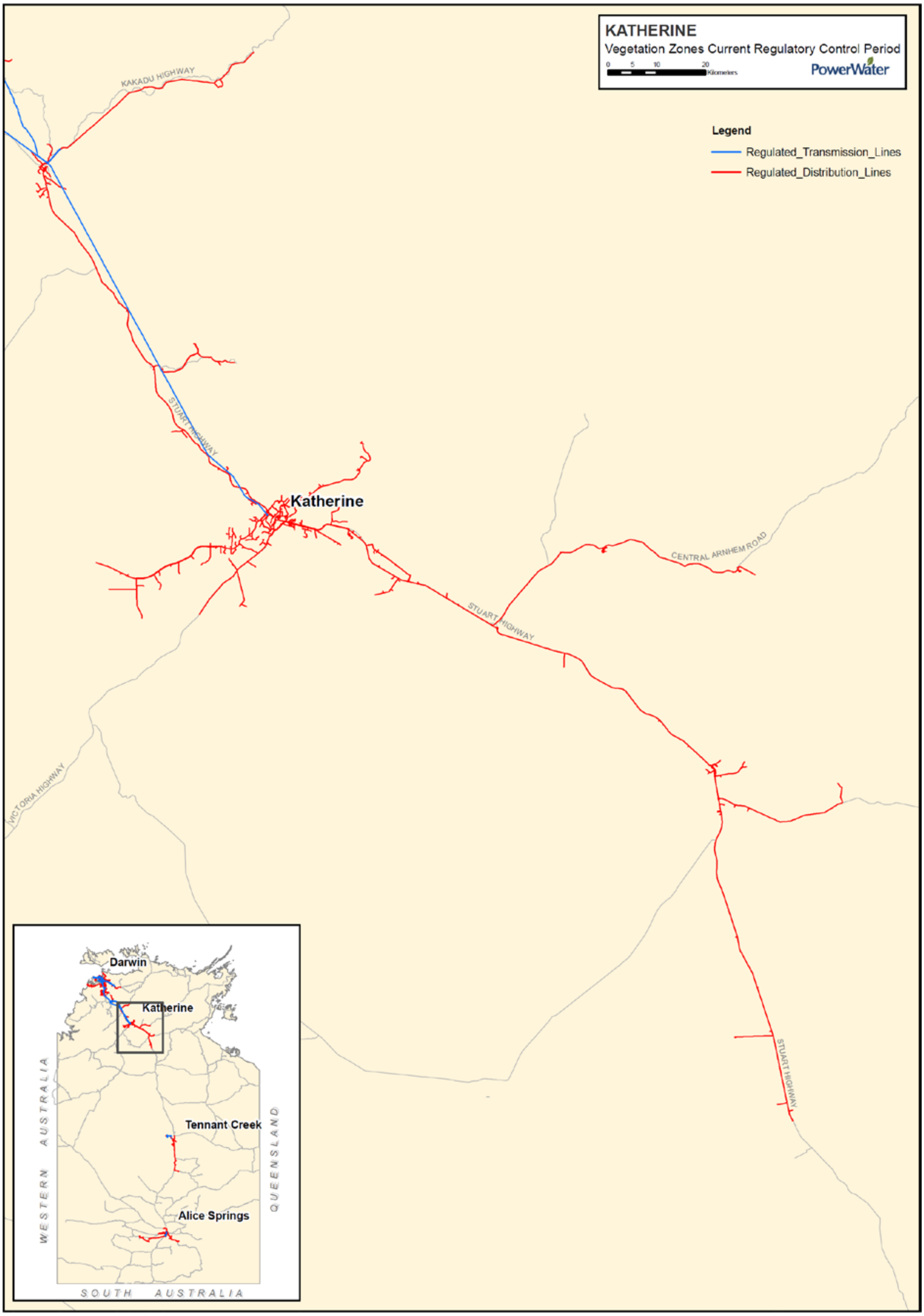
	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17
Statutory Accounts Operating Expense	$504,024	$961,554	$769,800	$590,250	$651,629	$718,160	$589,213	$616,308	$604,918
Less: Non-power networks expenses	-$406,956	-$677,923	-$670,485	-$474,136	-$533,985	-$578,888	-$445,481	-$470,864	-$439,159
Statutory Accounts Power Networks (21 + 22)	**$97,068**	**$283,630**	**$99,315**	**$116,115**	**$117,644**	**$139,272**	**$143,732**	**$145,444**	**$165,759**
Statutory Accounts Power Networks Regulated	$89,108	$274,640	$93,617	$114,619	$116,127	$137,649	$140,861	$143,545	$163,104
Statutory Accounts Power Networks Unregulated	$7,960	$8,990	$5,698	$1,496	$1,516	$1,624	$2,872	$1,900	$2,655
Total Power Networks Statutory Accounts	**$97,068**	**$283,630**	**$99,315**	**$116,115**	**$117,644**	**$139,272**	**$143,732**	**$145,444**	**$165,759**
less depreciation expense:									
Regulated	-$15,428	-$14,487	-$11,015	-$13,325	-$15,382	-$24,746	-$42,338	-$38,554	-$38,478
Unregulated	-$246	-$248	-$355	-$165	-$135	-$201	-$1,173	-$475	-$433
less finance costs:									
Regulated	-$9,301	-$12,414	-$18,404	-$25,462	$0	$0	-$26,218	-$31,274	-$24,164
Unregulated	-$3,418	-$1,080	-$1,600	$0	$0	$0	$0	$0	$0
Total Power Networks	**$68,675**	**$255,402**	**$67,940**	**$77,163**	**$102,127**	**$114,325**	**$74,004**	**$75,142**	**$102,684**
Regulatory Accounts (Power Networks)	$105,404	$283,839	$104,009	$129,021	$118,806	$135,816	$134,850	$143,307	$159,172
Finance costs excluded from Regulatory Accounts	$9,301	$12,414	$18,404	$25,462	$0	$0	$26,218	$31,274	$24,164
Other expenses	$0	$0	$0	$0	$25,744	$29,255	$0	$0	$0
Depreciation and amortisation expense	$0	$0	$0	$0	$17	$0	$0	$0	$0
Unregulated depreciation	$0	$0	$0	$0	$0	$0	-$1,172	$0	$0
Energy and materials remapped to revenue	$0	$0	$0	$0	$0	$0	$2,528	$0	$0
Journal misposting	$0	$0	$0	$0	$0	$0	$0	$63	-$63
Intergroup expenses excluded from Statutory Accounts	-$25,598	-$21,613	-$28,797	-$39,865	-$28,440	-$27,422	-$21,563	-$31,099	-$20,169
Statutory Accounts Power Networks Regulated	**$89,108**	**$274,640**	**$93,617**	**$114,619**	**$116,127**	**$137,649**	**$140,861**	**$143,545**	**$163,104**
Statutory Accounts (21 + 22)	**$68,675**	**$255,402**	**$67,940**	**$77,163**	**$102,127**	**$114,325**	**$74,004**	**$75,142**	**$102,684**
Less: excluded accounts	$7,485	-$179,982	$14,281	$26,943	$5,593	-$10,675	$38,787	$38,283	$11,719
subtotal	**$76,161**	**$75,419**	**$82,221**	**$104,106**	**$107,720**	**$103,651**	**$112,790**	**$113,424**	**$114,404**
Add: non expense accounts	$18,831	$15,749	$21,547	$25,899	$27,605	$27,226	$21,789	$31,141	$20,202
subtotal	**$94,992**	**$91,169**	**$103,768**	**$130,005**	**$135,325**	**$130,876**	**$134,579**	**$144,565**	**$134,606**
Add: for R&M adjustments	$424	$530	$791	$371	-$49	-$1,208	-$1,429	-$3,491	-$1,025
subtotal	**$95,416**	**$91,699**	**$104,559**	**$130,376**	**$135,276**	**$129,669**	**$133,150**	**$141,074**	**$133,581**
Add: Statutory Capitalisation	$0	$0	$0	$0	$0	$0	$0	$0	$5,882
subtotal	**$95,416**	**$91,699**	**$104,559**	**$130,376**	**$135,276**	**$129,669**	**$133,150**	**$141,074**	**$139,463**
Less: Labour adjustments	-$13,940	-$14,828	-$15,288	-$26,961	-$33,182	-$34,084	-$40,650	-$40,571	-$41,160
subtotal	**$81,477**	**$76,870**	**$89,271**	**$103,415**	**$102,094**	**$95,585**	**$92,500**	**$100,503**	**$98,303**
Less: Regulatory capital									
- overheads (Corp Indirect)	$0	$0	$0	$0	$0	$0	$0	$0	-$4,341
- overheads (PN Indirect)	$0	$0	$0	$0	$0	$0	$0	$0	-$2,958
- overheads (PN Direct)	$0	$0	$0	$0	$0	$0	$0	$0	-$4,579
subtotal	**$81,477**	**$76,870**	**$89,271**	**$103,415**	**$102,094**	**$95,585**	**$92,500**	**$100,503**	**$86,425**
SCS	$73,214	$68,554	$81,016	$93,331	$92,773	$82,109	$74,603	$81,480	$71,944
ACS - Metering	$1,672	$2,056	$2,312	$2,309	$1,318	$4,051	$4,548	$5,404	$4,614
ACS - QS	$938	$709	$1,040	$1,788	$1,822	$2,479	$4,440	$3,896	$2,934
ACS - FB	$481	$480	$513	$522	$399	$1,075	$1,994	$1,777	$1,565
Total SCS + ACS	**$76,305**	**$71,799**	**$84,880**	**$97,950**	**$96,312**	**$89,713**	**$85,586**	**$92,557**	**$81,056**
Unreg - Streetlight	$0	$446	$344	$3,590	$4,161	$4,260	$4,629	$5,475	$3,235
Unreg - Entity 22	$5,171	$4,625	$4,046	$1,875	$1,621	$1,612	$2,285	$2,471	$2,133
Total	**$81,477**	**$76,870**	**$89,271**	**$103,415**	**$102,094**	**$95,585**	**$92,500**	**$100,503**	**$86,425**
Standard Control Services Opex	$73,214	$68,554	$81,016	$93,331	$92,773	$82,109	$74,603	$81,480	$71,944
Alternative Control Services Opex	$3,091	$3,245	$3,864	$4,619	$3,539	$7,604	$10,983	$11,077	$9,113
RIN 2.1	**$76,305**	**$71,799**	**$84,880**	**$97,950**	**$96,312**	**$89,713**	**$85,586**	**$92,557**	**$81,056**

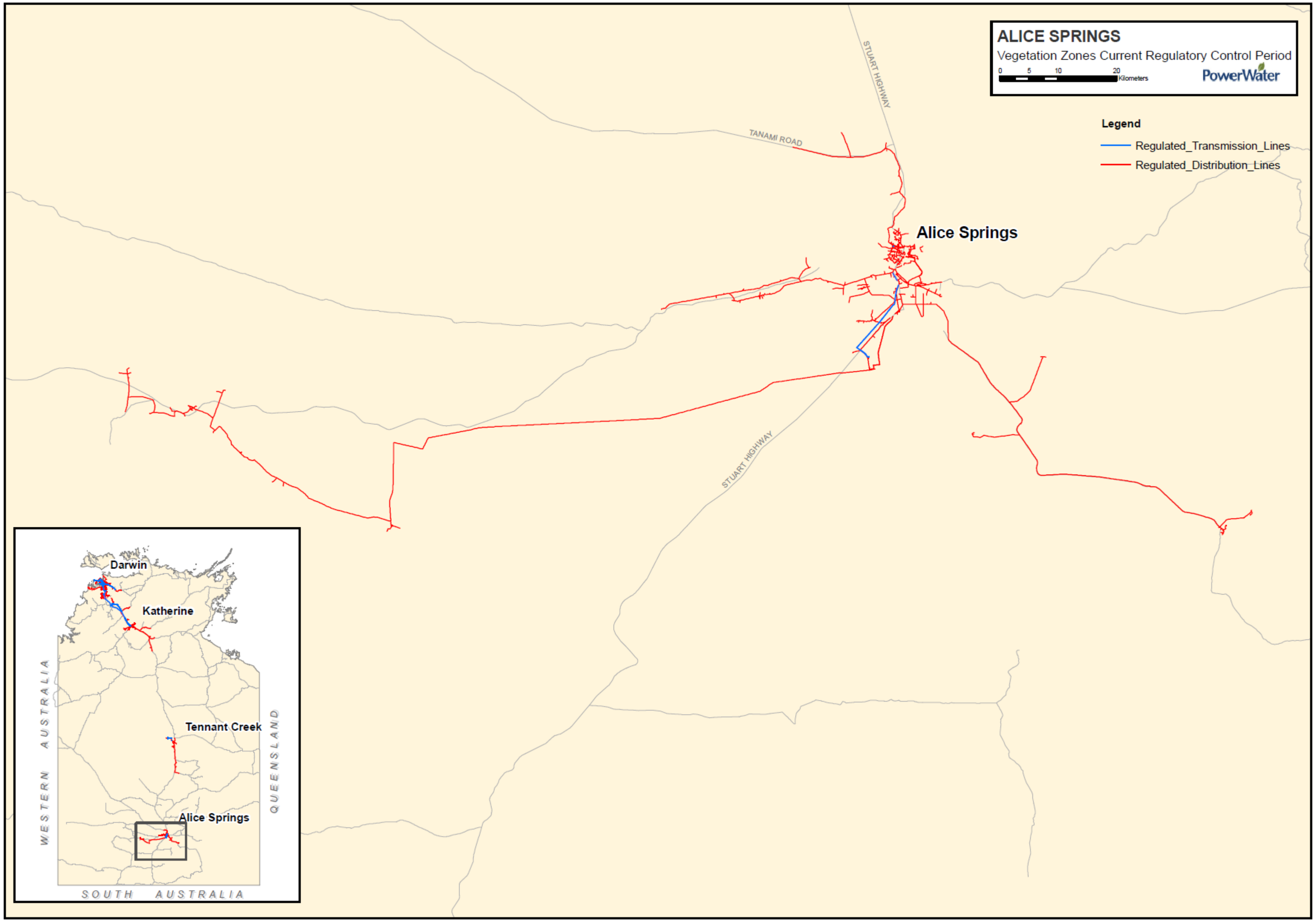
Appendix G: Vegetation Region Maps





TENNANT CREEK
Vegetation Zones Current Regulatory Control Period
0 5 10 20
Kilometers
PowerWater
BARKLY HIGHWAY
Legend
Regulated_Transmission_Lines
Regulated_Distribution_Lines
STUART HIGHWAY
Tennant Creek
STUART HIGHWAY
Darwin
Katherine
Tennant Creek
Alice Springs
WESTERN AUSTRALIA
QUEENSLAND
SOUTH AUSTRALIA


KATHERINE
Vegetation Zones Current Regulatory Control Period
0 5 10 20
Kilometers
PowerWater
Legend
Regulated_Transmission_Lines
Regulated_Distribution_Lines
KAKADU HIGHWAY
STUART HIGHWAY
Katherine
CENTRAL ARNHEM ROAD
VICTORIA HIGHWAY
Darwin
Tennant Creek
Alice Springs
WESTERN AUSTRALIA
QUEENSLAND
SOUTH AUSTRALIA


ALICE SPRINGS
Vegetation Zones Current Regulatory Control Period
0 5 10 20
Kilometers
PowerWater
Legend
Regulated_Transmission_Lines
Regulated_Distribution_Lines
Alice Springs
STUART HIGHWAY
TANAMI ROAD
STUART HIGHWAY
Darwin
Katherine
Tennant Creek
Alice Springs
WESTERN AUSTRALIA
QUEENSLAND
SOUTH AUSTRALIA