Basis of Preparation

2016/17 Response to Category Analysis RIN dated 7 March 2014

October 2017

Contents

Purpose

On 7 March 2014, the Australian Energy Regulator (AER) issued a Regulatory Information Notice (Category Analysis RIN) to Ausgrid under Division 4 of Part 3 of the *National Electricity (New South Wales) Law* (NEL). The Category Analysis RIN requires Ausgrid to provide and to prepare and maintain the information in the manner and form specified in the Category Analysis RIN. The AER has said that it requires the information for the performance or exercise of its functions or powers conferred on it under the NEL or the National Electricity Rules (NER).

Under paragraph 1.2 of Schedule 1 to the Category Analysis RIN, Ausgrid is required to provide a Basis of Preparation. The Basis of Preparation is to be provided in accordance with the Category Analysis RIN and the Principles and Requirements in Appendix E.

AER's instructions

In accordance with the Basis of Preparation requirements in Appendix E of the Category Analysis RIN, Ausgrid must explain, for all information in the regulatory templates the basis upon which Ausgrid prepared information to populate the input cells (basis of preparation).

The basis of preparation must be a separate document (or documents) that Ausgrid submits with its completed regulatory templates. The basis of preparation must follow a logical structure that enables auditors, assurance practitioners and the AER to clearly understand how Ausgrid has complied with the requirements of the Category Analysis RIN.

The AER has set out the minimum requirements of the Basis of Preparation. This is set out in Table 1 below.

	Minimum requirements of the Basis of Preparation
1	Demonstrate how the information provided is consistent with the requirements of the Notice.
2	Explain the source from which Ausgrid obtained the information provided.
3	Explain the methodology Ausgrid used to provide the required information, including any assumptions Ausgrid made
4	Explain circumstances where Ausgrid cannot provide input for a variable using actual information, and therefore must provide estimated information: (i) why an estimate was required, including why it was not possible for Ausgrid to provide actual information; (ii) the basis for the estimate, including the approach used, assumptions made and reasons why the estimate is Ausgrid's best estimate, given the information sought in the Notice.

As part of its response, Ausgrid may provide additional detail beyond the minimum requirements if Ausgrid considers it may assist a user to gain an understanding of the information presented in the regulatory templates.

When reporting an audit opinion or making an attestation report on the regulatory templates presented by Ausgrid, an auditor or assurance practitioner shall opine or attest by reference to Ausgrid's basis of preparation.

Ausgrid has prepared this document (Ausgrid Basis of Preparation) in accordance with the requirements in the Category Analysis RIN.

Other matters in the RIN

Clause 1.2(b) to Schedule 1 of the RIN

In relation to clause 1.2 (b) to Schedule 1 of the RIN, we have provided in accordance with this Notice and the Principles and Requirements in Appendix E, a Basis of Preparation demonstrating Ausgrid has 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.

Template 2.1 – Expenditure summary and reconciliation

The information provided in template 2.1 has been completed according to AER Category Analysis (CA) RIN requirements and instructions applicable to template 2.1 included in Appendix E and F. In 2016/17, Ausgrid has followed instruction issued by Kaye Johnson on 05 September 2017, to adjust amounts in tables 2.1.1 Standard Control Services Capex and table 2.1.2 Standard Control Services Opex to exclude amounts relating to transmission standard control services capex and opex respectively.

Table 2.1.1 – Standard control services capex

Demonstrate how the information provided is consistent with the requirements of the Notice
The information reported in table 2.1.1 is derived from other worksheets in the CA RIN. The total gross capex in the table is in accordance with Ausgrid's Cost Allocation Methodology (CAM). The information reported also complies with Australian Accounting Standards and the Regulatory Information Requirements Guidelines for the NSW Electricity Distributors.

On 20 October 2016 the Premier and Treasurer of New South Wales entered into a binding agreement with an Australian-owned consortium comprising of IFM Investors and AustralianSuper for the 99 year lease of 50.4 per cent of Ausgrid. The completion date was 1 December 2016. The State retains a 49.6 per cent interest in the lease.

The financial data provided in this submission for the 12 months ended 30 June 2017. It consists of 5 months consolidated data to 30 November 2016 under the operating structure of a State Owned Corporation and 7 months consolidated data from 1 December 2016 to 30 June 2017 under the new Ausgrid Operating structure. This new consolidation structure consists of two partnerships, Ausgrid Operator Partnership ('AOP') and Ausgrid Asset Partnership ('AAP') plus their respective controlled entities, Ausgrid Management Pty Limited and Ausgrid Finance Pty Limited. Inter-entity transactions have been eliminated.

Explain the source from which Ausgrid obtained the information provided.

Source of information for template 2.1, table 2.1.1 Standard Control Services Capex

a) Replacement expenditure is linked to table 2.2.1 'Replacement Expenditure, Volumes and Asset Failures by Asset Categories – sum of cells E11 to E146 less amount shown in table 2.1.5 Dual Function Assets for replacement capex.

b) Connections capex is linked to table 2.5.2 'Cost metrics by Connection Classification' – sum of cells D60 to D73 less amount shown in table 2.1.5 Dual Function Assets for connection capex.

c) Augmentation Expenditures is linked to table 2.3.4 'Augex data Total Expenditure' – sum of cells D38 to D46 less amount shown in table 2.1.5 Dual Function Assets for augmentation capex.

d) Non-network expenditure is linked to table 2.6.1 'Non-Network Expenditure' – sum of cells F34 to F43 service subcategory relating to capital expenditure less amount shown in table 2.1.5 Dual Function Assets for non-network capex.

e) Capitalised network overhead cost is linked to tab 2.10(A) table 2.10.1 'Network Overheads Expenditure' – cell D18 less amount shown in table 2.1.5 Dual Function Assets for capitalised network overheads.

f) Capitalised corporate overheads cost is linked to tab 2.10(A) table 2.10.2 'Network Overheads Expenditure' – cell D33 less amount shown in table 2.1.5 Dual Function Assets for capitalised corporate overheads.

g) Capital contributions are sourced from the Ausgrid accounting system - SAP and allocated as per CAM to obtain the Standard Control Services portion. Capital contributions assets relate to standard control services distribution business.

h) Corporate overhead cost is linked to tab 2.10(A), table 2.10(A).1 'Corporate Overheads' – cells D30 less amount shown in table 2.1.6 Dual Function Assets for corporate overheads.

i) Metering opex is sourced from the Ausgrid accounting system - SAP and allocated as per CAM to obtain the Standard Control Services portion. This is metering opex relates to bulk supply meters which is allocated to standard control services.

Explain the methodology Ausgrid used to provide the required information, including any assumptions Ausgrid made

Total gross capital expenditure for the Standard Control Services reported in template 2.1.1 has been prepared in accordance with Ausgrid's CAM. The capital contribution is obtained using SAP and allocated using Ausgrid's CAM to calculate the Standard Control Services portion. The capital contributions reported in the CA RIN for SCS matches the capital contribution number reported in the Annual Regulatory Accounts for 2016/17.

Explain circumstances where Ausgrid cannot provide input for a variable using actual information, and therefore must provide estimated information:

(i) why an estimate was required, including why it was not possible for Ausgrid to provide actual information;

Not applicable.

(ii) the basis for the estimate, including the approach used, assumptions made and reasons why the estimate is Ausgrid's best estimate, given the information sought in the Notice.

All data reported is obtained from relevant worksheets. Please refer to the basis of preparation for these worksheets.

Table 2.1.2 – Standard control services opex by category

Demonstrate how the information provided is consistent with the requirements of the Notice

The information reported in table 2.1.2 is derived from other worksheets in 2016/17 CA RIN. The total operating expenditure in the table aligns with principles set out in Ausgrid's CAM.

Explain the source from which Ausgrid obtained the information provided.

Source of information for table 2.1.2 – Standard Control Services Opex

j) Vegetation management opex is linked to table 2.7.2 'Vegetation Management', Expenditure Metrics by Zone – sum of cells E241 to E249 less amount shown in table 2.1.6 Dual Function Assets for vegetation management opex.

k) Maintenance opex is linked to table 2.8.2 'Vegetation Management', Cost Metrics for routine and non-routine maintenance – sum of cells F52 to G57, F60 to G68 and F71 to G76 less amount shown in table 2.1.6 Dual Function Assets for maintenance opex.

l) Emergency response opex is linked to table 2.9.1 'Emergency Response Opex' – cell D12 less amount shown in table 2.1.6 Dual Function Assets for emergency response.

m) Non network opex is linked to table 2.6.1 'Non Network Expenditure Opex' – cells D12 to D20 less amount shown in table 2.1.6 Dual Function Assets for non-network opex.

n) Network overhead cost is linked to tab 2.10(A), table 2.10(A).1 'Network Overheads' – cells D15 less amount shown in table 2.1.6 Dual Function Assets for non-network opex.

Explain the methodology Ausgrid used to provide the required information, including any assumptions Ausgrid made

Total operating expenditure for Standard Control Services reported in worksheet 2.1.2 aligns with principles set out in Ausgrid's CAM. Total operating expenditure reported in table 2.1.2 also aligns to operating expenditure reported in the Economic Benchmarking RIN and the Annual Reporting RIN for 2016/17.

Explain circumstances where Ausgrid cannot provide input for a variable using actual information, and therefore must provide estimated information:

(i) why an estimate was required, including why it was not possible for Ausgrid to provide actual information;

Not applicable.

(ii) the basis for the estimate, including the approach used, assumptions made and reasons why the estimate is Ausgrid's best estimate, given the information sought in the Notice.

All data reported is obtained from relevant worksheets. Please refer to the basis of preparation for these worksheets.

Table 2.1.3 – Alternative control services capex

Demonstrate how the information provided is consistent with the requirements of the Notice

The information reported in the tables is derived from other worksheets. The total reported in the table aligns with principles set out in Ausgrid's CAM.

Explain the source from which Ausgrid obtained the information provided.

Alternative Control Services capital expenditure is from SAP Business Intelligence system.

Source of information for table 2.1.3 – Alternative Control Capex

a) Capitalised network overhead cost is linked to tab 2.10(A) table 2.10.1 'Network Overheads Expenditure' – cell D19.

b) Capitalised corporate overhead cost is linked to tab 2.10(A) table 2.10.2 'Corporate Overheads Expenditure' – cell D24.

c) Metering capex is linked to table 4.2.2 'Cost Metrics' – cells E29, E47 and E58.

d) Public lighting capex is linked to table 4.1.2 'Descriptor Metrics Annually' – cells E222 and E226.

e) Fee and quoted services capex is sourced from the Ausgrid accounting system – SAP Business Intelligence system. It is capex allocated to fee and quoted services according to Ausgrid's CAM.

f) Balancing item relates to capitalised network and corporate overheads.

Explain the methodology Ausgrid used to provide the required information, including any assumptions Ausgrid made

Alternative Control Services capital expenditure has been prepared using principles set out in Ausgrid's CAM.

Explain circumstances where Ausgrid cannot provide input for a variable using actual information, and therefore must provide estimated information:

(i) why an estimate was required, including why it was not possible for Ausgrid to provide actual information;

Not applicable.

(ii) the basis for the estimate, including the approach used, assumptions made and reasons why the estimate is Ausgrid's best estimate, given the information sought in the Notice.

All information provided in table 2.1.3 is actual information.

Table 2.1.4 – Alternative control services opex

Demonstrate how the information provided is consistent with the requirements of the Notice

The information reported in the table is derived from other worksheets. The total in the table aligns with principles set out in Ausgrid's CAM.

Explain the source from which Ausgrid obtained the information provided.

Source of information for table 2.1.3 – Alternative Control opex

a) Network overhead cost is linked to tab 2.10(A) table 2.10.1 'Network Overheads Expenditure' – cell D16.

b) Corporate overhead cost is linked to tab 2.10(A) table 2.10.2 'Coporate Overheads Expenditure' – cell D31.

c) Metering capex is linked to table 4.2.2 'Cost Metrics' and it is sum of metering business cost categories listed below

- Meter testing (E32)
- Meter investigation (E35)
- Scheduled meter reading (cells E38 & E39)
- Special meter reading (cell 41)
- Meter maintenance (E50)
- Other metering (E55)
- IT infrastructure opex (E59)

Explain the methodology Ausgrid used to provide the required information, including any assumptions Ausgrid made

Alternative Control Services operating expenditure has been prepared using principles set out in Ausgrid's CAM.

Explain circumstances where Ausgrid cannot provide input for a variable using actual information, and therefore must provide estimated information:

(i) why an estimate was required, including why it was not possible for Ausgrid to provide actual information;

Not applicable.

(ii) the basis for the estimate, including the approach used, assumptions made and reasons why the estimate is Ausgrid's best estimate, given the information sought in the Notice.

All information provided in table 2.1.4 is actual.

Table 2.1.5 – Dual function assets capex

Demonstrate how the information provided is consistent with the requirements of the Notice

The total in table 2.1.5 aligns with principles set out in Ausgrid's CAM.

Explain the source from which Ausgrid obtained the information provided.

Dual function asset capital expenditure reported in table 2.1.5 is prepared from the SAP Business Intelligence system.

Explain the methodology Ausgrid used to provide the required information, including any assumptions Ausgrid made

The Dual Function Assets capital expenditure reported in template 2.1.5 has been prepared in accordance with Ausgrid's CAM. The information is from the SAP Business Intelligence system and allocated using Ausgrid's CAM to calculate the Dual Functions Assets portion.

Explain circumstances where Ausgrid cannot provide input for a variable using actual information, and therefore must provide estimated information:

(i) why an estimate was required, including why it was not possible for Ausgrid to provide actual information;

Not applicable.

(ii) the basis for the estimate, including the approach used, assumptions made and reasons why the estimate is Ausgrid's best estimate, given the information sought in the Notice.

All information provided in table 2.1.5 has been derived using principles set out in Ausgrid's CAM.

Table 2.1.6 – Dual function assets opex by category

Demonstrate how the information provided is consistent with the requirements of the Notice

The information reported in the tables is prepared from other worksheets.

Explain the source from which Ausgrid obtained the information provided.

Dual function assets operating expenditure categories reported in table 2.1.6 is Standard Control Services operating expenditure reported in table 2.1.2 multiplied by the Transmission operating expenditure percentage (described in the methodology section below).

Explain the methodology Ausgrid used to provide the required information, including any assumptions Ausgrid made

Dual function assets operating expenditure reported in table 2.1.6 is calculated based on numbers reported in table 2.1.2 for Standard Control Services, multiplied by the Transmission operating expenditure percentage for 2016/17.

For the Category Analysis RIN purposes, the Transmission operating expenditure percentage for 2016/17 is a portion of Transmission operating expenditure over total Transmission and Distribution operating expenditure for 2016/17. Total Transmission operating expenditure has been aligned number recorded in TM1, by adjusting Network Overheads in table 2.1.6.

Explain circumstances where Ausgrid cannot provide input for a variable using actual information, and therefore must provide estimated information:

(i) why an estimate was required, including why it was not possible for Ausgrid to provide actual information.

(ii) the basis for the estimate, including the approach used, assumptions made and reasons why the estimate is Ausgrid's best estimate, given the information sought in the Notice.

All information provided in table 2.1.6 has been prepared using principles set out in Ausgrid's CAM.

Template 2.2 – Repex

The information provided in template 2.2 has been completed in accordance with the AER RIN requirements and instructions applying to template 2.2. including Appendix E and F, and the instructions in the worksheet.

The data for REPEX is split into two major groups: sub-transmission strategic projects and replacement/duty of care programs.

Similarly the cost data for replacement programs has compatibility issues which affect reconciliation to the SAP Finance cost due to driver allocation differences.

It is worthwhile noting that the financial figures are updated at an exceptional basis as a result of a Financial Adjustments made on the 26th August (i.e. an update of the step change only, NOT a complete re-run of all the reports and analysis).

Table 2.2.1 – Cost metrics by asset category

Demonstrate how the information provided is consistent with the requirements of the Notice

The information in this table is compliant in that actual values are used where possible, and best estimates are provided where actual data is not available.

Explain the source from which Ausgrid obtained the information provided.

The source for the majority of data for this section has been Ausgrid's Corporate Information System (CIS). This includes data in categories poles, transformers, switchgear, and other (excluding meters). Volume data for overhead conductors, underground cables and service lines has been sourced from Ausgrid's Geographical Information System (GIS).

Please refer to RIN table 4.1 for expenditure and volume data associated with public lighting in 2016/17. Ausgrid believed that it is inappropriate to 'double count' this data as part of table 2.2 Repex as this table is meant to reconcile with the 'Replacement Expenditure' in table 2.1.1 which is for standard control services only.

Explain the methodology Ausgrid used to provide the required information, including any assumptions Ausgrid made

Expenditure and Asset Replacements

To provide the expenditure and quantum of assets replaced in 2016/17, extracts were obtained from the CIS detailing the capital expenditure for both Replacement and Duty of Care Programs as well as the share of major projects (Area Plans) associated with replacement and duty of care drivers. This extract was obtained via a CIS reporting tools (Business Objects (BO)/Business Intelligence (BI)).

This extract was then mapped from the relevant planning identifiers to the associated Replacement Expenditure (Repex) Asset Group and Asset Category based on primary assignment. In cases where there was either no direct relationship or a many to one relationship, methodologies were applied to apportion both the expenditure and replacements across these categories. Further detail on such apportionment is provided below for those cases.

Explain circumstances where Ausgrid cannot provide input for a variable using actual information, and therefore must provide estimated information:

(i) why an estimate was required, including why it was not possible for Ausgrid to provide actual information;

Estimated information is set out in the following table.

Pole replacement	Data is not held at the granular level required to populate the asset categories/asset metrics directly.
Pole Top Structures	Data is not held at the granular level required to populate the asset categories/asset metrics directly.
Overhead conductors	Data is not held at the granular level required to populate the asset categories/asset metrics directly.
Underground cables	Data is not held at the granular level required to populate the asset categories/asset metrics directly.
Service lines	Data is not held at the granular level required to populate the asset categories directly.
Transformers	Data is not held at the granular level required to populate the asset categories directly.
Switchgear	Data is not held at the granular level required to populate the asset categories directly.

(ii) the basis for the estimate, including the approach used, assumptions made and reasons why the estimate is Ausgrid's best estimate, given the information sought in the Notice.

The estimates and apportionment methods are set out below:

REPLACEMENT AND DUTY OF CARE PORTFOLIO

Poles

Pole expenditures are allocated based on a BO report which outlined the volumes of poles replaced by construction type (i.e. wood, concrete, metal) and voltages (i.e. LV, HV, Sub-transmission).

Staking of wooden pole is a direct mapping of a replacement program.

Pole & Pole-top Structure replacement:

To provide information in the asset group and asset categories, the extract obtained from CIS as detailed above was filtered to display only data associated with pole replacement activities.

For installed assets:

- Pole asset failure information is provided based on historical records.
- Total poles by feeder type were obtained from our GIS. Asset replacements were apportioned on the basis of pole population per feeder type as the historical assignment of feeder and hence feeder category is not held against the retired pole.

Conductors

The CIS extracts were apportioned to provide the required secondary data splits by feeder classification and conductor material. The feeder classifications were apportioned on the basis of length of feeder in each class. Similarly the apportionment to material type was also done on the basis of length of conductor in each material class.

Cables

The CIS extracts were apportioned to provide the required secondary data splits by feeder classification. The feeder classifications were apportioned on the basis of length of feeder in each class.

Ausgrid have introduced a 'Miscellaneous Ancillary Assets' asset category to capture programs which have fundamentally different unit of measures (i.e. while cables are counted in kilometres, pillars and link boxes are counted as units).

Service Lines:

The CIS extract and failure data were apportioned on the basis of customer information retrieved from the Metering Business System (MBS) via the National Metering Identifier (NMI) of the supply point connected to the service line. The customer type attributed to the NMI in MBS was used to classify the service line allowing distinction of those that are for residential or commercial/industrial connections. All service lines have been classified as simple type as the classification of complex type is related to the actions undertaken during the original connection and thus have no relevance to its classification in situ.

Switchgear

In general all direct costs were mapped to the relevant asset category, however in cases where the cost categories extracted covered more than one asset category or asset group, the costs and assets replaced were allocated on the basis of the ratio of detailed expenditure by asset category obtained from detailed planning estimates where the project is yet to be financially complete.

'< = 11 kV ; Circuit Breaker' is separated into '< 1 kV ; CIRCUIT BREAKER' and '> 1 kV & < ≈ 11 kV ; CIRCUIT BREAKER' to account for LV circuit breaker replacements (i.e. 415V) versus HV circuit breaker replacements (i.e. 11kV).

Other

In accordance to the 'AER Guide to the Repex Model' and the 'AER Repex Tool Tutorial' as provided to Ausgrid by Nuttall Consulting and in the AER website, only '*Non-demand-driven replacement of an asset with its modern-equivalent, where the timing of the need can be directly or implicitly linked to the age of the asset' is applicable to the Repex model.*

As a result, any Replacement or Duty of Care programs that are not age or condition driven is classified as 'Other' asset category (i.e. non-condition driven safety or non-condition driven environmental expenditures). Since these programs have a mixed unit of measure, it is inappropriate to provide summated volumes for these assets. Detailed individual program volume is available and can be provided upon request.

AREA PLANS REPEX PORTIONS

The Repex expenditure portions within the major projects are based on the 2016/17 actual expenditure data using the financial asset class and driver breakdown in CIS BI. Financial asset class is then mapped to the Repex 'Asset Group' and 'Asset Category' as much as reasonably practical.

Since Ausgrid doesn't capture technical data until asset commissioning and due to the long lead time of major projects (Area Plan projects), it is appropriate to partially recognise the asset volume of high-value assets (sub-transmission underground feeders) based on the estimated proportion of expenditure spent in 2016/17. This is based on the percentage of actual expenditure in 2016/17 against the expected total cost multiply by the total volume at project completion. This method ensures that expenditures and volumes for significant expenditures are correlated for Repex modelling.

It is also appropriate to classify the Repex portions of building and distribution assets in the Area Plans as 'Other' asset category. This is because expenditures incurred for building and distribution assets in the Area Plans aren't driven by the age or conditions from these assets themselves. These expenditures are incurred as a part of an enabling scope to replace existing assets (i.e. 11kV load transfer to facilitate the 'brownfield' replacement of 11kV

switchboards). This is not 'like for like' replacement as there is no equivalent asset removal (i.e. incompatible with the modelling concept of '*replacement of an asset with its modern-equivalent')*.

OTHER REPEX EXPENDITURES

System property and support costs (i.e. GIS data capture and switching) associated with Repex is also included as 'Other' asset category.

There were financial adjustments in FY2016/17 which related to employee on-costs and these have been allocated on a direct expenditure basis.

Table 2.2.2 – Descriptor metrics

Demonstrate how the information provided is consistent with the requirements of the Notice

The information in this section is compliant in that actual values are used where possible, and best estimates are provided where actual data is not available.

Explain the source from which Ausgrid obtained the information provided.

The source for the majority of data for this section has been CIS and the GIS IPART financial year reports. CIS data provides data in categories poles, transformers, switchgear, and others (excluding meters) while data for overhead conductors, underground cables and service lines has been sourced from the latest IPART Ausgrid GIS report:

– i.e. ODRC_Zone_Category_Totals_01_07_2016 and ODRC_FINYEAR_2016_NETWORK_AGE_01_07_2016.

Explain the methodology Ausgrid used to provide the required information, including any assumptions Ausgrid made

Asset Volume and Replacements

Quantum of assets replaced during the current financial year was obtained from CIS detailing these aspects for all regulatory identifiers associated with capex programs for both the replacement and Duty of Care Portfolios -Duty of Care expenditure limited to those programs that are safety driven, other than compliance standard changes (as per discussion with the AER). This extract was obtained via a specialised reporting interface, the CAPEX Dashboard, utilising Business Objects. This data is then manually validated by the Performance and Compliance team to confirm volumes replaced during the year.

This extract was then mapped from the relevant regulatory identifier to the associated Repex Asset Group and Asset Category based on primary assignment. In cases where there was either no direct relationship or a many-to-one relationship, methodologies were applied to apportion both the expenditure and replacements across these categories. Further detail on such apportionment is provided below for those cases.

OH Conductor Length by Material Type

To provide the volume of assets currently in commission as at the end of the financial year, the IPART ODRC_Network_Age report extract was then filtered and apportioned to represent the lengths of conductors by category for HV Line/LV Line and Primary Operating Voltage <=330kV by using the conductor material as the primary count. A working file is setup to filter by conductor material to allow calculating of the total lengths by material type.

Replacement volumes were estimated, and this estimation is explained in the following section.

Transformers

Copy in RIN 5.2 Age Profile working data for Distribution and Zone/STS TXs, use the data from the RIN 2.8 worksheet in each Excel work file. Ensure to have the TX MVA data captured for assets currently in Commission (i.e. a "Y" value for include in age profile calculation field)

Replaced = assets with a Decommission Date falling within the current financial year

Disposed of = assets with a Date Retired falling within the current financial year

Explain circumstances where Ausgrid cannot provide input for a variable using actual information, and therefore must provide estimated information:

(i) why an estimate was required, including why it was not possible for Ausgrid to provide actual information.

Pole replacement	Data is not held at the granular level required to populate the asset categories/asset metrics directly.
Pole Top Structures	Data is not held at the granular level required to populate the asset categories/asset metrics directly.
Overhead conductors	Data is not held at the granular level required to populate the asset categories/asset metrics directly.
Underground cables	Data is not held at the granular level required to populate the asset categories/asset metrics directly.

(ii) the basis for the estimate, including the approach used, assumptions made and reasons why the estimate is Ausgrid's best estimate, given the information sought in the Notice.

Pole & Pole-top Structure replacement:

To provide information in the asset group and asset categories, the extract obtained from CIS as detailed above was filtered to display only data associated with pole replacement activities.

For installed assets:

- Pole asset failure information is provided based on historical records.
- Total poles by feeder type were obtained from Ausgrid's GIS. Asset replacements were apportioned on the basis of pole population per feeder type as the historical assignment of feeder and hence feeder category is not held against the retired pole.

Conductors

The conductor lengths were apportioned to provide the required length by feeder category and conductor material. The feeder categories were apportioned on the basis of length of feeder in each class. Similarly the apportionment to material type was also done on the basis of length of conductor in each material class.

Cables

The cable lengths were apportioned to provide the required data by feeder category. The feeder categories were apportioned on the basis of length of feeder in each category class.

Asset Volumes Currently in Commission

Poles

To provide the pole count by Category, a GIS extract on assigned feeder category was used to develop a ratio of poles per feeder category. This ratio was assigned to the pole population by voltage sourced from the RIN Tab 5.2 where voltage <= 22kV.

OH Conductor Length by Feeder Type

To provide the OH conductor lengths by feeder type as at the end of the financial year, the IPART GIS report ODRC_Zone_Category_Totals extract was filtered to only HV/LV Line category (OH only) which has an operating voltage of <=22kV (not including service cables, mains, auxiliary, SL and unknowns). A percentage of category based cable length was calculated and that percentage applied to the source data from the ODRC_Network_Age report.

Ausgrid only applies a feeder type category to feeder cables and conductor with an operating voltage of <=22kV. It's not possible to assign feeder category to feeders above 22kV because they supply networks which would cover multiple feeder categories.

UG Cable Length by Feeder Type

To provide the UG cable lengths by feeder type as at the end of the financial year, the IPART GIS report ODRC_Zone_Category_Totals extract was filtered to only HV/LV Cable category (UG only) which has an operating voltage of <=22kV (excluding service cables, mains, auxiliary, SL and unknowns). A percentage of category based cable length was calculated and that percentage applied to the source data from the ODRC_Network_Age report.

Ausgrid only applies a feeder type category to feeder cables and conductor with an operating voltage of <=22kV. It's not possible to assign feeder category to feeders above 22kV because they supply networks which would cover multiple feeder categories.

Template 2.3 – Augex project data

The information provided in template 2.3 has been completed in accordance with the AER RIN requirements and instructions applying to template 2.3 including Appendix E and F, and the instructions in the worksheet. All tables have been completed.

It should be noted that the financial figures are updated at an exceptional basis as a result of a Financial Adjustments made on the 26th August (i.e. an update of the step change only, NOT a complete re-run of all the reports and analysis).

Table 2.3.1 – Augex Asset Data – Subtransmission Substations, Switching Stations and Zone Substations

Demonstrate how the information provided is consistent with the requirements of the Notice

This response is based on the worksheets and supporting documentation as provided by the AER up until 7th March 2014 and as interpreted by the relevant completing Ausgrid business unit. The information primarily comes from Ausgrid's CIS system or is based on advice from the relevant business unit experts. Subject matter experts were engaged in preparing this information as necessary.

It is worthwhile noting that the technical data for projects still under construction can be an estimates based on the best data available and advice from subject matter experts (i.e. we've consider then as actual in a RIN data entry perspective).

Explain the source from which Ausgrid obtained the information provided.

Sub-transmission projects

- CIS Business Intelligence (BI) reports from the transaction systems as the primary source of historical costs for materials, contract services, other costs, labour and associated man hours (updated for the full 2016/17 actual expenditure data);
- CIS BI reports from the forecasting system as the primary source of forecast costs, asset quantum and allocations requirements when historical information isn't readily available;
- A combination of CIS, GIS, RIC and System Diagrams are used for actual asset quantum and certain technical data.

Explain the methodology Ausgrid used to provide the required information, including any assumptions Ausgrid made

The method and assumptions are as follows:

Step 0. RIN information has been provided in prior years and is deemed to be complaint by the AER. Thus, it is not unreasonable to assume that the 2016/17 RIN should only be an update using the full 2016/17 actual expenditure data unless more accurate data is available that supersede any previous data provided (i.e. this provides a mechanism to improve on data quality).

Step 1. For network projects with expenditure within 2016/17, isolated the associated substation projects with an augmentation component greater than or equal to $5 million over the life of the project (note: Ausgrid uses an incremental capacity methodology to determine its augmentation component as required by the National Electricity Rules (NER)). However, once the applicable projects are determined, the full expenditure for each project is presented (including costs associated with other drivers for expenditure, e.g. replacement) rather than its theoretical fraction.

Step 2. For projects with both substation and sub-transmission lines components, the project is further interrogated into its work breakdown structure (WBS). For projects of this nature, only the expenditure of the substation component will be included. However, for a project with no sub-transmission line components, any associated distribution work to enable the commissioning of the substation will be included (i.e. 11kV connection expenditures).

Step 3. Provide the actual and expected years where expenditures have and will be incurred.

Step 4. For projects with actual incurred expenditure, information is provided in the following order:

- Transformers expenditure (exclude distribution, auxiliary and earthing transformers);
- Switchgear expenditure (include primary switchgears on both the high and low side of the substation);
- Capacitors expenditure (for capacitors within the substations that offer capacitive and voltage support);
- Other plant item expenditure (based on the total 'Material' booked to the project minus item 1, 2 & 3 above);
- Installation labour expenditure (uses the 'Labour-Direct' cost element of the project);
- Installation labour volume (uses associated labour component in project system and payroll);
- Easements expenditure (usually booked against the project itself);
- Civil works expenditure (based on the total 'Contract Services' booked to the project minus item 7 above);
- Other direct expenditure (uses the 'Other-Direct' cost element of the project);
- Land Purchase expenditure (from a separate report as land is booked separately from the project).

Note:

- *Item 1, 2 & 3 above are based on either separate reports that itemises the materials booked to the project more accurately or financial asset class breakdown in CIS BI.*
- *All monetary figures provided in Step 4 are as incurred (i.e. Nominal $).*
- *The monetary figures represent the full cost for the project irrespective of the proportion of augmentation components (see note in Step 1 above).*

Step 5. For projects with expected forecast expenditure, information is provided in the following order;

- For projects already midway through its investment cycle, it is reasonable to assumed that all major equipment is already procured and that the expected forecast expenditure for 'material' is part of 'Other Plant Item' only;
- For projects not yet authorised, the expected 'material' expenditure at the asset category level is used;
- Installation Labour expenditure is determined by peeling out the direct costs component of the expected expenditure using historical cost allocation;
- Installation Labour volume is determined using the result of item 3 above and dividing it by the average unit rate of direct labour ($/man hour);
    - Civil Works expenditure (based on 'Contract Services' cost element);
    - Other Direct expenditure (assumed to be included as part of item 5 above).
    - Any cancelled projects with expenditure in 2016/17 is not included (i.e. total project will be less than $5m)

Note:

- *The monetary figures used in Step 5 are in nominal $.*
- *The monetary figures represent the full cost for the project irrespective of the proportion of augmentation components (see note in Step 1 above).*

Step 6. Ausgrid has no 'Related Party Margins' and/or 'Non-Related Party Contracts'.

Step 7. Provide associated technical information for each project;

- Transformers units added (based on material booked to the project and checked against various corporate systems mentioned above);
- Transformers MVA added (based on information from various corporate systems mentioned above);
- Switchgear units added (based on material booked to the project and checked against various corporate systems mentioned above);

- Capacitors MVAR added (based on information from various corporate systems mentioned above);
- Substation ratings (pre and post), voltages, types and triggers are determined by subject matter experts with reference to project briefs, engineering systems (e.g. Ratings and Impedance Calculator (RIC)).

Ratings used are 'Normal Cyclic' Substation ratings. This is the throughput rating as defined in the notes for RIN Section 2.4. 'Normal condition' for the purposes of the Augex model is defined the planned network configuration, with no assets unavailable due to planned or unplanned outages.

For Project Type, 'New substation establishment' includes projects where a substation is established on a new site, even if it is in part driven by the replacement of an older substation.). Where an upgrade (including changes to primary voltage) occurs on the same location, 'Substation upgrade – capacity' is used.

Explanation of 'Other-please specify' records

A number of substations have the 'Project Trigger' identified as 'Other – please specify'. Summary of Substation Projects with 'Project 'Trigger' identified as 'Other': Information is provided as follows:

Substation ID	Project ID	Primary Trigger	Secondary Trigger
New Alexandria 132/33kV STS (SJ-00091 & SJ-00175)	ARA_03.1A.0028A	Replacement	Augmentation
New Rockdale 132/11kV ZN (SJ-05993)	ARA_04.1.0008	Replacement	Augmentation
Engadine ZN 132kV Conversion (SJ-04726 & SJ-05749)	ARA_04.2.0015	Replacement	Augmentation
Crows Nest ZN 132kV Conversion (SJ-05651)	ARA_05.1.0006	Replacement	Augmentation
New Broadmeadow 132/11kV ZN (SJ-04866 & SJ-00008)	ARA_07.1.0006	Replacement	Augmentation
New Charlestown 132/11kV ZN (SJ-05319 & SJ-06071)	ARA_07.5.0005	Replacement	Augmentation
New Aberdeen 66/11kV Zone (SJ-05634 & SJ-06031)	ARA_08.2.0014	Replacement	Augmentation

Step 8. Assign primary and secondary trigger for each project identified above. For projects where the primary trigger is augmentation, 100% of the project cost is considered to be augmentation. For projects where the primary driver is not augmentation, it is excluded from table 2.3.1 since having it there will contradict with the requirement to meet Schedule 2, Appendix E, 7.1 (a) of the RIN requirement as highlighted to us by NSW Audit. Please note that as outlined in the table above (step 7), the projects with a secondary trigger in augmentation exceeding $5m is identified and their relevant information is readily available to review upon request.

Step 9*. As requested in Appendix E, 1.9 and 1.10 then later specified in 7.2 (c) the actual and forecast expenditures derived from the steps above are converted into real dollars ($2012-13) using the following % CPI and indexations (which is then applied as an average escalation factor based on the years incurred):*

	FY2006/07	FY2007/08	FY2008/09	FY2009/10	FY2010/11	FY2011/12	FY2012/13	FY2013/14	FY2014/15	FY2015/16	FY2016/17	FY2017/18	FY2018/19
Assumed CPI	2.33%	4.35%	1.82%	2.85%	3.39%	2.30%	2.28%	2.71%	1.71%	2.32%	1.70%	1.96%	2.24%
Indexation for Real 12/13	1.183	1.156	1.108	1.088	1.058	1.023	1.000	0.973	0.956	0.934	0.918	0.900	0.880

Note that as required by Appendix E, 1.15, all the expenditures figures derived above are 'Direct Costs' only.

Explain circumstances where Ausgrid cannot provide input for a variable using actual information, and therefore must provide estimated information:

(i) why an estimate was required, including why it was not possible for Ausgrid to provide actual information;

Sub-transmission projects

- The process to filter out the applicable projects above (Step 1) is by nature a theoretical estimation of the associated augmentation component. Naturally, it is not considered an estimate if the project is deem to be 100% augmentation.

- As a result of how the template is setup, there is no mean to provide sensible inputs without resorting to a primary/secondary trigger to select meaningful projects applicable for this table and meet the RIN requirements at the same time.
- Any expected forecast expenditure is by nature an estimate.
- The conversion from actual dollars (nominal) to real dollars ($2012-13) is by nature an estimate.

There are no other estimates outside of what has already been stated for table 2.3.1 above.

(ii) the basis for the estimate, including the approach used, assumptions made and reasons why the estimate is Ausgrid's best estimate, given the information sought in the Notice.

Sub-Transmission projects

- The calculation for the augmentation component is based on a comparison between the preferred project that meet all identified network requirements versus a theoretical alternate project where no capacity constraints exists (i.e. incremental capacity methodology). It is the best estimate because it is deemed that this is the most correct method to satisfy the regulatory investment test under chapter 5 of the NER.
- The method used to determine primary/secondary trigger is based on the severity of need. This can be measure using a combination of financial difference, time criticalness and other measurable impacts. This is in line with how some DNSP evaluation their drivers.
- Please refer to Ausgrid's Area Plans documentations which outline the approach and assumption for the major project estimates provided.

The following are calculations requested by this table that are carried out outside of the processes in the steps above:

- Since indirect costs (i.e. Indirect Labour and Indirect Other) are embedded into the total labour cost within the forecast system, an allocation approach is used to separate the associated direct labour component. It is deemed that historical cost elements provide the most suitable basis for this allocation.
- The forecast installation labour volume is determined using the indirect labour derived above and dividing it by the average unit rate of direct labour ($/man hour). It is deemed that this is a reasonable approach given the timeframe and practicality of carrying out detail resource requirement against each project.

The procedure to populate Table 2.3.1 involved extensive manual analysis of information, as Ausgrid does not have any automated systems to generate this type of information. As this is the only method for Ausgrid to populate Table 2.3.1 the information used is the best available.

Table 2.3.2 – Augex Asset Data – Subtransmission Lines

Demonstrate how the information provided is consistent with the requirements of the Notice

This response is based on the worksheets and supporting documentation as provided by the AER up until 7th March 2014 and as interpreted by the relevant completing Ausgrid business unit. The information primarily comes from Ausgrid's CIS system or is based on advice from the relevant business unit experts. Subject matter experts were engaged in preparing this information as necessary.

It is worthwhile noting that the technical data for projects still under construction can be an estimates based on the best data available and advice from subject matter experts (i.e. we've consider then as actual in a RIN data entry perspective).

Explain the source from which Ausgrid obtained the information provided.

- CIS Business Intelligence (BI) reports of the transaction systems as the primary source of historical costs for materials, contract services, other costs, labour and associated man hours (updated for the full 2016/17 actual expenditure data);
- CIS BI reports of the forecasting system as the primary source of forecast costs, forecast asset quantum and allocations requirements when historical information isn't readily available;

- GIS Transmission Feeder Reports for actual asset quantum;
- Project Offers on any authorised projects for expected asset quantum.

Explain the methodology Ausgrid used to provide the required information, including any assumptions Ausgrid made

The method and assumptions are as follows:

Step 0. 2013/14 and 2014/15 RIN information has been provided in prior years and is deemed to be complaint by the AER. Thus, it is not unreasonable to assume that the 2016/17 RIN should only be an update using the full 2016/17 actual expenditure data unless more accurate data is available that supersede any previous data provided (i.e. this provides a mechanism to improve on data quality).

Step 1. For network projects with expenditure within 2009/10-2018/19, isolate the associated substation projects with an augmentation component greater than or equal to $5 million over the life of the project (note: Ausgrid uses an incremental capacity methodology to determine its augmentation component as required by the National Electricity Rules (NER)). However, once the applicable projects are determined, the full expenditure for each project is presented (including costs associated with other drivers for expenditure, e.g. replacement) rather than its theoretical fraction.

Step 2. For projects with both substation and subtransmission lines components, the project is further interrogated into its work breakdown structure (WBS). For projects of this nature, the substation component is excluded from the overall project costs. Thus, any associated distribution works will be included. This ensures that table 2.3.1 and 2.3.2 sums to the full cost of each project.

Step 3. Provide the actual and expected years where expenditures have and will incurred (note: project expenditures pre-2007/08 are not readily available due to the switching of financial systems at the time). In addition, data pre-2009/10 might not be as robust/accurate as recent data due to changes in booking practices.

Step 4. For projects with actual incurred expenditure, information is provided in the following order:

- Other plant item expenditure (uses the full 'material' cost element as expenditure cannot be readily separated sensibly and consistently for either overhead or underground construction);
- For 2016/17, some overhead/underground construction split is possible using financial asset class breakdown;
    - Installation labour expenditure (uses the 'Labour-Direct' cost element of the project);
    - Installation labour volume (uses associated labour component in project system and payroll);
    - Easements expenditure (usually booked against the project itself);
    - Civil works expenditure (based on the total 'Contract Services' booked to the project minus item 4 above);
    - Other direct expenditure (uses the 'Other-Direct' cost element of the project);
- Land purchase expenditure (assume no land purchases associated with lines and cables).

Note:

- *All monetary figures provided in Step 4 are as incurred (i.e. Nominal dollars).*
- *The monetary figures represent the full cost for the project irrespective of the proportion of augmentation components (see note in Step 1 above).*

Step 5. For projects with expected forecast expenditure, information is provided in the following order:

- For projects already midway through its investment cycle, it is reasonable to assume that all major equipment is already procured and that the expected forecast expenditure for 'material' is part of 'Other Plant Item' only;
- For projects not yet authorised, the expected 'material' expenditure at the asset category level is used;

- Installation Labour expenditure is determined by peeling out the direct costs component of the expected expenditure using historical cost allocation;
- Installation labour volume is determined using the result of item 3 above and dividing it by the average unit rate of direct labour ($/man hour);
- Civil works expenditure (based on 'Contract Services' cost element);
- Other direct expenditure (assumed to be included as part of item 5 above).

Note:

- *All monetary figures used in Step 5 are in nominal $.*
- *The monetary figures represent the full cost for the project irrespective of the proportion of augmentation components (see note in Step 1 above).*

Step 6. It is reasonable to assume that Ausgrid have no 'Related Party Margins' and/or 'Non-Related Party Contracts'.

Step 7. Provide associated technical information for each project;

- Underground Circuit KM Added (for actual use GIS data and for expected use Project Offer or Forecast System data);
- Overhead Lines Circuit KM Added (for actual use GIS data and for expected use Project Offer or Forecast System data);
- Poles/Towers Added (is based item 2 above divided by an average span length of 75m);
- Route Line Length Added (based on subject matter expert investigations and advice);
- Project type, trigger and voltage determined by subject matter experts with reference to project briefs and engineering systems.

Explanation of 'Other-please specify' records:

- For one project – ARA_05.1.0006 – Project Type is listed as 'Other-please specify'. This project covers installation of 132kV cable sections and termination works related to the conversion of Crows Nest zone substation into 132kV operation.
- A number of project triggers are listed as 'Other – please specify'. These projects are primarily driven by condition issues, where some incremental additional capacity is installed due a forecast need for greater capacity in future, where economical to do so. The summary of these projects is below:

Substation ID	Project ID	Primary Trigger	Secondary Trigger
New Alexandria STS 132kV connection works (SI-00172)	ARA_03.1A.0028A	Replacement	Augmentation
New Rockdale ZN 132kV connection works (SJ-06161)	ARA_04.1.0008	Replacement	Augmentation
Engadine ZN 132kV feeders 285, 286 & 289 (SI-05747)	ARA_04.2.0013	Replacement	Augmentation
Crows Nest ZN 132kV connection works (SJ-05651)	ARA_05.1.0005	Replacement	Augmentation
132kV fdrs 9E3 9E4/2 Lindfield-Willoughby replacement (SJ-06046)	ARA_05.1.0008	Replacement	Augmentation
New Broadmeadow ZN 132kV connection works (SJ-04866)	ARA_07.1.0006	Replacement	Augmentation
New Charlestown ZN 132kV connection works (SJ-05319)	ARA_07.5.0005	Replacement	Augmentation
New Aberdeen ZN 66kV feeders 82257 & 82244 (SJ-05634)	ARA_08.2.0014	Replacement	Augmentation

Three projects (ARA_07.6.0009, ARA_07.8.0003 and ARA_07.8.0023A) have 'Other' listed in the Voltage field. These are all 33kV feeder connection projects.

Step 8. Assign primary and secondary trigger for each project identified above. For projects where the primary trigger is augmentation, 100% of the project cost is considered to be augmentation. For projects where the primary driver is not augmentation, it is excluded from table 2.3.2 since having it there will contradict with the requirement to meet Schedule 2, Appendix E, 7.1 (a) of the RIN requirement as highlighted to us by NSW Audit. Please note that as outlined in the table above (step 7), the projects with a secondary trigger in augmentation exceeding $5m is identified and their relevant information is readily available to review upon request.

Step 9. Derive the Poles/Towers expenditures using Step 7 – item 3 above and an average unit rate of $1,200 per supporting structure). This derived expenditure is subtracted from the Other Plant Item expenditure in Step 4 – item 1 above to ensure that the overall project expenditure remains the same.

Step 10. As requested in Appendix E, 1.9 and 1.10 then later specified in 7.3 (c) the actual and forecast expenditures derived from the steps above are converted into real dollars ($2012-13) using the following % CPI and indexations (which is then applied as an average escalation factor based on the years incurred):

	FY2006/07	FY2007/08	FY2008/09	FY2009/10	FY2010/11	FY2011/12	FY2012/13	FY2013/14	FY2014/15	FY2015/16	FY2016/17	FY2017/18	FY2018/19
Assumed CPI	2.33%	4.35%	1.82%	2.85%	3.39%	2.30%	2.28%	2.71%	1.71%	2.32%	1.70%	1.96%	2.24%
Indexation for Real 12/13	1.183	1.156	1.108	1.088	1.058	1.023	1.000	0.973	0.956	0.934	0.918	0.900	0.880

Note that as required by Appendix E, 1.15, all the expenditures figures derived above are 'Direct Costs' only.

Explain circumstances where Ausgrid cannot provide input for a variable using actual information, and therefore must provide estimated information:

(i) why an estimate was required, including why it was not possible for Ausgrid to provide actual information;

Estimates were provided for the following reasons:

- The process to filter out the applicable projects above (Step 1) is by nature a theoretical estimation of the associated augmentation component. Naturally, this is not an issue for projects deem to be 100% augmentation.
- As a result of how the template is setup, there is no mean to provide sensible inputs without resorting to a primary/secondary trigger to select meaningful projects applicable for this table and meet the RIN requirements at the same time.
- Any expected forecast expenditure is by nature an estimate.
- Specific expenditure regarding underground cables are not available in the corporate transaction systems as subtransmission underground works are competitive tendered and the cable costs are typically imbedded as part of the invoice deemed as contract services. As such no sensible estimate can be made as the procurement cost for material varies between service providers and is not typically privilege information.
- Circuit KM Upgraded is simply not captured in any known system and cannot be readily determine as there are no sensible information that to use as point of reference.
- Although some Poles/Towers Added can be found within each project, it is proven that the asset counts in the system are inaccurate and not sensible compare to the actual Circuit KM Added. As such, it is more appropriate to provide an estimate using the actual Circuit KM Added and the average span distances between two common types of constructions.
- As a result of item 5 above, an effort is made to provide Poles/Towers expenditure using an average unit rate of $1,200 per supporting structure.
- The conversion from actual dollars (nominal) to real dollars ($2012-13) is by nature an estimate.

(ii) the basis for the estimate, including the approach used, assumptions made and reasons why the estimate is Ausgrid's best estimate, given the information sought in the Notice.

The basis for the estimates and the reason why they are the best estimates:

- The calculation for the augmentation component is based on a comparison between the preferred project that meet all identified network requirements versus a theoretical alternate project where no capacity

constraints exists (i.e. incremental capacity methodology). It is deemed that this is the only method that satisfies the regulatory investment test under chapter 5 of the NER.

- The method used to determine primary/secondary trigger is based on the severity of need. This can be measure using a combination of financial difference, time criticalness and other measurable impacts. This is in line with how some DNSP evaluation their drivers.
- Ausgrid's Area Plans documentation outlines the approach and assumption made for the project estimates provided. The Area Plans are provided as part of the regulatory proposal.

The following are calculations requested by RIN 2.3.2 that is carried outside of the processes in the steps above:

- Since indirect costs (i.e. 'Indirect Labour' and 'Indirect Other') are embedded into the total labour cost of the forecast system, an allocation approach is used to separate the associated direct labour costs. It is deem that historical cost elements provide the most suitable basis for this allocation.
- Installation labour volume is determined using the indirect labour derived above and dividing it by the average unit rate of direct labour ($/man hour). It is deemed that this is a reasonable approach given the timeframe and practicality of carrying out detail resource requirement against each project.
- In principle, when an estimate cannot be provided, it is because any known attempt to create this data is baseless and potentially leads to further misunderstanding of the information sought in the notice.

The procedure to populate table 2.3.2 involved extensive manual analysis of information, as Ausgrid does not have any automated systems to generate this type of information. As this is the only method for Ausgrid to populate table 2.3.2, the information used is the best available.

Table 2.3.3 – Augex Data – HV/LV Feeders and Distribution Substations

Demonstrate how the information provided is consistent with the requirements of the Notice

This response is based on the worksheets and supporting documentation as provided by the AER and as interpreted by the relevant completing Ausgrid business unit. The information primarily comes from Ausgrid's CIS system or is based on advice from the relevant business unit experts. Subject matter experts were engaged in preparing this information as necessary.

Explain the source from which Ausgrid obtained the information provided.

The information sources are from:

- HV Feeder Augmentation – Overhead (OH) Lines (Circuit km added) Actual + Authorised: Actual lengths sourced from GIS report of OH Lines proposed under 11kV capacity projects. List of projects is from CIS and Projtrak. Actual line commissioning dates sourced from GIS reports. Actual project commissioning dates and project status sourced from CIS BI. Note: Projects that involve the augmentation at the HV feeder level for the purpose of increasing capacity at the sub-transmission level have not been included.
- HV Feeder Augmentation – UG Cables (Circuit km added) – Actual + Authorised: Actual lengths sourced from GIS report of UG Cables proposed under 11kV capacity projects. List of projects is from CIS and Projtrak. Actual cable commissioning date sourced from GIS reports. Actual project commissioning date and project status sourced from CIS BI. Note: Projects that involve the augmentation at the HV feeder level for the purpose of increasing capacity at the sub-transmission level have not been included.
- HV Feeder Augmentations (Expenditure) – Overhead Lines and Underground Cables: Actual spend per fiscal year was obtained from CIS and BI.

Distribution Substations

The information for the number of added and upgraded substations came from Ausgrid's ERP CIS for the population of RIN table 2.3.3.1. A Business Objects (CIS) report identified the substations with a commissioned date between 1/7/2016 & 30/06/2017 including any asset information required to apportion this data across the nominated asset categories. This was interrogated with asset accounting information to give the substations commissioned and decommissioned to calculate the respective *added* values. Apportionment was required to categorise the substations which are commissioned but associated with projects not financially closed. Five years of details was used to apportion these details, consistent with previous RIN returns.

GIS queries were used to determine the length of cables installed under the augex projects completed in fiscal year 2016/17. The asset quantities for the as yet to be completed projects will be included in future Ausgrid RIN returns. Ausgrid utilised the substation location type to categorise into the type of substations based upon actual values.

The data required for RIN table 2.3.3.2 was generated using the costs booked to the Distribution Substation Capacity program and the forecasted unit costs for the respective categories. This information is consistent with Ausgrid's transitional and substantive proposals cost of delivery model.

LV Feeder Augmentations

The information required by RIN table 2.3.3.1 of HV and LV feeder lengths added and upgraded in km was derived from Ausgrid's GIS records of commissioned conductors, split by conductor types to show HV and LV feeder conductors and linked to the year the conductor was installed against the respective CIS project. Cable installed is derived from GIS details as the CIS system current doesn't record installed cable by project.

The asset quantities for the yet to be completed projects will be included in future Ausgrid RIN returns.

Overhead lines and underground Cables actual spend per fiscal year was obtained from CIS and BI.

Explain the methodology Ausgrid used to provide the required information, including any assumptions Ausgrid made

HV Projects

The method used to provide the required information involved:

Step 1. A report of all 11kV capacity projects undertaken in the 2016/17 period was extracted from CIS BI. The Proj trak numbers for these projects was sourced from the Distribution Planning DPS Register and the Proj trak database.

Step 2. A report was obtained from the GIS listing all OH Lines and UG Cables that were installed which included the associated 11kV capacity project Proj trak number. Each cable/line also has a proposed/completed status with a commissioning date. The status for each cable/line in the GIS extract represents the status of the associated project. The commissioning date for each cable/line represents the date the cable/line was commissioned. There are some instances where the cable/line was commissioned but the associated project was not yet completed. These lengths of these cables/lines have been included in the table. Only a material project (total cumulative expenditure over the life of the project is greater than or equal to $0.5 million) has been considered and inputted into Table 2.3.3.1 of the RIN.

Step 3. For Cost Metrics (table 2.3.3.2): The total spend for the 2016/17 financial year was obtained from CIS BI through the financial asset class breakdown.

Step 4. Upgrade data in table 2.3.3 is not available as Ausgrid does not capture asset data at that level of granularity. However, it is estimated that the amount of upgrade should be immaterial and is thus assumed to be zero.

Note: All monetary figures in table 2.3.3.2 used above are as incurred (i.e. Nominal $).

Distribution Substations

The split between new and upgraded distribution substations in RIN table 2.3.3.1 was achieved by:

- Assuming all PTs are new (i.e. a pole substation is not "upgraded" as the replacement of the transformer is fundamentally a change of the entire substations and generally no other equipment is required to be augmented for capacity related reasons).
- The split between added and upgraded for ground and indoor substations was achieved based on completed projects during the years 2009 to 13 which was taken to be representative of the split for the regulatory period. This split is shown in the table below. For the purposes of the split, given the substantial cost difference, ground-mounted substations were assumed to be pad-mounted or kiosk substations; and indoor substations were assumed to be any other built structure including those with a combination of indoor and outdoor equipment and outdoor enclosures (i.e. equipment is all outdoor).

	Upgraded		Added	
Ground-mounted	121	51%	117	49%
Indoor	7	64%	4	36%

The data in RIN table 2.3.3.2 splits the Distribution Substation Capacity (SY.01.03) programme cost across the three categories based on the relative cost of delivery of projects and the quantities added and upgraded in each category.

LV Feeder Augmentations

The LV feeder information derived from reported GIS figures was based upon a provided list of projects with a capacity related augmentation driver. All cable installed under these projects in the GIS was then split into underground and overhead conductors based on conductor codes.

For LV feeders the split between added and upgraded was not able to be accurately determined based on the available information as the GIS does not link the new conductor with any instance of a replaced conductor in a way which would enable reporting of this metric. It was assumed that all underground conductor was "new" and all overhead conductor was "upgraded" based on the following reasoning:

- In general, extensions of the LV network are undertaken with entirely underground LV conductors particularly within urban areas.
- The majority of properties within Ausgrid's network have existing conductors adjacent. Where the augmentation is not driven by a customer connection it is assumed that these conductors are available. Therefore the main reason for installing overhead conductors in Ausgrid's franchise area is to rectify a capacity constraint in the existing conductor and hence falls into the "upgraded" category.
- While some underground conductors are installed as part of a capacity related augmentation to replace existing under-sized underground conductors, the proportion of underground conductors installed for this reason under an augmentation driver is minor compared to the instance of additional conductor installed underground to connect a new distributor from a ground-mounted or indoor substation to the overhead LV network via an adjacent UGOH.

The total spend for the 2016/17 financial year was obtained from CIS BI through the financial asset class breakdown.

Explain circumstances where Ausgrid cannot provide input for a variable using actual information, and therefore must provide estimated information:

(i) why an estimate was required, including why it was not possible for Ausgrid to provide actual information;

HV Projects

- Ausgrid doesn't capture data associated with upgrade at the asset level and thus an estimate is made.

(ii) the basis for the estimate, including the approach used, assumptions made and reasons why the estimate is Ausgrid's best estimate, given the information sought in the Notice.

HV Projects

- For distribution mains, it is seldom for cables or lines to be removed from an augmentation project. Even in upgrade situations where a small capacity cable is replaced by a larger capacity cable for augmentation reasons, the network is typically rearranged so that the smaller capacity cable provides additional capacity support to the network.

Note that re-conductoring is not considered to be line removal since the majority of the supporting structure remains in place (i.e. it is considered an upgrade)

Distribution Substations

The quantities of substations added and upgraded in the 2016/17 financial year were not able to be accurately determined due the timing of substations being installed, but not financially completed. These works form part of the actual costs for the fiscal year and are classified as work in construction. The known quantity for this period is the cost booked to the Distribution Substation Capacity (SY.01.03) programme. Therefore, the quantities added or upgraded for this period are assumed to be equal to the average of the following five (5) financial years weighted to match the known programme cost in the 2016/17 financial year.

This estimate is the best available estimate as it uses the known reliable data for the period in conjunction with the data for the following financial years average to reduce the impact on year-on-year variation.

The available ERP CIS data does not differentiate between a commissioned date for an upgraded substation, and that of a newly commissioned substation. As such the actual data for the number of substations added and upgraded is not available. The estimated split of added/upgraded is based upon an analysis of substation projects from the current regulatory period and the quantities added or upgraded. This is the best available estimate that represents a reasonable investment of time and resources given the prohibitive cost of manually calculating the full data for the other five (5) financial years.

The Distribution Substation data in RIN table 2.3.3.2 is split based on the relative cost of projects in the defined categories of pole-mounted, ground-mounted, and indoor. This split is based upon an analysis of substation projects from the current regulatory period and the costs incurred by projects completed. This is the best available estimate that represents a reasonable investment of time and resources given the prohibitive cost of manually calculating the full data for the other five (5) financial years.

LV Feeder Augmentations

The quantities of underground and overhead conductor classified as “added” and “upgraded” in RIN table 2.3.3.1 are not available due to the limitations of the data recorded in GIS. There is no way of determining at a high level what quantities of underground and overhead cable belong in each category without detailed analysis of individual projects which is cost prohibitive. The assumptions made represent the best available approximation of the actual data based upon the known approaches to augmentation within Ausgrid’s network.

The LV feeder data in RIN table 2.3.3.2 is split based on the relative cost of projects in the defined categories of underground and overhead conductors. This split is based upon an analysis of LV Feeder projects from the current transitional and substantive regulatory proposal based upon a representative sample of projects completed included in Ausgrid’s Cost to Deliver model.

This is the best available estimate that represents a reasonable investment of time and resources given the prohibitive cost of manually calculating the full data for the other five (5) financial years.

Both the Distribution Substation and LV Feeder Augmentation expenditures are as incurred (i.e. Nominal $).

Table 2.3.4 – Augex Data – Total Expenditure

Demonstrate how the information provided is consistent with the requirements of the Notice

This response is based on the worksheets and supporting documentation as provided by the AER up until 7th March 2014 and as interpreted by the relevant completing Ausgrid business unit. The information primarily comes from Ausgrid’s CIS system or is based on advice from the relevant business unit experts. Subject matter experts were engaged in preparing this information as necessary.

Explain the source from which Ausgrid obtained the information provided.

- CIS Business Intelligence (BI) reports from the transaction systems as the primary source of historical expenditure and allocations;

Explain the methodology Ausgrid used to provide the required information, including any assumptions Ausgrid made

Step 1. Produce a BI report in both a driver and financial asset category dimension format for 2016/17 with cost element breakdown.

Step 2. Identify direct cost elements and map each financial asset category into the asset category for table 2.3.4.

Step 3. Pro-rata -$2.1m long service leave provision across each asset category.

Note that as required by Appendix E, 1.15, all the expenditures figures derived above are 'Direct Costs' only.

Note: All monetary figures in table 2.4 used above are as incurred (i.e. Nominal $).

Explain circumstances where Ausgrid cannot provide input for a variable using actual information, and therefore must provide estimated information:

(i) why an estimate was required, including why it was not possible for Ausgrid to provide actual information;

(ii) the basis for the estimate, including the approach used, assumptions made and reasons why the estimate is Ausgrid's best estimate, given the information sought in the Notice.

Table 2.3.4 should reconcile with the sum of the augmentation expenditure from Table 2.3.1 to Table 2.3.3.2 given that the following variations are taken into consideration:

- Table 2.3.1 and 2.3.2 exclude dedicated distribution asset projects for sub-transmission purposes (i.e. Strategic 11kV load transfers to relieve zone capacity).
- As previously stated above, the expenditure in Table 2.3.1 and Table 2.3.2 represent full project expenditures rather than its theoretical fraction. On the other hand, projects with augmentation component where the primary driver is not augmentation are not included.
- Table 2.3.1 and 2.3.2 exclude projects with a life time cost of less than $5m or any cancelled projects with expenditures in 2016/17.
- Direct support costs like switching and GIS are excluded from the tables Table 2.3.1 to Table 2.3.2. Due to their non-Augex nature, switching and GIS above are considered as 'Other Assets' in table 2.3.4 (i.e. not considered to be demand driven).
- While Table 2.3.1 to Table 2.3.2 is presented in real dollars ($2012-13) as required in the RIN requirements, Table 2.3.4 is presented in nominal $ (due to its hardcode link to Table 2.1).

Template 2.5 – Connections

The information provided in template 2.5 has been completed in accordance with the AER RIN requirements and instructions applying to template 2.5 including Appendix E and F, and the instructions in the worksheet.

Table 2.5.1 – Descriptor Metrics

Demonstrate how the information provided is consistent with the requirements of the Notice

This response is based on the same preparation of worksheets and supporting documentation used in the Reset RIN. The information at an aggregated level primarily comes from Ausgrid's SAP or GIS systems or is based on advice from the relevant business unit experts. Subject matter experts were engaged in preparing this information as necessary.

Explain the source from which Ausgrid obtained the information provided.

The information was obtained from SAP and GIS. The SAP Business Intelligence and Business Object reports were used as a basis for determining costs associated with different types of connections. Customer project numbers have been sourced from SAP and Business Intelligence reporting.

Since Ausgrid operates in a contestable environment, the connection volumes are provided to reflect the number of connections with capital contributions from Ausgrid. These connections can be carried out by external ASPs or carried out by Ausgrid as contestable connections. Ausgrid capital contributions include reimbursements to ASPs, CIA95B works where Ausgrid undertakes part of a contestable connection projects because it is deemed to be a risk to safety or the network, free issue materials or substation upgrades / network augmentation projects undertaken by Ausgrid to accommodate the network and part of the cost can be co-ordination cost (ancillary cost) caused by the booking practices of the local working groups.

Since Ausgrid does not categorise connection projects in the way the RIN has requested them it was necessary to rely on an analysis of projects completed in 2016/17 to split volumes and the year to date spend of the projects with Connections driver to split expenditure. Projects were categorised on the basis of existing categorisation at the individual project level. The volume is from the completed projects and the expenditure covers not only completed projects but also incomplete projects, it is not recommended to benchmark unit cost from dividing the expenditure by the volume.

Expenditure in this area has been impacted by a change in Ausgrid's Customer Connection Policy back in 2014/15 to comply with AER Connection Charge Guidelines. In the new policy, Ausgrid is not required to provide capital contributions, so the expenditure of this RIN template will ease as the legacy payment of the connections projects agreed under the old Customer Connection Policy winds down. This is outlined in Ausgrid's Connection Policy which has been provided as part of the regulatory proposal.

Explain the methodology Ausgrid used to provide the required information, including any assumptions Ausgrid made

The SAP system was interrogated to obtain the connection volume of projects with Ausgrid capital contributions completed in 2016/17, their connection dates, connection type (commercial, residential etc.) ,connection configuration types (Underground or Overhead) and other details. This was then queried directly with the GIS database, to determine the length of net circuit added (HV or LV). To determine whether the projects are completed is based on their status of showing either "PC" or "FC" and the date for their completion is based on the "PC" milestone date.

The SAP Business Intelligence report was used as a basis for determining the volume associated with Distribution Centres (DC's) installed as a part of a customer's installation and the split of residential and commercial is obtained from the project category field in the same report. A SAP Ratings report was utilised to determine the total MVA added to the network based on the substation numbers obtained from the SAP BI report. The Ratings report provided the rated kVA, which was in turn converted to MVA. To obtain the spend on DC's estimates for typical DC installation jobs is from the same approach as using SAP BI report but include the incomplete projects which incurred cost in 2016/17.

High Voltage (HV) and Low Voltage (LV) network augmentation information for the net circuit km added was provided by GIS system mentioned earlier based on the projects completed in 2016/17. Any cable installed in association with a project which is still 'in construction' will be allocated to a future RIN response when complete.

However the cost of HV and LV network augmentation was obtained from SAP BI report of the projects incurred cost in 2016/17 with the split based on the project sub-category field. The cost includes any projects which are still 'in construction'.

The costs specific to different types of connection projects were extracted from SAP with the same approach of splitting connection types and configuration types as the volumes. The support costs from Control Room and GIS team were prorated between the connection projects based on actual costs. The method relies on the accuracy of the connection description and category entered in SAP by the relevant user.

The negative expenditure on some of the items relates to a correction of historical bookings.

The mean number of days to connect a single phase LV residential customer utilised information obtained from SAP (according to 'sales documents' generated for customer invoicing) and subject matter experts and only relates to connection work completed by Ausgrid as a L2 Accredited Service Provider as this work is contestable in NSW with the majority being completed by others. The volume of GSL breaches, customer complaints and payments relating to connection services for residential customers were also obtained from SAP and subject matter experts.

Ausgrid has no volume but some expenditure to report in relation to Embedded Generation other than Alternative Control Services in worksheet 4.3 Ancillary Services - Fee Based services and 4.4 Ancillary Services - Quoted Services. This misalignment is caused by the sourcing difference for volume and expenditure, as mentioned earlier the volume is from the projects completed in 2016/17 which is none from Ausgrid for embedded generation while the expenditure covered incomplete projects carried out in 2016/17.

We assumed that units greater than 5MVA capacity would require a new connection and any work required to connect would be totally at the proponent's costs. Ausgrid has no records of augmentation as a result of connecting an embedded generator.

Support costs, including GIS and Network Control costs are not booked directly to projects so these costs have been allocated on a pro-rata basis.

Explain circumstances where Ausgrid cannot provide input for a variable using actual information, and therefore must provide estimated information:

(i) why an estimate was required, including why it was not possible for Ausgrid to provide actual information;

N/A.

(ii) the basis for the estimate, including the approach used, assumptions made and reasons why the estimate is Ausgrid's best estimate, given the information sought in the Notice.

N/A.

Table 2.5.2 – Cost Metrics by Connection Classification

Demonstrate how the information provided is consistent with the requirements of the Notice

This response is based on the same preparation of worksheets and supporting documentation used in the Reset RIN. The information at an aggregated level primarily comes from Ausgrid's SAP system or is based on advice from the relevant business unit experts. Subject matter experts were engaged in preparing this information as necessary.

Explain the source from which Ausgrid obtained the information provided

The information was obtained from SAP and GIS. The SAP Business Intelligence and Business Object reports were used as a basis for determining expenditure associated with new residential & commercial connections.

Connection figures for Table 2.5.2 were obtained from a detailed analysis of projects initiated by the Customer Connection driver. This was required because projects were not categorised in Ausgrid's systems in the same way as the AER's RIN categories.

The total volume and the expenditure of 2016/17 is obtained from SAP Business Intelligence and then split by connection type by analysing the connection projects' category and subcategory.

As mentioned earlier under 2.5.1, the volume of this template is sourced from the connections projects completed in 2016/17 while the expenditure includes the expenditures of the projects still in construction.

Explain the methodology Ausgrid used to provide the required information, including any assumptions Ausgrid made

The information was obtained from SAP and GIS. The SAP Business Intelligence and Business Object reports were used as a basis for determining expenditure associated with new residential & commercial connections.

Connection figures for Table 2.5.2 were obtained from a detailed analysis of projects' category and subcategory within the Customer Connection program. This was required because projects were not categorised in Ausgrid's systems in the same way as the AER's RIN categories.

Ausgrid has no volume but some expenditure to report in relation to Embedded Generation other than Alternative Control Services in worksheet 4.3 Ancillary Services - Fee Based services and 4.4 Ancillary Services - Quoted Services. This misalignment is caused by the sourcing difference for volume and expenditure, as mentioned earlier the volume is from the projects completed in 2016/17 which is none from Ausgrid for embedded generation while the expenditure covered incomplete projects carried out in 2016/17.

Explain circumstances where Ausgrid cannot provide input for a variable using actual information, and therefore must provide estimated information:

(i) why an estimate was required, including why it was not possible for Ausgrid to provide actual information;

Connection projects are not categorised in Ausgrid's systems in the same way as the AER's RIN categories.

(ii) the basis for the estimate, including the approach used, assumptions made and reasons why the estimate is Ausgrid's best estimate, given the information sought in the Notice.

As a result, the information provided has been allocated to the various RIN categories on the basis of the most appropriate internal categorisation.

Template 2.6 - Non-network expenditure

The information provided in template 2.6 has been completed in accordance with the AER RIN requirements and instructions applying to template 2.6 including Appendix E and F, and the instructions in the worksheet.

Table 2.6.1 – Non-Network Expenditure

Demonstrate how the information provided is consistent with the requirements of the Notice
Actual data for the period 2016/17 has been based on an extraction of actual financial data directly from our SAP financial system or via TM1. As such, the prevailing entries represent a subset of figures that have been reported in our annual audited financial statements and have been made in accordance with our CAM at the time of entry.

It should be noted that all costs shown exclude overhead and/or other costs that are not directly attributable to the non-network assets, as defined by the AER's RIN instructions. Furthermore, all financial data as it relates to IT & Communications, Property & Vehicle expenditure has been extracted via either TM1 or directly from SAP and represents a subset of the financial figures as reported in our annual audited financial statements, with any assumptions in respect of the basis for estimating the respective allocation between cost categories noted within the Basis of Preparation.

All the required categories of expenditure for Operating and Capital expenditure contained in tables 2.6.1, 2.6.2 and 2.6.3 have been completed. No further categories were considered material enough to be reported individually.

Where there has been a variation to the above approach it has been disclosed in the relevant sections below.

Explain the source from which Ausgrid obtained the information provided.

Actual data for the period 2016/17 has been based on an extraction of actual financial data directly from our SAP financial system or via TM1. Specific details of exact sources of information are shown in the below table:

Summary for Table 2.6.1 – Non-Network Expenditure

Expense Category	Source
IT & Communications Opex	SAP via TM1 data extraction and non-financial information noted below
IT & Communications Capex	SAP via BI data extraction and ICT project information
Motor Vehicles Opex	SAP via TM1 data extraction, FigFleet System and non-financial information noted below
Motor Vehicles Capex	SAP via BI data extraction, FigFleet System and non-financial information noted below
Building and Property Opex	SAP via TM1 data extraction
Building and Property Capex	SAP via BI extraction
Other Opex	Not applicable
Other Capex	Not applicable

Explain the methodology Ausgrid used to provide the required information, including any assumptions Ausgrid made

Actual Costs

Actual data for the period 2016/17 has been based on an extraction of actual financial data directly from our SAP financial system or via TM1. There is also a component of non-financial information involved in the preparation of the information.

All costs are shown exclusive of overhead and indirect cost allocations to provide a direct cost view.

Operating expenditure – Table 1

Expense Category	Methodology	Assumptions
Client Devices Opex	725040 - Desktop Support + 725090 - IT Hardware Leasing Expense	Client Devices Opex assumed to be the operating cost attached to the leasing and desktop support of PCs and other hand held devices. All other costs including software were included in recurrent/non-recurrent expenditure.
Recurrent Opex	All other Opex net of Client Devices and Non-Recurrent expenditure.	Recurrent Opex assumed to include expenditure that is recurrent in nature to support the ongoing ICT operations of the business (e.g. hardware/software maintenance, facilities management, application support, etc).
Non Recurrent Opex	ICT Opex analysed to determine non recurrent expenditures.	Non Recurrent Opex assumed to be work performed on projects that cannot be capitalised (e.g. preparation of business cases, minor enhancements to applications, work performed for various internal divisions that were not in direct support of an application, etc).
Car Opex	Total Number of Cars in Fleet (as per 2.6.3) divided by Total Fleet multiplied by NLOB Opex for Fleet.	Assumed that weighted average basis is an effective mechanism for splitting costs across vehicles. Ignores intricacies between vehicle types.
Light Commercial Vehicle (LCV) Opex	Total Number of LCV's in Fleet (as per 2.6.3) divided by Total Fleet multiplied by NLOB Opex for Fleet.	Assumed that weighted average basis is an effective mechanism for splitting costs across vehicles. Ignores intricacies between vehicle types.
Elevated Work Platform (EWP) LCV Opex	Total Number of EWP's LCV in Fleet (as per 2.6.3) divided by Total Fleet multiplied by NLOB Opex for Fleet.	Assumed that weighted average basis is an effective mechanism for splitting costs across vehicles. Ignores intricacies between vehicle types. Additionally, assumed all EWP's were in the HCV class.
Elevated Work Platform (EWP) HCV Opex	Total Number of EWP's HCV in Fleet (as per 2.6.3) divided by Total Fleet multiplied by NLOB Opex for Fleet.	Assumed that weighted average basis is an effective mechanism for splitting costs across vehicles. Ignores intricacies between vehicle types.

Heavy Commercial Vehicle (HCV) Opex	Total Number of HCV's in Fleet (as per 2.6.3) divided by Total Fleet multiplied by NLOB Opex for Fleet.	Assumed that weighted average basis is an effective mechanism for splitting costs across vehicles. Ignores intricacies between vehicle types.
Buildings and Property Opex	Actual data for the period 2016/17 has been based on an extraction of actual financial data directly or via TM1 from our SAP financial system.	
Other Opex	No other Opex has been reported.	Based on the definition contained in Appendix F: Definitions, and a review of the Network Overhead and Corporate Overhead RIN categories, no Other Non-Network costs were identified per the table included in the Other Opex rationale table below.

Capital expenditure – Table 2

Expense Category	Methodology	Assumptions
Client Devices Capex	All ICT Project Capex – include only cost elements - 725160 - Hardware Purchases & 722100 – External Material – costs then analysed for Client Device expenditure only.	Client Devices Capex assumed to include hardware devices that access services made available by a server including desktop computers, laptops, thin client interfaces and handheld end user computing devices including smart phones, tablets and iPads.
Recurrent Capex	All ICT Capex project expenditure analysed to determine recurrent and non-recurrent expenditures.	Recurrent Capex assumed to include expenditure that is recurrent in nature to continually run the business and organically grow business operations (e.g. refresh/replacement of infrastructure, true-up of licences, application upgrades, enhancements, remediation, etc). Assumed all capex not performed by ICT to be recurring.
Non Recurrent Capex	All ICT Capex project expenditure analysed to determine recurrent and non-recurrent expenditures.	Non-Recurrent Capex assumed to be projects of a one-off and non-recurring nature. (e.g. new applications, new models, new developments, pilot projects, compliance requirements, migrations, etc).
Light Commercial Vehicle Capex	Estimate of proportion required multiplied by total Capex. See estimate section for further details. Capex data extracted directly from SAP BI from project FL-00002.	
Buildings and Property Capex	The numbers are obtained directly from the SAP financial system via BI.	

Motor Vehicle capital expenditure assumptions - Table 3

Circumstance	Methodology	Reason for Estimate
Car Capex	No fleet capex spend related to cars in 2016/17.	The required information is not readily available from our Financial and Fleet systems.
Light Commercial Vehicle Capex	Total fleet capex related to light commercial vehicles in 2016/17.	The required information is not readily available from our Financial and Fleet systems.
Elevated Work Platform (EWP) HCV Capex	No fleet capex for EWP's in 2016/17.	The required information is not readily available from our Financial and Fleet systems.
Heavy Commercial Vehicle (HCV) Capex	No fleet capex for HCV's in 2016/17.	The required information is not readily available from our Financial and Fleet systems.

Explain circumstances where Ausgrid cannot provide input for a variable using actual information, and therefore must provide estimated information:

(i) why an estimate was required, including why it was not possible for Ausgrid to provide actual information;
Not applicable

(ii) the basis for the estimate, including the approach used, assumptions made and reasons why the estimate is Ausgrid's best estimate, given the information sought in the Notice.
Not applicable

Table 2.6.2 – Annual Descriptor Metrics – IT & Communications Expenditure

Demonstrate how the information provided is consistent with the requirements of the Notice

The information provided is consistent with the requirements of the RIN. The definition of IT & Communication "devices" and "user numbers" is consistent with the definitions in the RIN.

Explain the source from which Ausgrid obtained the information provided.

For employee numbers, actual data for 2016/17 has been used from SAP.

For user numbers and number of devices, actual data for 2016/17 has been used. These are based on an extraction of actual data from subsidiary systems (e.g. Active Directory) and spreadsheets used to track and record current ICT statistics and balances. (e.g. number of PC desktops & laptops).

Explain the methodology Ausgrid used to provide the required information, including any assumptions Ausgrid made

The number of employees engaged in standard control services is calculated based on work over the year scaled for time spent on standard control services work. This metric includes labour engaged under labour hire agreements.

Average number of employees excluding labour hire engaged in Standard Control Services work over FY 2016/17 was 3,176. Allocation to the Standard Control Services is based on FTE split of 85.2%. This aligns with Ausgrid's CAM.
Number of devices assumed to include hardware devices that access services made available by a server including desktop computers, laptops, thin client interfaces and handheld end user computing devices including smart phones, tablets and iPads. Number of users assumed to include active directory IT system log-in accounts. The total number of devices and users has been allocated to Standard Control Services on the basis of the FTE split as per the CAM.

Explain circumstances where Ausgrid cannot provide input for a variable using actual information, and therefore must provide estimated information:

(i) why an estimate was required, including why it was not possible for Ausgrid to provide actual information;

User numbers are difficult to define in an overall perspective given the services that are delivered from the devices affect all staff in some direct capacity.

(ii) the basis for the estimate, including the approach used, assumptions made and reasons why the estimate is Ausgrid's best estimate, given the information sought in the Notice.

User numbers assumed to be total staff numbers as all staff are exposed to and have carriage of the devices services.

Table 2.6.3 – Annual Descriptor Metrics – Motor Vehicles

Demonstrate how the information provided is consistent with the requirements of the Notice
Actual data for the period 2016/17 has been based on an extraction of actual financial data directly from our SAP financial system or via TM1. As such, the prevailing entries represent a subset of figures that have been reported in our annual audited financial statements and have been made in accordance with our CAM at the time of entry.

It should be noted that all costs shown exclude overhead and/or other costs that are not directly attributable to the non-network assets, as defined by the AER's RIN instructions. Furthermore, all financial data as it relates to IT & Communications, Property & Vehicle expenditure has been extracted via either TM1 or directly from SAP and represents a subset of the financial figures as reported in our annual audited financial statements, with any assumptions in respect of the basis for estimating the respective allocation between cost categories noted within the Basis of Preparation.

All the required categories of expenditure for Operating and Capital expenditure contained in tables 2.6.1, 2.6.2 and 2.6.3 have been completed. No further categories were considered material enough to be reported individually.

Where there has been a variation to the above approach it has been disclosed in the relevant sections below.

Explain the source from which Ausgrid obtained the information provided.

Non-financial information has been sourced from Ausgrid's fleet management system, FigFleet.

Explain the methodology Ausgrid used to provide the required information, including any assumptions Ausgrid made

Ausgrid has used data extracted from its FigFleet system to align with the information requirements. The summary table is as follows:

ASSET CATEGORY	NUMBER
Car	342
Light commercial vehicle	1000
Elevated work platform (LCV)	0
Elevated work platform (HCV)	200
Heavy commercial vehicle	329
TOTAL	**1871**

Descriptor Category	Methodology	Assumptions
Number of Leased and Owned Cars	Sedans + Wagons from FigFleet	Assumed all wagons and Sedans to be considered 'Cars'.
Car Allocation to Regulatory Expenditure	NLOB cube used for Opex and SAP BI NLOB for Capex.	NLOB is 100% Regulated and Capex split based on Corporate percentages for LOB splits.
Number of Leased and Owned LCVs	Vans/Utilities + Special Units + Light Cab Chassis from FigFleet.	Assumed all Vans, Utilities, Special Units and Light Cab Chassis are LCVs.
LCV Allocation to Regulatory Expenditure	NLOB cube used for Opex and SAP BI NLOB for Capex.	NLOB is 100% Regulated and Capex split based on Corporate percentages for LOB splits.
Number of Leased and Owned EWP LCVs		Assumed all EWP's were considered HCVs.
Number of Leased and Owned EWP HCVs	EWP figures from FigFleet + MG Set Vehicles	All EWP categorised vehicles are considered EWP HCVs.
EWP HCV Allocation to Regulatory Expenditure	NLOB cube used for Opex and SAP BI NLOB for Capex.	NLOB is 100% Regulated and Capex split based on Corporate percentages for LOB splits.
Number of Leased and Owned HCVs	PHB/PE + Trucks in Fig Fleet.	Assumed all PHB/PE and Trucks are categorized as HCVs.
HCV Allocation to Regulatory Expenditure	NLOB cube used for Opex and SAP BI NLOB for Capex.	NLOB is 100% Regulated and Capex split based on Corporate percentages for LOB splits.

Explain circumstances where Ausgrid cannot provide input for a variable using actual information, and therefore must provide estimated information:

(i) why an estimate was required, including why it was not possible for Ausgrid to provide actual information;

Circumstance	Estimation Used	Reason for Estimate
Average Kilometres Travelled	KMs were assumed to be linked to the vehicle category of similar vehicle types in the system. This is due to a number of vehicles no longer being in the system. Were specific vehicle details were available these have been used.	Not all vehicle information is available in the system, hence the need for estimation.

(ii) the basis for the estimate, including the approach used, assumptions made and reasons why the estimate is Ausgrid's best estimate, given the information sought in the Notice.

Specific information per vehicle was not available for all kilometres, therefore where specific information was not available, an appropriate estimate of vehicle category based on similar vehicle types was used.

Template 2.7 – Vegetation management

The information provided in template 2.7 has been completed in accordance with the AER RIN requirements and instructions applying to template 2.2. including Appendix E and F, Schedule 1 to the RIN, and the requirements in the worksheet.

Table 2.7.1 – Descriptor Metrics by Zone

Demonstrate how the information provided is consistent with the requirements of the Notice

In reference to Worksheet 2.7 Vegetation Management, the information has been provided in line with the requirements provided by the AER in the RIN.

The information provided in Table 2.7.1 is consistent with the requirements in the RIN. In providing information on vegetation management metrics, Ausgrid has completed the table in accordance with section 13.8 – 13.10 of Appendix E of the RIN, and also relevant definitions.

In addition, Ausgrid has also provided the following, as required by section 10.15 of Schedule 1 and section 13.7 of Appendix E of the RIN:

- Provide compliance audits of vegetation management work conducted by Ausgrid during the current regulatory control period;
- A list of regulations that impose a material cost on performing *vegetation management* works (including, but is not limited to, bushfire mitigation regulations);
- A list of any of the self-imposed standards from Ausgrid's *vegetation management* program which apply to that zone; and
- An explanation of the cost impact of regulations and self-imposed standards on performing *vegetation management* work.

Explain the source from which Ausgrid obtained the information provided.

Because of the way Ausgrid has established its vegetation management contracts, the whole of Ausgrid's distribution network (supply area) has been considered as one (1) vegetation management zone for this submission.

Route length within zone and Number of maintenance spans

Route line length and number of spans was calculated using Ausgrid's Geographical Information System (GIS) data. Ausgrid's GIS data is not represented as spans or singular routes, but represents the network as individual circuits; therefore significant manipulation of the existing data model was required and is documented in the Methodology and Assumptions part (c) below.

To classify route lengths into feeder categories the above data was combined with the 2015/16 reliability feeder classifications. Ausgrid performs an annual feeder re-categorisation which is based on the loading and length of the feeder as per STPIS definitions. The feeder categories are updated and stored in TOAD which flows to the Business Objects reporting environment.

The route line length used does not correspond to the AER's amended version to the definition emailed on Ausgrid on 7 April 2014. The amended definition in this email states that underground cables should be included to the "route line length". The definition as outlined in this email was not adhered to for the calculations for Template 2.7 as underground cables are not relevant to vegetation management. Route line length has been calculated as per "Economic benchmarking RIN Instructions and Definitions.pdf".

"*The aggregate length in kilometres of lines, 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 many circuits it contains. This is the distance between line segments and does not include vertical components such as line sag.*"

"Economic benchmarking RIN Instructions and Definitions.pdf" (page 50)

Total length of maintenance spans

Information for 'total length of maintenance span' was sourced using GIS data on the same basis as "Route length within zone". All of Ausgrid's overhead network is subject to vegetation management practises to ensure adequate clearances.

Length of vegetation corridors

Information on 'length of vegetation corridors' has been provided by the vegetation management contractors through their contractor data capture. Only current data could be obtained and was used for 2012/13. Earlier years have been estimated.

Average number of trees per maintenance span

GIS data. Route line maintenance spans combined with;

- 201/17 reliability feeder classifications
- Ausgrid acquired 2016 Light Detection And Ranging (LiDAR)

Average frequency of cutting cycle

Information for 'average frequency of cutting cycles' has been estimated. This is discussed further below.

Explain the methodology Ausgrid used to provide the required information, including any assumptions Ausgrid made

Route length within zone and Number of maintenance spans

To calculate the "Route line length" and "Number of maintenance spans", Ausgrid has spatially manipulated the data using the following methodology:

- The circuit data was split into individual line segments at every pole
- Where these line segments ran parallel they were snapped together, and
- For spans which contained multiple conductors with different feeder classifications (Rural portion, Urban, and CBD), the highest voltage's classification was attributed to the span, with all others removed. If the span represented conductors with different feeder classifications and of the same voltage the following priority was applied to the span, only retaining the highest priority;
    .1 CBD
    .2 Urban
    .3 Rural

Ausgrid does not give Transmission feeders (feeders >22kV) a feeder classification of CBD, Urban or Rural. A transmission feeder typically supplies multiple HV feeder classifications. As a consequence, spans made up of transmission only feeders are not assigned a CBD, Urban or Rural category. If a span only consists of transmission, it received a classification of Transmission however, if there was also a feeder of lesser voltage on the span, the transmission voltage was ignored and the classification of the lower voltage was applied.

The RIN templates only shows spans associated with low voltage and high voltage mains. Transmission only spans were not included in the RIN template.

The RIN templates were unable to be edited therefore the transmission results have been provided below;

- Transmission vegetation maintenance spans (number of spans)
    .1 2009/10 17970
    .2 2010/11 18419
    .3 2011/12 18386
    .4 2012/13 18468
    .5 2013/14 17165
    .6 2014/15 17564
    .7 2015/16 17544
    .8 2016/17 16985

The decrease in 2013/14 transmission vegetation maintenance spans can be explained by the transferral of ownership of feeders to Transgrid from Ausgrid.

Services Mains lengths are an arbitrary length of 10m towards the centre of the supplied land parcel; therefore they have been excluded as a calculated length. In parts of Ausgrid's network the Service Mains (*Service Mains - The low voltage overhead mains belonging to the company between the company's Distribution Mains and the Point of Supply. Point of Supply – The point of delineation i.e. junction between the company owned overhead mains and the Consumer's Mains)* span is subject to vegetation management practises and it has been counted as a span. The decrease in the total number of spans between 2013/14 and 2014/15 is due to a data quality improvement project to accurately identify Service Mains and Consumer Mains in Ausgrid's GIS. Due to the source data structure used to calculate the feeder classifications, street lighting data was not able to be assigned a classification and therefore omitted from the feeder category split results. For this reason and the omission of the Transmission only spans, the sum of the "Urban and CBD" and "Rural" number of maintenance spans will not equal the total number of maintenance spans. The increase in number of maintenance spans is accounted for the increased scope of vegetation managed service spans in 2016/17. In previous years, the number of vegetation service spans has been limited to discrete geographic areas, but has since been expanded to include all service spans in the Ausgrid network.

Total length of maintenance spans

Information for 'total length of maintenance spans' was provided on the same basis as "Route length within zone". All of Ausgrid's overhead network is subject to vegetation management practises to ensure adequate clearances are maintained.

Length of vegetation corridors

Current data was estimated for 2016/17 based on 2012/13 data. Because Ausgrid does not formally capture this data, based on the knowledge of the locations of these corridors it has been assumed that all of the vegetation corridors are associated with 'rural" feeders.

Average number of trees per maintenance span

2012/13 to 2016/17

Ausgrid utilised LiDAR acquired data for 2013, 2014, 2015 and 2016 to calculate vegetation within the vicinity of its network covered by vegetation management activities. The spread or coverage of the LiDAR data and tree identification was within the LiDAR swath width which was up to 8 meters from the network. Trees and vegetation outside of this corridor were ignored and deemed not to be within the vicinity of the network for vegetation management activities.

The LiDAR data acquired by Ausgrid does not identify individual trees, however the data extracted from the point cloud data, acquired in 2015 and 2016 identifies areas or canopies of vegetation. These areas are more representative of tree branches and canopies than individual trees therefore, these individual segments have been amalgamated together based on a 3 metre radius and counted as one tree. The detail of this data has been improved and is therefore more refined than previous years.

The source data did not fully cover the Ausgrid's network, nor was it an equal sample of construction types, environmental, and demographic variations within its supply area. The coverage area for LiDAR acquisition has been modified each year to obtain a greater coverage over the network area. This results in a difference in sample data used year on year between 2012 and 2016 shown in the table 3.7.2.3 below;

Sample Data Representation of Total Network

Feeder Classification	2012	2013	2014	2015	2016
Transmission	66%	63%	65%	45%	69%
Rural	34%	94%	53%	58%	76%
Urban/CBD	1%	10%	18%	14%	23%

To increase the sample data for the 20165 average number of trees and therefore reporting accuracy; data coverage from the 2016 LiDAR acquisition has been combined with the 2014 and 2015 LiDAR areas omitted from the 2016 flights. Data coverage from 2013 LiDAR acquisition was included where it has been omitted from both 2014, 2015 and 2016LiDAR acquisition areas. Note that this was not used to calculate the average number of defects; average number of defects only used the 2016 LiDAR data.

The network covered by summing the 2013 2014, 2015, and 2016 LiDAR coverage areas together is shown below

Sample Data Representation of Total Network

Feeder Classification	2012	2013	2014	2015	2016	Total LiDAR Coverage
Transmission	66%	63%	65%	45%	69%	85%
Rural	34%	94%	53%	58%	76%	91%
Urban/CBD	1%	10%	18%	14%	23%	38%

The AER has requested the defects and trees be categorised by feeder classification, however Transmission feeders (feeders > 22kV) do not have a feeder classification of CBD, Urban, or Rural. A transmission feeder typically supplies multiple feeders with different classifications. As a consequence, spans which are transmission only feeders are not assigned a CBD, Urban, or Rural category. If a span only consisted of transmission it received a classification of transmission, and therefore the defect and trees along the same span received the same classification. If there was also a conductor of lesser voltage in the span, transmission voltage was ignored and the classification of the lower voltage was applied to the span, associated defects, and trees.

The RIN templates only accommodate the reporting of trees and defects associated with low voltage and high voltage mains, therefore Transmission only trees and defects were not included in the RIN Template. The transmission defect and tree quantities are as follows

Average Number of Trees Near Transmission Only Spans

Year	Trees
2011/12	0.34
2012/13	0.30
2013/14	0.30
2014/15	2.07
2015/16	3.143
2016/17	3.165

As backup GIS data is not available for 2008/09, the 2009/10 figure has been used.

All of the overhead network is subject to vegetation management practises to ensure adequate clearances are maintained.

Length of vegetation corridors

Based on the new overheard line construction work that has occurred over the past years, a 5% increase from 2008/09 up to the 2012/13 figure has been assumed.

Average number of trees per maintenance span

For 2008/09 to 2010/11 an average of 2011/12 to 2012/13 data was used.

Average frequency of cutting cycle

There is no clause or requirement in Ausgrid vegetation management contracts to carry out vegetation maintenance activities in a cyclic manner. Because of this we have assumed a review cycle of 1 year.

Table 2.7.2 – Cost Metrics by Zone

Demonstrate how the information provided is consistent with the requirements of the Notice

The information provided in Table 2.7.2 is consistent with the requirements in the RIN. In providing information on vegetation management metrics, Ausgrid has completed the table in accordance with the relevant requirements of section 13 of Appendix E of the RIN, and also relevant definitions.

In particular, Ausgrid has provided an explanation of the expenditures that have been included in Table 2.7.2, as per section 13.15 of Appendix E of the RIN.

Explain the source from which Ausgrid obtained the information provided.

Vegetation management costs

The figures shown have been extracted from Ausgrid's corporate asset management system (SAP) and financial system (TM1), using established work orders for capturing the costs associated with vegetation management.

Explain the methodology Ausgrid used to provide the required information, including any assumptions Ausgrid made

Tree trimming costs

Tree trimming costs are the total direct contracted services costs associated with the current vegetation management contracts excluding ground clearance, veg corridor clearance & Inspection Costs.

Assumptions have been made to determine the percentage of expenditure allocated to each sub-category. This is further explained below. The methodology used in providing this data is explained below.

Other vegetation management costs

As stated in Section 2.4 (c) above, this figure is a combination of direct material costs, direct other costs and the direct internal labour costs associated with "gaining access" ("outage costs") to the network (Operators – switching and Lineworkers – erecting earths). These figures comprise:

- Materials and Other costs: All direct material and other costs were included in this sub-category.
- Outage costs: Are all direct internal labour costs associated with "gaining access" ("outage costs") to the network (Operators – switching and Lineworkers – erecting earths). Of the total direct internal labour costs, 35.6% of these costs have been apportioned to "Outage Costs". The other remaining 64.4% has been allocated to "Contract Management" costs and has been discussed further below.

Therefore, the total "Other vegetation management" costs consist of 1 and 2 above.

All other sub-category costs

Due to the "Maintenance" contract structure of Ausgrid's vegetation management contracts, Ausgrid approached each of its incumbent contractors to request an apportionment of their total contract costs to assign to each sub-category. An average of these was taken to achieve the final splits shown.

Analysis was undertaken of Ausgrid's Contract Inspector/Officer direct internal labour booked to the contract work orders. The outcome was that approximately 64% of their time was committed to "Contract Management" and 36% of their time associated with "Outage costs".

The following assumptions were made:

- Ground clearance: 1% of Ausgrid's total tree trimming costs.
- Vegetation corridor clearance: 1% of Ausgrid's total tree trimming costs.
- Inspection: 4% of Ausgrid's total tree trimming costs.
- Audit: Of the total direct internal labour costs, 64% of these costs have been apportioned to "Contract Management". Of the total "Contract Management" costs, 60% of these costs have then been allocated to the "Audit" sub-category.

Contractor liaison Expenditure: Of the total direct internal labour costs, 64% of these costs have been apportioned to “Contract Management”. Of the total “Contract Management” costs, 40% of these costs have then been allocated to the “Contractor liaison expenditure” sub-category.

“Other vegetation management costs” are a combination of direct material costs, direct other costs and the direct internal labour costs associated with “gaining access” (“outage costs”) to the network (Operators – switching and Lineworkers – erecting earths).

Hazard tree cutting and Tree replacement program costs

Ausgrid does not have established “Hazard tree cutting” or “Tree replacement” programs (see below).

Ground clearance, Vegetation corridor clearance, Inspection, Audit, and Contract Liaison expenditure

Because Ausgrid’s corporate asset management and finance system (SAP, TM1) has not been set up to capture the cost information in these sub-categories, this information has been apportioned across the different sub-categories based on information from our current contractors. The methodology used in providing this data is explained below.

Explain circumstances where Ausgrid cannot provide input for a variable using actual information, and therefore must provide estimated information:

(i) why an estimate was required, including why it was not possible for Ausgrid to provide actual information;

N/A

(ii) the basis for the estimate, including the approach used, assumptions made and reasons why the estimate is Ausgrid’s best estimate, given the information sought in the Notice.

N/A

Table 2.7.3 – Descriptor Metrics across all Zones – Unplanned Vegetation Events

Demonstrate how the information provided is consistent with the requirements of the Notice

Ausgrid’s Outage Management System tracks fire start events caused by Network Assets as well as event trigger information, including Vegetation Blow/Fall in and Vegetation Grown In Categories. This system is used to provide the data for this Table. As Ausgrid has a legal responsibility within NSW to manage all tree-trimming activities in the proximity of power lines, all events are assumed to be Ausgrid responsibility.

Explain the source from which Ausgrid obtained the information provided.

The data is sourced from the Outage Management System (OMS) using a custom Business Objects report. The results are saved in the file ‘Fire Starts by Veg.xls’. A periodic reconciliation between OMS and the detailed Fire Event Database is made to ensure the OMS system is updated with fire event investigation results. Note this database was only in place from the end of October 2014 so full year data is not able to be reconciled. Also as the databased was only in place from end of October 2014, this is the first year that Ausgrid has been able to complete this table.

Explain the methodology Ausgrid used to provide the required information, including any assumptions Ausgrid made

The number of events in the Outage Management System are returned based on filtering by ‘Fire Start Flag’ = “Y” and ‘Event Trigger’ = [Vegetation Grow In; Vegetation Blow/Fall In].

Explain circumstances where Ausgrid cannot provide input for a variable using actual information, and therefore must provide estimated information:

(i) why an estimate was required, including why it was not possible for Ausgrid to provide actual information;

N/A

(ii) the basis for the estimate, including the approach used, assumptions made and reasons why the estimate is Ausgrid's best estimate, given the information sought in the Notice.

N/A

Template 2.8 – Maintenance

The information provided in template 2.8 has been completed in accordance with the AER RIN requirements and instructions applying to template 2.2. including Appendix E and F, and the requirements in the worksheet.

Table 2.8.1 – Descriptor Metrics for Routine and Non-Routine Maintenance

Demonstrate how the information provided is consistent with the requirements of the Notice

The information in this section is compliant in that actual values are used where possible, and best estimates are provided where actual data is not available.

Explain the source from which Ausgrid obtained the information provided.

For asset quantity and average age data has been obtained from SAP PM where the quantity is in units and from GIS where the quantity is a length. Data has been extracted from SAP PM via the reporting environment using a multitude of Business Objects reports, and sometimes directly from Business Intelligence (SAP BI).

Information for quantities inspected in each financial year has been obtained from SAP PM, extracted via Business Objects and also via SAP BI.

Inspection cycles have been obtained from the Network Technical Maintenance Plan database.

Explain the methodology Ausgrid used to provide the required information, including any assumptions Ausgrid made

Global assumptions:

- Quantities inspected/maintained are those tasks identified for pro-active maintenance. That is, those tasks with regular maintenance cycles identified.
- Tasks for pro-active 'PROTECTION SYSTEMS MAINTENANCE' are not identified individually, and are performed in conjunction with the corresponding switchgear maintenance.
- Dual function assets are all included in the 'SUBTRANSMISSION ASSET MAINTENANCE' category. This includes assets within locations that have been designated as dual function (e.g. switchgear within a dual function substation). For assets categorised using information from SAP PM, anything with a 'Business Type' value (held in the first 3 characters of the 'Room' field) of "TSP" indicates it is for a dual function asset.
- The 'ZONE SUBSTATION…' categories also include assets in what Ausgrid refers to as subtransmission substations where these assets are for DNSP functions only. This is assumed due to the specification of the 'SUBTRANSMISSION ASSET MAINTENANCE' category as being for dual function assets only.
- Some costs for SCADA and network control maintenance are contained within the corresponding individual categories with 'ZONE SUBSTATION MAINTENANCE' and 'SUBTRANSMISSION ASSET MAINTENANCE'. This is due to the data in the reports not having the required attributes to be able splits costs incurred by the field group that works on both SCADA and CLC assets.

Asset quantity at year end

Pole overhead line & service line maintenance

For 'SERVICE LINES' this data has been obtained from GIS, and stored in file "Age Profile - Services.xlsx" worksheet "OH Services".

For 'POLE TOPS AND OVERHEAD LINES' this data has been obtained from SAP PM via SAP BI and processed in MS Access (file "Pole Profile.mdb"). A combination of current status, commissioned date and retired date is used to determine if an asset was commissioned at the end of the year. Assets that have been identified as dual function assets (i.e. 'Business Type' = "TSP") have been included in the 'SUBTRANSMISSION ASSET MAINTENANCE' category, and not in these categories.

Pole inspection and treatment

This data has been obtained from SAP PM via SAP BI and processed in MS Access (file "Pole Profile FY1415.mdb"). A combination of current status, commissioned date and retired date is used to determine if an asset was commissioned at the end of the year. Assets include poles and pillar standards.

Overhead asset inspection

This data has been obtained from the yearly GIS extract giving length of commissioned mains by age. This extract has been stored in file "ODRC_FINYEAR_2015_NETWORK_AGE_01_07_2015.xlsx".

The following table shows the filters applied and field summated in the files to produce the result:

Data extract file filters		Data used
Asset Category	**Primary Operation Voltage**	**Length field used**
LV line	LV	Length Total ODRC (kms)
HV line	11kV	
	12.7kV	
	22kV	
	33kV	
	66kV	
	132kV	

Network underground cable maintenance by voltage

This data has been obtained from the yearly GIS extract giving length of commissioned mains by age. This extract has been stored in file "ODRC_FINYEAR_2014_NETWORK_AGE_01_07_2015.xlsx".

For category 'LV – 11 to 22kV' the following table shows the filters applied and field summated in the files to produce the result:

Data extract file filters		Data used
Asset Category	**Primary Operation Voltage**	**Length field used**
LV cable	LV	Length Total ODRC (kms)
HV cable	5kV	
	11kV	
	22kV	

For category '33kV and above', this data has been obtained from the yearly GIS extract giving length of commissioned mains by network age. This extract has been stored in file "ODRC_FINYEAR_2015_NETWORK_AGE_01_07_2015.xlsx".

The following table shows the filters applied and field summated in the files to provide a total cable length commissioned at these voltages. A percentage has then been calculated to split this length into assets that are identified as dual function assets and those considered wholly DNSP function. This percentage has been obtained from SAP PM, via a Business Objects report, and stored in file "Split of Feeder Portions by TSP_DSP.xlsx". This percentage is then applied to the corresponding length for voltages 33kV and above.

Data extract file filters		Data used
Asset Category	**Primary Operation Voltage**	**Length field used**
HV cable	33kV	Length Total ODRC (kms)
	66kV	
	132kV	

Network underground cable maintenance: by location

For 'NETWORK UNDERGROUND CABLE MAINTENANCE: BY LOCATION' the required data is not retained in a way that installed lengths can be reported in these categories. As such an apportionment of the total lengths for 'NETWORK UNDERGROUND CABLE MAINTENANCE: BY VOLTAGE' has been applied using the proportionate length of underground high voltage cable in the CBD feeder category. This proportion is contained in file "HV Conductor lengths by Category.xlsx".

Distribution substation equipment & property maintenance

The data for Distribution Substation Transformers has been obtained from data extracted from SAP PM. This data is stored in file "Dist Txs.xlsx", and summarised in worksheet "Count and Age for 2.8". All assets with a 'Room' field value of "DSP_DC" (representing distribution substations) and in commission at the end of the financial year (use field 'Include in Age Profile' = "Y") are included in the calculation.

The data for Distribution Substation Switchgear has been obtained from data extracted from SAP PM. This data is stored in file "Switchgear list for age profile Data Template GG July 2015.xlsx", and summarised in worksheet "Age and count for 2.8". All assets with a 'Room' field value of "DSP_DC" (representing distribution substations) OR DSP_DMOH (representing distribution mains – as per instructions from the AER during Reset RIN submission), and in commission at the end of the financial year, and are of an 'enclosed' switch type that is proactively maintained has been included in the calculation. These are identified by using the field 'Include in Age Profile' = "Y".

The data for Distribution Substation – Other Equipment is a count of all distribution substations (as the AER specified "Earth Mat" appears to be a typographical error) and has been obtained from data extracted from SAP PM. Data is stored in file "Substation Profile Data Template GG July 2015.xlsx" and summarised on worksheet "Counts and Ages for 2.8". Data has been selected by including Object types SUB_BASEMT, SUB_BUILD, SUB_KIOSK, SUB_OE, SUB_POLE, SUB_UNDERG and SUB_UPPERL, and identifying assets commissioned at the end of the financial year by selecting the field 'Include in age profile' = "Y".

The data for Distribution Substation Property has been obtained from data extracted from SAP PM. Data is stored in file "Substation Profile.xlsx" and summarised on worksheet "Counts and Ages for 2.8". Data has been selected by including Object types SUB_BASEMT, SUB_BUILD, SUB_OE, SUB_UNDERG and SUB_UPPERL, and identifying assets commissioned at the end of the financial year by selecting the field 'Include in age profile' = "Y".

Zone substation equipment maintenance

The data for Transformers – Zone Substation has been obtained from data extracted from SAP PM. This data is stored in file "Major Txs.xlsx", and summarised in worksheet "Count and Age for 2.8". All assets with a 'Room' field value of "DSP_ZN" or "DSP_TS" (representing wholly DNSP assets) and in commission at the end of the financial year (use field 'Include in Age Profile' = "Y") are included in the calculation.

The data for Transformers - Distribution has been obtained from data extracted from SAP PM. This data is stored in file "Dist Txs.xlsx", and summarised in worksheet "Count and Age for 2.8". All assets with a 'Room' field value of "DSP_ZN" or "DSP_TS" (representing wholly DNSP assets inside zone/subtransmission substations) and in commission at the end of the financial year (use field 'Include in Age Profile' = "Y") are included in the calculation.

Based on the information available, all power transformers at Ausgrid have been categorised as either Transformers – Zone Substation or Transformers – Distribution, thus no assets have been categorised as Transformer – HV.

The data for Zone Substation – Other Equipment is a count of DNSP categorised substations and has been obtained from data extracted from SAP PM. Data is stored in file "Substation Profile.xlsx" and summarised on worksheet "Counts and Ages for 2.8". Data has been selected by including Object types SUB_ZONE, SUB_STS and SUB_STSS, selecting only wholly DNSP assets by using the 'Room' field = "DSP_ZN" or "DSP_TS", and identifying assets commissioned at the end of the financial year by selecting the field 'Include in age profile' = "Y".

Zone substation property maintenance

The data for Zone Substation Property has been obtained from data extracted from SAP PM. Data is stored in file "Substation Profile.xlsx" and summarised on worksheet "Counts and Ages for 2.8". Data has been selected by including Object types SUB_ZONE, SUB_STS and SUB_STSS, selecting only wholly DNSP assets by using the 'Room' field = "DSP_ZN" or "DSP_TS", and identifying assets commissioned at the end of the financial year by selecting the field 'Include in age profile' = "Y".

Public lighting maintenance

Extracted data for streetlights from SAP PM via Business Objects has been merged with information provided from GIS to identify lights on major roads. A combination of current status, commissioned date, decommissioned date and retired date is used to determine if a light was commissioned at the end of the financial year. This is contained in MS excel file "Streetlight Asset Data.xlsx".

SCADA & network control maintenance

The unit of measure is specified as number of systems. As such the data has been sourced from SAP PM using the functional location object type = "CTL_SYSTEM". This data is stored in file "SCADA and Control Systems.xlsx" and summarised in worksheet "Count and Age for 2.8". Data has been selected by identifying assets commissioned at the end of the financial year by selecting the field 'Include in Count' = "Y".

Protection systems maintenance

The unit of measure is specified as number of systems. As such the data has been sourced from SAP PM using the functional location object type = "PROT_GRP". This data is stored in file "Protection Systems.xlsx" and summarised in worksheet "Count and Age for 2.8". Data has been selected by identifying assets commissioned at the end of the financial year by selecting the field 'Include in Count' = "Y".

Subtransmission asset maintenance

The volume and age of dual function assets were taken from the document D13 571169 Transmission Assets Classification.xls. This document contains a summary of all dual-function assets. Average age and length were derived from columns AF and AG in the spreadsheet.

Asset quantity inspected/maintained

All data related to the quantities inspected have been extracted from SAP PM using Business Objects. This information is stored in file "Routine Maintenance Task Completions RIN FINAL FY17".

Pole overhead line & service line maintenance

For 'POLES AND OVERHEAD LINES', 'POLE TOPS AND OVERHEAD LINES' the quantities inspected have been extracted from SAP PM using Business Objects and selecting all "Line Inspection" (LINS) and "Tower Inspection" (TINS) notifications.

For 'POLES AND OVERHEAD LINES', 'SERVICE LINES' the quantity of inspections is entered as 0 as these assets are inspected as part of an overall routine line inspection.

Pole inspection & treatment

For 'POLE INSPECTION AND TREATMENT', 'ALL POLES' the quantities inspected have been extracted from SAP PM using Business Objects and selecting all "Pole Inspection" (PINS) notifications.

Overhead asset inspection

For 'OVERHEAD ASSET INSPECTION' the length inspection has been calculated using the count of "Line Inspection" (LINS) notifications, the total number of Ausgrid poles and the total route length of overhead conductor. The formula used to calculate this value is shown below:

$$Length\ (km) = \frac{Total\ Overhead\ Conductor\ Route\ Length}{Total\ Number\ of\ Poles} \times Number\ of\ Poles\ Inspected\ Annually$$

Network underground cable maintenance by voltage

For 'NETWORK UNDERGROUND CABLE MAINTENANCE BY VOLTAGE', 'LV – 11 to 22kV', the quantities inspected have been extracted from SAP PM using Business Objects and by selecting the following notifications within the asset group Distribution Mains Underground (DMUG):

- Pit Lid (PITL) tasks
- Pillar (PILR) tasks
- Thermovision (THRM) tasks

For ‘NETWORK UNDERGROUND CABLE MAINTENANCE BY VOLTAGE’, ‘33KV AND ABOVE’, the quantities inspected have been extracted from SAP PM using Business Objects and by selecting the following notifications within the asset group Transmission Mains Underground (TMUG):

- Pit Lid (PITL) tasks
- Performance (PERF) tasks

Network underground cable maintenance by voltage

For ‘NETWORK UNDERGROUND CABLE MAINTENANCE: BY LOCATION’ the required data is not retained in a way that the number of assets inspected/maintained can be reported in these categories. As such an apportionment of the total number of assets inspected/maintained for ‘NETWORK UNDERGROUND CABLE MAINTENANCE: BY VOLTAGE’ has been applied using the proportionate length of underground high voltage cable in the CBD feeder category. This proportion is contained in file “Routine Maintenance Task Completions RIN FINAL FY17”.

Distribution substation equipment & property maintenance

For ‘DISTRIBUTION SUBSTATION EQUIPMENT & PROPERTY MAINTENANCE’, ‘DISTRIBUTION SUBSTATION TRANSFORMERS’ the quantity of inspections is entered as 0 as these assets are inspected as part of an overall substation inspection with all others assets in the substation (with the exception of the HV switchgear).

For ‘DISTRIBUTION SUBSTATION EQUIPMENT & PROPERTY MAINTENANCE’, ‘DISTRIBUTION SUBSTATION SWITCHGEAR (WITHIN SUBSTATIONS AND STAND ALONE SWITCHGEAR’, the quantities inspected have been extracted from SAP PM using Business Objects and selecting all switchgear tasks within the asset groups Distribution Mains Underground (DMUG) and Distribution Substations (DC).

For ‘DISTRIBUTION SUBSTATION EQUIPMENT & PROPERTY MAINTENANCE’, ‘DISTRIBUTION SUBSTATION OTHER EQUIPMENT’, the quantities inspected have been extracted from SAP PM using Business Objects and selecting the following notifications within the asset group Distribution Substations (DC):

- All SU tasks (excluding SU0106, SU0151, SU0115, SU0116, SU0401, SU0402 tasks)
- All TX tasks
- All DC tasks

All PETS tasks have been excluded from the total count for this category.

For ‘DISTRIBUTION SUBSTATION EQUIPMENT & PROPERTY MAINTENANCE’, ‘DISTRIBUTION SUBSTATION PROPERTY’, the quantities inspected have been extracted from SAP PM using Business Objects and selecting the following notifications within the asset group Distribution Substations (DC):

- All AU tasks
- SU0106, SU0401 and SU0402 tasks

Zone substation equipment maintenance

For ‘ZONE SUBSTATION EQUIPMENT MAINTENANCE’, ‘TRANSFORMERS ZONE SUBSTATION’ the quantities inspected have been extracted from SAP PM using Business Objects and selecting all “Transformer Inspection” (TX) notifications for the following ‘DNSP’ asset groups:

- Zone Substations (ZN)
- Transmission Substations (TS)

For ‘ZONE SUBSTATION EQUIPMENT MAINTENANCE’, ‘TRANSFORMERS DISTRIBUTION’ the quantity of inspections is entered as 0 as these assets are inspected as part of an overall substation inspection with all others assets in the Zone substation.

For ‘ZONE SUBSTATION EQUIPMENT MAINTENANCE’, ‘TRANSFORMERS HV’ the quantity of inspections is entered as 0 as Ausgrid does not capture information in this format. Based on the information available, all asset inspections related to Zone power transformers at Ausgrid have been categorised as Transformers – Zone Substation, thus no assets have been categorised as ‘TRANSFORMERS HV’.

For ‘ZONE SUBSTATION EQUIPMENT MAINTENANCE’, ‘OTHER EQUIPMENT’, the quantities inspected have been extracted from SAP PM using Business Objects and selecting the following tasks within the ‘DNSP’ asset groups Zone Substations (ZN) and Transmission Substations (TS):

- All DC tasks
- ER0102 and ER0103 tasks
- PR0101 and PR0201 tasks
- SU0101, SU0115 and SU0116 tasks
- All Switchgear tasks

All OH4004, SU0121, ER0104, ER0105, VR0101 tasks have been excluded from the total count for this category.

Zone substation property maintenance

For ‘ZONE SUBSTATION PROPERTY MAINTENANCE’, ‘ALL ZONE SUBSTATION PROPERTIES’ the quantities inspected have been extracted from SAP PM using Business Objects and selecting all the following notifications within the ‘DNSP’ asset groups Zone Substations (ZN) and Transmission Substations (TS):

- All AU tasks (Excluding STCK tasks)
- SU0106, SU0140 and SU0141 tasks

Public lighting maintenance

For ‘PUBLIC LIGHTING MAINTENANCE’, ‘MINOR ROADS’ and ‘PUBLIC LIGHTING MAINTENANCE’, ‘MAJOR ROADS’ categories combined, the quantities inspected have been extracted from SAP PM using Business Objects and selecting “Bulk Lamp Replacement” notifications. However, the required data is not retained in a way that the number of assets inspected/maintained can be reported in these two categories. As such an apportionment of the total number of assets inspected/maintained for ‘PUBLIC LIGHTING MAINTENANCE’, ‘MINOR ROADS’ and ‘PUBLIC LIGHTING MAINTENANCE’, ‘MAJOR ROADS’ has been applied using the proportionate number of street lights in the major roads category. This proportion is contained in file “Routine Maintenance Task Completions RIN FINAL FY17”.

SCADA & network control maintenance

For ‘SCADA & NETWORK CONTROL MAINTENANCE’ there are no routine maintenance tasks undertaken for these assets, thus the inspection/maintenance quantities reported are 0.

Protection Systems maintenance

For ‘PROTECTION SYSTEMS MAINTENANCE’, tasks for inspection/maintenance are not identified individually and are performed in conjunction with the corresponding switchgear maintenance, and as the expenditure for these tasks is also contained within the corresponding switchgear category the quantities reported in this category (and sub-categories) is 0.

Sub-Transmission asset maintenance (For DNSP’s with dual function assets)

For ‘SUB-TRANSMISSION ASSET MAINTENANCE’, the quantities inspected have been extracted from SAP PM using Business Objects and selecting all the notifications within the following ‘TNSP’ asset groups:

- Zone Substations (ZN)
- Transmission Substations (TS)
- Transmission Overhead (TMOH)
- Transmission Underground (TMUG)

Various assets

For ‘VARIOUS ASSETS’ there are no routine maintenance tasks undertaken for these assets, thus the inspection/maintenance quantities reported are 0.

Ground clearance access tracks

For ‘GROUND CLEARANCE ACCESS TRACKS’ there are no routine maintenance tasks undertaken for these assets, thus the inspection/maintenance quantities reported are 0.

Average age of asset group

Pole overhead line & service line maintenance

For service line maintenance this data has been obtained from GIS, and stored in the file 'Average Age Line commission dates-ALEX.xlsx'. The majority of ages are derived from line commission dates, where this is unknown either the customer NMI information or nearest neighbour commissioning date were used as proxies."

For 'POLE TOPS AND OVERHEAD LINES' this data has been obtained from SAP PM via SAP BI and processed in MS Access (file "Pole Profile FY1415.mdb"). A combination of current status, commissioned date and retired date is used to determine the age of an asset at the end of the financial year. The average age of the assets for each year is then calculated using a standard MS Access query. Assets that have been identified as dual function assets (i.e. 'Business Type' = "TSP") have been included in the 'SUBTRANSMISSION ASSET MAINTENANCE' category, and not in these categories.

Pole inspection and treatment

This data has been obtained from SAP PM via SAP BI and processed in MS Access (file "Pole Profile.mdb"). A combination of current status, commissioned date and retired date is used to determine the age of an asset at the end of the financial year. Assets include poles and pillar standards.

Overhead asset inspection

This data has been obtained from the yearly GIS extract giving length of commissioned mains by age. This extract has been stored in file "ODRC_FINYEAR_2014_NETWORK_AGE_01_07_2014.xlsx".

The following table shows the filters applied and field summated in the files to produce the result:

A weighted average age is then calculated by using the sum of product of each age with the length associated and dividing through by the total length.

Network underground cable maintenance by voltage

This data has been obtained from the yearly GIS extract giving length of commissioned mains by age. This extract has been stored in file "ODRC_FINYEAR_2014_NETWORK_AGE_01_07_2014.xlsx".

For category 'LV – 11 to 22kV' the following table shows the filters applied and field summated in the files to produce the result:

Data extract file filters		Data used
Asset Category	**Primary Operation Voltage**	**Length field used**
LV cable	LV	Length Total ODRC (kms)
HV cable	5kV	
	11kV	
	22kV	

A weighted average age is then calculated by using the sum of product of each age with the length associated and dividing through by the total length.

For category '33kV and above' and 'Subtransmission Underground Maintenance', this data has been obtained from the yearly GIS extract giving length of commissioned mains by network age. This extract has been stored in file "ODRC_FINYEAR_2014_NETWORK_AGE_01_07_2015.xlsx".

The following table shows the filters applied and field summated in the files to provide a total cable length commissioned at these voltages. A weighted average age is then calculated by using the sum of product of each age with the length associated and dividing through by the total length.

Data extract file filters		Data used
Asset Category	**Primary Operation Voltage**	**Length field used**
HV cable	33kV	Length Total ODRC (kms)
	66kV	
	132kV	

Network underground cable maintenance: by location

For 'NETWORK UNDERGROUND CABLE MAINTENANCE: BY LOCATION' the required data is not retained in a way that average age can be separately calculated for these categories. As such the average age across all voltages has been used for both categories. This has been calculated by getting the weighted average of the two values in category 'NETWORK UNDERGROUND CABLE MAINTENANCE: BY VOLTAGE'.

Distribution substation equipment

The data for Distribution Substation Transformers has been obtained from data extracted from SAP PM. This data is stored in file "Dist Txs for Age Profile – Date Template GG July 2015.xlsx", and summarised in worksheet "Count and Age for 2.8". All assets with a 'Room' field value of "DSP_DC" (representing distribution substations) and in commission at the end of the financial year (use field 'Include in Age Profile' = "Y") are included in the calculation.

The data for Distribution Substation Switchgear has been obtained from data extracted from SAP PM. This data is stored in file "Switchgear list for age profile - Data Template GG 2015.xlsx", and summarised in worksheet "Age and count for 2.8". All assets with a 'Room' field value of "DSP_DC" (representing distribution substations) OR DSP_DMOH (representing distribution mains – as per instructions from the AER during Reset RIN submission), and in commission at the end of the financial year, and are of an 'enclosed' switch type that is proactively maintained has been included in the calculation. These are identified by using the field 'Include in Age Profile' = "Y".

The data for Distribution Substation – Other Equipment is the average age of all distribution substations and has been obtained from data extracted from SAP PM. Data is stored in file "Substation Profile – Date Template GG July 2015.xlsx" and summarised on worksheet "Counts and Ages for 2.8". Data has been selected by including Object types SUB_BASEMT, SUB_BUILD, SUB_KIOSK, SUB_OE, SUB_POLE, SUB_UNDERG and SUB_UPPERL, and identifying assets commissioned at the end of the financial year by selecting the field 'Include in age profile' = "Y".

The data for Distribution Substation Property has been obtained from data extracted from SAP PM. Data is stored in file "Substation Profile.xlsx" and summarised on worksheet "Counts and Ages for 2.8". Data has been selected by including Object types SUB_BASEMT, SUB_BUILD, SUB_OE, SUB_UNDERG and SUB_UPPERL, and identifying assets commissioned at the end of the financial year by selecting the field 'Include in age profile' = "Y".

Zone substation equipment maintenance

The data for Transformers – Zone Substation has been obtained from data extracted from SAP PM Business Objects Reports. This data is stored in file "Major Txs for age profile-processed.xlsx", and summarised in worksheet "Count and Age for 2.8". All assets with a 'Room' field value of "DSP_ZN" or "DSP_TS" (representing wholly DNSP assets) and in commission at the end of the financial year (use field 'Include in Age Profile' = "Y") are included in the calculation.

The data for Transformers - Distribution has been obtained from data extracted from SAP PM PM Business Objects Reports. This data is stored in file "Dist Txs.xlsx", and summarised in worksheet "Count and Age for 2.8". All assets with a 'Room' field value of "DSP_ZN" or "DSP_TS" (representing wholly DNSP assets inside zone/subtransmission substations) and in commission at the end of the financial year (use field 'Include in Age Profile' = "Y") are included in the calculation.

Based on the information available, all power transformers at Ausgrid have been categorised as either Transformers – Zone Substation or Transformers – Distribution, thus no assets have been categorised as Transformer – HV.

The data for Zone Substation – Other Equipment is the average age of DNSP categorised substations and has been obtained from data extracted from SAP PM PM Business Objects Reports. Data is stored in file "Substation Profile.xlsx" and summarised on worksheet "Counts and Ages for 2.8". Data has been selected by including Object types SUB_ZONE, SUB_STS and SUB_STSS, selecting only wholly DNSP assets by using the 'Room' field = "DSP_ZN" or "DSP_TS", and identifying assets commissioned at the end of the financial year by selecting the field 'Include in age profile' = "Y".

Zone substation property maintenance

The data for Zone Substation Property has been obtained from data extracted from SAP PM. Data is stored in file "Substation Profile.xlsx" and summarised on worksheet "Counts and Ages for 2.8". Data has been selected by including Object types SUB_ZONE, SUB_STS and SUB_STSS, selecting only wholly DNSP assets by using the

'Room' field = "DSP_ZN" or "DSP_TS", and identifying assets commissioned at the end of the financial year by selecting the field 'Include in age profile' = "Y".

Public lighting maintenance

Extracted data for streetlights from SAP PM via Business Objects has been merged with information provided from GIS to identify lights on major roads. This is contained in MS excel file "Streetlight Asset Data.xlsx". A combination of current status, commissioned date, decommissioned date and retired date is used to determine if a light was commissioned at the end of the financial year. The average age of the assets is then calculated using the standard MS excel average function in a pivot table (worksheet "Age for 2.8").

SCADA & network control maintenance

The unit of measure is specified as number of systems. As such the data has been sourced from SAP PM using the functional location object type = "CTL_SYSTEM". This data is stored in file "SCADA and Control Systems.xlsx" and summarised in worksheet "Count and Age for 2.8". Data has been selected by identifying assets commissioned at the end of the financial year by selecting the field 'Include in Count' = "Y".

Protection systems maintenance

The unit of measure is specified as number of systems. As such the data has been sourced from SAP PM using the functional location object type = "PROT_GRP". This data is stored in file "Protection Systems.xlsx" and summarised in worksheet "Count and Age for 2.8". Data has been selected by identifying assets commissioned at the end of the financial year by selecting the field 'Include in Count' = "Y".

Subtransmission asset maintenance

The volume and age of dual function assets were taken from the document D13 571169 Transmission Assets Classification.xls. This document contains a summary of all dual-function assets. Average age and length were derived from columns AF and AG in the spreadsheet.

Inspection and maintenance cycles

A detailed list of cycles has been included in each category showing the various maintenance tasks required and the cycles of those tasks. Where a pro-active task is primarily of an inspection nature, the task cycle has been populated in the Inspection Cycle column. Where a pro-active task primarily contains manual maintenance activities, the task cycle has been populated in the Maintenance Cycle column. Where a task contains both Inspection and Maintenance activities, both columns have been populated. If either type is not applicable for a maintenance activity the cycle has been entered as 0. At the applicable category/sub-category level, the cycles have been entered as 0 with the subsequent rows containing the maintenance types disaggregated holding the applicable cycles within that category.

Explain circumstances where Ausgrid cannot provide input for a variable using actual information, and therefore must provide estimated information:

(i) why an estimate was required, including why it was not possible for Ausgrid to provide actual information;
N/A

(ii) the basis for the estimate, including the approach used, assumptions made and reasons why the estimate is Ausgrid's best estimate, given the information sought in the Notice.
N/A

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

Demonstrate how the information provided is consistent with the requirements of the Notice

The information in this section is compliant in that actual values are used where possible, and best estimates are provided where actual data is not available.

Explain the source from which Ausgrid obtained the information provided.

Financial spend for routine and non-routine maintenance has been obtained from SAP PM (work order costs) using Business Objects.

Explain the methodology Ausgrid used to provide the required information, including any assumptions Ausgrid made

Global assumptions

Dual function assets are all included in the 'SUBTRANSMISSION ASSET MAINTENANCE' category. This includes assets within locations that have been designated as dual function (e.g. switchgear within a dual function substation). For assets categorised using information from SAP PM, anything with a 'Business Type' value (held in the first 3 characters of the 'Room' field) of "TSP" indicates it is for a dual function asset.

The 'ZONE SUBSTATION…' categories also include assets in what Ausgrid refers to as subtransmission substations where these assets are for DNSP functions only. This is assumed due to the specification of the 'SUBTRANSMISSION ASSET MAINTENANCE' category as being for dual function assets only.

Some costs for SCADA and network control maintenance are contained within the corresponding individual categories with 'ZONE SUBSTATION MAINTENANCE' and 'SUBTRANSMISSION ASSET MAINTENANCE'. This is due to the data in the reports not having the required attributes to be able splits costs incurred by the field group that works on both SCADA and CLC assets.

Routine and non-routine maintenance costs

Financial data has been obtained using a modified version of the "Maintenance Cost & Productivity" Business Objects report. The report has been modified to restrict costs to direct costs only (as specified for this section of the RIN) by filtering on specific cost element groups. To restrict "Labour" costs to direct costs only the cost element groups LOB-NTA and LOB-OTA have been used. To restrict "Materials" costs to direct costs only the cost element group LOB-MAT has been used. To restrict "Contracted Services" to direct costs only, the cost element group LOB-CONT has been used. To restrict "Other" costs to direct costs only the cost element group LOB-OTHDIR has been used. The report has also been modified to allow costs to be split between DNSP dual function assets and single function assets. These reports have been extracted into an MS Excel file "Maintenance Task Cost and Productivity Report - All Direct Only - No Veg FY17.xlsx" and manually mapped to the applicable asset categories. "Routine maintenance" costs are those settled against PM01 "inspection" work orders, "Non-routine maintenance" costs are those settled against PM02 "corrective" work orders. Costs have then been summated for the categories for each year, excluding costs on maintenance orders that have been identified as for Vegetation Maintenance (and reported separately in this RIN). Expenditure that is located within the 'POLES AND OVERHEAD LINES', 'POLE TOPS AND OVERHEAD LINES' RIN category has also been reduced as 50% of the LiDAR expenditure has been removed and allocated to Vegetation Maintenance (and reported separately in this RIN within 2.7)

The extracted information in the MS Excel file "Maintenance Task Cost and Productivity Report - All Direct Only - No Veg FY17.xlsx" mapped expenditure to Ausgrid allocated "asset groups" and "asset categories" based on the maintenance activity type / maintenance task and the functional location type of the asset maintained or the "asset category. These asset groups were then aligned to the RIN asset categories and sub-categories. The SAP "Room" field was also used to determine whether the expenditure was allocated to "DNSP" or "TNSP" categories ("Room" field of "DSP" was allocated as distribution asset expenditure, "Room" field of "TSP" was allocated as subtransmission asset expenditure). Any expenditure against the maintenance activity type of "Vegetation management" has been excluded in accordance with the RIN preparation rules.

Where the SAP extracts did not contain information in regard to the Ausgrid allocated asset group or the maintenance activity type/maintenance task, or where the RIN definitions required mapping away from an Ausgrid asset group, the expenditure was allocated to a RIN asset category and sub-category based on the workgroup for which the expenditure was incurred for routine maintenance expenditure and/or the SAP "asset category" for non-routine expenditure. The assumptions used are detailed below:

For the "Communication" asset group:

- This asset group is assumed to be for network control / data assets outside of substations; and
- Expenditure identified against this asset group was assigned to "SCADA and network control maintenance".

For the "Distribution mains overhead" asset group:

- For Field Services OH sections, expenditure was assigned to 'POLES AND OVERHEAD LINES', 'POLE TOPS AND OVERHEAD LINES' unless the asset category was defined as "LV Service Mains Conductor

& Accessories" (expenditure allocated to 'POLES AND OVERHEAD LINES', 'SERVICE LINES') or the asset category was defined as OH control points (expenditure was assigned to 'DISTRIBUTION SUBSTATION EQUIPMENT & PROPERTY MAINTENANCE', 'DISTRIBUTION SUBSTATION SWITCHGEAR (WITHIN SUBSTATIONS AND STAND ALONE SWITCHGEAR'). Note: The service line sub-category is not used for routine maintenance as Ausgrid undertake the inspection of service wires as part of routine line inspection.

- For Field Services or Transmission Sydney Line inspection workgroups or where maintenance activity "Line inspection" or "Bushfire patrol" is defined, expenditure was assigned to 'OVERHEAD ASSET INSPECTION'.
- For Asset Access workgroups, expenditure was assigned to 'NETWORK UNDERGROUND CABLE MAINTENANCE BY VOLTAGE', 'LV – 11 to 22kV' as it is assumed that the majority of their work would be in relation to the access of HV pits in the Sydney CBD.
- For Voltage Regulation workgroups or transformer related inspection tasks, expenditure was assigned to 'DISTRIBUTION SUBSTATIONS OTHER' category as voltage regulators or capacitors are the only assets maintained by these groups on distribution overhead assets.
- For workgroups with "Pole Insp" in their title, expenditure was assigned to 'POLE INSPECTION AND TREATMENT', 'ALL POLES' as this is the assumed majority of their work.
- For building maintenance workgroups, expenditure was assigned to 'POLES AND OVERHEAD LINES', 'POLE TOPS AND OVERHEAD LINES' as their work in this asset category, primarily graffiti removal, was considered not appropriate to be assigned to 'POLE INSPECTION AND TREATMENT', 'ALL POLES' as it is not planned inspection / testing.
- For protection workgroups, battery maintenance tasks are assumed to be for 'DISTRIBUTION SUBSTATION EQUIPMENT & PROPERTY MAINTENANCE', 'DISTRIBUTION SUBSTATION OTHER EQUIPMENT' as the tasks for reclosers /ELBS's include battery replacement within the "SW180*" tasks. Non-routine expenditure is assumed to be for 'DISTRIBUTION SUBSTATION EQUIPMENT & PROPERTY MAINTENANCE', 'DISTRIBUTION SUBSTATION SWITCHGEAR (WITHIN SUBSTATIONS AND STAND ALONE SWITCHGEAR', primarily reclosers or ELBS's.
- For telecontrol workgroups, expenditure was assigned to 'DISTRIBUTION SUBSTATION EQUIPMENT & PROPERTY MAINTENANCE', 'DISTRIBUTION SUBSTATION SWITCHGEAR (WITHIN SUBSTATIONS AND STAND ALONE SWITCHGEAR' based on the assumption that SCADA related work is mostly undertaken on reclosers / ELBS's and the asset category was identified as OH control points.
- For substations workgroups, expenditure was assigned to 'POLES AND OVERHEAD LINES', 'POLE TOPS AND OVERHEAD LINES' if the asset category was related to OH conductors, or assigned to 'DISTRIBUTION SUBSTATION EQUIPMENT & PROPERTY MAINTENANCE', 'DISTRIBUTION SUBSTATION SWITCHGEAR (WITHIN SUBSTATIONS AND STAND ALONE SWITCHGEAR' if the asset category was related to OH control points.
- For customer connections workgroups, expenditure was assigned to 'POLES AND OVERHEAD LINES', 'SERVICE LINES' unless the asset category was related to LV mains or conductor (this expenditure assigned to 'POLES AND OVERHEAD LINES', 'POLE TOPS AND OVERHEAD LINES').

<u>For the "Distribution mains underground" asset group:</u>

- Expenditure for all workgroups was assigned to "Network underground cable maintenance / LV – 11 to 22 kV" except for expenditure where the asset category was identified as either "UG Services – LV" or "Sub-transmission Mains UG General (including spares)".
- Expenditure identified against the asset category "UG Services – LV" was assigned to "Pole, overhead line and service line maintenance /Service lines" as per RIN definitions.
- Expenditure identified against the asset category "Sub-transmission Mains UG General (including spares)" was assigned to "Network underground cable maintenance / 33kv and above".
- Expenditure identified against task "UG2101" task (pillar thermovision inspections) was assigned to "Network underground cable maintenance / LV – 11 to 22 kV".

For the “Distribution substations” asset group:

- Expenditure identified against an “SW” task, against an asset category for HV switchgear or against an asset category for 11kV OH control point was assigned to ‘DISTRIBUTION SUBSTATION EQUIPMENT & PROPERTY MAINTENANCE’, ‘DISTRIBUTION SUBSTATION SWITCHGEAR (WITHIN SUBSTATIONS AND STAND ALONE SWITCHGEAR’.
- Expenditure identified against either a “TX” task or a voltage regulation workgroup was assigned to ‘DISTRIBUTION SUBSTATION EQUIPMENT & PROPERTY MAINTENANCE’, ‘DISTRIBUTION SUBSTATION OTHER EQUIPMENT’.
- Expenditure identified against a “DC” task was assigned to ‘DISTRIBUTION SUBSTATION EQUIPMENT & PROPERTY MAINTENANCE’, ‘DISTRIBUTION SUBSTATION OTHER EQUIPMENT’.
- Expenditure identified against an “SU” task (except for task SU0106) was assigned to ‘DISTRIBUTION SUBSTATION EQUIPMENT & PROPERTY MAINTENANCE’, ‘DISTRIBUTION SUBSTATION OTHER EQUIPMENT’ as these tasks include inspection of housings, transformers, LV boards, HV switchgear and testing of earthing systems and expenditure would be very difficult to disaggregate to a lower level
- Expenditure identified against task “SU0106, against asset categories which include “Land”/“Building”, against building maintenance workgroups or against maintenance activity types related to asbestos removal were assigned to ‘DISTRIBUTION SUBSTATION EQUIPMENT & PROPERTY MAINTENANCE’, ‘DISTRIBUTION SUBSTATION PROPERTY’. This expenditure could not be disaggregated between the building components and electrical components.
- Where a task was not identified in the extract, expenditure was assigned to ‘DISTRIBUTION SUBSTATION EQUIPMENT & PROPERTY MAINTENANCE’, ‘DISTRIBUTION SUBSTATION OTHER EQUIPMENT’ as it could have been for switchgear, protection or communication systems. LV boards, building issues etc.
- Expenditure identified against an asset category which included “Distribution transformer” or a Transformer Services workgroup were assigned to ‘DISTRIBUTION SUBSTATION EQUIPMENT & PROPERTY MAINTENANCE’, ‘DISTRIBUTION SUBSTATION TRANSFORMERS’ for non-routine maintenance expenditure only as routine tasks to inspect distribution transformers are covered in the general substation inspection tasks.
- Expenditure identified against an asset category which included “Zone transformer” was assigned to ‘ZONE SUBSTATION EQUIPMENT MAINTENANCE’, ‘TRANSFORMERS ZONE SUBSTATION’.
- Any expenditure associated with the ER tasks was assigned to ‘DISTRIBUTION SUBSTATION EQUIPMENT & PROPERTY MAINTENANCE’, ‘DISTRIBUTION SUBSTATION OTHER EQUIPMENT’.

For the “Sub-transmission substations” asset group:

- Expenditure against this asset group includes both “DSP” and “TSP” room field values. “DSP” expenditure has mostly been assigned to Zone substation RIN categories and “TSP” expenditure has mostly been assigned to Subtransmission asset RIN categories as detailed below.
- Expenditure identified against an “SW” task or against an asset category for “switchgear” was assigned to the ‘ZONE SUBSTATION EQUIPMENT MAINTENANCE’, ‘OTHER EQUIPMENT’ or ‘SUB-TRANSMISSION ASSET MAINTENANCE’ RIN sub-category (based on the “Room” field value, i.e. TNSP or DNSP).
- Expenditure identified against either a “TX” task, a “VR” tasks or a voltage regulation workgroup was assigned to the ‘ZONE SUBSTATION EQUIPMENT MAINTENANCE’, ‘TRANSFORMERS ZONE SUBSTATION’ or ‘SUB-TRANSMISSION ASSET MAINTENANCE’ RIN sub-category (based on the “Room” field value, i.e. TNSP or DNSP).
- Expenditure identified against a “DC” task or a “DC systems” asset category was assigned to the ‘ZONE SUBSTATION EQUIPMENT MAINTENANCE’, ‘OTHER EQUIPMENT’ or ‘SUB-TRANSMISSION ASSET MAINTENANCE’ RIN sub-category (based on the “Room” field value, i.e. TNSP or DNSP).
- Expenditure identified against a “PR” task or against an asset category for “CT’s and VT’s” was assigned to the ‘ZONE SUBSTATION EQUIPMENT MAINTENANCE’, ‘OTHER EQUIPMENT’ or ‘SUB-

TRANSMISSION ASSET MAINTENANCE' RIN sub-category (based on the "Room" field value, i.e. TNSP or DNSP).

- Expenditure identified against an "ER" task was assigned to the 'ZONE SUBSTATION EQUIPMENT MAINTENANCE', 'OTHER EQUIPMENT' or 'SUB-TRANSMISSION ASSET MAINTENANCE' RIN sub-category (based on the "Room" field value, i.e. TNSP or DNSP).
- Expenditure identified which does not have a task or asset category, or which has a "general" asset category, was assigned to the 'ZONE SUBSTATION EQUIPMENT MAINTENANCE', 'OTHER EQUIPMENT' or 'SUB-TRANSMISSION ASSET MAINTENANCE' RIN sub-category (based on the "Room" field value, i.e. TNSP or DNSP).
- Expenditure identified against a "Reactor and capacitor" asset category, was assigned to the 'ZONE SUBSTATION EQUIPMENT MAINTENANCE', 'OTHER EQUIPMENT' or 'SUB-TRANSMISSION ASSET MAINTENANCE' RIN sub-category (based on the "Room" field value, i.e. TNSP or DNSP).
- Expenditure identified against an "SU" task (except for tasks SU0106, SU0115 or SU0116) was assigned to the 'ZONE SUBSTATION EQUIPMENT MAINTENANCE', 'OTHER EQUIPMENT' or 'SUB-TRANSMISSION ASSET MAINTENANCE' RIN sub-category (based on the "Room" field value, i.e. TNSP or DNSP).
- Expenditure identified against an "SU0115" or "SU0116" task or an "Oil Cont" workgroup was assigned to the 'ZONE SUBSTATION EQUIPMENT MAINTENANCE', 'OTHER EQUIPMENT' or 'SUB-TRANSMISSION ASSET MAINTENANCE' RIN sub-category (based on the "Room" field value, i.e. TNSP or DNSP).
- Expenditure identified against task "SU0106, against asset categories which include "Land" / "Building" or against building maintenance workgroups was assigned to the 'ZONE SUBSTATION PROPERTY MAINTENANCE', 'ALL ZONE SUBSTATION PROPERTIES' or 'SUB-TRANSMISSION ASSET MAINTENANCE' RIN sub-category (based on the "Room" field value, i.e. TNSP or DNSP).
- Expenditure identified which does not have a task and is against a Telecontrol workgroup, or which has a "Communications" asset category, was assigned to the 'ZONE SUBSTATION EQUIPMENT MAINTENANCE', 'OTHER EQUIPMENT' or 'SUB-TRANSMISSION ASSET MAINTENANCE' RIN sub-category (based on the "Room" field value, i.e. TNSP or DNSP).
- Expenditure identified against a "Protection and control" asset category and a Protection workgroup was assigned to the 'PROTECTION SYSTEMS MAINTENANCE' RIN category.

For the "Transmission Overhead" asset group:

- Expenditure against this asset group includes both "DSP" and "TSP" room field values. "DSP" expenditure has mostly been assigned to "Pole, Overhead Line and Service line maintenance" RIN sub-categories and "TSP" expenditure has mostly been assigned to "Subtransmission asset maintenance" RIN sub-categories as detailed below.
- Expenditure identified against maintenance activity "Line inspection", Thermovision" or "Bushfire patrol" was assigned to 'OVERHEAD ASSET INSPECTION'.
- Expenditure identified against maintenance activity "Pole inspection" was assigned to the 'POLE INSPECTION AND TREATMENT', 'ALL POLES' RIN category.
- Expenditure identified against an "SW" task and a Protection workgroup was assigned to 'ZONE SUBSTATION EQUIPMENT MAINTENANCE', 'OTHER EQUIPMENT' due to the very small expenditure.
- Expenditure identified against a "Control point" asset category and an OH workgroup was assigned to 'POLES AND OVERHEAD LINES', 'POLE TOPS AND OVERHEAD LINES'.
- Expenditure identified against maintenance activity "Tower inspection", against a "Tower line" asset category or a "Tower" workgroup was assigned to the 'POLES AND OVERHEAD LINES', 'POLE TOPS AND OVERHEAD LINES' or 'SUB-TRANSMISSION ASSET MAINTENANCE' RIN category and "Tower lines" RIN sub-category (based on the "Room" field value, i.e. TNSP or DNSP).
- Expenditure identified against a "Sub-transmission Mains UG" asset category was assigned to the assigned to 'NETWORK UNDERGROUND CABLE MAINTENANCE BY VOLTAGE', '33KV AND ABOVE' RIN sub-category.

- All other expenditure was assigned to the 'POLES AND OVERHEAD LINES', 'POLE TOPS AND OVERHEAD LINES' or 'SUB-TRANSMISSION ASSET MAINTENANCE' RIN category and "Tower lines" RIN sub-category (based on the "Room" field value, i.e. TNSP or DNSP).

For the "Transmission Underground" asset group:

- Expenditure against this asset group includes both "DSP" and "TSP" room field values. "DSP" expenditure has been assigned to the 'NETWORK UNDERGROUND CABLE MAINTENANCE BY VOLTAGE', '33KV AND ABOVE' RIN sub-category and "TSP" expenditure has been assigned to the 'SUB-TRANSMISSION ASSET MAINTENANCE' RIN sub-category.

For the "Zone substations" asset group:

- Expenditure against this asset group includes both "DSP" and "TSP" room field values. "DSP" expenditure has mostly been assigned to Zone substation RIN categories and "TSP" expenditure has mostly been assigned to Subtransmission asset RIN categories as detailed below.
- Expenditure identified against an "SW" task or against an asset category for "switchgear" was assigned to the 'ZONE SUBSTATION EQUIPMENT MAINTENANCE', 'OTHER EQUIPMENT' or 'SUB-TRANSMISSION ASSET MAINTENANCE' RIN sub-category (based on the "Room" field value, i.e. TNSP or DNSP).
- Expenditure identified against either a "TX" task, a "VR" tasks or a voltage regulation workgroup was assigned to the 'ZONE SUBSTATION EQUIPMENT MAINTENANCE', 'TRANSFORMERS ZONE SUBSTATION' or 'SUB-TRANSMISSION ASSET MAINTENANCE' RIN sub-category (based on the "Room" field value, i.e. TNSP or DNSP).
- Expenditure identified against a "DC" task or a "DC systems" asset category was assigned to the 'ZONE SUBSTATION EQUIPMENT MAINTENANCE', 'OTHER EQUIPMENT' or 'SUB-TRANSMISSION ASSET MAINTENANCE' RIN sub-category (based on the "Room" field value, i.e. TNSP or DNSP).
- Expenditure identified against a "PR" task or against an asset category for "CT's and VT's" was assigned to the 'ZONE SUBSTATION EQUIPMENT MAINTENANCE', 'OTHER EQUIPMENT' or 'SUB-TRANSMISSION ASSET MAINTENANCE' RIN sub-category (based on the "Room" field value, i.e. TNSP or DNSP).
- Expenditure identified against an "ER" task was assigned to the 'ZONE SUBSTATION EQUIPMENT MAINTENANCE', 'OTHER EQUIPMENT' or 'SUB-TRANSMISSION ASSET MAINTENANCE' RIN sub-category (based on the "Room" field value, i.e. TNSP or DNSP).
- Expenditure identified which does not have a task or asset category, or which has a "general" asset category, was assigned to the 'ZONE SUBSTATION EQUIPMENT MAINTENANCE', 'OTHER EQUIPMENT' or 'SUB-TRANSMISSION ASSET MAINTENANCE' RIN sub-category (based on the "Room" field value, i.e. TNSP or DNSP).
- Expenditure identified against a "Reactor and capacitor" asset category, was assigned to the 'ZONE SUBSTATION EQUIPMENT MAINTENANCE', 'OTHER EQUIPMENT' or 'SUB-TRANSMISSION ASSET MAINTENANCE' RIN sub-category (based on the "Room" field value, i.e. TNSP or DNSP).
- Expenditure identified against an "SU" task (except for tasks SU0106, SU0115 or SU0116) was assigned to the 'ZONE SUBSTATION EQUIPMENT MAINTENANCE', 'OTHER EQUIPMENT' or 'SUB-TRANSMISSION ASSET MAINTENANCE' RIN sub-category (based on the "Room" field value, i.e. TNSP or DNSP).
- Expenditure identified against an "SU0115" or "SU0116" task or an "Oil Cont" workgroup was assigned to the 'ZONE SUBSTATION EQUIPMENT MAINTENANCE', 'OTHER EQUIPMENT' or 'SUB-TRANSMISSION ASSET MAINTENANCE' RIN sub-category (based on the "Room" field value, i.e. TNSP or DNSP).
- Expenditure identified against task "SU0106, against asset categories which include "Land" / "Building" or against building maintenance workgroups was assigned to the 'ZONE SUBSTATION PROPERTY MAINTENANCE' or 'SUB-TRANSMISSION ASSET MAINTENANCE' RIN sub-category (based on the "Room" field value, i.e. TNSP or DNSP).

- Expenditure identified which does not have a task and is against a Telecontrol workgroup, or which has a "Communications" or "CLC" asset category, was assigned to the 'ZONE SUBSTATION EQUIPMENT MAINTENANCE', 'OTHER EQUIPMENT' or 'SUB-TRANSMISSION ASSET MAINTENANCE' RIN sub-category (based on the "Room" field value, i.e. TNSP or DNSP).
- Expenditure identified against a "Protection and control" asset category and a Protection workgroup was assigned to the 'PROTECTION SYSTEMS MAINTENANCE' RIN category.
- Expenditure identified against a "Transmission UG" or "Tunnels" workgroup was assigned to the 'NETWORK UNDERGROUND CABLE MAINTENANCE BY VOLTAGE', '33KV AND ABOVE' or 'SUB-TRANSMISSION ASSET MAINTENANCE' RIN sub-category (based on the "Room" field value, i.e. TNSP or DNSP).

For the "NA" and "Not assigned" asset groups:

Expenditure was assigned to a RIN category and sub-category based on either the task, the workgroup and where that workgroup is most likely to work, or the asset category and could also be a mixture of either of these as to where the expenditure was assigned.

Explain circumstances where Ausgrid cannot provide input for a variable using actual information, and therefore must provide estimated information:

(i) why an estimate was required, including why it was not possible for Ausgrid to provide actual information;

(ii) the basis for the estimate, including the approach used, assumptions made and reasons why the estimate is Ausgrid's best estimate, given the information sought in the Notice.

For 'NETWORK UNDERGROUND CABLE MAINTENANCE: BY LOCATION' the required data is not retained in a way that costs can be reported in these categories. As such an apportionment of the total costs for 'NETWORK UNDERGROUND CABLE MAINTENANCE: BY VOLTAGE' has been applied using the proportionate length of underground high voltage cable in the CBD feeder category. This is considered the best estimate as it uses actual total figures for Network Underground Cable Maintenance, but apportioned according to asset quantities.

For 'PUBLIC LIGHTING MAINTENANCE' the required data is not retained in a way that costs can be reported in these categories. As such the total costs reported for public lighting maintenance has been apportioned to the two categories proportionately according to the total number of assets installed at the end of each year. This is considered the best estimate as it uses actual total figures for Public Lighting Maintenance, but apportioned according to asset quantities.

Template 2.9 – Emergency response

The information provided in template 2.9 has been completed in accordance with the AER RIN requirements and instructions applying to template 2.9 including Appendix E and F, and the requirements in the worksheet.

Table 2.9.1 – Emergency Response Expenditure

Demonstrate how the information provided is consistent with the requirements of the Notice

The information provided on table 2.9.1 is consistent with the requirements in the RIN. The information is consistent with the definition of emergency response, major storm and major events provided in Appendix F of the RIN. The information is consistent with the requirements in paragraph 14.1 of Appendix E of the RIN. The information includes the following expenditure for each regulatory year:

1. Total emergency response expenditure
2. 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.
3. 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.

As required by paragraph 1.15 of the Appendix E, of the Category Analysis RIN, Template 2.9 information is the Direct Costs only, and excludes expenditures on Overheads.

Explain the source from which Ausgrid obtained the information provided.

Financial data included in template 2.9 is sourced from SAP and TM1 (Ausgrid's financial accounting and reporting systems).

The major event days are defined using the TMED metric. Definition is defined as "TMED - The threshold of daily SAIDI performance which identifies a "major event day". The TMED threshold is calculated according to the IEEE Std-1366 guidelines (section 4.5), and also described in Schedule 6 of the Licence Conditions".

TMED days are included in other RIN templates and are a subset of that worksheet including direct costs.

It is important to note that costs associated with major event days vary depending on the extent of damage to the network sustained and the labour, material and contracted services required to rectify the network following the event.

PM03 (Breakdown) & PM04 (Nature Induced Breakdown) was used as the basis for determining 'emergency expenditure'. A given list of days in which TMED was exceeded was used to define the total expenditure in more detail as required by isolation of costs by major event day (using Business Objects). The overall amount excludes any capitalised costs, such as minor capital expenditure incurred with any associated rectification works.

Explain the methodology Ausgrid used to provide the required information, including any assumptions Ausgrid made

Ausgrid has prepared 2016/17 information based on these categories. 2016/17 has used the same methodology as was applied in the regulatory accounting statements for 2013/14, 2014/15 and 2015/16.

The steps in obtaining the outcomes are:

1. Extract detailed list of PM03 & PM04 orders using SAP & TM1
2. Extract all costs associated with these cost objects
3. Source list of TMED days for separation of defined major event days
4. With TMED days list, isolate orders associated with work on those days or after which work was carried out, PM04 orders were selected on Major Event Days where a storm was identified, however PM03 orders were used on days where a failure was listed.
5. Emergency Service Officers (EMSO) costs (sourced via TM1) have been included on the basis of 82.4% allocation of standard control services costs for 'emergency work', with the balance representing other

network activities such as reconnection and off peak conversion works. There was an increase in this rate from 65.6% in 2015/16 to 82.4% in 2016/17 and primarily as a result of reconnection activities during business hours being undertaken by an outsourced arrangement during 2016/17.

6. EMSO costs have been divided over the 365 days per year (24/7 shifts), and for each TMED day the average cost per day has been included as an allocation to each major event days cost.
7. There was NIL Category B Major Events.

Assumptions made are:

- PM03 & PM04 defines emergency response
- TMED days exceeding 2016/17 threshold of 2.88 define major event days
- Call Centre staff costs are included as indirect cost
- Classification of works as emergency works and the recording of time through the internal time and attendance process are relied upon.
- The costs associated with a major event can be carried out after the actual day exceeding the TMED threshold.

Explain circumstances where Ausgrid cannot provide input for a variable using actual information, and therefore must provide estimated information:

(i) why an estimate was required, including why it was not possible for Ausgrid to provide actual information;

Emergency Service Officers (EMSO) costs have been included as an estimate as employees do not usually allocate their time to individual activities. Where identified that EMSO staff have booked to work orders, these costs have been excluded from the estimate, so there is no overlap or inflated costs due to double counting.

(ii) the basis for the estimate, including the approach used, assumptions made and reasons why the estimate is Ausgrid's best estimate, given the information sought in the Notice.

EMSO costs associated with emergency response work were calculated based on the agreed proportion of 82.4% of the total direct costs. To calculate the major events a daily EMSO rate was used. Refer to steps 5 & 6 in the methodology stated above.

Template 2.10(A) – Overheads

The information provided in template 2.10(A) has been prepared according to the AER RIN requirements and instructions applicable to template 2.10 (A) including Appendix E and F, and requirements in the worksheet.

Table 2.10.1 – Network Overheads Expenditure

Demonstrate how the information provided is consistent with the requirements of the Notice

Actual data for 2016/17 has been based on an extraction of actual financial data directly or via TM1 and/or Business Intelligence (BI) from our SAP financial system. Information reported in table 2.10.1 aligns with Ausgrid's Cost Allocation Methodology (CAM).

Explain the source from which Ausgrid obtained the information provided.

Actual data for 2016/17 is from TM1 and/or SAP BI (Ausgrid financial reporting system).

Explain the methodology Ausgrid used to provide the required information, including any assumptions Ausgrid made.

The split of overhead costs between network and corporate overheads is based on mapping of RIN categories reported in Ausgrid's 2014-19 Regulatory Proposal.

Operating and capital expenditure has been extracted from SAP via TM1 and/or BI for 2016/17 according to profit centre mapping for each cost category for standard control services and alternative control services.

Network overheads include both operating and capital expenditure and are extracted from the SAP financial system using TM1 and BI.

There has been no change in Ausgrid's capitalisation policy in 2016/17.

Explain circumstances where Ausgrid cannot provide input for a variable using actual information, and therefore must provide estimated information:

(i) why an estimate was required, including why it was not possible for Ausgrid to provide actual information;

No estimates reported in template 2.10(A).

(ii) the basis for the estimate, including the approach used, assumptions made and reasons why the estimate is Ausgrid's best estimate, given the information sought in the Notice.

Not applicable to table 2.10.1.

Table 2.10.2 – Corporate Overheads Expenditure

Demonstrate how the information provided is consistent with the requirements of the Notice.

Actual data for 2016/17 has been based on an extraction of actual financial data directly or via TM1 from our SAP financial system. Information reported in table 2.10.2 aligns with Ausgrid's CAM.

Explain the source from which Ausgrid obtained the information provided.

Actual data for 2016/17 is from TM1 and/or SAP BI (Ausgrid financial reporting system).

Explain the methodology Ausgrid used to provide the required information, including any assumptions Ausgrid made.

The split of overhead costs between network and corporate overheads is based on mapping of RIN categories used in Ausgrid's 2014-19 Regulatory Proposal.

Operating expenditure is from SAP via the TM1 cube for 2016/17 and is based on the profit centres mapped for corporate overheads and relating to standard control services.

Corporate overheads and capitalised corporate overheads are extracted from the SAP financial system using TM1 and BI.

Explain circumstances where Ausgrid cannot provide input for a variable using actual information, and therefore must provide estimated information:

(i) why an estimate was required, including why it was not possible for Ausgrid to provide actual information;

No estimates reported in template 2.10(A).

(ii) the basis for the estimate, including the approach used, assumptions made and reasons why the estimate is Ausgrid's best estimate, given the information sought in the Notice.
Not applicable to table 2.10.

Template 2.11 – Labour

The information provided in template 2.11 has been prepared according to AER RIN requirements and instructions applicable to template 2.11 including Appendix E and F, and requirements in the worksheet.

Table 2.11.1 – Cost Metrics Per Annum

Demonstrate how the information provided is consistent with the requirements of the Notice

All financial costs for 2016/17 financial year have been allocated as per principles set out in Ausgrid's CAM. The actual labour expenditure provided is based on an extraction of actual financial and labour data from the Chris 21 and SAP financial system.

The information provided in table 2.11.1 and 2.11.2 is in line with the requirements in RIN Schedule 1, APPENDIX E: PRINCIPLES AND REQUIREMENTS.

Total labour expenditure included in table 2.11.1 is as per the Labour Cost definition included in Appendix F: Definitions. As per the definition labour costs include:

- Labour hire,
- ordinary time earnings,
- other earnings, on-costs and taxes,
- superannuation,
- termination and redundancy payments,
- purchase of protective clothing,
- training and study assistance; and
- specific employee related FBT taxes.

The segregation of Ausgrid employees into direct labour, network overheads and corporate overheads has been determined according to the job category and cost centres recorded against the employee in the Chris 21 payroll system.

Explain the source from which Ausgrid obtained the information provided.

Type of information per AER	Source
Average Staffing Level	Actual hours against Salary codes from Chris 21 divided by 1,877.1 hrs per year based on 52.14 weeks per year and 36 hours standard week. Data is sourced from Chris 21.
Average productive hours	Total hrs booked against Normal & Overtime codes for 2016/17 divided by ASL from Chris 21.
Stand down occurrences	Total Stand - Down instances per ASL from SAP.
Average productive work hour overtime	Total hrs booked against overtime codes for 2016/17 divided by ASL from Chris 21.

Explain the methodology Ausgrid used to provide the required information, including any assumptions Ausgrid made

ASL by Labour Classification

Total staffing level is calculated using actual hours against Salary codes from Chris 21 divided by 1,877.1 hrs per year based on 52.14 weeks per year and 36 hours standard week. This data is sourced from SAP HR. The employee data is held in Ausgrid's SAP HR System by 'Job Family' and these have been mapped to the relevant AER classifications. The mapping is shown below. The number of FTEs working on standard control services has been calculated based on the Ausgrid CAM by using the FTE allocation (or FTE split) for 2016/17.

AER Classification	Ausgrid Job Family / Job Category
Executive Manager	Executive (level 2 & 3 managers)
Senior Manager	Level 4 managers
Manager	Field Managers Field Supervisors Managers
Professional	Engineering Management / Professional Job Family (less Managers – Job Category)
Semi professional	Engineering Officers Field Support Officers Business Services Environment Metering Technology Work Scheduler Trainers Community Engagement Estimators Security
Support Staff	Administration
Intern, junior staff, apprentice	Trainees Work Experience Cadets Graduates
Skilled electrical worker	Base Field – Electrical Workers Advanced Field – Electrical Workers
Skilled non-electrical worker	Workshop Technician
Apprentice	Apprentices – Electricians Apprentices - Overhead

	Apprentices - Underground
Unskilled worker	Base Field - Asset Access Base Field – Electricity Supply Officer (ESO)

Based on the AER classifications, a number of employees (ie. Managers, Professional and Semi Professional) are being allocated as network overheads, instead of direct network labour, who directly work on the network. Ausgrid would classify these employees as being direct but have followed the template and allocated these employees to network overheads. Therefore network overhead is overstated and direct network labour is understated.

Ordinary time include ordinary time salaries and wages booked against salary code for 2016/17, excluding overtime. It also includes allowances, bonuses, incentive payments and superannuation.

Ordinary time expenditure has been extracted from Ausgrid's Chris 21 payroll system. Ordinary time expenditure attributable to standard control services has been calculated by using the FTE allocation rate for 2016/17.

Average Productive Hours per ASL

Actual Available Hours has been used to calculate the quantum of productive hours. Per the AER definition of productive hours, we have deemed that using actual available hours was appropriate after excluding assumptions such as sick leave, annual leave, roster days off and public holidays.

Stand Down Occurrences

Data has been extracted directly from SAP with each 'stand down' instance obtained year by year from Cross Application Time Sheet (CATS), and employees crossed referenced to allocate to labour classifications.

Explain circumstances where Ausgrid cannot provide input for a variable using actual information, and therefore must provide estimated information:

(i) why an estimate was required, including why it was not possible for Ausgrid to provide actual information;

No estimates reported in template 2.11.

(ii) the basis for the estimate, including the approach used, assumptions made and reasons why the estimate is Ausgrid's best estimate, given the information sought in the Notice.

All information provided is based on actual data.

Table 2.11.2 – Extra Descriptor Metrics for Current Year

Demonstrate how the information provided is consistent with the requirements of the Notice

The information provided in table 2.11.2 is in line with the requirements and definitions in the RIN.

Explain the source from which Ausgrid obtained the information provided.

Type of information per AER	Source
Average productive work hours - ordinary time – per ASL	Total hrs booked against Salary code for 2016/17 divided by ASL. Source data from Chris 21.
Average productive work hours - ordinary time – Hourly Rate per ASL	Total labour cost (excluding overtime cost) + on costs booked against Salary for each category for 2016/17 divided by ASL multiplied by average productive work hours per ASL. Source data has been obtained from Chris 21.

Average productive work hours - overtime time – per ASL	Total hours booked against overtime codes for 2016/17 divided by ASL. Source data from Chris 21.
Average productive work hours - overtime time – Hourly Rate per ASL	Total Overtime costs for 2016/17 each category divided by ASL multiplied by average productive work hours overtime per ASL. Source data from Chris 21.

Explain the methodology Ausgrid used to provide the required information, including any assumptions Ausgrid made

Average productive hours per ASL is calculated using total labour costs plus on costs booked against salary codes for each category for 2016/17 divided by ASL multiplied by the FTE allocation rate for 2016/17 as per the Ausgrid CAM. The source data is from Chris 21 and SAP HR.

Total Overtime hours incurred for 2016/17 was sourced directly from CHRIS 21 payroll, and using cross references to job families mapped to labour classification. This figure was then divided by ASL for that classification.

Total Overtime dollars were extracted from the Chris 21 payroll system, and using cross references to job families mapped to labour classification. The dollars were then divided by the hours to provide the hourly rate.

Explain circumstances where Ausgrid cannot provide input for a variable using actual information, and therefore must provide estimated information:

(i) why an estimate was required, including why it was not possible for Ausgrid to provide actual information;

(ii) the basis for the estimate, including the approach used, assumptions made and reasons why the estimate is Ausgrid's best estimate, given the information sought in the Notice.

All information provided is based on actual data.

Template 2.12 - Input tables

The information provided in template 2.12 has been prepared to align to total in each relevant template listed in 2.12.1 Input Tables. Ausgrid notes that there are no specific instructions applicable to template 2.12 in Appendix E and F.

Table 2.12 – Input tables

Demonstrate how the information provided is consistent with the requirements of the Notice

Actual data for 2016/17 is based on actual financial data directly or via TM1 reports from Ausgrid's SAP financial system for operating expenditure and SAP Business Intelligence system (BI) for capital expenditure. Direct materials, direct labour and contract expenditure are shown excluding of overhead costs and indirect cost allocations to provide a direct cost view for templates 2.2 to 2.9. This is as per Appendix E of the Category Analysis RIN, paragraph 1.15. Other expenditure includes both direct and indirect costs.

Functions/cost groupings listed below shows direct costs in template 2.12

- Vegetation management
- Routine maintenance
- Non-routine maintenance
- Augmentation
- Replacement
- Connections
- Emergency response
- Non network expenditure

Functions/cost groupings listed below shows total costs in template 2.12 (ie. include overhead costs and indirect cost allocations)

- Public lighting
- Fee based services
- Quoted services
- Overheads

Explain the source from which Ausgrid obtained the information provided.

Specific details of the exact source of information for the expenditure category in template 2.12 are shown in the below table:

Expense Category	Source
Vegetation management	SAP via TM1 data extraction for operating expenditure [no capital expenditure under this category]
Routine maintenance	SAP via TM1 data extraction for operating expenditure [no capital expenditure under this category]
Non-Routine maintenance	SAP via TM1 data extraction for operating expenditure [no capital expenditure under this category]
Overheads	SAP via TM1 data extraction for operating expenditure and BI data extraction for

	capital expenditure
Augmentation	SAP via BI data extraction for capital expenditure [no operating expenditure under this category]
Connections	SAP via BI data extraction for capital expenditure [no operating expenditure under this category]
Emergency response	SAP via TM1 data extraction for operating expenditure [no capital expenditure under this category]
Public lighting	SAP via TM1 data extraction for operating expenditure and BI data extraction for capital expenditure
Metering	SAP via TM1 data extraction for operating expenditure and BI data extraction for capital expenditure
Fee-based services	SAP via TM1 data extraction for operating expenditure and BI data extraction for capital expenditure
Quoted services	SAP via TM1 data extraction for operating expenditure and BI data extraction for capital expenditure
Replacement	SAP via BI data extraction for capital expenditure [no operating expenditure under this category]
Non-network expenditure	SAP via TM1 data extraction for operating expenditure and BI data extraction for capital expenditure

Explain the methodology Ausgrid used to provide the required information, including any assumptions Ausgrid made

Overhead expenditure split for 2.12

Costs reported in template 2.12 relating to overheads include both operating and capital expenditure for standard control and alternative control services only. Overhead costs relating to unregulated services reported in template 2.10(A) has not been included in template 2.12. The methodology used to calculate information in template 2.12 is discussed below. Definitions applicable to template 2.12 are from the AER's CA RIN guidelines.

Direct costs – operating or capital expenditure directly attributable to a work activity, project or work order, consists of in-house costs of direct labour, direct materials, contractor costs, and other costs excluding any allocated overhead expenditure.

Direct labour cost – labour cost attributable to a specific asset or service, cost centre, work activity, project or work order.

Labour cost definition used in template 2.12 is as per the definition included in Appendix F: Definitions of the CA RIN and include the following:

- Labour hire,
- ordinary time earnings,
- other earnings, on-costs and taxes,
- superannuation,
- termination and redundancy payments,
- purchase of protective clothing,
- training and study assistance; and

- specific employee related FBT taxes.

Other earnings include termination and redundancy payments, purchase of protective clothing, training and study assistance as per the AER definition.

Overhead expenditure in template 2.12 is divided into network and corporate overheads. Network and corporate overheads include operating and capital expenditure. The methodology used to calculate direct labour, material, contract and other expenditure is discussed below.

Operating expenditure

Expenditure is obtained from SAP via the TM1 cube for the 2016/17 financial year according to the profit centre mapping for the expenditure categories reported in template 2.10 Overheads by the following cost groupings:

- LOB-OPEX: Total Opex (excluding costs for maintenance – considered to be direct costs)
- LOB-LABOUR: Labour costs (excluding any allocated overheads)
- LOB- MAT: Materials
- LOB-CONT: Contractors

Direct labour definition used in overheads costs in template 2.12 is as per AER's labour cost definition excluding labour overhead allocations but including the following cost elements:

- Protective clothing
- Contracted services – labour hire
- MV licences employees
- Fringe Benefits Tax
- Training and staff development
- Redundancy expenses

Direct materials costs is LOB - MAT less protective clothing which is categorised under direct labour.

Contract expenditure is LOB-CONT less contracted services labour hire which is categorised under direct labour.

Other Expenditure is all other expenditure (i.e. vehicle expenditure, IT expenditure, professional/licences, rent expenditure, postage & printing costs, etc.) less cost items reported under direct labour, direct material and contract expenditure.

The adjusted cost profile for opex is then used to split total opex overhead costs for standard control and alternative control services. (ie. total overhead costs split based on a percentage allocation).

Capital expenditure

Costs were extracted from SAP via the BI reporting system for the 2016/17 financial year. The cost groupings used in BI are:

PM/PS_DIR: total direct costs, which comprises:

- PM/PS_LAB – direct labour
- PM/PS_MAT – direct material
- PM/PS_SRV – contract services
- PM/PS_OTHER – other direct costs

PM/PS_INDIR: total indirect costs, which comprises:

- PMPS_LABIN: indirect labour

- PMPS_OVER: indirect other overhead

Direct Labour definition used in template 2.12 is as per AER's labour cost definition excluding labour overhead allocations but including the following cost elements:

- Protective clothing
- Contracted services – labour hire
- MV licences employees
- Training and staff development

The above cost elements included in labour are in accordance with the AER definition stated in Appendix F Definitions of the Category Analysis RIN requirements dated 07 March 2014.

Direct materials costs is LOB - MAT less protective clothing which is categorised under direct labour.

Contract expenditure is LOB-CONT less contracted services labour hire which is categorised under direct labour.

Other Expenditure is all other expenditure (i.e. vehicle expenditure, IT expenditure, professional/licences, rent expenditure, postage & printing costs, etc.) less cost items reported under direct labour, direct material and contract expenditure.

The adjusted cost profile for capex is then used to split total capex overhead costs for standard control and alternative control services (ie. total overhead costs split based on a percentage allocation).

Public Lighting expenditure split for 2.12

Operating expenditure

The method used to calculate direct labour, direct material, contract and other expenditure for Public Lighting is as follows:

- LOB-OPEX: Total opex
- LOB-LABOUR: Labour costs (excluding any allocated overhead)
- LOB- MAT: Materials
- LOB-CONT: Contractors

Direct labour also includes:

- Protective clothing
- Contracted services – labour hire
- MV licences employees
- Fringe Benefits Tax
- Training and staff development
- Redundancy expenses

Direct materials costs is LOB - MAT less protective clothing which is categorised under direct labour.

Contract expenditure is LOB-CONT less contracted services labour hire which is categorised under direct labour.

Other Expenditure is all other expenditure (i.e. vehicle expenditure, IT expenditure, professional/licences, rent expenditure, postage & printing costs, etc.) less cost items reported under direct labour, direct material and contract expenditure.

Capital expenditure

Costs were extracted from SAP via the BI reporting system for the 2016/17 financial year. The cost groupings used in BI are:

PM/PS_DIR: total direct costs, which comprises:

- PM/PS_LAB – direct labour

- PM/PS_MAT – direct material
- PM/PS_SRV – contract services
- PM/PS_OTHER – other direct costs

PM/PS_INDIR: total indirect costs, which comprises:

- PMPS_LABIN: indirect labour
- PMPS_OVER: indirect other overhead

Direct Labour definition used for Public Lighting expenditure in template 2.12 is as per AER's labour cost definition excluding labour overhead allocations but including the following cost elements:

- Protective clothing
- Contracted services – labour hire
- MV licences employees
- Training and staff development

The above cost elements included in labour are in accordance with the AER definition stated in Appendix F Definitions of the Category Analysis RIN requirements dated 07 March 2014.

Direct materials costs is LOB - MAT less protective clothing which is categorised under direct labour.

Contract expenditure is LOB-CONT less contracted services labour hire which is categorised under direct labour.

Other Expenditure is all other expenditure (i.e. vehicle expenditure, IT expenditure, professional/licences, rent expenditure, postage & printing costs, etc.) less cost items reported under direct labour, direct material and contract expenditure.

Non-network expenditure split for 2.12

Operating expenditure

The method used to calculate direct labour, direct material, contract and other expenditure for Public Lighting is as follows:

- LOB-OPEX: Total opex
- LOB-LABOUR: Labour costs (excluding any allocated overhead)
- LOB- MAT: Materials
- LOB-CONT: Contractors

Direct labour also includes:

- Protective clothing
- Contracted services – labour hire
- MV licences employees
- FBT Taxes
- Training and staff development
- Redundancy expenses

Direct materials costs is LOB - MAT less protective clothing which is categorised under direct labour.

Contract expenditure is LOB-CONT less contracted services labour hire which is categorised under direct labour.

Other Expenditure is all other expenditure (i.e. vehicle expenditure, IT expenditure, professional/licences, rent expenditure, postage & printing costs, etc.) less cost items reported under direct labour, direct material and contract expenditure.

Capital expenditure

Costs were extracted from SAP via the BI reporting system for the 2016/17 financial year. The cost groupings in BI used to populate direct material, direct labour, contract and other expenditure are:

PM/PS_DIR: total direct costs, which comprises:

- PM/PS_LAB – direct labour
- PM/PS_MAT – direct material
- PM/PS_SRV – contract services
- PM/PS_OTHER – other direct costs

PM/PS_INDIR: total indirect costs, which comprises:

- PMPS_LABIN: indirect labour
- PMPS_OVER: indirect other overhead

Direct labour also includes:

- Protective clothing
- Contracted services – labour hire
- MV licences employees
- Training and staff development

The above cost elements included in labour are in accordance with the AER definition stated in Appendix F Definitions of the Category Analysis RIN requirements dated 07 March 2014.

- Direct Materials = PM/PS_MAT less Protective clothing which is categorised as Direct labour above
- Contract = PM/PS_SRV less Contracted services – labour hire which is categorised as Direct labour above
- Other Expenditure = All other expenditure (i.e. vehicle expenditure, IT expenditure, professional/licences, rent expenditure, postage & printing costs, etc.) less cost items reported under direct labour, direct material and contract mentioned above.

Augmentation split for 2.12

Capital expenditure

Costs were extracted from SAP via the BI reporting system for the 2016/17 financial year. The cost groupings in BI used to populate direct material, direct labour, contract and other expenditure are:

PM/PS_DIR: total direct costs, which comprises:

- PM/PS_LAB – direct labour
- PM/PS_MAT – direct material
- PM/PS_SRV – contract services
- PM/PS_OTHER – other direct costs

PM/PS_INDIR: total indirect costs, which comprises:

- PMPS_LABIN: indirect labour
- PMPS_OVER: indirect other overhead

Direct labour also includes:

- Protective clothing
- Contracted services – labour hire
- Course fees

The above cost elements included in labour are in accordance with the AER definition stated in Appendix F Definitions of the Category Analysis RIN requirements dated 07 March 2014.

- Direct Materials = PM/PS_MAT less Protective clothing which is categorised as Direct labour above
- Contract = PM/PS_SRV less Contracted services – labour hire which is categorised as Direct labour above
- Other Expenditure = All other expenditure (i.e. vehicle expenditure, IT expenditure, professional/licences, rent expenditure, postage & printing costs, etc.) less cost items reported under direct labour, direct material and contract mentioned above.

Replacement split for 2.12

Capital expenditure

Costs were extracted from SAP via the BI reporting system for the 2016/17 financial year. The cost groupings in BI used to populate direct material, direct labour, contract and other expenditure are:

PM/PS_DIR: total direct costs, which comprises:

- PM/PS_LAB – direct labour
- PM/PS_MAT – direct material
- PM/PS_SRV – contract services
- PM/PS_OTHER – other direct costs

PM/PS_INDIR: total indirect costs, which comprises:

- PMPS_LABIN: indirect labour
- PMPS_OVER: indirect other overhead

Direct labour also includes:

- Protective clothing
- Contracted services – labour hire
- Course fees
- Training costs

The above cost elements included in labour are in accordance with the AER definition stated in Appendix F Definitions of the Category Analysis RIN requirements dated 07 March 2014.

- Direct Materials = PM/PS_MAT less Protective clothing which is categorised as Direct labour above
- Contract = PM/PS_SRV less Contracted services – labour hire which is categorised as Direct labour above
- Other Expenditure = All other expenditure (i.e. vehicle expenditure, IT expenditure, professional/licences, rent expenditure, postage & printing costs, etc.) less cost items reported under direct labour, direct material and contract mentioned above.

Explain circumstances where Ausgrid cannot provide input for a variable using actual information, and therefore must provide estimated information:

(i) why an estimate was required, including why it was not possible for Ausgrid to provide actual information;

Only emergency responses have estimated data in template 2.12 (with commentary contained in the basis of preparation for 2.9 Emergency Responses).

(ii) the basis for the estimate, including the approach used, assumptions made and reasons why the estimate is Ausgrid's best estimate, given the information sought in the Notice.

Only emergency responses have estimated data in template 2.12. For the reason, please refer to basis of preparation for 2.9 Emergency Responses.

Template 4.1 - Public lighting

The information provided in template 4.1 has been completed in accordance with the AER RIN requirements and instructions applying to template 4.1 including Appendix E and F, and the requirements in the worksheet.

Table 4.1.1 – Descriptor Metrics over Current Year

Demonstrate how the information provided is consistent with the requirements of the Notice
Report provides a listing of current active streetlights based on Luminaire type (as at July 2017).

Responses provided in table 4.1.1 for Public Lighting have been complete in accordance with the requirements of the Notice. This includes:

- Schedule 1: 15 – Public Lighting Alternative Control Services
- Appendix E: 21 – Public Lighting Alternative Control Services
- Appendix E: 1 – General principles and requirements

Explain the source from which Ausgrid obtained the information provided.
This data is taken from the SAP PM Street Lighting Inventory Reports (transaction ZSD0014)

- Includes all commissioned lights installed on Ausgrid's network.
- The Streetlight rate is either 01 (Ausgrid owned and maintained) or 02 (Ausgrid maintained) – rate 03

(Private) is excluded.

Explain the methodology Ausgrid used to provide the required information, including any assumptions Ausgrid made
Assumed that all maintained public lighting is to be included - both rate 1 (Ausgrid owned and maintained) and rate 2 (customer funded, Ausgrid maintained). Data provided as at July 2017.

Explain circumstances where Ausgrid cannot provide input for a variable using actual information, and therefore must provide estimated information:

(i) why an estimate was required, including why it was not possible for Ausgrid to provide actual information;
Not applicable

(ii) The basis for the estimate, including the approach used, assumptions made and reasons why the estimate is Ausgrid's best estimate, given the information sought in the Notice.
Not applicable

Table 4.1.2 – Descriptor Metrics Annually

Demonstrate how the information provided is consistent with the requirements of the Notice
Responses provided in table 4.1.2 for Public Lighting have been compliant with the requirements of the Notice. This includes:

- Schedule 1: 15 – Public Lighting Alternative Control Services
- Appendix E: 21 – Public Lighting Alternative Control Services
- Appendix E: 1 – General principles and requirements

Number of Lights Installed - volume of works and expenditure
This is the total volume of new light or dedicated street lighting pole installations where no pole or light existed before. Both rate 1 (Ausgrid funded) and rate 2 (customer funded) luminaires and poles are included.

Light replacement - volume of works and expenditure
This is the total volume of street light luminaire replacements and dedicated pole replacements excluding new installations covered in 'Light Installation'.

Light maintenance - volume of works and expenditure

This includes the total volume of lights serviced (but not replaced) as part of planned (bulk lamp replacement) and unplanned (spot replacements). Bulk lamp replacement work is completed on periodic basis. The bulk lamp replacement work is held in the SAP asset base as M1 notifications.
Spot replacement is done on an ad hoc basis and is recorded in the SAP asset base as M2, M3, M4 or ML notifications.

Mean days to rectify/replace public lighting assets (days)
This figure is the average number of days taken for Ausgrid to repair customer reported overhead street light outages.

Volume of GSL breaches (0s)
This figure is the number of times Ausgrid were in breach of the NSW Public Lighting Code for time taken to repair streetlights for both customer and local council reported outages.

GSL payments ($000s)
Payments made for GSL breaches $15 each.

Volume of customer complaints (0s)
Data held in Ausgrid's SAP asset base which records details of customer reported street light issues. Notifications can be flagged as a complaint by a customer when they complete the web based 'Report a streetlight fault' form or verbally to call centre staff when reporting a street light issue over the phone.

Explain the source from which Ausgrid obtained the information provided.

Light Installation, Light Replacement, Light Maintenance and Quality of Supply volume data is sourced from SAP Plant Maintenance database. Financial data is sourced from SAP and tm1prod:Line of Business – iAMS.

Explain the methodology Ausgrid used to provide the required information, including any assumptions Ausgrid made

Lights Installation - volume of works and expenditure
Light installation volume is calculated by reporting on all luminaires with 'effective dates' and 'start-up' dates in FY17. Luminaires are divided into major and minor road categories by lights that are typically used on residential roads (category P) and lights that are typically used on arterial roads (category V). This has typically been delineated by wattage; 100W and less is minor and over 100W is major. With the introduction of LED some additional analysis needs to be performed as LED's can now be less than 100W and servicing a major road.

Number of poles installed
This is the total number of new dedicated pole installations both rate 1 and 2. This data is sourced from SAP PM database and is calculated by supports that have both an "effective date" and "start-up date' in FY17.

Total Costs ($'s)
The total cost including materials, indirect and direct labour costs associated with Light Installation - volume of works and expenditure, is the total public lighting capex for the program titled 'New Public Lighting' SY.11.02.05.

Light replacement - volume of works and expenditure

Replacement of Ausgrid street lights (luminaires), excluding new installations. Data held in Ausgrid's asset base (SAP-PM) includes notifications generated each time a street light luminaire is replaced. As well as a notification being generated the characteristics of the luminaire type change to reflect the new type of light. The number of light replacements is therefore where a completed FIX notification aligns with a characteristic change of the luminaire. The notification type could be M2, M3, M7 or ML. Major and Minor lights are separated as discussed above.

Number of Poles replaced.
Includes all poles physically replaced. Data extracted from SAP asset system for new poles stood that have a related pole replace notification (i.e. excludes brand new poles listed in Light Installation). This data is then filtered to only include poles that have a street light attached.

Total Costs ($'s)
The total cost associated with Light replacement - volume of works and expenditure, is the public lighting capex less any new installation capex.

Light maintenance - volume of works and expenditure
Includes all maintenance work performed on street lights during the period. Data held in Ausgrid's asset base (SAP-PM) includes notifications generated each time a street light luminaire is replaced or maintained. Instances where lights are repaired will generate a notification but will not have any change to the luminaire type. The total number of light maintenance tasks is where a completed notification has been flagged as FIX and there is not a corresponding change to the luminaire type. The notification type could be M2, M3, M7 or ML. Major and Minor lights are separated as discussed above.

Number of poles installed (number of lights maintained)
This is the total number of poles that have a street light installed on Ausgrid's network

Total Costs ($'s)
The total cost associated with Light maintenance - volume of works and expenditure, is the total public lighting opex. This includes, materials, indirect and direct labour and contract services.

Mean days to rectify/replace public lighting assets (days)
Data held in Ausgrid's SAP asset system which records details of customer reported street light issues. Figures based on the average number of days required to complete an overhead street lighting fault from the day it was reported to the day it was repaired.

Volume of GSL breaches (0s)
Data extracted from SAP asset system based on ML (customer generated) notifications where the light reported is outside the customers property, the notification is 'not held' (i.e. not subject to issues like traffic control or UG repairs) and the time to repair the street light is greater than the 12 days allowed in the Public Lighting Code.

GSL payments ($000s)
Based on the Volume of GSL beaches multiplied by $15.

Volume of customer complaints (0s)
Data extracted from SAP asset system based on ML notifications that have been recorded as a complaint by the customer. Notifications can be flagged as a complaint by a customer when they complete the web based 'Report a streetlight fault' form or verbally to call centre staff when reporting a street light issue over the phone.

Explain circumstances where Ausgrid cannot provide input for a variable using actual information, and therefore must provide estimated information:

(i) why an estimate was required, including why it was not possible for Ausgrid to provide actual information;

(ii) The basis for the estimate, including the approach used, assumptions made and reasons why the estimate is Ausgrid's best estimate, given the information sought in the Notice.
Not applicable

Table 4.1.3 – Cost Metrics

Demonstrate how the information provided is consistent with the requirements of the Notice
Responses provided in Table 4.1.2 for Public Lighting have been compliant with the requirements of the Notice. This includes:

- Schedule 1: 15 – Public Lighting Alternative Control Services
- Appendix E: 21 – Public Lighting Alternative Control Services
- Appendix E: 1 – General principles and requirements

Explain the source from which Ausgrid obtained the information provided.

All costs have been sourced from Ausgrid's Public Lighting regulatory pricing models. Light Installation and Light Replacement costs are sourced from Ausgrid's Post 2009 annuity model, Light Maintenance costs are sourced from Ausgrid's Maintenance charge model.

Explain the methodology Ausgrid used to provide the required information, including any assumptions Ausgrid made

Light Installation

Costs listed are the modelled costs to install each of the luminaire types. Cost include materials, labour, and overheads. All assumptions are listed in the model.

Light Replacement
There is no difference in cost for Light Installation and Light Replacement. These figures are duplicated from Light Installation.

Lighting Maintenance
These costs are the output of Ausgrid's operational expenditure pricing model. These costs take into consideration all scheduled and unscheduled maintenance associated with each asset and pricing of all associated materials required for the maintenance of these assets. This model forms part of Ausgrid's public lighting substantive proposal. All underlying assumptions for these calculations can be found in this model.

Explain circumstances where Ausgrid cannot provide input for a variable using actual information, and therefore must provide estimated information:

(i) why an estimate was required, including why it was not possible for Ausgrid to provide actual information;

(ii) The basis for the estimate, including the approach used, assumptions made and reasons why the estimate is Ausgrid's best estimate, given the information sought in the Notice.
Not applicable

Template 4.2 – Metering

The information provided in template 4.2 has been completed in accordance with the AER RIN requirements and instructions applying to template 4.2 including Appendix E and F, and the requirements in the worksheet.

Table 4.2.1 – Metering descriptor metric

Demonstrate how the information provided is consistent with the requirements of the Notice

The response to table '4.2.1 Metering descriptor metric' utilised the AER response worksheets provided. This submission complies with the relevant sections of the RIN and costs have been derived in accordance with Ausgrid's reporting methodology and operational quantities are drawn from the appropriate Ausgrid database.

Explain the source from which Ausgrid obtained the information provided.

2016/17 volumes were obtained from Ausgrid's Metering Business System (MBS).

Explain the methodology Ausgrid used to provide the required information, including any assumptions Ausgrid made

The process of populating this RIN utilised a centrally managed approach. The business process owner coordinated the inputs that were supplied by subject matter experts and management teams. A feedback loop was also incorporated to allow the Manager to verify the accuracy of the supplied information (including source data) and this notice was prepared in accordance with the methodology utilised in AER 2014-19 Regulatory Submission.

The response to table **4.2.1 Metering Descriptor Metric** is based upon a number of assumptions. These are detailed below:

- **Tables 4.2.1 (Meter Type 4)** - Relates to Contestable Meter Sites (Type 1-4). These sites are already open to competition and deemed not to be part of this regulatory submission, therefore all entries have been set to zero in this template.
- **Table 4.2.1 (Meter Type 5 & Meter Type 6)** - Type 5 & 6 meters for this table are defined as installed populations only (based upon how a site is registered/classified in the national electricity market). The volume is a count of meters. This volume includes some NEM registered type 5 sites that have aspects of AMI or Type 4 style communications implemented for operational reasons. i.e. chronic access.

Explain circumstances where Ausgrid cannot provide input for a variable using actual information, and therefore must provide estimated information:

(i) Why an estimate was required, including why it was not possible for Ausgrid to provide actual information;

(ii) The basis for the estimate, including the approach used, assumptions made and reasons why the estimate is Ausgrid's best estimate, given the information sought in the Notice.

Not applicable as no estimates were required.

Table 4.2.2 – Cost metrics

Demonstrate how the information provided is consistent with the requirements of the Notice

The response to table '4.2.2 Cost metrics' utilised the AER response worksheets provided. This submission complies with the relevant sections of the RIN and costs have been derived in accordance with Ausgrid's financial methodology and operational quantities are drawn from the appropriate Ausgrid databases.

Explain the source from which Ausgrid obtained the information provided.

2016/17 costs are actual and were identified from Financial Internal Order (I/O) reports and analysis derived by Ausgrid's Finance and Compliance - Commercial and Decision Support Team.

Total metering costs are considered to be the costs captured against IO's directly attributable to the activities contained within this template. These costs have been extracted from our financial system (SAP) from the TM1 reporting system.

For 2016/17, actual volumes were extracted from Ausgrid's Metering Business System database and SAP system.

Explain the methodology Ausgrid used to provide the required information, including any assumptions Ausgrid made

The process of populating this RIN utilised a centrally managed approach. The business process owner coordinated the inputs that were supplied by subject matter experts and management teams. A feedback loop was also incorporated to allow the Manager to verify the accuracy of the supplied information (including source data) and this notice was prepared in accordance with the methodology utilised in AER 2014-19 Regulatory Submission.

The response to table 4.2.2 Cost Metrics (Cost & Volume) is based upon a number of assumptions. These are detailed below:

- Table 4.2.2 (General Comment) - For this table, volumes and expenditure include metering as an Alternate Control Service (ACS) but does not include Fee-Based (Ancillary Network Services - ANS) services as these services are documented separately in worksheet 4.3. Ausgrid's metering group also undertakes some activities that are related to Standard Control Services (SCS) such as monitoring statistical metering related to transmission and distribution substations, validating incoming data from other metering providers for the purposes of network billing.
- Tables 4.2.2 (Meter Type 4) – Relates to Contestable Meter Sites (Type 1-4). These sites are already open to competition and deemed not to be part of this regulatory submission, therefore all entries have been set to zero in this template.
- Table 4.2.2 (Meter Purchase, New Meter Installation, Meter Replacement) – The costs associated with these three components when combined add up to the amount added to Ausgrid's regulated asset base (RAB) for Type 5 and Type 6 metering. The apportionment of the overall costs includes a small quantity of logistics labour attributed to new meter purchase.
- Table 4.2.2 (Meter Purchase) – A Type 5 meter is defined as the volume of purchased interval capable meters irrespective of whether installed in the NEM as a Type 5 or Type 6 site. The values in the cell for Type 5 costs and volumes represent the sum of both Type 5 & Type 6 'Meter purchase' activities (excluding customer funded metering), as we are unable to split costs/volumes by the separate meter categories. Meter purchase costs were calculated based on SAP network activity financial reporting for meter and material costs, when added to the regulated asset base (RAB) and not at the time of purchase. Meter purchase volumes equate to the actual volume of Ausgrid driven meter replacements.
- Table 4.2.2 (Meter Testing – Meter Type 5 & Meter Type 6) - Meter Testing is defined as Sample Meter Testing. Financial and volume based data for Type 5 and Type 6 sites has been combined as there has been significant merging of work associated with Type 5 and Type 6 sites making accurate apportionment difficult between testing Interval Meters and Accumulation meters. For example; a site tested as Type 6 and then upgraded to Type 5 could have been captured as a Type 5 cost and quantity. Therefore for the indicated periods, Type 5 meter tests also include Type 6 meter tests at a NMI level. 2016/17 actual costs were identified from Financial Internal Order (I/O) reports. Sample Meter testing volumes are calculated on a per NMI basis and volumes were extracted via the Metering Business System database.
- Retailer requested meter tests - identified as ZMET_ ANS Service Orders have been excluded, as it is an Ancillary Network Service and documented separately in worksheet 4.3 Fee-based services.
- Table 4.2.2 (Meter Investigation – Meter Type 5 & Meter Type 6) – The value in the cell for Type 5 meter investigation also includes Type 6 meter investigations as we are unable to separate meter investigation

into separate categories. 2016/17 actual costs were identified from Financial Internal Order (I/O) reports. Meter Investigation volumes are calculated on a per NMI basis and volumes were obtained via the Metering Business System database.

- Table 4.2.2 (Scheduled Meter Reading) - Scheduled means routine meter reads (including either monthly or quarterly read cycles). Scheduled Meter reading actual volumes for Type 5 & Type 6 metering are recorded on a per NMI basis and were obtained from Ausgrid's MBS database. 2016/17 actual costs were identified from Financial Internal Order (I/O) reports. The costs were then allocated across Type 5 and Type 6 scheduled meter readings based on a weighted allocation of the unit cost. The cost is calculated per read, and excludes Ancillary Network Services i.e. Special Meter Reading & Move In/Out meter reads (MIMO) which are detailed separately in worksheet 4.3.1 Fee-based services.

- Table 4.2.2 (Special Meter Reading – Meter Type 5 & Meter Type 6) – Special Meter Reading is defined as special reads/off cycle meter reads that are initiated by the network for the purpose of quality assurance and other scheduled meter reading related activities. The values in the cell for Type 5 costs and volumes represent the sum of both Type 5 & Type 6 'special meter reading' activities as we are unable to split costs/volumes by the separate meter categories. 2016/17 actual costs were identified from Financial Internal Order (I/O) reports. Special Meter Reading volumes were calculated on a per NMI basis and volumes were extracted via the Metering Business System database. For Type 5 meters removed from a site prior to an actual final reading being obtained, Ausgrid have established a process to obtain readings from these removed meters and also uploaded to the Metering Business System database. Any attempted readings that fail to upload as part of this process are recorded in a separate database and volumes are included as part of this service sub-category.

  Retailer requested, Special Meter Reads/MIMO Reads have been excluded, as it is an ancillary network service (ANS) therefore costs and volumes are contained in worksheet 4.3.1 Fee-Based Services.

- Table 4.2.2 (New Meter Installation – Meter Type 5 & Meter Type 6) – No Expenditure or volumes have been provided for this activity due to the exclusion of customer funded metering (i.e. materials and labour) from Ausgrid's metering RIN.

- Table 4.2.2 (Meter Replacements – Meter Type 5) – This represents combined proactive and reactive replacements. Meter test and release labour costs were assigned proportionately across all meter replacement activities. 2016/17 actual costs were obtained via SAP Network Activity Financial reporting. The physical cost of the meter has been excluded from the meter replacement costs as it has been previously included in meter purchase cost. Meter replacement actual volumes were calculated on a per meter basis and were obtained via SAP Network Activity reporting.

- Table 4.2.2 (Meter Maintenance – Meter Type 5 & Type 6) - Indicates field meter maintenance tasks excluding Meter Investigation and Meter Testing, detailed elsewhere in sections 4.2.2 and 4.3.1 of this document.

  The values in the cell for Type 5 volume and costs represent the sum of both Type 5 & Type 6 meter maintenance activity on a per NMI basis (unable to separate meter maintenance into separate categories). 2016/17 actual costs were identified from Financial Internal Order (I/O) reports. Actual volumes for Meter Maintenance were calculated on a per NMI basis and were obtained via SSDM reporting database.

- Table 4.2.2 (Other Metering – Type 4) - This cell has been used to record expenditure related to Metering Standard Control Services. The main components of the recorded expenditure are Meter Data Processing and Distribution, Metering Technology and Engineering Support relating to metering Standard Control Service. These costs are not associated with Alternate Control service or Type 4 costs, they have been included under this category to allow transparency of all regulated costs in the metering business and allow for comparison of costs with the 2015/16 RIN.

  2016/17 actual costs were identified from Financial Internal Order (I/O) reports. As this category has a combination of qualitative and quantitative activities, no volumes were recorded in this template.

- Table 4.2.2 (Other Metering – Meter Type 5) - The recorded expenditure comprises is comprised of Meter Data Processing and Distribution, Metering Technology and Engineering Support relating to metering Alternate Control Service.

  The value in the cell for Type 5 costs represents the sum of both Type 5 & Type 6 'Other metering' activities (unable to split costs into separate categories). 2016/17 actual costs were identified from

Financial Internal Order (I/O) reports. As this category has a combination of qualitative and quantitative activities, no volumes were recorded in this template.

- Table 4.2.2 (Other Metering – Meter Type 7)

  It is noted that there are no Type 7 physical meters in Ausgrid's network; therefore no volume has been recorded. The main components of the recorded expenditure are Type 7 database recording and maintenance along with data processing and distribution. 2016/17 actual costs were identified from Financial Internal Order (I/O) reports.

- Table 4.2.2 (IT infrastructure Capex)

  Costs categorised as IT Infrastructure Capex relate to the disaggregation of Ausgrid's capital expenditure into different service categories for Metering Alternate Control and Metering Ancillary Network Services. This involves the application of the cost allocation principles at different levels of disaggregation. These costs are primarily incurred by the Information Communications & Technology group. 2016/17 actual costs were obtained from Ausgrid's SAP Financial System and have been allocated as per Ausgrid's Cost Allocation Methodology.

- Table 4.2.2 (IT infrastructure Opex)

  Costs categorised as IT Infrastructure Opex relate to Corporate and IT overheads, allocated to Metering Alternate Control and Metering Ancillary Network Services. These costs are incurred by the corporate support divisions of Ausgrid (e.g. Information Communications & Technology, Customer & Corporate, Property, Finance, and Human Resources/Safety). These 2016/17 actual costs were obtained from Ausgrid's SAP Financial System and have been allocated as per Ausgrid's Cost Allocation Methodology.

Explain circumstances where Ausgrid cannot provide input for a variable using actual information, and therefore must provide estimated information:

(i) why an estimate was required, including why it was not possible for Ausgrid to provide actual information;

(ii) the basis for the estimate, including the approach used, assumptions made and reasons why the estimate is Ausgrid's best estimate, given the information sought in the Notice.

Not applicable as no estimates were required.

Template 4.3 Ancillary services – fee based services

The information provided in template 4.3 has been completed in accordance with the AER RIN requirements and instructions applying to template 4.3 including Appendix E and F, and the requirements in the worksheet.

Note: Section 19, Appendix E of the RIN contains instructions on what must be included in this section of the Basis of Preparation:

In the basis of preparation, Ausgrid must provide a description of each fee-based and quoted service listed in regulatory templates 4.3 and 4.4. In each services' description, Ausgrid must explain the purpose of each service and detail the activities which comprise each service. This has been provided below.

Detailed Service Descriptions

Service Group	Standard Detailed Description
Design related services (Provision of design information, design certification and design rechecking services in relation to connection and relocation works provided contestably)	Design Information: The electronic provision of necessary technical information to enable an ASP to prepare a design drawing and submit it for certification. This may include without limitation: • Deriving the estimated loading on the system, technically known as the ADMD (After Diversity Maximum Demand). This estimate depends on such factors as the number of customers served and specific features of the customer's demand; • Provide drawings electronically that show existing low and high voltage circuits (geographically & schematically) and adjacent projects; • Provision and maintenance of systems necessary to facilitate ASP electronic access to data and information allowing electronic drawing transfer and retrieval of standards. • Specify the preferred sizes for overhead conductors or underground cable; • Specify switchgear configuration type, number of pillars, lights etc; • Determine Ausgrid's Network Planning requirements necessary to make electrical supply available to a development and cater for future works; • Nominating network connection points; Provision of any of the above information (GIS, Standards, ADMD etc.) electronically as determined by the NSP.
	Design Certification: Ausgrid is required to certify the design will not compromise the safety or operation of Ausgrid's distribution network. This may include without limitation: • Certify that the design information / project definition have been incorporated in the design; • Certify that easement requirements and earthing details are shown and are in order; • Considering design issues, including checking for over -design and mechanisms to permit work on high voltage systems without disruption to customer's supply; • Certify that funding details for components in the scope of works are correct; • Certify that there are no obvious errors that depart from Ausgrid's design standards and specifications; • Certify that shared assets are not over -utilised to minimise developer's connection costs and that all appropriate assets have been included in the design; • Audit design calculations such as voltage drop calculations, conductor clearance (stringing) calculations etc; • Certify that a bill of materials has been submitted;

Service Group	Standard Detailed Description
	• Check and certify that an environmental assessment has been submitted by an accredited person.
	Design Re-certification: Ausgrid is required to recheck a design initially found to be not certifiable, except where the modifications to a design are of a trivial or minor nature.
ASP inspection services (Inspection and re-inspection of contestable connection and relocation works performed by Accredited Service Providers (ASPs))	Inspection Level 1 ASP: The inspection by Ausgrid, in accordance with the DTIRIS Accredited of Service Provider Scheme of work undertaken by a Level 1 ASP, for the purpose of ensuring the quality of assets to be handed over to Ausgrid.
	Inspection Level 2 ASP: The inspection by Ausgrid, in accordance with the DTIRIS Accredited of Service Provider Scheme of work undertaken by a Level 2 ASP, for the purpose of ensuring the quality of assets to be handed over to Ausgrid. The minimum number of inspection required must correspond to the grade of the DNSP as shown: Inspection rate Grade of ASP Number of inspections A - 1 inspection per 25 jobs B - 1 inspection per 5 jobs C - Each job to be inspected
	Re-inspection Level 1 & 2 ASP: The re-inspection by a Ausgrid of work (other than Customer Installation work) undertaken by an ASP accredited to perform Level 1 or Level 2 work, for the reason that on first inspection the work was found to be not satisfactory.
Reinspection of installation work in relation to customer assets (Reinspection by a distributor of private electrical wiring work undertaken by an electrical contractor, required where the first inspection revealed defective work.)	Note: no charge applies where DNSP carries out an initial inspection of private electrical installation work, during normal working hours, which has been notified by a Certificate of Compliance Electrical Work (CCEW) form. The service is applied when the inspector identifies a defect within an installation and issues a defect notice. Where more than one dwelling is found to be defective within a multi-unit complex the service should be applied to each of these individual units.
Contestable substation commissioning (Includes complex Contestable substation commissioning). Involves the process of connecting the substation to the network. Complex involves kiosk and chamber substations that may involve protection settings.	The commissioning by Ausgrid of a new substation, and includes all necessary commissioning checks and tests prior to, during and after energising the substation via the high voltage switchgear and closing the low voltage circuit breaker, links or fuses and the setting or resetting of protection equipment and updating of engineering systems including the labelling of the network to comply with the asset numbering standards and safety requirements. [complex = kiosks ≥1MVA, multiple kiosks or chamber/s] An Access Permit fee in addition may be required to gain access to the network in order to undertake the commissioning.

Service Group	Standard Detailed Description
Access permits (The provision of an access permit by a distributor to a person authorised to work on or near distribution systems including high voltage.)	This service fee includes High Voltage access and may include without limitation: • Access to the low voltage network (e.g. direct distributors) • Researching and documenting the request for access including a site visit as required; • Documenting the actual switching process; • Programming the work; • Control room activities; • Fitting and removing of access permit earths; • The actual switching of the High Voltage network including travel costs; • Identification of any customers who will be interrupted for carding by the ASP; • Low voltage switching and paralleling of substations that permits high voltage work without disrupting supply to other customers; • Excludes provision of MG and Live Line to maintain supply. These are services in addition and covered by another quoted service; • Cable ID, stab, cut and phase; • Reinstate network and testing; • Travel costs
Clearance to work (The provision of a clearance to work by a distributor to a person authorised to work on or near the system generally at a low voltage.)	This may include without limitation: • Researching and documenting the request for the Clearance to Work (may require a site visit) • Operate the Low Voltage network including travel costs; • Identification of all customers who will be interrupted for ASP to notify ; • Excludes provision of MG to maintain supply. These are services in addition and covered by a quoted service; • Reinstate network and testing; Note: An Access Permit is required when the LV is controlled by operation of a switch located within an electrical station or distribution centre therefore a clearance to work to access a LV direct distributor is covered by the basic fee of the Access Permit service.
Access (standby person)	The provision of access to switchrooms, substations and the like to an ASP who is accompanied by an Ausgrid staff member, but does not include the circumstance where an ASP is provided with keys for the purpose of securing access and is not accompanied by distributor's staff member. Preparation of CLW is included and charged in the hourly rate.
Notices of arrangement (Work of an administrative nature performed by a distributor where a local council requires evidence in writing from the distributor that all necessary arrangements have been made to supply electricity to a development. This may include receiving and checking linen plans and	Work of an administrative nature performed by Ausgrid where a local council requires evidence in writing that all necessary arrangements have been made to supply electricity to a development. This may include without limitation a NoA or a Compliance Certificate involving: • Receiving and checking linen plans and 88B Instruments; • Checking and recording easement details; • Prepare records for conveyance officers; • Liaise with developers if errors occur or changes are required;

Service Group	Standard Detailed Description
88 B instruments, copying linen plans, checking and recording easement details, preparing files for conveyance officers, liaising with developers if errors or charges are required, checking and receiving duct declarations and any amended linen plans and 88B instruments approved by a conveyancing officer and preparing notifications of arrangement.)	• Check and receive duct declarations and any amended linen plans and 88B instruments approved by a conveyance officer; • Confirm the works are completed in accordance with Ausgrid's requirements including substations and ducts, service mains to the customer's 'point of supply' and peg all easements and lot frontages and complete the works, However DNSP, may issue a NoA or Compliance Certificate prior to completion of the contestable works provided: • the contestable design has been certified, and • an additional bond has been deposited either in cash or as a Banker's Guarantee, consisting of an amount equal to the value of the contestable works remaining to be completed which is returned if all of the above requirements have been satisfied. • Prepare notification of arrangement or compliance certificate;
Authorisation of ASPs (Annual authorisation of individual employees and sub-contractors of ASPs and additional authorisations at request of ASP. Authorisation excludes training costs.)	The annual authorisation by Ausgrid of individual employees or sub -contractors of an ASP to carry out work on or near Ausgrid's distribution and subtransmission system. This may include without limitation: • Familiarisation and assessment in Ausgrid's safety rules; • Access Permit Recipient training and assessment include by Ausgrid; • Induction in the unique aspects of the network; • Verification that the applicant has undertaken the necessary Regulatory safety training (resuscitation etc.) within the last 12 months; • Conducting interviews and examinations and in-field safety audit; • Issuing authorisation cards; • Administration support directly related to Authorisation;
Administration services relating to work performed by ASPs, including processing work	Work of an administration nature (not including work of an administrative nature described in service - Notice of Arrangement or Authorisation of ASPs), including the processing of Level 1 and/or Level 3 work where the customer is lawfully required to pay for the Level 1 and / or Level 3 work. This may include without limitation: • Checking supply availability; • Processing applications; • Correspondence from application to completion; • Record – keeping; • Requesting and receiving fees (initially, then prior to design and after certification); • Receiving design drawings (registering and copying); • Raising order for high voltage (HV) work; • Calculating HV reimbursements; • Calculating the cost of a project and warranty / maintenance bond; • Organising refunds to developers for HV work; • Liaising with developers via phone and facsimile; • Updating Geographic Information Systems (GIS) and mapping; • Supporting the process of design information, design certification and design rechecking.

Service Group	Standard Detailed Description
Conveyancing information (Supply of conveyancing information – desk inquiry; or field visit)	The provision of information regarding the availability of supply, presence of Ausgrid's equipment, power lines and related information for property conveyance purposes undertaken with or without any physical inspection of a site, other than the provision of information or the answering of inquiries relating to any matter under Freedom of Information legislation.
Customer interface coordination for contestable works	This service is proposed where customer developments may require a high level of Ausgrid's involvement in order to coordinate a range of inputs from Ausgrid to help establish the development. This usually occurs on projects with the following characteristics: • Multiple components. For example, relocation and connection works associated with the one development, or works ≤ 11 kV and works at higher voltages. • Projects with scheduling challenges such as rapid deployment requirements or constrained timeframes for particular tasks. • Multiple and/or conflicting works to be undertaken in tandem or cooperation with other services or utilities. • Projects where there are significant inter-relationships between capital and contestable works which would benefit from coordination. The form of this service includes, but is not limited to, attendance at internal and external project meetings in accordance with the needs of particular customers. It requires strong communication skills and technical understanding. The nature of the project would determine the skill level of the assigned officer and the number of hours required. Customer interface coordination for contestable works. Coordinating internal resources and managing DNSP involvement in the overall connection program consumes a significant amount of the time spent in facilitating major connections. Activities include arranging internal review meetings, reviewing and issuing internal project documentation and coordination of the wide range of internal stakeholders involved.
Preliminary enquiry service (For services provided to connection applicants making a preliminary enquiry requiring site specific or written response.)	Providing prospective connection applicants with specific information and advice in relation to the connection process and requirements associated with establishing a new or altered connection or a relocation of existing network assets. This service is for initial advice and excludes more detailed investigations/advice which may subsequently be required from Strategic Planning Studies and Analysis and Process Facilitation. This service includes an initial site inspection and preparation of a written response addressing the issue(s) queried by the applicant. It may also include an initial customer meeting where requested. It would not be charged for all initial enquiries only those where the cost to serve is more appropriately born by the applicant.
Connection offer service (basic or standard) (For services provided by distributors in assessing the applicant's application and making a basic or standard connection offer)	Services provided by Ausgrid in assessing connection applications and making basic or standard connection offers. This may include without limitation: • Assessment of application by Team Leader. If the application is deemed to require a basic connection offer service the application is forwarded to Customer Operations who will process the offer. If the application is deemed to require a standard connection offer service the application is allocated to Contestability. • Contestability is responsible for deriving the estimated loading on the electrical distribution network, technically known as the ADMD (After Diversity Maximum Demand). This estimate depends on such factors as the number of customers served and specific features of the customer's demand. • Once the ADMD is derived the customer is advised what is required to connect to the electrical distribution network. This could be one of the following methods of supply; A direct distributor from an existing substation,

Service Group	Standard Detailed Description
	A direct distributor from a new kiosk substation, A direct distributor from a new pole mounted transformer substation, A direct distributor from a new chamber substation. • Once the assessment has been completed by Contestability, Administration staff forward the assessment of the standard connection offer to the customer.
Rectification works (Includes rectification of illegal connections, provision of service crew/additional crew, fitting of tiger tails, high load escorts)	Rectification of Illegal Connection: Work undertaken by Ausgrid to the property of Ausgrid or to the property of another person in order to: • Rectify damage; or • Prevent injury to persons or property; resulting from conduct that constitutes an offence under Part 6, division 1 of the Electricity Supply Act. For example, to rectify an unauthorised connection to Ausgrid's distribution system. Note: the supply would be left disconnected until the customer employed their own electrical contractor/ASP to rectify any faulty wiring or equipment which had been interfered with e.g. full replacement of consumer's mains.
	Additional Crew: Provision of a crew when others are working on or near the Ausgrid's network or when Ausgrid undertake work at the request of a customer.
	Fitting of Tiger Tails: Installation of temporary covering (known as 'torapoli pipes' or 'tiger tails') on overhead mains and service lines. NB This does not include the installation of temporary covers by certain ASPs in association with their contestable work, in accordance with their Service Provider Authorisation, which is contestable work. Note: Pricing for the installation of temporary torapoli pipes or tiger tails will also include a rental charge for the use of this equipment.
	High Load Escort: Temporary relocation of overhead mains for high vehicular loads and high load escorts. The pricing methodology for the provision of these Customer Specific Services is based on actual direct costs as outlined in Ausgrid's published rates.

Service Group	Standard Detailed Description
Connection/relocation process facilitation	Providing connection applicants with ongoing information and advice in relation to the connection process and requirements associated with establishing a new or altered connection or a relocation of existing network assets. This service is additional to the published instructions available to all applicants and is not a mandatory requirement of the connection process for standard connections to the distribution network (≤ 11kV). It would be recommended for first time contestable customers or customers with complex or challenging projects. The intent would be to help minimise project delays caused by customers not taking the required action at the optimum time in the process. This would be achieved by staff taking a proactive approach to communication and engagement with connection applicants. It is an essential requirement for major connection projects (greater than 10MW load or connected at >11 kV) because the process varies to meet particular project requirements (the electrical component potentially being a smaller but often critical part of a much larger project). The form of this service includes, but is not limited to, • Project coordination activities; • One-on-one engagement to review project or process particulars; • Consultation of connection particulars; • Facilitation
Services to supply and connect temporary supply to one or more customers (Including equipment and related costs in relation to planned access permits)	The provision of an MG (Motor Generator) connected to the network or a direct distributor and/or use of HV Live Line Techniques when required to maintain a continued but temporary supply to otherwise impacted customers during contestable connection works. Service is in conjunction with but in addition to access permits and clearance to work. Cost of MG hire not included in calculations as these are commercially available.
Carrying out planning studies and analysis relating to distribution (including subtransmission and dual function assets) connection applications	This service undertakes necessary planning studies and associated technical analysis to help determine suitable/feasible connection options for further consideration by proponents. The service applies mainly to large loads and generators where suitable connection options are not necessarily obvious and may result in potentially significant impacts on Ausgrid's existing network development strategies and augmentation requirements. For some projects a technical assessment of a nominated option may need to be explored to ensure sufficient cost and timing certainty for an applicant and to help underpin subsequent connection offers. A detailed report or reports are provided as agreed and form a basis for the customer's final proposal.
Services involved in obtaining deeds of agreement in relation to property rights associated with contestable connection works	Services related to the acquisition of tenure over and access to Ausgrid assets associated with contestable connection works. New assets being connected to the network may be positioned on land not legally accessible to Ausgrid. To ensure Ausgrid has appropriate tenure and access to these new assets into the future, a Deed of Agreement is established in advance of connecting the new assets to facilitate the necessary execution of formal arrangements that create appropriate easement or lease arrangements to be registered on the land title deed. Services provided in relation to obtaining deeds of agreement for property rights associated with contestable connection works, including processes associated with obtaining registered leases and easements for land on which Ausgrid assets are located (i.e. those assets assigned or "gifted" to Ausgrid's on electrification). These property rights are necessary in order to ensure that Ausgrid is able to carry out ongoing maintenance in relation to its assets. As Ausgrid often connect assets before registered leases or easements have been obtained, it is necessary to obtain deeds of agreement from landowners in the interim.

Service Group	Standard Detailed Description
Investigation, review and implementation of remedial actions associated with ASPs' connection work	The investigation, review and implementation of remedial actions associated with contestable connection works leading to corrective and disciplinary action of an ASP due to unsafe practices, substandard workmanship or other serious circumstances that impact upon ongoing Authorisation as an Accredited Service Provider to Ausgrid.

Table 4.3.1 – Cost metrics for fee-based services

Demonstrate how the information provided is consistent with the requirements of the Notice

The information provided on table 4.3.1 is consistent with the requirements in the RIN. The information is consistent with the definition of Alternative Control Services Fixed Fee provided in Appendix F of the RIN.

The information has been prepared to align with the requirements of Sections 12, 13 and 14 of Schedule 1 of the RIN It is also aligns with the principles and requirements outlined in Section 19 of Appendix E – Principles and requirements.

The fees listed in table 4.3.1 are a reflection of the fees listed in Ausgrid's annual tariff proposal. Expenditures reported have not been distinguished as standard or alternative control nor have they been distinguished as Capex or Opex.

This response is based on the same preparation of worksheets and supporting documentation used in the Reset RIN. The information primarily comes from SAP. Where practical, information is provided at sufficiently low level to encapsulate each proposed service. See Ausgrid's Substantive Proposal, our supplementary information 8.22_Ancillary network services proposal_140529.pdf and Attachment 8.24_ID00219_Connection related ANS models_140515.zip for further details from each service model.

Explain the source from which Ausgrid obtained the information provided.

The information provided was sourced from Ausgrid's SAP system.

Ausgrid records both expenditure and revenue associated with each service using dedicated internal orders and activity numbers in its SAP financial system. Volumes of services provided were determined by interrogating revenue billing data. The exception to this was the volume of connection offers which was sourced from SAP Connection Application records.

Explain the methodology Ausgrid used to provide the required information, including any assumptions Ausgrid made

The methodology used to populate this RIN table utilised a centrally coordinated approach. Inputs were supplied via management and various subject matter experts (SME) to the central point. A checking and feedback loop involving a financial review was also incorporated to ensure the Branch Manager could verify supplied information and processes aligned to RIN requirements.

In preparing the RIN response for 4.3 Ancillary Services – fee based services, reference was made to various reports obtained from Ausgrid's SAP system.

Expenditure - The Ancillary Network Services report provides expenditure recorded on each of the dedicated internal order and activity numbers associated with each service fee. Indirect costs – Corporate allocations comprises $6.4m redundancies expenses in relation to the Ancillary Services.

Volumes – The volumes of services provided were determined using one of two methods:-

- Invoicing and revenue data obtained from the Ancillary Services Revenue report is used identify the volume of service fees billed.

- For connection offer volumes only, the volume of connection offers provided was sourced from SAP connection application records using the SAP IW67 report (interrogating task code and task start date).
- For inspection of service work by level 2 ASP volumes only, the volume of inspections was sourced from SAP inspection records using the SAP AIS AC Status report (interrogating the number of inspections generated)

Explain circumstances where Ausgrid cannot provide input for a variable using actual information, and therefore must provide estimated information:

(i) why an estimate was required, including why it was not possible for Ausgrid to provide actual information

No estimated data was used for fee based services.

(ii) the basis for the estimate, including the approach used, assumptions made and reasons why the estimate is Ausgrid's best estimate, given the information sought in the Notice

No estimated data was used for fee based services.

Template 4.4 – Ancillary services– quoted services

The information provided in template 4.4 has been completed in accordance with the AER RIN requirements and instructions applying to template 4.3 including Appendix E and F, and the requirements in the worksheet.

Detailed Service Descriptions

In accordance with Section 19 of Appendix E of the RIN a description of quoted services has been provided in the Basis of Preparation for template 4.3.

Table 4.4.1 – Cost metrics for Quoted services

Demonstrate how the information provided is consistent with the requirements of the Notice

The information provided on table 4.4.1 is consistent with the requirements in the RIN. The information is consistent with the definition of Alternative Control Quoted Services provided in Appendix F of the RIN.

The information has been prepared to align with the requirements of Sections 12, 13 and 14 of Schedule 1 of the RIN. It also aligned with the principles and requirements outlined in Section 19 of Appendix E – Principles and Requirements.

The fees listed in table 4.4.1 are a reflection of the fees listed in Ausgrid's annual tariff proposal. Expenditures reported have not been distinguished as standard or alternative control nor have they been distinguished as Capex or Opex.

This response is based on the same preparation of worksheets and supporting documentation used in the Reset RIN. The information primarily comes from SAP. Where practical, information is provided at sufficiently low level to encapsulate each proposed service. See Ausgrid's Substantive Proposal, our supplementary information 8.22_Ancillary network services proposal_140529.pdf and Attachment 8.24_ID00219_Connection related ANS models_140515.zip for further details from each service model.

Explain the source from which Ausgrid obtained the information provided.

The information provided was sourced from Ausgrid's SAP system.

Ausgrid records both expenditure and revenue associated with each service using dedicated internal orders and activity numbers in its SAP financial system. Volumes of services provided were determined by interrogating revenue billing data. The exception to this was the volume of connection offers which was sourced from SAP Connection Application records.

Explain the methodology Ausgrid used to provide the required information, including any assumptions Ausgrid made

The methodology used to populate this RIN table utilised a centrally coordinated approach. Inputs were supplied via management and various subject matter experts (SME) to the central point. A checking and feedback loop involving a financial review was also incorporated to ensure the Branch Manager could verify supplied information and processes aligned to RIN requirements.

In preparing the RIN response for 4.4 Ancillary Services –quoted services, reference was made to various reports obtained from Ausgrid's SAP system.

Expenditure - The Ancillary Network Services report provides expenditure recorded on each of the dedicated internal order and activity numbers associated with each service fee. For Rectification Works – fitting tiger tails, in addition to the dedicated orders, service orders were also used to capture the cost.

Volumes – The volumes of services provided were determined using one of two methods:-

- Invoicing and revenue data obtained from the Ancillary Services Revenue report is used identify the volume of service fees billed.

- For connection offer volumes only, the volume of connection offers provided was sourced from SAP connection application records using the SAP IW67 report (interrogating task code and task start date).

Explain circumstances where Ausgrid cannot provide input for a variable using actual information, and therefore must provide estimated information:

(i) why an estimate was required, including why it was not possible for Ausgrid to provide actual information

No estimated data was used for quoted services

(ii) the basis for the estimate, including the approach used, assumptions made and reasons why the estimate is Ausgrid's best estimate, given the information sought in the Notice.

No estimated data was used for quoted services.

Template 5.2 – Asset age profiles

The information provided in template 5.2 has been completed in accordance with the AER RIN requirements and instructions applying to template 5.2 including Appendix E and F, and the requirements in the worksheet.

Table 5.2.1 – Asset age profile

Demonstrate how the information provided is consistent with the requirements of the Notice

The information in this section is compliant in that actual values are used where possible, and best estimates are provided where actual data is not available.

Explain the source from which Ausgrid obtained the information provided.

The source for the majority of data for this section has been SAP PM (Plant Maintenance). This includes data in categories Poles, Transformers, Switchgear, Public Lighting, SCADA – Field Devices and AFLC, and Other (excluding Meters). Data for Overhead Conductors, Underground Cables, Service Lines, and SCADA – Copper Comms Cable (Communications Linear Assets) lengths has been sourced from Ausgrid's GIS (Geographical Information System) IPART report. Meter quantities have been obtained from the MBS (Metering Business System), as was information to aid the categorisation of service lines as residential or commercial. SCADA – Optical Fibre (Communications Linear Assets) lengths have been sourced from PNI, a Smallworld system containing spatial data for communications assets. SCADA – Master Station Assets information has been sourced from records held containing equipment acquisition data. SCADA – Communications Site Infrastructure information has been retrieved in part from Ausgrid's Technical Drawing Management System (TDMS).

Explain the methodology Ausgrid used to provide the required information, including any assumptions Ausgrid made

General Methodology for Economic Life and Std Deviation

Ausgrid has, in most cases, applied a sampling approach to determine the economic life and standard deviation of asset populations. This approach uses the age at retirement of a sample of assets retired in recent years, typically three or six years, to determine the average and standard deviation. Only assets with recorded commissioning and decommissioning dates are used to ensure accuracy. The sample is restricted to more recent years (eg. past 5 years where applicable) as data accuracy is higher and also to ensure that the results reflect current asset management approaches.

Poles

To provide the age profile information, an extract was obtained from SAP Business Objects of all commissioned poles, excluding those dedicated to public lighting (Refer to number of public lighting dedicated poles in the Public Lighting data rows). Whilst data is stored directly against the assets to capture material type, the voltage level at which the pole is commissioned is not retained directly. The data was then processed using FME software package to combine recorded voltages of feeders supported by poles. A query on this database was developed to provide the age profiles as per the required RIN categories.

For the mean and standard deviation of economic life, the population of poles retired/decommissioned during the 8 year period from July 2009 to June 2017 was analysed. As direct attributes for voltage level are not retained, when poles are retired they lose the attributes in the asset system that allow them to be allocated to a voltage. Thus mean and standard deviation for economic life are grouped by material type only.

The primary assumption for data in this category is that approximately half of the pole population has an assumed age based on a suburb age methodology. This is due to the absence of pole discs on most poles pre-1980, and that records of installation were not retained prior to the late 1990's. Whilst this is assumed to provide a relatively good estimate of the global population profile, individual and local population ages can be inaccurate. Additionally, a number of pole records do not have details to be able to categorise them directly into a voltage category. These have been assigned to the <1kV category for the material type applicable.

For 'STAKING OF A WOODEN POLE', this is assumed to refer to the data for poles that have been reinforced with what Ausgrid refers to as a 'nail' or 'splint'. The master data for these assets does not currently contain the date of installation of the nail. However for most assets this can be obtained from the 'notification' data in SAP (ie. the record of work for the 'nailing' activity). A Business Objects report has been developed to extract both pole

data and associated notification data. The remaining assets for which an installation date cannot be determined has been evenly assigned an installation year between 1997 and 2002, as this is the period for which pole nailing (staking) was in effect in Ausgrid but prior to the installation data being stored within the assets system. For the calculation of economic life, the staked poles retired in the 2014-17 financial years have been analysed.

Overhead conductors

Data for the age profile is extracted from the GIS system. The lengths have been extracted and aggregated by voltage and phases.

For lengths of 22kV where the phase is "unknown" this has been assigned in equal proportions to both single-phase and multi-phase categories

Conductors that have 'Date Unknown' GIS report has been proportioned between amongst the rest of the years as there are missing conductor information within the Ausgrid network. There are about 1% of the overall lengths that does not have a commissioning date.

Data is not retained for removed conductors to allow for the provision of economic life information based on actual data. And as the renewal of overhead conductors have synergies with the renewal of the supporting structures, the mean and standard deviation for all overhead conductor categories is estimated to be the same as for wood poles.

Underground cables

Data for the age profile is extracted from the GIS system. The lengths have been extracted and aggregated by voltage and phases. Data for the 'Other' category (pits, pillars etc) has been sourced from SAP:BO contained in the file "UG_Cable_–_Others_Category" worksheet.

Conductors that have 'Date Unknown' in the financial year column in the GIS report has been proportioned between amongst the rest of the years as there are missing conductor information within the Ausgrid network. There are about <1% of the overall lengths that does not have a commissioning date.

Data for economic life mean and standard deviation has been calculated by acquiring a similar report from GIS by selecting lengths of underground cable that have a status of 'abandoned'. Further restrictions on the data used are on decommissioning dates between 1/1/2011 and current RIN reporting year end (ie. 30/6/2017) and a non-blank commissioning date and decommissioning date. Cable lengths have then been assigned to the relevant category using the 'voltage' column.

A weighted average age and corresponding standard deviation has been calculated in the FME software package. UG Cables categorised as 'Other' has miscellaneous ancillary assets (ie. Pillars, pits, link boxes, ISO Cabinets, Cabinets) that has an asset group category of DMUG and TMUG which are distribution and transmission underground assets and owned by Ausgrid only.

Service lines

The age profile for service lines was obtained by extracting services from GIS that are not identified as private installations. Where multiple segments of service line supply the one customer, these are still only counted as one service. This information is merged with customer information retrieved from the Metering Business System (MBS) via the National Metering Identifier (NMI) of the supply point connected to the service line. The customer type attributed to the NMI in MBS was then used to classify the service line allowing distinction of those that are for residential or commercial/industrial connections. Commissioning dates attached to the service line in GIS have been used to determine the installation year; however where this data not recorded the corresponding meter installation date in MBS has been used. Where the installation year has been provided as prior to 1911, the count of services has been redistributed to the year 1911. All OH service lines have been classified as simple type as the classification of complex type is related to the actions undertaken during the original connection and thus have no relevance to its classification in situ. Therefore UG service lines has been classified as complex.

Transformers

To obtain the age profile information, extracts of all commissioned transformers were obtained from SAP PM using Business Objects, including attributes on primary voltage, secondary voltage, type of transformer, phases, installation location and year of first commissioning. Using these attributes each commissioned transformer was then allocated to one of the required categories.

Similarly for the calculation of economic life mean and standard deviation, an extract was obtained for all retired (disposed) transformers 5 years prior to the current RIN reporting year end (ie. 30/6/2016), and the same

attributes used to assign records to the categories required in the RIN template. The sample is restricted to more recent years (eg. past 5 years) as data accuracy is higher and also to ensure that the results reflect current asset management approaches.

The RIN category mapping is obtained by considering data in key SAP substation fields include object type, operating voltage and rated name-plate ratings.

Switchgear

Data has been extracted from SAP for all equipment that would map to the specified categories, or other switchgear categories that have been defined by Ausgrid. This includes attributes such as object type, operating voltage, location, status, commissioning dates and decommissioning dates. Valid records have then been manually mapped to the defined categories using these attributes. Age profiles for each category are then generated by filtering on Commissioned equipment only. For a couple of categories there are a relatively significant number of records without commissioning dates.

Data for economic life mean and standard deviation has been obtained using a sample data set based on the retired and decommissioned assets where the decommissioned date was in the last 5 years priorto the current RIN reporting year end. The sample is restricted to more recent years (eg. past 5 years where applicable) as data accuracy is higher and also to ensure that the results reflect current asset management approaches. For a couple of categories there is insufficient data to generate a reliable output, so data from another asset category has been used if it is considered that it is representative (eg. only differs by voltage level).

Public lighting

For age profile information or Luminaires, Lamps and Brackets categories, corresponding data for all commissioned lights (excluding Rate 3 lights which are privately owned and maintained) has been extracted from SAP PM. This has then been merged with data provided from GIS on major and minor roads to allow the provision of data in the 6 categories required.

For age profile information on Poles, data has been extracted from SAP PM for all commissioned poles that are classified as being solely for public lighting purposes (file “SL Poles for Age Profile” worksheet). Again this data has been merged with the data provided from GIS on major roads to allow the split between major and minor roads to been supplied.

For the economic life information for the streetlight components (lamps, luminaires, brackets), data from the 2014 Reset RIN has been used, as it is not expected to have changed materially. This data is based on change records in the SAP PM system; however, as the data for the previous installed component is overwritten during the component replacement, database change records were required to be extracted to provide the necessary information. Change record extracts were obtained, for each of the component categories, for those lights identified as having the component changed within the current financial year. The assumptions within this data was that data was excluded if the new effective date was the same as the old effective date, and for lamps the data was excluded if the old effective date was prior to 1/7/2009 (as these are considered to be data anomalies as the effective date for lamps during replacement has only been updated after that date). Again this data has been merged with the data provided from GIS on major roads to allow the split between major and minor roads to been supplied.

Data with ‘Unknown’ categories were proportioned between the two categories (Major & Minor). There were about 7% of the street lighting pole data that has an unknown roads category.

For economic life information for poles, data has been extracted from SAP BO for all poles that are classified as being solely for public lighting purposes that were retired in the current financial year (file “SL Poles for Standard life info” worksheet). Again this data has been merged with the data provided from GIS on major roads to allow the split between major and minor roads to been supplied, and standard MS Excel calculations used to generate the required measures. Data with ‘Unknown’ categories were proportioned between the two categories (Major & Minor).

SCADA, network control and protection systems

Field Devices

Data was obtained from SAP PM using Business Objects for all Relay object types. An age profile was obtained by using all currently commissioned assets. Data with Unknown commissioning dates were proportioned into the final age profile.

Economic life mean and standard deviation was obtained using the data of assets retired during the 5 years prior to the current reporting RIN year end.

Local Network Wiring Assets

This data was estimated with further explanation in the next section.

Communications Network Assets

This data was estimated with further explanation in the next section.

Master Station Assets

This data was estimated with further explanation in the next section.

Communications Site Infrastructure

This data was estimated with further explanation in the next section.

Communications Linear Assets

The current total length of Optical fibre has been obtained from the PNI database. The profile used in the Reset RIN submission for optical fibre was retained for years up to the previous RIN, but with the total quantity differential being accounted for in the current RIN year. Life and standard deviations are estimated and averaged across a population of approximately 50% ADSS, 25% UGFO and 25% OPGW.

This data is then combined with the copper pilots and communications cable data referred to in the 'estimates' section to produce an overall profile and economic life information. Due to the lack of source data and minimal changes for optical fibre component, the standard deviation and mean has been estimated to be similar to the previous financial data.

AFLC

Data was obtained from SAP PM using Business Objects for all MG_SET and SFU object types. An age profile was obtained by using all currently commissioned assets. Economic life mean and standard deviation was obtained using the data of assets retired during the current financial year.

Other

Distribution Substations and Zone & Subtransmission Substations

Data for age profiles of this category has been obtained through extracting all commissioned and decommissioned substations from SAP PM (Object types SUB_BASEMT, SUB_BUILD, SUB_KIOSK, SUB_OE, SUB_POLE, SUB_UNDERG or SUB_UPPERL for Distribution. Object types SUB_STS, SUB_ZONE or SUB_STSS for Zone & Subtransmission). Data for economic life mean and standard deviation utilised the data from SAP PM where a decommissioned or retired status had been set, a valid commissioned date and decommissioned date were available, and where the decommissioned date was 5 years prior to the current RIN reporting year end (ie. 30/6/2017).

Distribution Voltage Regulation

Data for age profiles of this category has been obtained through extracting all commissioned and decommissioned voltage regulators (object type = TX_REGULTR) from SAP PM.

Data for economic life mean and standard deviation utilised the data from SAP PM where the retired status had been set, and a valid commissioned data and decommissioned data were available (approximately 40 units).

Towers

Data for the age profile has been extracted from SAP PM via Business Object.

Data for the economic life mean and standard deviation has been obtained from towers retired 5 years prior to thecurrent RIN reporting year end via a Business Objects report from SAP PM.

Global assumptions

- No privately owned assets are included in the data sets.
- Data quantities are correct as of the time of extract. As SAP PM is a live system, subject to continuous update, data cleansing and correction, asset counts are subject to change.

- Asset ages are as recorded in the SAP PM system, or other records as appropriate. For many older assets, these ages are derived from associated assets as records for that asset type were not kept (e.g poles). As such there are inherent inaccuracies in this data.

Explain circumstances where Ausgrid cannot provide input for a variable using actual information, and therefore must provide estimated information:

(i) why an estimate was required, including why it was not possible for Ausgrid to provide actual information;

Poles

Data is not retained on voltage of removed poles to allow for the provision of actual economic life information by voltage. Actual data is used to prepare economic life by material type only. Missing data for some poles prevents the calculation of the age of those poles. This counts for <1% of the total pole volume.

Overhead conductors

Data is not retained for removed conductors to allow for the provision of economic life information based on actual data.

Underground cables

No data exists for abandoned 66kV cables, so provision of actual economic life for this voltage is not possible.**Service lines**

Data is not retained for removed overhead service lines to allow for the provision of economic life information based on actual data.

Transformers

For a few categories, there is insufficient data to calculate economic life based on actual figures for the corresponding category.

Switchgear

For 2 categories there is insufficient actual data for removed assets to calculate the mean and standard deviations for economic life

SCADA, network control and protection systems

Some data in this category is not currently retained in any asset system.

(ii) the basis for the estimate, including the approach used, assumptions made and reasons why the estimate is Ausgrid's best estimate, given the information sought in the Notice.

Poles

Data on economic life is not available by voltage level, only by material type. Actual data is used to develop an economic mean life and standard deviation for each material type, which is then applied to all categories of this material type.

Overhead conductors

As the renewal of overhead conductors have synergies with the renewal of the supporting structures, the mean economic life and standard deviation for all overhead conductor categories is estimated to be the same as the total pole population.

Underground cables

No data exists for abandoned 66kV cables. As such it is considered a best estimate to use the corresponding economic life values calculated for 33kV cables. Also Ausgrid only has a small amount (10km) of 66kV cable connected to the network. This is considered satisfactory as these are the most similar types of cables.

Service lines

The mean and standard deviation for economic life of Overhead & Underground Services have been estimated using industry knowledge. These estimates are considered reasonable in the absence of actual values and have

been used elsewhere in consideration of asset replacement programmes. The Reset RIN 2014 estimate has been used. This estimate was derived as per the description below which was for Underground services.

Data for economic life mean and standard deviation of service cables has been obtained from the GIS by selecting lengths of underground cable that have a status of 'abandoned'. Then only using data from lines with decommissioning dates between 1/1/2011 and 31/12/2013 and only where the commissioning date is populated. Underground Service cable lengths have then been assigned to the relevant category using the 'voltage' column. This data is stored in the file "Abandoned cables for Std Life calcs" worksheet. A weighted average age and corresponding standard deviation has been calculated.

Transformers

For the transformer categories that require estimation due to small sample sizes, the most similar category with sufficient data has been used for economic life figures. This is considered a best estimate in that it uses real data for assets that have similar attributes. For ground mounted >22kV transformers the low volumes retired mean when broken down into the individual categories the data can deviate further from average. As such a global average is used across all categories. This is considered a best estimate as it uses real data for similar assets.

Switchgear

For category '> 11 kV & < = 22 kV; SWITCH' there is insufficient data for calculation of mean and standard deviation of economic life, so the calculated values for '> 22 kV & < = 33 kV; SWITCH' have been used.

SCADA, network control and protection systems

Local Network Wiring Assets

Local network wiring assets include all secondary wiring in a major substation including power supplies to secondary equipment. Lifetime and standard deviation reflects change-out of major equipment rather than lifetime of the wiring itself. Estimation was done by breaking assets into multicore and single core wire, estimating lengths for each substation based on the 'scaling factor' for each substation, and then applying the substation age to achieve a profile. Then the results for each multi-core and single-core were then summated to achieve a combined profile.

Source data is obtained from DARTS, with substation list and panel information extracted to match against SAP data (start-up date) for age profile distribution.

<u>Multicores</u>
Length of multicore cable has been derived from the cable estimate used to construct Leichhardt.
Leichhardt was built with:

- 2x 132 kV feeders
- 3x 132 kV buses
- 6x 11 kV buses
- 2x Transformers

and is estimated to contain 28150 m of multicore cable.
Scaling factors as follows have been applied to take into consideration other sizes of substation:

Sydney typical zone	Leichhardt	
Sydney large zone	2x	Sydney typical zone
Sydney subtransmission station	2x	Sydney typical zone
Newcastle typical zone	2/3x	Sydney typical zone
Newcastle subtransmission station	2x	Sydney typical zone
Newcastle large zone	1x	Sydney typical zone

<u>Single core panel wire</u>
Workshops advise verbally that it takes roughly 200 m of wire to construct a typical freestanding panel.

The number of freestanding panels has been assumed to equal the number of subtransmission protection panels as recorded in DARTS. The preceding assumption means that some panel types are ignored - including VR panels and freestanding 11 kV busbar protection panels.

It has been assumed that each medium voltage (11 kV and 5 kV) breaker contains a similar length of wire to a subtransmission protection panel.

It has been assumed that a distribution substation with protection contains a similar length of wire to three subtransmission protection panels.

This data is held in file “secondary_wiring_AgeProfiles” worksheet.

After a survey of available information and industry knowledge it is estimated that the economic life mean is 40 years with a standard deviation of 10.

Note about this year: The number of extra distributions panels was estimated based on recent historical trends. The amount of distribution centre wiring is much smaller than that for major substations, so it was deemed to have little impact for this year.

Communications Network Assets

Telecommunications apparatus is estimated on a roll-out of the MPLS network commenced in 2007 which carries SCADA and other traffic, followed by a rollout of tele-protection multiplexer equipment which carries protection signals. A diverse range of devices are used with different lifetimes.

A copy the updated “shelf_quantity_report” worksheet can be requested from Ausgrid’s Communications Engineering section to analyse any new assets added during the current financial year.

Master Station Assets

To provide a relevant metric for the master Station, all of the components were identified and the more significant items such as Servers, workstations, Wallboard displays and Networking devices were nominated as assets to be included in the age profile. Asset age was assigned using resident knowledge. The number of significant items will represent the scale of the master station solution as components are replaced or the system size changes.

Economic life mean and standard deviation for the assets in this category have been estimated from typical asset life observed, and considering varied asset with differing life expectancy.

Communications Site Infrastructure

This information has been obtained from a list of Ausgrid radio sites. Year of commissioning is a combination of known refurbishment dates, known original installation dates and estimated installation dates.

Economic life mean and standard deviation for the assets in this category have been estimated utilising typical asset life observed and industry knowledge.

Communications Linear Assets

Copper pilot cable age profiles are based on a conglomerate age profile for UG medium voltage and high voltage cabling. The profile previously determined in 2012 for the annual RIN has been utilised in conjunction with current information from GIS to determine an appropriate profile. Information from GIS was obtained using the “Network Age” 6 monthly extract file saved as “ODRC Network Age” report and using filters on Asset Category (=”Auxiliary Cable”) and Asset Type (contains “CU”). Lengths with a commissioning date prior to 2006 and with an unknown commissioning date have been apportioned over the profile from 2012. Assets with a commissioning date since 2006 utilise actual lengths stored in GIS. The mean and standard deviations have been estimated using industry experience as decommissioning dates are not available for pilot cables.

A conglomerated age profile is then achieved by combining this set of data with the optical fibre cable length data. Whilst total quantity of fibre installed is a known actual, the date of installation is not readily available for those installed prior to 2012. Therefore the age profile for optical fibre data is based on actual installed quantities from 2012 to 2017, and estimated annual quantities prior to 2012.

The economic life and standard deviation for this asset group estimated in prior years has been used for the FY17 annual RIN.

Template 5.3 – Maximum demand and network levels

The information provided in template 5.3 has been completed in accordance with the AER RIN requirements and instructions applying to template 5.3 including Appendix E and F, and the requirements in the worksheet.

Table 5.3.1 – Raw and weather corrected coincident MD and network level

Demonstrate how the information provided is consistent with the requirements of the Notice

All data in table 5.3.1 is provided as actual data from Ausgrid's Spatial Demand Forecasting System.

Explain the source from which Ausgrid obtained the information provided.

Data provided in table 5.3.1 is obtained from an aggregation of data from Ausgrid's spatial demand forecast system, which is derived from measurements collated from Ausgrid's SCADA or metering points.

Explain the methodology Ausgrid used to provide the required information, including any assumptions Ausgrid made

Ausgrid performs weather normalisation at 10% and 50% POE using simulation technique at the zone substation level on a yearly basis. A base spatial demand forecast is produced each year from the 5 or 7 year trend of 10% and 50% POE weather corrected substation loads (adjusted for spots and transfers) for each zone and sub transmission substation.

Raw coincident network maximum demand MW and MVA is an aggregation of the coincident loads of all transmission connection points within the Ausgrid Network at the recorded date and time of system peak.

Weather corrected 10% and 50% POE network coincident demand is the aggregation of each location's respective weather corrected load with its system diversity factor for that season.

The actual 2016/17 "Embedded generation" value is the generation amount due to rooftop solar at the time of network coincident MD plus the generation amount due to non-solar embedded generators connected at 33kV or 66kV at the time of network coincident MD.

- For rooftop solar, the embedded generation adjustments to the network peak demand are calculated based on the installed rated solar capacity by substation, the date and time of system peak and the average solar generation profile as a function of rated capacity over a range of summer peak days. Zone substations are the set of substations used for this calculation.
- For the 33kV or 66kV connected non-solar generators, the adjustments are based on their interval data from SCADA systems or metering points.
- Redbank 132kV generator is the only 132kV generator embedded in Ausgrid's transmission network, but behaves as a transmission supply to the Singleton 132/66kV transmission connection point. The values for transmission connection point (TCP) data are derived from a summation of the individual TCP nodes as measured at the secondary voltage. These measured values include both the supply from TransGrid and from 132kV connected embedded generators. To avoid double counting, the contribution from the 132kV connected embedded generator is not included in the embedded generation value in Table 5.3.1. Note that Redbank generator was shut down in October 2014.

Key assumptions include:

- For forecasting purposes, Ausgrid's winter season covers period 1 May – 31 August and in Ausgrid's view it is impractical to divide the winter season across two financial years. Therefore data provided for 2008, for example, covers the calendar period 1 May 2007 – 30 April 2008.
- All load data is obtained from Ausgrid's SCADA system or metering points. All weather data is obtained from Bureau of Meteorology weather stations.
- Ausgrid interprets "transmission connection point" as any "subtransmission substation" and "High Voltage Customer" connected at 132kV within Ausgrid's network.
- A 5 year historical system diversity factor is calculated for all locations based on the previous five seasons' diversity factors for each location.

Explain circumstances where Ausgrid cannot provide input for a variable using actual information, and therefore must provide estimated information:

(i) why an estimate was required, including why it was not possible for Ausgrid to provide actual information;

(ii) the basis for the estimate, including the approach used, assumptions made and reasons why the estimate is Ausgrid's best estimate, given the information sought in the Notice.

All information provided in template 5.3 is provided as Actual.

Template 5.4 Maximum demand and utilisation at spatial level

The information provided in template 5.4 has been completed in accordance with the AER RIN requirements and instructions applying to template 5.4 including Appendix E and F, and the requirements in the worksheet.

Table 5.4.1 – Non-coincident & Coincident Maximum Demand

Demonstrate how the information provided is consistent with the requirements of the Notice

All data in Tables 5.4.1 and 5.4.2 is provided as actual data from Ausgrid's Base Forecast.

Explain the source from which Ausgrid obtained the information provided.

Data provided in Tables 5.4.1 and 5.4.2 is obtained from Ausgrid's spatial demand forecast system.

Explain the methodology Ausgrid used to provide the required information, including any assumptions Ausgrid made

Ausgrid performs weather normalisation at 10% and 50% POE using simulation technique at the zone substation level on a yearly basis. A base spatial demand forecast is produced each year from the 5 or 7 year trend of 10% and 50% POE weather corrected substation loads (adjusted for spots and transfers) for each zone and sub transmission substation.

Substation rating (MVA), Raw MW and Raw MVA taken from Ausgrid's spatial demand forecast for each respective historical year. The higher of the summer and winter Raw MW for each year determines the dominant season with the corresponding substation rating, date and time of peak being displayed for that year.

Historical Non-coincident 10% and 50% POE Maximum Demand is the weather normalised load based on the simulation output of the forecast system.

Historical Coincident 10% and 50% POE Maximum Demand is the weather normalised load based on the simulation output of the forecast system multiplied by the corresponding coincidence factor for each respective year.

The "Adjustments – Embedded generation" values are calculated based on a combination of the installed capacity, time of substation and system peak, and generation profile of solar PV generation at each substation. STS values are the calculated using the same method, based on the total installed capacity from downstream zone substations.

Key assumptions include:

- For forecasting purposes, Ausgrid's winter season covers period 1 May – 31 August and in Ausgrid's view it is impractical to divide the winter season across two financial years. Therefore data provided for 2008, for example, covers the calendar period 1 May 2007 – 30 April 2008.
- All load data is obtained from Ausgrid's SCADA system or metering points. All weather data is obtained from Bureau of Meteorology weather stations.
- For any substation that is not commissioned in a particular year, the cell is left blank as instructed.
- Any substation that does not have any historical demand values entered are new substations under construction, and the magnitude of future transfers have not yet been determined and no transfers works have been financially committed.

Explain circumstances where Ausgrid cannot provide input for a variable using actual information, and therefore must provide estimated information:

(i) why an estimate was required, including why it was not possible for Ausgrid to provide actual information;

(ii) the basis for the estimate, including the approach used, assumptions made and reasons why the estimate is Ausgrid's best estimate, given the information sought in the Notice.

All information provided in template 5.4 is provided as Actual.

Template 6.3 Sustained interruptions to supply

The information provided in template 6.3 has been completed in accordance with the AER RIN requirements and instructions applying to template 6.3 including Appendix E and F, and the requirements in the worksheet.

Table 6.3.1 – Sustained interruptions to supply

Demonstrate how the information provided is consistent with the requirements of the Notice

Where possible, Ausgrid has provided information consistent with the requirements of the notice due to technical constraints. The table below summarises the requirements of the notice applicable to table 6.3.1 and demonstrates how the information provided is consistent with the requirements of the notice or where compliance with the requirements is not possible.

Requirement	Comments
Schedule 1, 23.2	Ausgrid calculates reliability metrics differently from Appendix A of the STPIS. Reliability metrics are calculated as follows: STPIS Appendix A, Note 1: All reliability metrics are calculated using daily customer counts. Ausgrid has consistently adopted this approach because average customer counts do not result in stable metrics suitable for trend analysis due to the constant adding, removing and reconfiguring of feeders. (Different) STPIS Appendix A, Note 2: All unmetered supplies are excluded from the calculation of reliability metrics. (Compliant) STPIS Appendix A, Note 3: All active customers are included in the calculation of reliability metrics. All inactive customers are excluded in the calculation of reliability metrics. The following assumptions regarding customer counting have been made: Active = Energised + De-energised Inactive = Extinct = Deactivated De-energised $_{(AER)}$ = Temporary disconnection $_{(AUSGRID)}$ Inactive $_{(AER)}$ = Permanent disconnection $_{(AUSGRID)}$ (Compliant)
Appendix E, 22.1	Table 6.3.1 contains all unplanned sustained interruptions to supply and planned interruptions to supply.
Appendix E, 22.2	Table 6.3.1 contains information consistent with Appendix 22, 22.2.
Appendix E, 22.3	Table 6.3.1 contains information consistent with Appendix 22, 22.3.
Appendix E, 22.4	Table 6.3.1 contains information consistent with Appendix 22, 22.4. Interruptions that are excluded under Clause 3.3 (a) of the STPIS are indicated in the "Reason for interruption" column of table 6.3.1. The Major Event Day Thresholds (T_{MED}) are calculated in accordance with Appendix D of the STPIS for the 2016/17 regulatory year. Any interruption that occurs on a day where the total unplanned SAIDI (Excluding interruptions specified in Clause 3.3 (a) STPIS) exceeds the specific annual T_{MED}, is marked with a "Y" in the MED column of table 6.3.1. All other interruptions are marked with an "N".
Appendix E, 22.5	Ausgrid has selected reasons from the "Detailed reason for interruption" from the outage event records. The cell where applicable is shaded black, consistent with the requirements of the notice for the detailed reason for interruption.

Explain the source from which Ausgrid obtained the information provided.

Data used to populate table 6.3.1 has been taken from outage event records located in Ausgrid's Outage Management System (OMS) and its related reporting environment.

Final outage event records are manually entered into OMS after outage events. Fields within each record are entered both automatically and manually and are subject to quality assurance checks.

Information for interruptions affecting single premises is sourced from Ausgrid's Customer Aided Service System (CASS). For other network events, supply restoration and other information is recorded by System Operators in the Sydney control room on Interruption Report Forms (blue forms), or by System Operators in the Newcastle control room on Line Impedance Data (LID) system reports, and on switching sheets. This information is reconciled into OMS post event. Following an outage, an Ausgrid officer validates the existing OMS record against the blue form or LID system report and customer call data. If the existing outage event record can be made to accurately reflect interruption details it is completed. Otherwise, the event is recreated in OMS based on switching details such that the record accurately reflects the restoration switching.

OMS outage event records include the following fields:

- Date of event
- Time of interruption
- Time of restoration[1]
- Event trigger
- Number of Customers Interrupted (CI)
- Number of Customer Minutes Interrupted (CMI)
- Feeder ID
- Event Hierarchy
- Exclusion Flag
- Exclusion Reason

OMS automatically calculates CI and CMI by combining the following information:

- Electrical connectivity details from Ausgrid's Graphical Information System (GIS)
- Interruption and restoration steps as recorded by System Operators
- National Metering Identifier (NMI) information from SAP, Customer Care Solution (CCS) and Business to Business (B2B)

The automatic calculation of CI and CMI is based on NMIs and therefore excludes all unmetered supplies. CI and CMI calculations are automatic on the basis of manually entered interruption and switching steps. SAP, CCS and B2B are used to exclude inactive customers (permanently disconnected) from the calculation of CI and CMI.

The reporting environment contains data extracted from OMS that has been cleansed to remove redundant data. Relevant calculations such as SAIDI and SAIFI are also added to records within the reporting environment. The reporting environment facilitates the extraction of information into to a range of Business Objects reports. The reporting environment also contains reference tables developed within the Tool for Oracle Application Developers (TOAD). One reference table contains feeder categorisation on an annual basis.

A report (*AER RIN 2016 – 17 Sustained Interruption to Supply V1.0*) for the 2016/17 regulatory year is generated from the reporting environment on 10/7/2017. Each report contains a list of outage events with the following key attributes:

- Event ID
- Reporting date
- Feeder ID
- Feeder Category
- Event Trigger
- Event Hierarchy

[1] There may be multiple restoration times for customer groups within a single outage event due to staged restoration works.

- CI
- CMI
- Global SAIDI2
- Global SAIFI2
- Feeder Category SAIDI2
- Feeder Category SAIFI2

Separate entries appear in the list if a single event affected multiple feeders. The report contains separate sections for unplanned, planned and excluded outage events. The report does not contain momentary interruptions of duration one minute or less.

The source data for planned interruptions is from two databases; LID for the Newcastle control room and Disconnect Reconnect Order System (DAROS) for the Sydney Control Room. For the 2016/17 regulatory year planned outages from both LID and DAROS were manually entered into OMS.

Explain the methodology Ausgrid used to provide the required information, including any assumptions Ausgrid made

Key elements of the methodology:

The AER RIN 2016 - 17 Sustained Interruption to Supply V1.0 business objects reports are used to populate the cells of table 6.3.1.

The methodology comprises of the following steps:

1. Copy outage event attributes directly from AER RIN 2015 – 16 Sustained Interruption to Supply V1.0 into table 6.3.1 as per the table below:

Outage event attribute	Table 6.3.1 Column
Reporting date	Date of event
Event begin time	Time of interruption
Feeder	Asset ID
Feeder category	Feeder classification
CI	Number of customers affected by interruption
Feeder Category SAIDI	Effect on unplanned SAIDI (by feeder classification)
Feeder Category SAIFI	Effect on unplanned SAIFI[3] (by feeder classification)

2. Determine the reason for interruption and the detailed reason for interruption by looking up the Event trigger from AER RIN 2016 – 17 Sustained Interruption to Supply V1.0 in the mapping table below:

[2] Verified to be calculated in accordance with the assumptions below.
[3] SAIFI is expressed per 0.01 interruptions as per AER requirements.

Event trigger	Event Hierarchy	Reason for interruption	Detailed reason for interruption
Animal Bird		Animal	Animal impact Animal nesting / burrowing, etc. and other
Animal Flying Fox		Animal	Animal impact Animal nesting / burrowing, etc. and other
Animal Frog		Animal	Animal impact
Animal Goanna		Animal	Animal impact
Animal Insect		Animal	Animal impact
Animal Other		Animal	Animal impact
Animal Possum		Animal	Animal impact
Arcing		Other	Other - Arcing
Burnt Contacts		Asset failure	LV; Distribution substation; HV; Zone substation; Subtransmission
Customer Installation Fault		Third Party	Other
Equipment Failed in Service	LV, Single Customer	Asset failure	LV
Equipment Failed in Service	Single DC	Asset failure	Distribution substation
Equipment Failed in Service	HV	Asset failure	HV
Equipment Failed in Service	Zone Sub	Asset failure	Zone substation
Equipment Failed in Service	Subtransmission	Asset failure	Subtransmission
Excavation Ausgrid Contractor		Network business	Network error
Excavation 3rd Party		Third Party	Dig-in
Excavation Ausgrid Staff		Network business	Network error
Fire (Non Ausgrid)		Third Party	Fire
Fire (non-electrical)		Third Party	Fire
Lightning Strike		Weather	
Load Shed - Ausgrid		Other	
O/H Conductor Wind Related		Weather	
OTHER - REFER COMMENTS		Other	
Overload		Overloads	
Overload LV Parallel		Network business	Network error
Overload Operational		Network business	Switching and protection error
Planned Outage		Planned	
Self Clear (No Cause Found)		Other	Other - Self Clearing Trigger
Staff Operation		Network business	Switching and protection error
Staff Other		Network business	Network error
Telco Fault		Third Party	Other
Vandalism		Third Party	Unauthorised access
Vegetation Blow/Fall in		Vegetation	Blow-in/Fall-in - NSP responsibility
Vegetation Cut Down 3rd Party		Third Party	Other
Vegetation Cut Down		Network business	Network error
Vegetation Grow in		Vegetation	Grow-in - NSP responsibility
Wind Blown Debris		Weather	
3rd Party Action		Third Party	Other
3rd Party Vehicle		Third Party	Vehicle impact

3. Calculate the “Average duration of sustained interruption” by dividing CMI by CI for each line in *AER RIN 2016 – 17 Sustained Interruption to Supply V1.0*. Copy into table 6.3.1.

4. Calculate the daily total SAIDI (excluding interruptions as per STPIS Clause 3.3 (a)) for the period spanning 1/7/2016 to 30/6/2017 by summing the "Effect on unplanned SAIDI (global SAIDI)" column in table 6.3.1.
5. Using the data from in the April 2014 Reset RIN for 2011/12 & 2012/13 and 2013/14, 2014/15, 2015/16 data from Business Objects report 02_01 Monthly and Daily Reporting - Global Ver 15.3 (report run on 10 July 2017), see Step 4 above and additional data from table 6.4.1 (Major event Day data); calculate the 2017 Major Event Day Threshold (T_{MED}) in accordance with STPIS Appendix D.
6. For all entries where the "Date of event" in table 6.3.1 corresponds to a day where the daily SAIDI from Step 4 exceeds the T_{MED} for the appropriate financial year calculated in Step 5; fill the "MED" column with "Y". For all other entries fill the "MED" column with "N".
7. Complete the "Reason for interruption" column for excluded events separately by referring to the exclusion reason in the outage event record.

Key assumptions used in methodology:

1. All outage event attributes are correctly entered in OMS
2. Feeder category reference tables are accurate.
3. The NMI connectivity details in GIS are correct at the time of outages, or that any errors are managed through manual processes to determine the actual customers affected by an event, or by holding out outage event records in the OUTAGES_NOT_IN_OMS table until GIS updates are received.
4. All unmetered customers are excluded from calculations.
5. All SAIDI and SAIFI calculations are performed using daily customer counts. Ausgrid has consistently adopted this approach for the calculation of all reliability metrics because average customer counts do not result in stable metrics suitable for trend analysis due to the constant adding, removing and reconfiguring of feeders.
6. All active customers are included in the calculation of reliability metrics. All inactive customers are excluded in the calculation of reliability metrics. The following assumptions regarding customer counting have been made:

   Active = Energised + De-energised

   Inactive = Extinct = Deactivated

   De-energised (AER) = Temporary disconnection (AUSGRID)

   Inactive (AER) = Permanent disconnection (AUSGRID)
7. All customers connected to a three phase low voltage supply are interrupted for the entire duration of an event. This approach is adopted because the accurate determination of customers connected to each phase of a low voltage supply is currently not possible.

Explain circumstances where Ausgrid cannot provide input for a variable using actual information, and therefore must provide estimated information:

(i) why an estimate was required, including why it was not possible for Ausgrid to provide actual information;

Some planned outages are restored at a time different to that originally expected. A laborious manual process is required to track and record these differences compared to the planned restoration time, therefore only the estimated restoration time is recorded in the system. Significant additional labour resources or IT system upgrades would be required to efficiently capture actual restoration times for planned events.

(ii) the basis for the estimate, including the approach used, assumptions made and reasons why the estimate is Ausgrid's best estimate, given the information sought in the Notice.

The planned interruption durations are based on the original estimated restoration time which is recorded in the OMS. This is the best available consolidated information on planned outage durations. It is a conservative estimate and is estimated to increase the reported planned duration SAIDI by 10-15%.