Asset Management Plan

Telecommunications Telephony and Voice Systems

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Authorisations

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Responsibilities

This document is the responsibility of the Metering and Asset Strategy Team, Tasmanian Networks Pty Ltd, ABN 24 167 357 299 (hereafter referred to as "TasNetworks").

The approval of this document is the responsibility of the General Manager, Strategic Asset Management.

Please contact the Metering and Asset Strategy Leader with any queries or suggestions.

- Implementation   All TasNetworks staff and contractors.
- Compliance   All group managers.

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Record of revisions

Section number	Details

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Glossary of Terms

ACMA	Australian Communications and Media Authority
AEMC	Australian Energy Market Commission
AEMO	Australian Energy Market Operator
CAPEX	Capital Expenditure
CVPN	Carrier Virtual Private Network
DNS	Domain Name System
E2E	End-to-End
ERP	Enterprise Resource Planning
FCAPS	ITU-T Management Framework which consists of Fault Management, Configuration Management, Accounting, Performance, and Security
GIS	Geographic Information Systems
IEC	International Electrotechnical Commission
IEEE	Institute of Electrical and Electronics Engineers
IP	Internet Protocol
ISDN	Integrated Services Digital Network
ISO	International Standards Organisation
IT	Information Technology
ITU	International Telecommunication Union
ITU-T	International Telecommunication Union - Telecommunication Standardization Sector
LAN	Local Area Network
MTBF	Mean Time Between Failures
MTTR	Mean Time To Repair
NER	National Electricity Rules
NMS	Network Management System
OPEX	Operational Expenditure
OS	Operating System
OSI	Open Systems Interconnection
OSI Model	An international layered model for the interconnection of information technology and/or telecommunication based networks and devices
PABX	Private Automatic Branch Exchange
PBX	Private Branch Exchange
PoE	Power over Ethernet
PSTN	Public Switched Telephone Network

R19	Regulatory Submission Period from financial years 2019 to 2024
REPEX	Replacement Expenditure
SAN	Storage Area Network
SAP	System Applications Products
SIP	Session Initiation Protocol
TCP/IP	Transmission Control Protocol/Internet Protocol, the suite of protocols that govern the Internet and Internet based networks
TDM	Time Division Multiplexing
TESI	Tasmanian Electricity Supply Industry
TIMS	Telephone Information Management Systems
TMR	Trunk Mobile Radio
TOTEX	Total Expenditure which is equal to Capital Expenditure + Operational Expenditure
VoIP	Voice over Internet Protocol
VPN	Virtual Private Network
WAN	Wide Area Network

1 Purpose

The purpose of this document is to describe the management of the Telecommunications Telephony and Voice Systems and related assets:

- TasNetworks' approach to asset management, as reflected through its legislative and regulatory obligations and strategic plans
- The key projects and programs underpinning its activities
- Forecast CAPEX and OPEX, including the basis upon which these forecasts are derived

2 Scope

2.1 Inclusions

The scope of this Asset Management Plan document includes, but is not limited to, the following prescribed telecommunications assets:

- Telephone systems, including:
  - o TDM based PABX systems;
  - o VoIP telephone systems, servers, and software;
  - o Hybrid VoIP/TDM PABX telephone systems; and
  - o Keyphone systems;
  - o Analogue gateways
  - o Session Border Controllers;
  - o IP network gateways;
  - o Voice recording and logging systems
- Satellite telephone handsets; and
- Trunked Mobile Radio handsets.

2.2 Exclusions

The scope of this Asset Management Plan document excludes:

- Non-Prescribed telecommunications assets and systems
- Prescribed assets covered under other Telecommunications portfolio asset management plans
- Transmission and distribution electricity network operational and management systems
- Transmission and distribution electricity network Supervisory Control and Data Acquisition systems
- TasNetworks' assets and sites covered by the Facilities group
- Virtual and/or physical servers and associated storage access networks (SAN).
- Operating systems and associated supporting software such as anti-virus, patch-management, DNS and Windows Active Directory Services
- Corporate and Administrative Information Technology systems and assets managed by the Information Technology group

3 Strategic Alignment and Objectives

This asset management plan has been developed to align with both TasNetworks' Asset Management Policy and Strategic Objectives. This management plan describes the asset management strategies and programs developed to manage the Telecommunications Telephony and Voice Systems, with the aim of achieving these objectives.

3.1 Overall business objectives

For these assets the management strategy focuses on the following objectives:

- Safety will continue to be our top priority and we will continue to ensure that our safety performance continues to improve
- Service performance will be maintained at current overall network service levels, whilst service to poorly performing reliability communities will be improved to meet regulatory requirements
- Cost performance will be improved through prioritisation and efficiency improvements that enable us provide predictable and lowest sustainable pricing to our customers
- Customer engagement will be improved to ensure that we understand customer needs, and incorporate these into our decision making to maximise value to them
- Our program of work will be developed and delivered on time and within budget

3.2 Strategic asset management objectives

- Present an overview of the Telecommunications Telephony and Voice Systems asset populations;
- Manage business risk presented by the assets to within acceptable limits;
- Achieve reliable asset performance consistent with prescribed service standards;
- Assess the risks specific to the assets and identify corresponding risk mitigation strategies;
- Ensure the effective and consistent management and coordination of asset management activities relating to the assets throughout their life-cycle;
- Ensure our team members are trained, authorised and competent to undertake their work activities;
- Demonstrate that the assets are being managed prudently throughout their life-cycle;
- Ensure asset management issues and strategies, as they relate to the assets, are taken into account in decision making and planning; and
- Define future operational and capital expenditure requirements of the assets.

4 Asset Information Systems

4.1 Systems

Prescribed telecommunications asset data and information is currently stored and managed using the following systems and methods:

- Autodesk AutoCAD and Microsoft Visio drawings stored within the Information Management systems. Each telecommunication site has a detailed set of drawings including:
  - o site drawings

- o building drawings
- o rack layout drawings
- o schematic diagrams
- o wiring diagrams
- o manufacturer drawings

- Excel Spreadsheets for information such as krone termination details
- Network Management System software as detailed in section 5
- Geographic Information System (GIS) used for fibre optic cable management
- The Australian Communications and Media Authority (ACMA) radio frequency (RF) database and associated RF Hazard folders
- A Microsoft Access database that is scheduled to be replaced by a SAP based ERP system in 2018

4.2   Asset Information

The asset data for TasNetworks' Network Management Systems Assets has been well documented and detailed using the current Asset Information systems TasNetworks' has in place.

5   Description of the Assets

5.1   Telephone system overview

TasNetworks owns and manages a telecommunications telephone system which provides operational voice services for TasNetworks' Network Operations and Control Centres and substations, Hydro Tasmania's Energy Control Centre and power stations and the connection to AEMO's control centre via the voicenet connection provided. The operational network meets the requirements of TasNetworks' Telecommunications Operational Voice Policy.

The telecommunications telephone system is the base platform upon which the Tasmanian Electricity Supply Industry (TESI) realises its voice telephony needs and is considered an essential operational component of the Tasmanian Electricity Network.

The telephone network is designed and operated to provide high performance in terms of the service availability. In maintaining compliance with National Electricity Rules (NER), diversity options are provided where necessary to further increase the system performance. The network provides internal 4-digit dialling.

In order to leverage value from the telephone network, the system is used to provide administrative telephone services for TasNetworks and Hydro Tasmania. These administrative services tend to be concentrated in the metropolitan areas where a high volume of services are concentrated.

The TasNetworks' telephone systems utilise a combination of Voice over Internet Protocol PBX technologies combined with hybrid TDM PBX nodes located a strategic points throughout the TasNetworks telecommunications network.

Most individual telephone services are connected directly to one of the PBX nodes. At the majority of TasNetworks' larger substations and switchyards and Hydro Tasmania's power stations, key telephone systems have been installed, to enable several handsets throughout each site to share a smaller number of lines to the PBX. The key systems also allow intercommunication between handsets within each site (independent of the PBX).

5.1.1 Telecommunications Assets Age Profile and Asset Count

The age profile and asset counts of the iSDx assets are described in the following table and graphs.

Table 1 - Telecommunications Telephony and Voice Assets

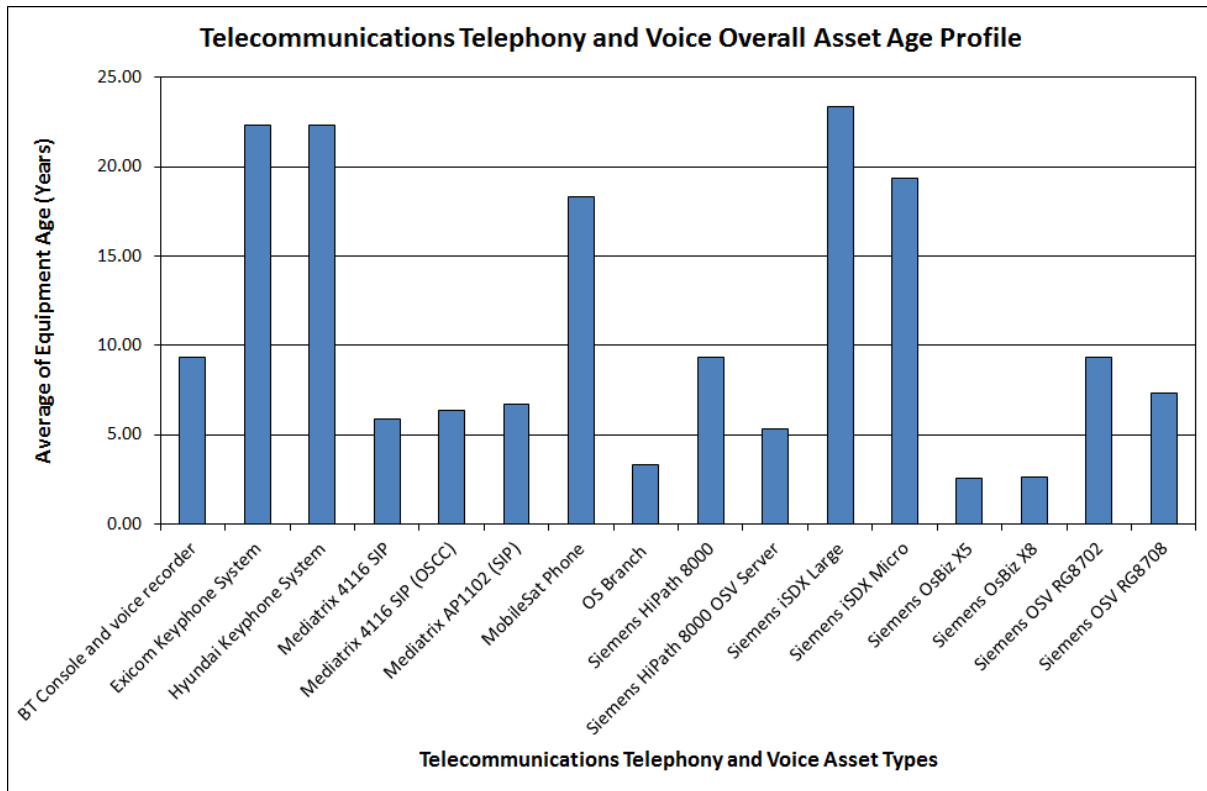| Telecommunications Telephony and Voice Asset Types	Average of Equipment Age (Years)	Number of Assets
BT Console and voice recorder	9.34	2
Exicom Keyphone System	22.34	3
Hyundai Keyphone System	22.34	1
Mediatrix 4116 SIP	5.84	2
Mediatrix 4116 SIP (OSCC)	6.34	2
Mediatrix AP1102 (SIP)	6.67	3
MobileSat Phone	18.34	12
OS Branch	3.34	1
Siemens HiPath 8000	9.34	1
Siemens HiPath 8000 OSV Server	5.34	1
Siemens iSDX Large	23.34	3
Siemens iSDX Micro	19.34	1
Siemens OsBiz X5	2.55	23
Siemens OsBiz X8	2.59	8
Siemens OSV RG8702	9.34	1
Siemens OSV RG8708	7.34	1
Total		**65**

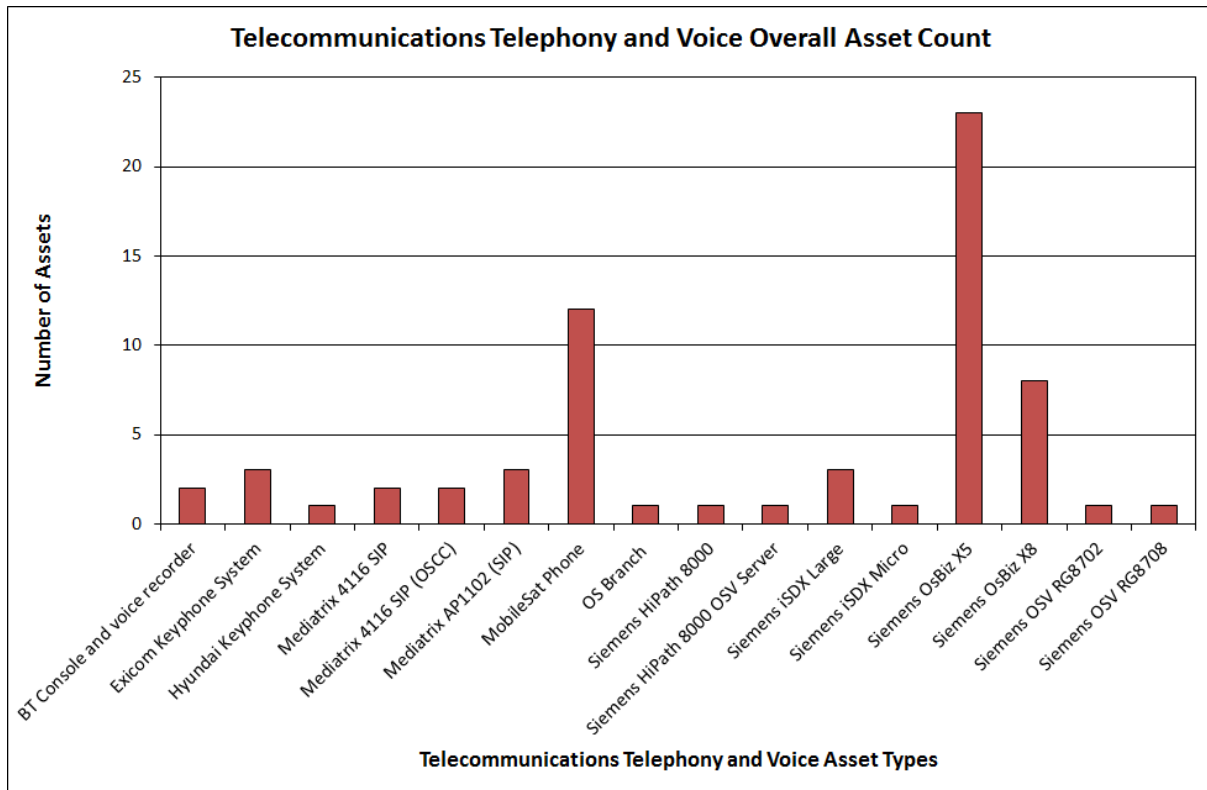**Figure 1 - Telecommunications Telephony and Voice Overall Asset Age Profile**

Figure 2 - Telecommunications Telephony and Voice Overall Asset Count

5.1.2 iSDX Based Network

The existing telephone system was based on Siemens Enterprise Communications' iSDX range of PBX equipment. It consists of five iSDX-L (large) PBX nodes and six iSDX-Micro PBXs with interconnecting routes designed so that each node has at least two routes to any other node. The routes are carried on the TasNetworks telecommunications bearer and multiplexer networks (digital communications system using microwave radio and optical fibre links). There are three additional iSDX-Micro PBXs which are only provided with a single trunk path. Most nodes also have local access to the public carrier network.

These systems have progressively been replaced with a hybrid VoIP and TDM based PBX network.

5.1.3 Telephony Core

The IP-PBX is being expanded as the preferred administrative telephone system for TasNetworks and is operating as the umbrella system for the traditional TDM based equipment. The TDM equipment will be provided with diversity arrangements to maintain operation of the telephone network during a failure of the IP network.

Telephone handsets at sites which use IP-based (OpenScape) equipment are connected to a local area network (LAN). A voice server is also connected to the LAN and sets up IP connections between IP Phones.

5.1.4 Alternate Operational Voice Communications

TasNetworks' operational voice policy requires that two independent voice services are provided as a minimum into all TasNetworks sites. This usually means a Trunk Mobile Radio (TMR) service and a TasNetworks operational telephone handset are included. In some circumstances, a fixed satellite telephone is also installed as an alternative communications medium. TasNetworks utilise satellite telephones in the control rooms.

Whilst Hydro generation sites also include satellite telephones which are connected through TasNetworks' keyphone systems, TasNetworks does not own, operate or manage these satellite phones and therefore these are not considered in this Asset Management Plan.

5.1.5 Design Philosophy and Intent

TasNetworks' voice communications system is primarily built to service the needs of the electricity industry in Tasmania. The key function of the network is to provide safe, secure and reliable voice services for the Tasmanian electricity industry. These services, directly used in the operation of the electricity network, are considered Operational Voice and take priority over other traffic on the network.

In order to leverage further from the installed infrastructure, TasNetworks utilises the infrastructure further to provide the office based telephones servicing the support functions of the business. These services are considered administrative and do not have a direct short term bearing on the operations of the electricity network. Administrative services tend to be high volume services and are therefore much more cost effective to provide.

The network is designed to ensure that congestion due to administrative traffic will not constrain the operational voice services.

5.1.6 Reduction of single points of failure

As with the telecommunications bearer network, the TasNetworks' telephone system is designed to minimise the single points of failure through the provision of redundancy. This is provided at a number of levels (to the extent possible due to equipment and network configurations):

- where possible, operational sites operating on a keyphone are provided with a direct carrier based service or a satellite phone service;
- where possible, critical key telephone and PBX extensions are provided with bypass functionality to maintain phone operation due to a PBX/keyphone fault;
- the system operates over TasNetworks' telecommunications bearer network with operational functions not relying on carrier networks for voice communications;
- the larger nodes (and the IP phone system) are provided with main and standby processors; and
- Alternate traffic routing around the system is provided using both internal and external trunks.

5.1.7 Telephone system power supply security

The TasNetworks' telephone system is provided with backup power designed to maintain the operational services for a minimum of 24 hours following the failure of the AC supply at a telecommunications site. This includes for the trunks operating through the telecommunications network infrastructure sites.

The IP handsets for the administrative telephone network are powered from Ethernet access switches using Power over Ethernet (PoE). However, the provision of backup power is a facilities responsibility and has been deemed unnecessary for the general administrative services. An exception to this has been made for the IT service desk which is provided with backup power via an uninterruptable power supply for their PoE enabled access switches.

5.1.8 Closed numbering plan

A closed numbering plan for the network is maintained providing 4-digit dialling within the company, and providing internal call routing between electricity industry users of the network. The network numbering plan is administered by TasNetworks.

Some sites are also solely connected by the carrier's incoming trunks. These sites are provided with 4 digit dialling numbers also utilising the site infrastructure to undertake translations or by using a Corporate Virtual Private Network (CVPN) connection setup by the carrier.

5.1.9 Network Operations Control Room telephone console and voice recording systems

TasNetworks' Network Operations Control System operators utilise a telephone console and voice recorder system known as the 'BT-ITS System'. These devices operate to consolidate all of the voice system connections in the control room into a single console device to simplify the service usage by the control room operators whilst providing additional system functionality.

The NER require TasNetworks to maintain call records in the control room. In order to comply with this section of the NERs, TasNetworks has implemented voice recorders on the BT-ITS system to ensure that all calls are recorded. These voice recorders are also used to maintain call records in other areas of the business through the individual extensions on the telephone network.

The BT-ITS system allows operators to access voices services on the operational telephone network, the state trunked mobile radio network and a satellite telephone service with all calls logged on voice recorders satisfying the requirements of AEMO. Operators can identify incoming calls in a queue, answer calls in any order and make outgoing calls on any of the connected services.

The BT-ITS is provided by a redundant, high availability configuration distributed between the control room sites. TasNetworks operate the BT-ITS system with 9 consoles distributed between the control rooms.

5.1.10 Operational voice

TasNetworks owns and manages a telecommunications telephone system which provides operational voice services for TasNetworks' Network Operations and Control Centres and substations. The TasNetworks telephone network also connects to Tasmanian NEM generators' control centres, their power stations and the connection to AEMO's control centre via the voicenet connection provided. The operational network meets the requirements of TasNetworks' Operational Voice Policy.

The telecommunications telephone system is the base platform upon which the Tasmanian Electricity Supply Industry (TESI) realises its voice telephony needs and is considered an essential operational component of the Tasmanian Electricity Network.

The TasNetworks' telephone network is designed and operated to provide high performance in terms of the service availability. In maintaining compliance with National Electricity Rules (NER), diversity options are provided where necessary to further increase the system performance. The TasNetworks' telephone network provides internal 4-digit dialling.

5.1.11 Corporate and administrative voice

In order to leverage value from the telephone network, the TasNetworks' telephone system is used to provide administrative telephone services for TasNetworks and other NEM participants. These administrative services tend to be concentrated in the metropolitan areas where a high volume of services are concentrated.

5.1.12 How telephone services are connected

Most individual telephone services are connected directly to one of the PBX nodes. At the majority of TasNetworks' larger substations and switchyards and NEM generator power stations, key telephone systems have been installed, to enable several handsets throughout each site to share a smaller number of lines to the PBX. The key systems also allow intercommunication between handsets within each site (independent of the PBX).

At most of the PBX nodes, there is local access to public carrier based voice services.

5.2   Telephony and voice system asset types and components

5.2.1 iSDX based PBX

Since 1993, the telephone system has been based on the ISDX equipment provided by Siemens Enterprise Communications. No new ISDX systems have been available since 2001 and on numerous occasions the manufacturer has indicated an end of support date for the product.

The ISDX utilises a very powerful, yet somewhat unique trunking protocol which allows all of the networked ISDXs to fully integrate with extensions being able to access the same features on a network wide basis. The ISDX programming is undertaken via a standard command line interface using a simple command set. This does mean however that in order to work on the product a level of knowledge about the PBX command line is required. TasNetworks utilises 2 variants of the ISDX product, the large ISDX-L and the smaller ISDX-Micro.

These variants of ISDX PBXs are being retired and replaced with modern, supported equipment.

5.2.1.1 Asset age profile and asset count

The age profile and asset counts of the iSDx assets are described in the following table and graphs.

Table 2 - iSDX PBX Equipment

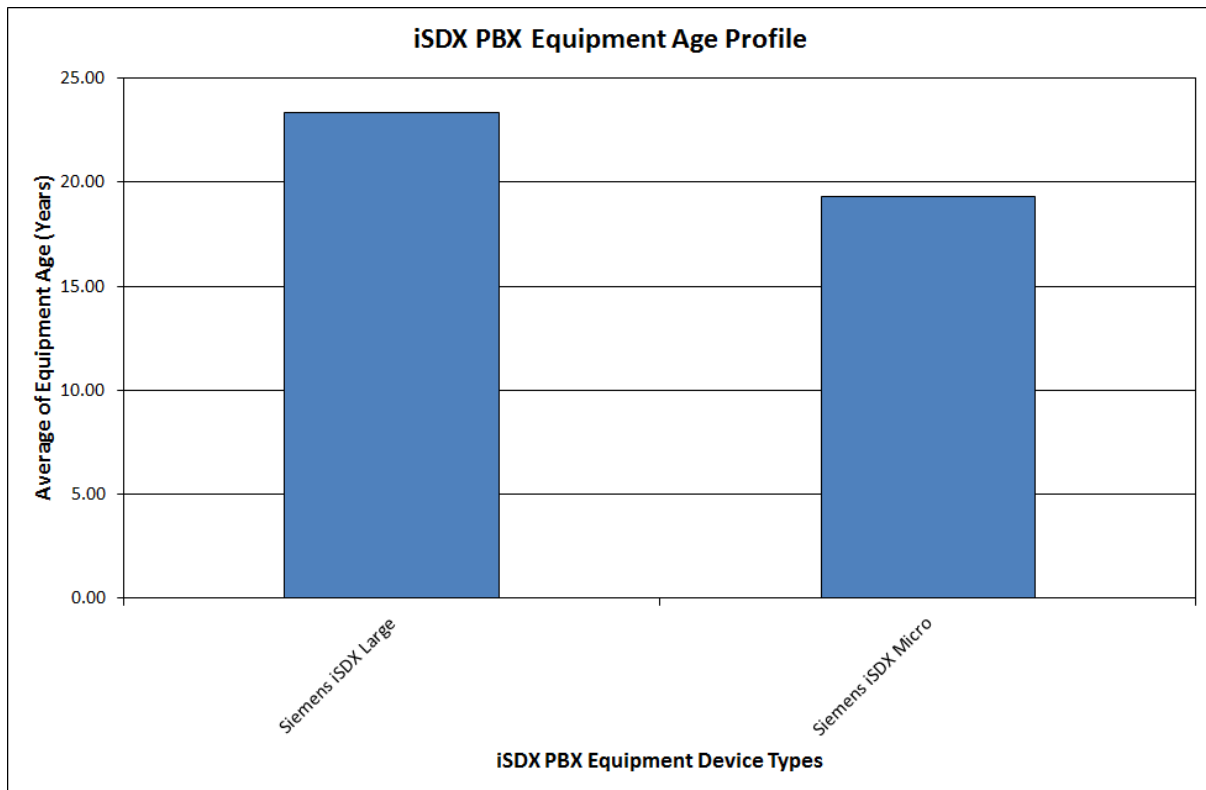| iSDX PBX Equipment Device Types	Average of Equipment Age (Years)	Number of Assets
Siemens iSDX Large	23.33	3
Siemens iSDX Micro	19.33	1
Total		**4**

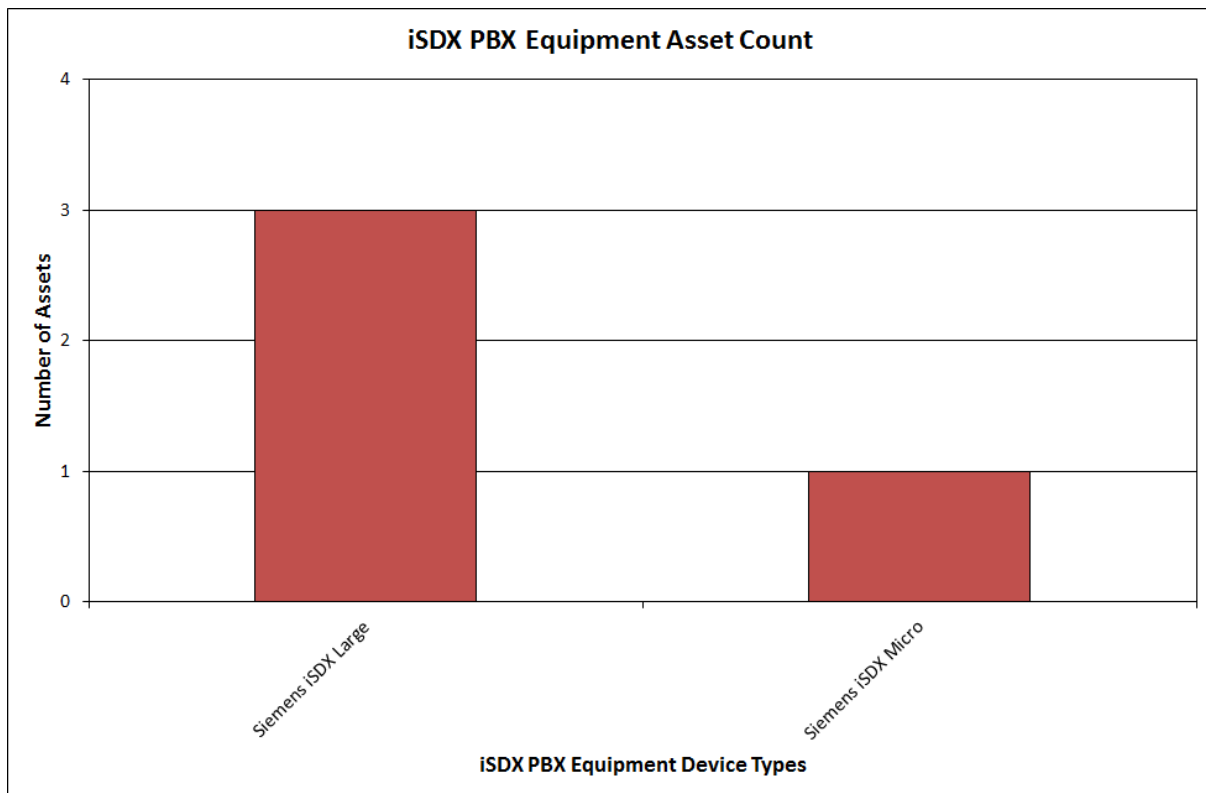**Figure 3 - iSDX PBX Equipment Age Profile**

Figure 4 - iSDX PBX Equipment Asset Count

5.2.2 OpenScape Voice Platform

The new IP telephony core is based on the Siemens OpenScape Voice platform (formerly known as the HiPath 8000). OpenScape Voice is a server based system which provides telephone services to extensions via the internal IP network. The system can scale to 100,000 extensions, and can be expanded to provide additional systems features as required.

The OpenScape Voice platform consists of:

- duplicated OpenScape Voice nodes on dedicated server infrastructure;
- high availability pair of Session Border Controllers one device installed alongside each of the servers;
- separate virtual servers for Media Servers (2 servers), Deployment Service (DLS), Management Portal (CMP), OpenScape Contact Centre (OSCC);
- remote Gateways (RG 8702 and RG 8708) at each of the Carrier Network interfaces;
- analogue Gateways (Mediatrix AP1102, 4102, 4116) for the provision of analogue extensions (e.g. fax machines, lift phone); and
- Interalia XMU+ (voice announcements) for use with OpenScape Contact Centre.

5.2.3 HiPath 8000/Siemens OsBiz X8

These devices are the core servers for the OpenScape Voice systems that run the telephone network. These devices are located at major strategic points throughout the telecommunications

voice network. These devices also communicate with remote gateways that interface with public carrier networks at various points throughout the TasNetworks' telecommunications network.

5.2.3.1 Age profile and asset count

The age profile and asset counts of the HiPath 8000/Siemens OsBiz X8 assets are described in the following table and graphs.

Table 3 - OpenScape Voice Server Assets

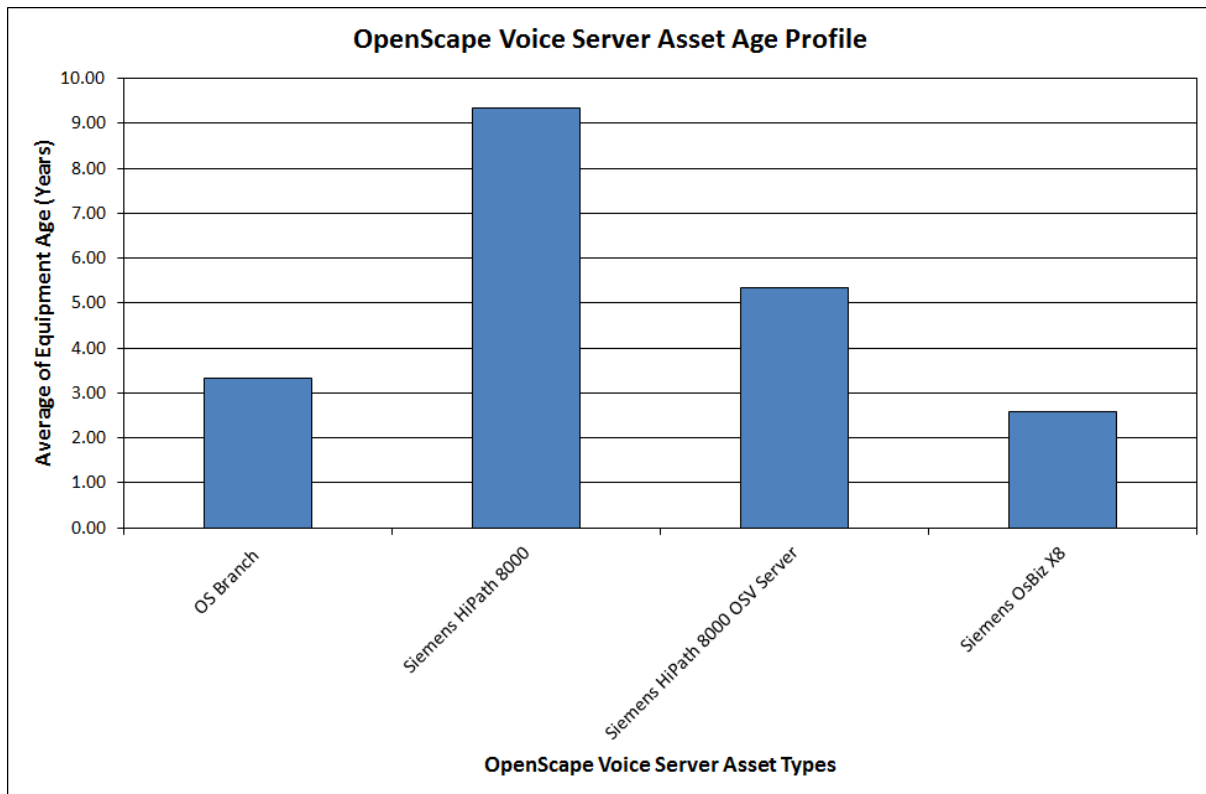| OpenScape Voice Server Asset Types	Average of Equipment Age (Years)	Number of Assets
OS Branch	3.33	1
Siemens HiPath 8000	9.33	1
Siemens HiPath 8000 OSV Server	5.33	1
Siemens OsBiz X8	2.58	8
Total		**11**

Figure 5 - OpenScape Voice Server Asset Age Profile
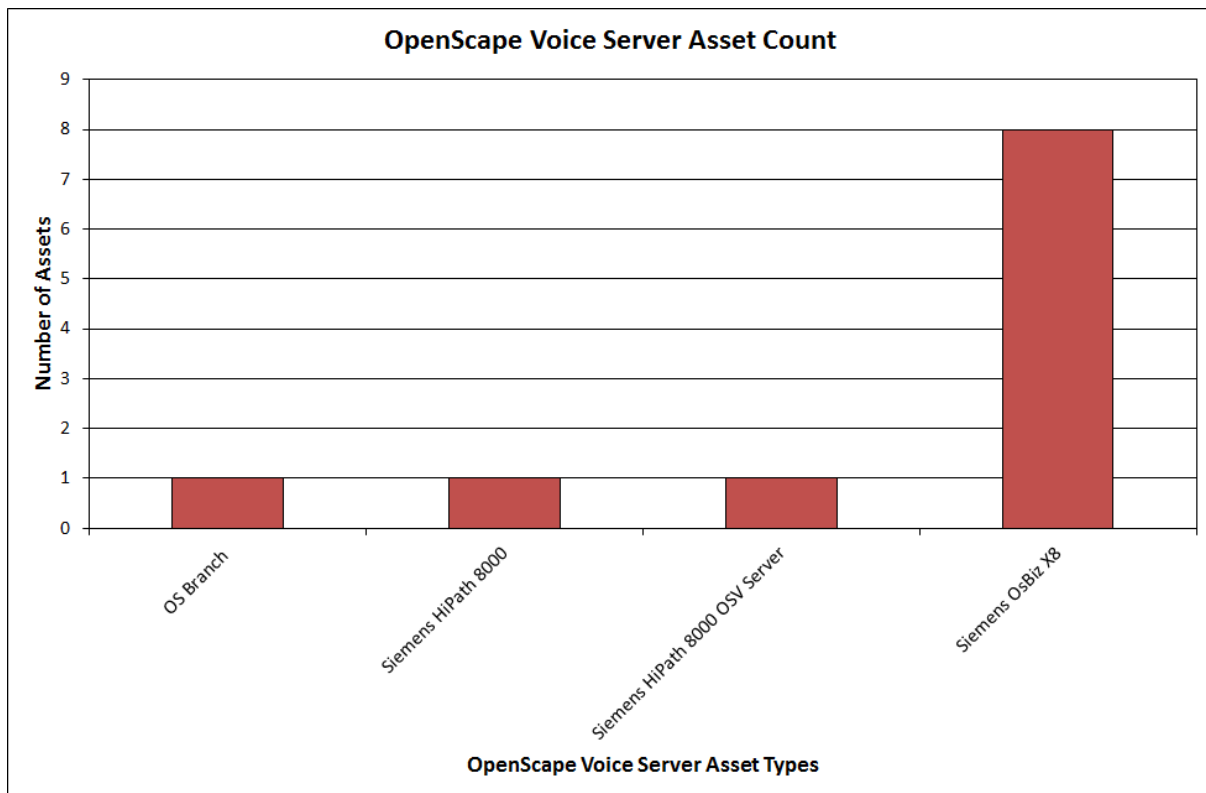
Figure 6 - OpenScape Voice Server Asset Count

5.2.4 Siemens OsBiz X5 PBX/Keyphone Assets

The Siemens OsBiz X5 units are operated as hybrid TDM PBXs on TasNetworks operational sites. These devices interface to the VoIP network as well as on the TDM network via trunks on the telecommunications bearer network if the IP network fails. This setup is used to ensure that operational voice traffic gets trough between sites and the control centres via redundant paths on the TasNetworks Telecommunications Network.

The Siemens OsBiz X5 units (specifically the previous HiPath 3550 units which can be firmware upgraded to a Siemens OsBiz X5 units) are configured as keyphone systems for select sites such as substations and power stations. These units will eventually replace the remaining legacy keyphone systems on the TasNetworks' telecommunications network.

5.2.4.1 Age profile and asset count

The age profile and asset count of the Siemens OsBiz X5 PBX/Keyphone Assets are described in the following tables and graphs.

Table 4 - OpenScape OsBiz X5 Systems

OpenScape OsBiz X5 Systems Asset Types	Average of Equipment Age (Years)	Number of Assets
Siemens OsBiz X5	2.55	23
Total		**23**

OpenScape OsBiz X5 Systems Asset Age Profile

Average of Equipment Age (Years)

OpenScape OsBiz X5 Systems Asset Types

Siemens OsBiz X5

Figure 7 - OpenScape OsBiz X5 Asset Age Profile

OpenScape OsBiz X5 Systems Asset Count

Number of Assets

OpenScape OsBiz X5 Systems Asset Types

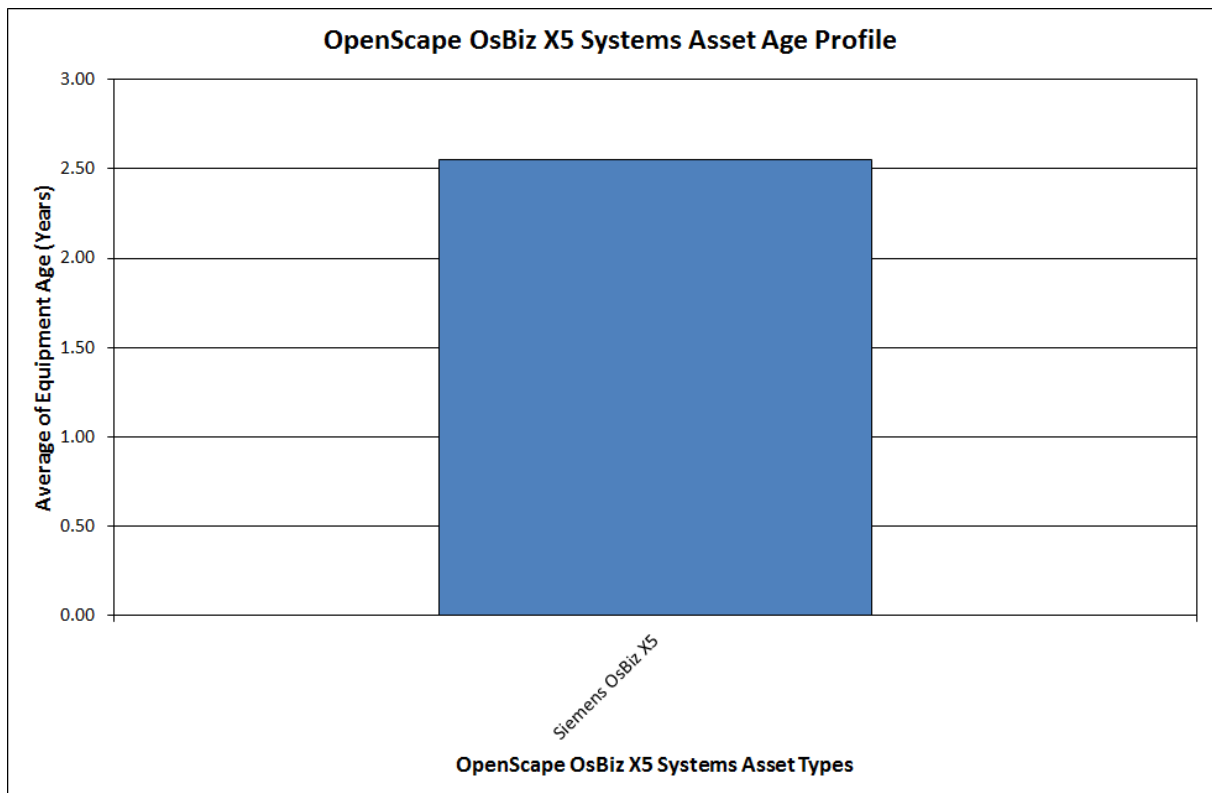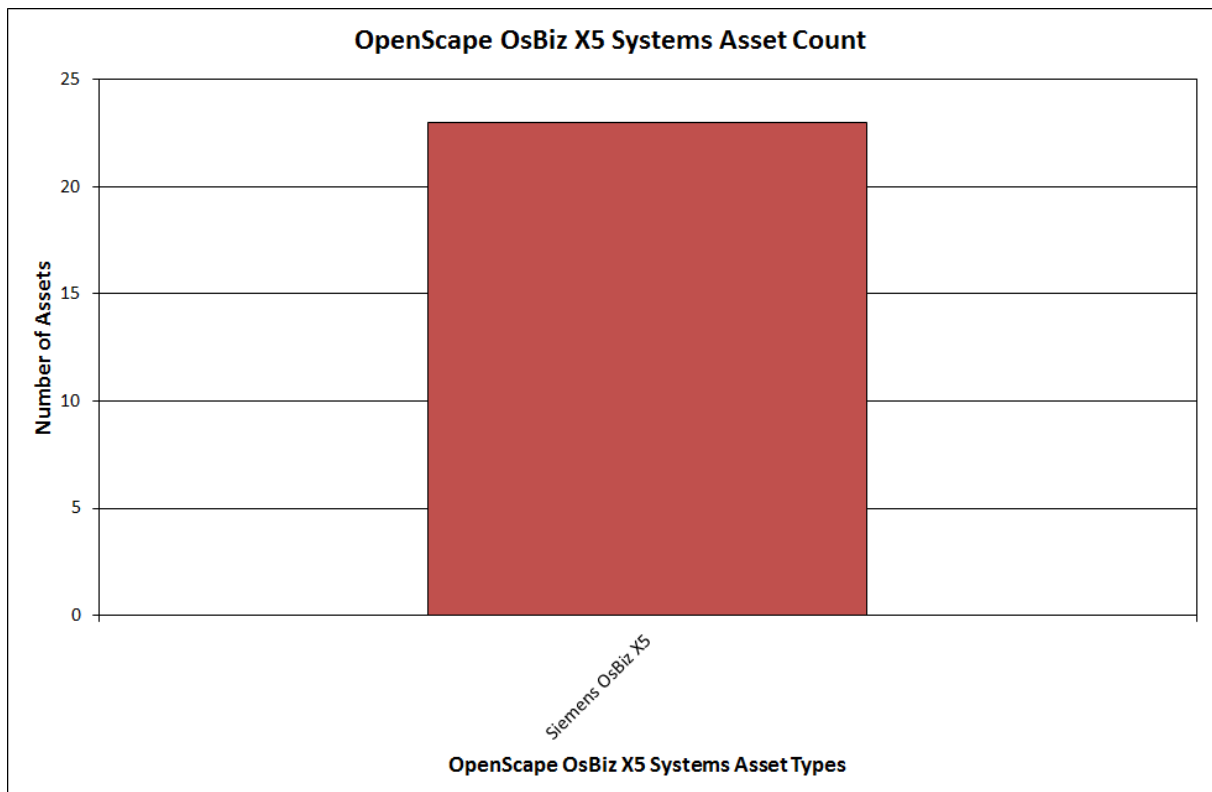Siemens OsBiz X5

Figure 8 - OpenScape OsBiz X5 Systems Asset Count

5.2.5 OpenScape Remote Gateways

The Siemens OpenScape RG 8702 and RG 8708 remote gateways provide interface points between the public carrier networks and the TasNetworks telephone systems.

5.2.6 Keyphone Systems

TasNetworks operates 2 brands of legacy keyphone systems throughout power stations and substations. These are the Hyundai 816 (8 incoming lines and 16 extensions) and the Exicom 1832 (18 incoming lines and 32 extensions). The keyphone systems allow calls to be made between stations and allow the distribution of incoming lines to all extensions around the site.

A number of the legacy keyphone systems have been progressively replaced with HiPath 3550 units or OsBiz X5 units. The replacements perform similar functions to the legacy keyphone systems remaining on the TasNetworks' telecommunications network.

5.2.6.1 Asset age profile and asset count

The asset age profile and asset counts of the legacy keyphone systems are described in the following table and graphs.

Table 5 - Keyphone systems

Keyphone System Types	Average of Equipment Age (Years)	Number of Assets
Exicom Keyphone System	22.33	3
Hyundai Keyphone System	22.33	1
Total		**4**
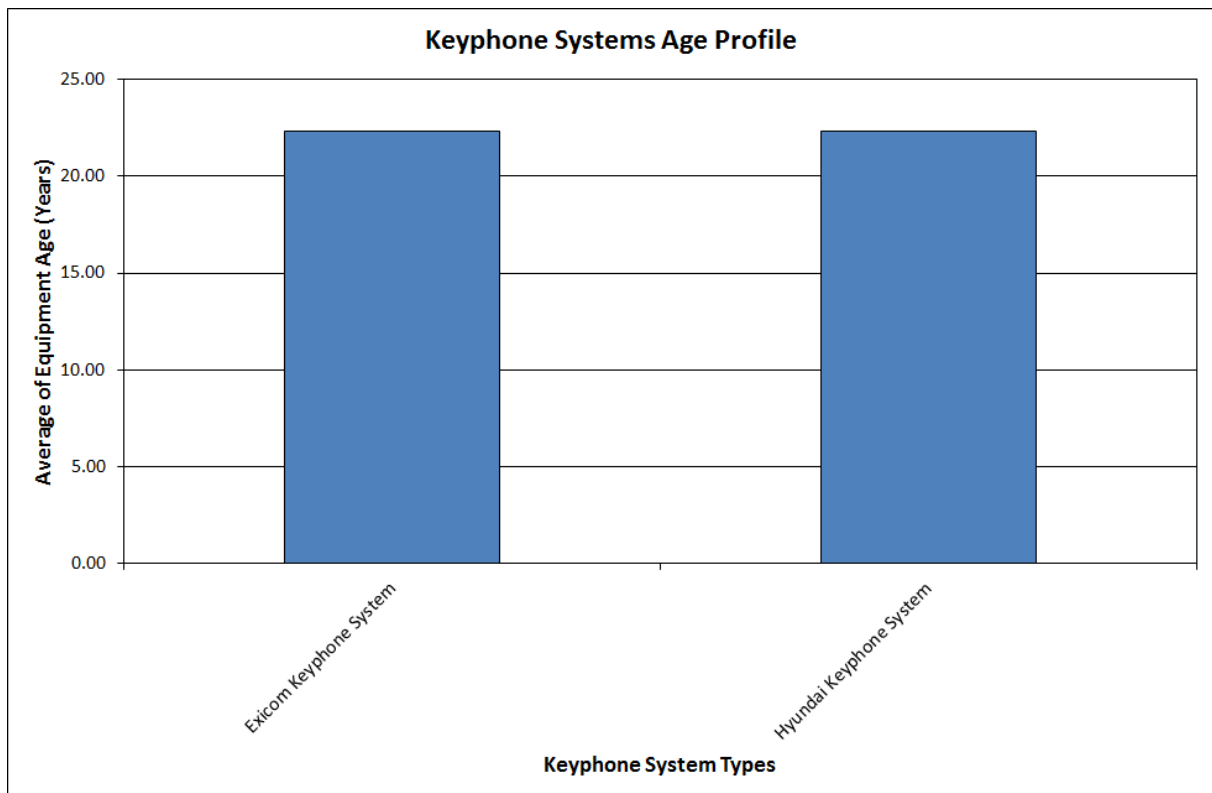
Figure 9 - Keyphone Systems Age Profile
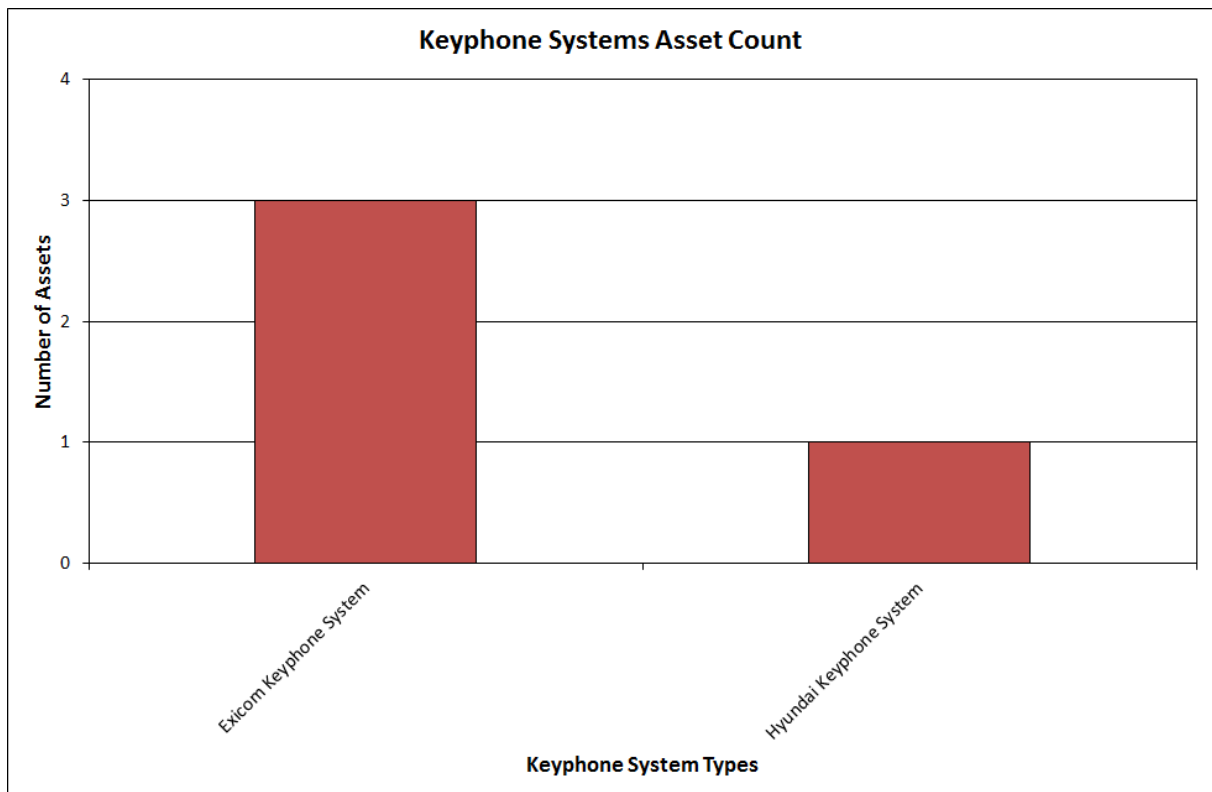
Figure 10 - Keyphone Systems Asset Count

5.2.7 Analogue IP Gateways

To provide analogue extensions for facsimile machines, analogue dial-up modems, and analogue voice handsets, Mediatrix analogue IP gateways have been installed to interface with the OpenScape voice platform on the VoIP network.

5.2.7.1 Legacy non-IP systems

For the remaining iSDX platforms, analogue extension cards can provide 16 extensions.

5.2.7.2 Asset age profiles and asset counts

The asset age profile and asset counts of the analogue IP gateways are described in the following table and graphs.

Table 6 - Analogue IP Gateways

Analogue IP Gateways Equipment Types	Average of Equipment Age (Years)	Number of Assets
Mediatrix 4116 SIP	5.83	2
Mediatrix 4116 SIP (OSCC)	6.33	2
Mediatrix AP1102 (SIP)	6.67	3
Total		**7**
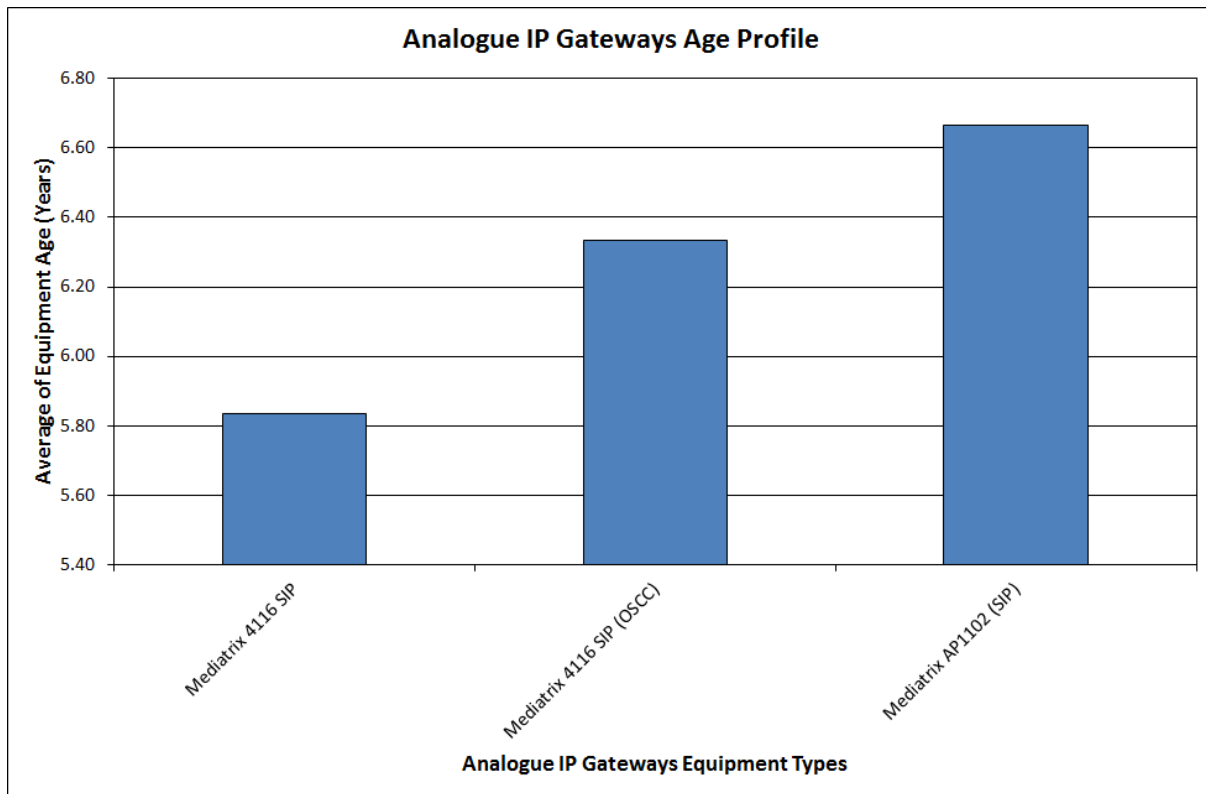
Figure 11- Analogue IP Gateways Age Profile
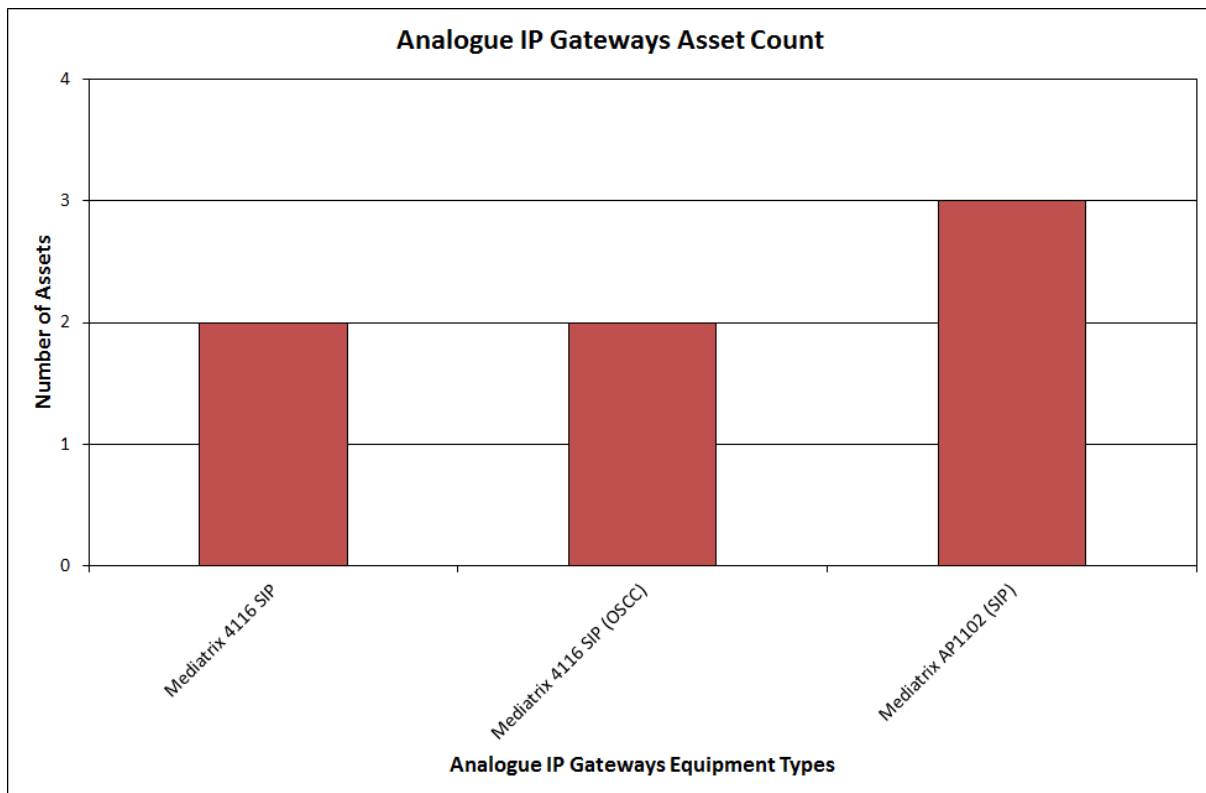
Figure 12 - Analogue IP Gateways Asset Count

5.2.8 Control room BT-ITS System

The BT-ITS System provides a high availability console in the control rooms which allows operators to access the numerous voice communications facilities from the console. The console accesses the voice network, the Trunk Mobile Radio network, and the satellite telephones. The BT-ITS System also provides a voice recording function.

5.2.9 Satellite Telephone System

TasNetworks utilises an Optus MobileSat unit which is now at end of life and may no longer be operational in the future. TasNetworks is considering the replacement of these units to the Iridium network as a future program of work.

5.2.9.1 Asset age profiles and asset counts

The asset age profile and asset counts of the satellite phone handsets are described in the following table and graphs.

Table 7 - Satellite Phones

Satellite Phone Handset Equipment Types	Average of Equipment Age (Years)	Number of Assets
MobileSat Phone	18.33	12
Total		**12**
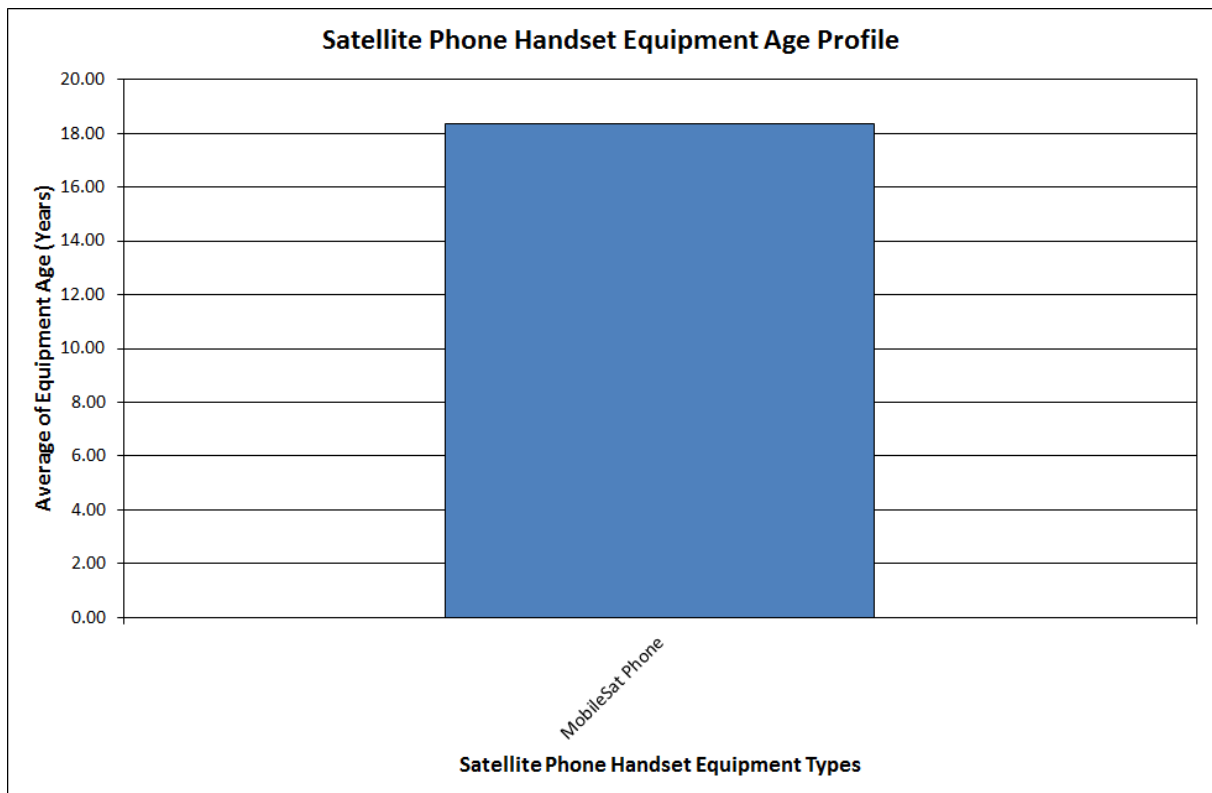
Figure 13 - Satellite Phone Handsets Age Profile

Figure 14 - Satellite Phone Handsets Asset Count

5.2.10 Trunked Mobile Radio Handsets

TasNetworks' utilises the Tasmanian Government Trunked Mobile Radio network as a backup voice communications medium used in substations, power stations, vehicles, and other TasNetworks sites.

The Tasmanian Government Trunked Mobile Radio Network is shared between government departments, emergency services, Tasmanian utilities and other select parties.

TasNetworks does not manage this network but has interfaces and connection points to this network and owns its own fleet of handsets to access this voice network.

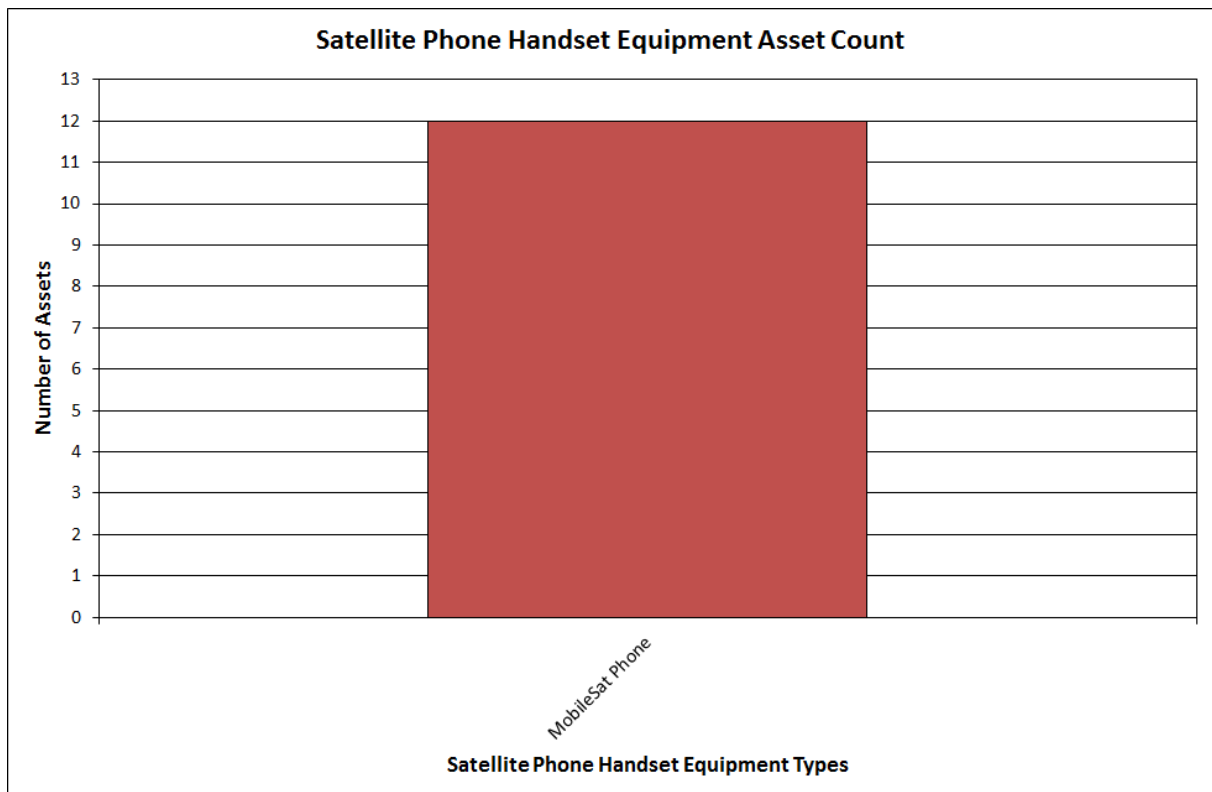The Tasmanian Government has a program of work in place to replace the Trunked Mobile Radio network with a modern equivalent. Therefore, the current fleet of TasNetworks' Trunked Mobile Radio handsets will be non-functional when the TMR network is replaced.

TasNetworks has incorporated the Trunked Mobile Radio replacements as a program of work in the 2019 to 2024 regulatory period.

5.2.10.1 Age profile and asset count

The asset age profile and asset counts of the satellite phone handsets are described in the following table and graphs.

5.2.11 Telephone Handsets

The telephone handsets used are classified into 3 major types:
- VoIP handsets;
- iSDX handsets; and
- Analogue handsets

5.2.11.1 VoIP OSV Handsets

The OSV System handsets are based on the standard SIP protocol allowing for a level of interoperability between different systems and handsets although the manufacturers use of the proprietary sections of the SIP protocol does limit the full features of the system to handsets from the same manufacturer. The SIP handsets used by the OSV system are the Openstage 40, Openstage 60, Openstage 80 and Optipoint 410 handsets.

5.2.11.2 iSDX handsets

The iSDX system IP handsets are based on Siemens implementation of the ITU-T H.323 standard called HFA. This implementation is heavily proprietary. HFA handsets are usually the Optipoint 410 versions and can be used on the iSDX and the HiPath 3000/4000 systems.

5.2.11.3 Analogue handsets

These types of handsets are handsets designed to be used on the older Public Switched Telephone Network (PSTN) on analogue circuits. These types of handsets are readily available but their use is diminishing rapidly. The analogue services are mainly used for analogue modems and facsimile machines. These services are provided via analogue interface cards on the iSDX units or via the IP analogue gateways which connect to the TasNetworks VoIP network.

5.2.12 Telephony and Voice Software Systems

TasNetworks utilises a number of software products to configure and maintain the integrity of the TasNetworks' telephone systems. The software includes:

- CadsWin;
- OpenScape Voice Database; and
- OpenScape Contact Centre Database.

TasNetworks maintains the software products and their platforms by applying:

- Six monthly system patching regime for core systems;
- Monthly patching on Microsoft based servers;
- Maintain system software release is no more than 2 major versions behind the most currently released version.

This regimen is highly dependent on the vendor license agreements and software support subscriptions. TasNetworks actively manages software licenses and subscriptions to mitigate the risks associated with unsupported software.

A description of each software system is described in the following sections

5.2.12.1 CadsWin

CadsWin is a product which allows TasNetworks to collect telephone call information. It was updated to a current version in 2015. The product is supported by JCurve. The system is off premise cloud based. TasNetworks runs a virtual server for data collection which sends details to the cloud servers for reporting. TasNetworks runs reports from the web portal. TasNetworks pays for a service contract which includes all upgrades and support. There are no plans to replace this product as it meets TasNetworks' business requirements.

5.2.12.2 OpenScape Voice Database

The OpenScape Voice Database is a proprietary database which is manually backed up weekly.

5.2.12.3 OpenScape Contact Centre Database

The OpenScape Voice Database is a proprietary database which is manually backed up daily.

6 Standard of Service

6.1 Technical Standards

The National Electricity Rules (NER) outlines the requirements for voice communications at each of the network facilities.

Section 4.11 lists these requirements which include, but are not limited to, the following clauses:

4.11.3 Power system voice/data operational communication facilities

(c) Each Registered Participant must provide, for each nominated person, two independent telephone communication systems fully compatible with the equipment installed at the appropriate control centre nominated by AEMO.

Note

This clause is classified as a civil penalty provision under the National Electricity (South Australia) Regulations. (See clause 6(1) and Schedule 1 of the National Electricity (South Australia) Regulations.)

(d) Each Registered Participant must maintain both telephone communication systems in good repair and must investigate faults within 4 hours, or as otherwise agreed with AEMO, of a fault being identified and must repair or procure the repair of faults promptly.

4.11.4 Records of power system operational communication

(a) AEMO and the System Operators must record each telephone operational communication in the form of log book entries or by another auditable method which provides a permanent record as soon as practicable after making or receiving the operational communication.

Note

This clause is classified as a civil penalty provision under the National Electricity (South Australia) Regulations. (See clause 6(1) and Schedule 1 of the National Electricity (South Australia) Regulations.)

(b) Records of operational communications must include the time and content of each communication and must identify the parties to each communication.

Note

This clause is classified as a civil penalty provision under the National Electricity (South Australia) Regulations. (See clause 6(1) and Schedule 1 of the National Electricity (South Australia) Regulations.)

(c) Voice recordings of telephone operational communications may be undertaken by AEMO and the System Operators. AEMO and the System Operators must ensure that, when a telephone conversation is being recorded under this clause, the persons having the conversation receive an audible indication that the conversation is being recorded. Voice recordings may be used as an alternative to written logs.

(d) AEMO and the System Operators must retain all operational communications records including voice recordings for a minimum of 7 years.

In response to the NER requirements for operational voice communications, TasNetworks has developed a Telecommunications Operational Voice Policy to ensure a uniform standard of service is provided at the optimum cost.

6.2 Performance Objectives

The following table details the performance levels required for TasNetworks operational voice network. The performance targets of the administrative/corporate voice network have the same performance targets with the exception of fault restoration times.

Performance Parameter	Performance Measure	Performance Target Commercial Grade	Performance Target Operational Grade
PBX Network Service	PBX Grade of Service	0.9	0.9
Security and quality of supply	Service Availability	99.9% Service Availability over each rolling 12 month period.	99.9% Service Availability over each rolling 12 month period.
Fault Response	Response Time	1 hour	1 hour
Restoration	Restoration time for faulty equipment.	Close of Business next working day	4 hours Mean Time To Repair

6.2.1 Performance Measure Definitions

6.2.1.1 PBX Grade of Service

The grade of service measure is the probability that a given amount of telephone traffic will be carried successfully.

$0.0 \leq PBX\ Grade\ of\ Service \leq 1.0$

6.2.1.2 Security and quality of supply

This is defined as Service Availability where:

$$Service\ Availability = \left(\frac{(Service\ Time - Service\ Outage)}{Service\ Time}\right) \times 100.0$$

$Service\ Time = P \times N$

P = the availability measurement period in minutes

N = Number of switches in the system

Service Outage = The Sum of all switch outages in minutes for the measurement period where a switch outage is defined as an unplanned outage/event which leaves greater than 20% of handsets associated with the particular switch without service.

Fault response = Response time from logging of a fault/service call until the client is contacted to advise the status of the call.

6.3 Key Performance Indicators

TasNetworks monitors the performance of the Telephone network through network management systems operated by the TasNetworks' Telecommunications Network Management System. The fault response is initiated with Telecommunications Services and recorded in VFire as a fault. Equipment failures are rectified, whilst system failures are subject to an investigation to establish the root cause and recommend remedial strategies to reduce the likelihood of similar system failures occurring in the future.

The record of equipment failures is maintained in VFire enabling internal performance monitoring and trending of all telecommunications equipment related faults or defects. This allows equipment design faults and poor component performance levels to be identified and adequately addressed associated risk.

7 Associated Risk

TasNetworks has developed a Risk Management Framework for the purposes of assessing and managing its business risks, and for ensuring a consistent and structured approach for the management of risk is applied.

An assessment of the risks associated with the Telephony and Voice Systems assets has been undertaken in accordance with the Risk Management Framework. For each asset in this class the assessments have been made based on:

- Condition of Telephony and Voice Systems assets in service across the network
- Criticality of Telephony and Voice Systems and associated assets
- Probability of failure (not meeting business requirement)
- Consequence of failure
- Performance
- Safety risk
- Environmental risk
- Customer

The quantification of risk is supported by the Condition Based Risk Management (CBRM) framework. This approach allows the risks of individual assets to be quantified against the defined assessment.

Due to the level of risk identified in some of the assessment criteria a requirement to actively manage these risks has been identified.

The proposed programs of work in this Asset Management Plan will manage the risks to TasNetworks at an acceptable level in accordance with the TasNetworks' Risk Management Framework. An overall risk matrix for the Telecommunications Telephony and Voice Systems program of work is detailed in the following section.

7.1.1 Risk Matrix for the proposed program of work and assets

7.1.1.1 Telephony and Voice Systems Risk Matrix

Risk Category	Risk	Likelihood	Consequence	Untreated Risk Rating	Residual Risk Rating
Customer	Not addressing poor asset performance will likely result in telecommunications system outages which may result in subsequent power system compliance issues. This results into poor service to connected customers.	Possible	Minor	Low	Low
Environment and Community	There is unlikely to be any significant risk to the environment and community.	Rare	Negligible	Low	Low
Financial	There is a minor risk to TasNetworks' financial position.	Unlikely	Minor	Low	Low

Risk Category	Risk	Likelihood	Consequence	Untreated Risk Rating	Residual Risk Rating
Network Performance	Poor condition assets due to lack of vendor support adds increased risk of non-compliance of prescribed services and increase risk of outages. The lack of vendor support and software/firmware patching risks cybersecurity issues and unpatched vulnerabilities. Lack of sales support and systems spares may limit support staff ability to repair faults. Failed voice communications may cause power system operations issues where reliable voice communications between sites is critical. Also the ability to log and record operational voice calls including dates, times, and parties are critical for compliance with the National Electricity Rules. Lack of management systems support will prevent operations staff from monitoring and managing the telecommunications assets.	Possible	Moderate	Medium	Low
Regulatory Compliance	Non-compliance with National Electricity Rules section 4.1.1 Power Security Support. A decline in network availability affects the ability of TasNetworks to maintain compliance with the National Electricity Rules.	Possible	Moderate	Medium	Low
Reputation	There is unlikely to be any significant risk to TasNetworks' reputation.	Rare	Negligible	Low	Low

Risk Category	Risk	Likelihood	Consequence	Untreated Risk Rating	Residual Risk Rating
Safety and People	A failed voice system at a remote site in a safety emergency may impede the dispatch of emergency services or assistance to reach the site. This risk is especially relevant in areas where there is no public telecommunications infrastructure/coverage.	Unlikely	Severe	High	Medium

7.2 <Asset Type1>

8 Management Plan

8.1 Historical

This TasNetworks' Asset Management Plan has been renamed TasNetworks' Telephony and Voice from Telephone Systems.

8.2 Strategy

8.2.1 Philosophy of design and operation

The underlying philosophy of the telephony and voice systems is to provide:

- a robust network infrastructure for the provision of telephone services; and
- The ability to provide operational and administrative telephone services both internally and externally on common infrastructure.

In following this philosophy, the following issues need to be addressed in relation to the lifecycle management of the assets which make up the telephone system:

- the need to use high performance carrier grade assets suitable for use for power utilities for operational and administrative voice traffic;
- the need to remove one-off installations and bespoke designs that are difficult to maintain due to the lack of appropriate expertise and spares;
- the need to appropriately upgrade the network to provide the telephone services required by TESI in maintaining compliance with the NER;
- the need to monitor the network and analyse faults to determine system performance;
- continue to rigorously manage
    - o hardware;
    - o software
    - o firmware issues; and
- The need to maintain vendor support at all times.

8.2.2 Preventative Maintenance

The performance of the telephony assets is monitored by Telecommunications Operations staff and supported by appropriately timed software management and preventative maintenance activities. Aside from this software management, preventative maintenance is confined to maintaining suitable environmental conditions where possible.

Software and firmware management is designed to prevent the equipment from being affected by security vulnerabilities, bugs and defects.

8.2.2.1 6 monthly routine maintenance

Preventative maintenance on the telecommunications network is undertaken on a site basis to enhance efficiencies. The routine testing for each site is based on 6 monthly routine testing – covering the site infrastructure (as detailed in the Telecommunications Site Infrastructure Asset Management Plan), and checking the filters on individual equipment. This includes battery maintenance to ensure power supply integrity during mains failure for all of the equipment on the site.

The key maintenance activity for the telephone system equipment is the software management. A review of the current running software is undertaken every 6 months and consideration given to software upgrades. Any urgent software releases within the 6 month period will be promptly reviewed and if it is deemed appropriate, will be installed. The other maintenance activity revolves around physically maintaining the equipment by ensuring that fans and filters are kept clean and optimised.

8.2.2.2 System backup routines

In managing the system configurations, regular system configuration backups are taken for telephony and voice system assets. The following table lists the systems that have routine backups and their frequency:

Table 8 - Telephony and Voice System Asset Backup Intervals

Telephony/Voice System Asset	Backup Interval
iSDX (Large and Micro)	3 Months
OpenScape Voice Database	1 Week
OpenScape Contact Centre Database	1 Day
Session Border Controller	Following System Change
HiPath 3000 (3550 and 3800)/OpenScape OsBiz x5	3 Months
BT-ITS System Database	Daily

8.2.2.2.1 iSDX Backups

The iSDX systems maintain a copy (on the internal hard drives) of their configuration for 5 days (most recent days). This configuration allows for the system recovery in between the 3 month backups. The 3 month backup is duplications from the iSDX system hard drives.

8.2.2.2.2 OpenScape OsBiz X5/HiPath 3000 Backups

The HiPath 3000/OpenScape OsBiz X5 systems are located in the operational environment where configurations changes are not common. The 3 monthly backup is deemed appropriate for these sites, however as with all of the products, a configuration backup is taken whenever significant modifications are made.

8.2.3 Corrective Maintenance

Corrective or non-routine maintenance of these assets is initiated in line with the service level agreement for the network for providing services both internally and to external customers. Depending on the fault severity and the networks performance at that time corrective maintenance can be for prompt attention with a targeted service restoration time of 4 hours, or for deferred attention where services are not affected.

The initiation of the corrective maintenance is by either:

- an alarm initiated by the telecommunications network supervisory system;
- a network defect found during the periodic routine testing;
- a critical software upgrade; or
- A customer report of service degradation.

The TasNetworks' telecommunications program of work has been designed to minimise the amounts of corrective maintenance done on the telecommunications network. Faults and their severity of electronic equipment are unpredictable and often very disruptive. To reduce corrective maintenance, proactive replacements and prudent management of vendor support dates are essential for optimum operation of the TasNetworks' telecommunications network.

8.2.4 Planned Asset Replacement versus Corrective Asset Replacement

To prevent bespoke designs and to increase operational efficiency, TasNetworks performs planned telephone and voice systems replacements at defined intervals. As telephony and voice system technology is advancing at a rapid pace, TasNetworks needs to keep up-to-date to ensure that its systems are compatible with the latest carrier telecommunications standards and systems.

Corrective asset replacements do not fit in with this philosophy as there is a very high probability that the replacement equipment may have compatibility issues with existing systems. To avoid this scenario, planned replacements are a more suitable approach.

Telephone and voice systems have been transitioning to becoming heavily IP based from traditional circuit switched and TDM networks. TasNetworks needs to actively manage this transition to maintain compliance and compatibility with other carrier grade telecommunications networks.

Telephony and voice systems, although based on international standards often have manufacturer modifications that make them proprietary and incompatible with each other with conversions required. In the future TasNetworks should consider more open systems that follow standards with minimal manufacturer modifications.

8.2.5 Non Network Solutions

There are no non-network solutions used for the management of these assets.

8.2.6 Network Augmentation Impacts

8.2.6.1 Electricity Transmission System

TasNetworks' requirements for developing the power transmission system are principally driven by five elements:

- Demand forecasts
- New customer connection requests
- New generation requests
- Network performance requirements
- National electricity rules (NER) compliance

8.2.6.2 Telephony and voice network

TasNetworks' requirements for developing telephony and voice systems assets are principally driven by the following key elements:

- Expansion of the number of operating sites such as:
  - o substations
  - o offices
  - o telecommunications sites
  - o NEM generator power stations and sites
- Network performance requirements (capacity, congestion, successful versus dropped connections); and
- NER, AEMO and ACMA compliance.

8.3 Regulatory Obligations

The National Electricity Rules (NER) outlines the requirements for voice communications at each of the network facilities.

Section 4.11 lists these requirements which include, but are not limited to, the following clauses:

4.11.3 Power system voice/data operational communication facilities

(c) Each Registered Participant must provide, for each nominated person, two independent telephone communication systems fully compatible with the equipment installed at the appropriate control centre nominated by AEMO.

Note

This clause is classified as a civil penalty provision under the National Electricity (South Australia) Regulations. (See clause 6(1) and Schedule 1 of the National Electricity (South Australia) Regulations.)

(d) Each Registered Participant must maintain both telephone communication systems in good repair and must investigate faults within 4 hours, or as otherwise agreed with AEMO, of a fault being identified and must repair or procure the repair of faults promptly.

4.11.4 Records of power system operational communication

(a) AEMO and the System Operators must record each telephone operational communication in the form of log book entries or by another auditable method which provides a permanent record as soon as practicable after making or receiving the operational communication.

Note

This clause is classified as a civil penalty provision under the National Electricity (South Australia) Regulations. (See clause 6(1) and Schedule 1 of the National Electricity (South Australia) Regulations.)

(b) Records of operational communications must include the time and content of each communication and must identify the parties to each communication.

Note

This clause is classified as a civil penalty provision under the National Electricity (South Australia) Regulations. (See clause 6(1) and Schedule 1 of the National Electricity (South Australia) Regulations.)

(c) Voice recordings of telephone operational communications may be undertaken by AEMO and the System Operators. AEMO and the System Operators must ensure that, when a telephone conversation is being recorded under this clause, the persons having the conversation receive an audible indication that the conversation is being recorded. Voice recordings may be used as an alternative to written logs.

(d) AEMO and the System Operators must retain all operational communications records including voice recordings for a minimum of 7 years.

The prescribed TasNetworks' Telecommunications Voice Systems must comply with these requirements to participate in the National Electricity Market. In order to maintain compliance with the NER, the telecommunications voice/telephony assets must remain under vendor support to maintain a reliable system in good repair.

8.4   Program Delivery

The needs assessment and options analysis for undertaking an asset management activity is documented in the Investment Evaluation Summary for that activity.

The delivery of these activities follows TasNetworks' end to end (E2E) works delivery process.

8.5   Disposal Plan

Replaced or removed equipment is decommissioned and removed from sites as part of the capital replacement projects. Assets required for the business are retained for system spares, whilst all other equipment is offered to educational institutions and other relevant bodies for training purposes. Equipment that is no longer wanted or required by the business will be disposed of appropriately.

8.6 Capital programs and projects

8.6.1 Replacements and upgrades

8.6.1.1 R19 01463 Telecommunications Voice Systems/Telephony Planned Replacement/Upgrade Program

This program of work is for the replacements and upgrades of telephony equipment used in the TasNetworks' transmission network. This program of work is for the upgrades and replacements of the following telephony and voice systems:

- Control room telephone system upgrades;
- Telephony system applications upgrades;
- TDM/Hybrid TDM/VoIP telephone system software upgrades;
- Keyphone system replacements; and
- Trunked Mobile Radio handset replacements.

The Trunked Mobile Radio system replacements are dependent on when the Tasmanian Government commissions the replacement radio network. This has been estimated to be in the 2019-2024 regulatory period.

8.6.1.2 R19 00876 Telecommunications Telephony and Voice Systems – Distribution

This program of work is for the replacement of the electricity distribution zone substation telephony systems and for the integration into the newly formed TasNetworks' business with TasNetworks' standard telephone system designs and equipment.

This is to ensure that the previous distribution telephone system interfaces with the new TasNetworks' telephone and voice networks and numbering schemes.

8.7 Operational programs and projects

8.7.1 Preventative Maintenance Operational Programs

8.7.1.1 R19 01885 Telecommunications Voice Systems and Telephony - Telephone Systems Preventative OPEX Program

This program of work focuses on the preventative/routine maintenance of the telephony and voice system assets. This program includes the 6 monthly, and 2 yearly routines as well as other day-to-day operations of the telephony and voice systems.

This program excludes the Mobile Radio assets.

8.7.1.2 R19 02261 Telecommunications Voice Systems and Telephony - Voice Systems Mobile Radios Preventative OPEX Program

This program of work focuses on the preventative/routine maintenance of the mobile radio assets. This program includes the 6 monthly, and 2 yearly routines as well as other day-to-day operations of the mobile radio assets.

This program excludes the telephony assets.

8.7.2 Corrective Maintenance Operational Programs

8.7.2.1 R19 02262 Telecommunications Voice Systems and Telephony - Telephone Systems Corrective OPEX Program

This program of work focuses on the corrective maintenance and repairs of the telephony and voice system assets. This includes fault response and correction of telephone and voice system faults.

This program excludes the Mobile Radio assets.

8.7.2.2 R19 01921 Telecommunications Voice Systems and Telephony - Voice Systems Mobile Radios Corrective OPEX Program

This program of work focuses on the corrective maintenance and repairs mobile radio system assets. This includes fault response and correction of mobile radio asset faults.

This program excludes the telephony assets.

9   Summary of programs

An overall view of the programs of work described in this asset management plan, including volumes and financial information, is located in the following document:

Telecommunications Telephony and Voice Systems Asset Management Plan Program Summary, Record Number: R0000862509, http://reclink/R0000862509

10   Related Standards and Documentation

The following documents have been used to either in the development of this management plan, or provide supporting information to it:

1. Australian Energy Market Commission, National Electricity Rules (Current Rules), http://www.aemc.gov.au/Energy-Rules/National-electricity-rules/Current-Rules

2. Australian Energy Market Operator, AEMO - Final Determination - Standard for Power System Data Communications Version 1.2, https://www.aemo.com.au/-/media/Files/Electricity/NEM/Network_Connections/Transmission-and-Distribution/AEMO-Standard-for-Power-System-Data-Communications.pdf

3. TasNetworks Corporate Plan - Planning period: 2017-18 to 2021-22, R0000745475, http://reclink/R0000745475

4. TasNetworks Strategy on a page 2017-18, R0000764312, http://reclink/R0000764312

5. TasNetworks Business Plan 2017-18, R0000779008, http://reclink/R0000779008

6. TasNetworks Roadmap – 2025, https://www.tasnetworks.com.au/customer-engagement/submissions/

7. TasNetworks Zero Harm Policy, https://www.tasnetworks.com.au/about-us/policies/zero-harm/

8. TasNetworks Risk Management Framework, R0000238142, http://reclink/R0000238142

9. TasNetworks Telecommunications CAPEX/OPEX Budget Long Term, R0000768704, http://reclink/R0000768704

10. TasNetworks, Telecommunications Telephony and Voice Systems Asset Management Plan Program Summary, Record Number: R0000862509, http://reclink/R0000862509

11. Transend Networks, Telecommunications Operational Voice Policy TNM-PY-809-0453, Issue 1.0, 01/10/2006, Record Number: D11/110659, http://viewdoc/D11/110659

12. International Telecommunications Union (ITU), Telecommunication Standardization Sector of ITU (ITU-T), H.323 : Packet-based multimedia communications systems, 14/12/2009, https://www.itu.int/rec/T-REC-H.323-200912-I/en

13. International Standards Organisation/International Electrotechnical Commission, ISO/IEC 10040:1998 Information technology -- Open Systems Interconnection -- System Management Overview, https://www.iso.org/standard/24406.html