



Asset Management Plan

Transmission Line Easements

Record Number: R32687

Version Number: 4

Date: October 2017

Authorisations

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Review cycle	2.5 Years	

Responsibilities

This document is the responsibility of the Strategic Asset Management 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 Asset Strategies Team 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
Whole document	Reformatted to TasNetworks template. Vegetation management removed from this document as covered in the VAMP

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1 Purpose

The purpose of this document is to describe Transmission Line Easements 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

2 Scope

This document covers all TasNetworks transmission line easements security systems and access tracks associated with transmission line easements.

Vegetation management is excluded from this asset management plan and covered in the Vegetation Asset Management Plan (VAMP) R282674.

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 transmission line easements, with the aim of achieving these 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

4 Asset Information Systems

4.1 Systems

TasNetworks maintains an Asset Management Information System (AMIS) that contains detailed information relating to easements.

It is a tool that interlinks asset management processes through the entire asset lifecycle and provides a robust platform for extraction of relevant asset information.

The following AMIS standard provides additional information relevant to transmission line easement:

- R17068 WASP Asset Register – Data Integrity Standard – Property

TasNetworks' Geographic Information System (GIS) also captures asset data associated with transmission lines. This data is stored in a standalone database with links into WASP.

TasNetworks is currently undertaking a change in asset management systems from WASP to SAP. This will see data stored in WASP moved to SAP in 2018.

5 Description of the Assets

A transmission line easement is a legal right-of-way providing TasNetworks with the right to perform controlled activities (such as construction, operations and maintenance) on land associated with transmission lines.

Transmission line easements are generally 50 m wide (for 110 kV circuits) or 60 m wide (for 220 kV circuits), centred around the transmission line support structure.

The terrain and vegetation located on and around easements varies considerably depending on the geographic location of the transmission line, and is a significant factor in determining the asset management strategies utilised by TasNetworks.

5.1 Easement asset types

TasNetworks assets or assets for which TasNetworks has an obligation to manage, covered by this asset management plan include:

- Transmission line easements for;
 - i. Overhead lines; and
 - ii. Underground cables.
- Easements database;
- Access tracks to, and along easements, including TasNetworks owned structures such as bridges and culverts; and,
- Access track security systems.

5.1.1 Easements

TasNetworks has defined rights over land on which transmission line infrastructure has been constructed, or in some cases, is proposed for installation. These easements establish the legal right for TasNetworks to construct, maintain, develop, access and remove its transmission lines and associated infrastructure necessary for the transmission of electrical energy. The ownership of the land on which easements are located remains with the property owner.

Easements for TasNetworks' transmission lines are secured by one of the following forms of tenure:

- By 'agreement' with the landowner;
- Statutory easement created under Section 11 of the Electricity Wayleaves and Easement Act 2000; or
- Registered on title.

Approximately 60 per cent of the easements associated with TasNetworks' transmission network are by agreement and 40 per cent by statutory easement or registered on title (in route kilometre terms). By-agreement easements include those for which an agreement document exists, those created through land subdivision, and those compulsorily acquired. Approximately 5 per cent of the by-agreement easements are fully registered on title.

Easements are required by TasNetworks for a number of reasons including the following:

- To facilitate the construction of new transmission lines;
- To facilitate the maintenance of existing transmission lines;
- To facilitate prompt response to fault outages or other emergency conditions; and
- To provide TasNetworks with the authority to manage vegetation to:

- i. prevent fault outages due to vegetation contacting energised conductors or damaging transmission line asset;
- ii. mitigate the risk of bushfire ignition in the unlikely event of an asset failure; and
- iii. mitigate the impact of a bushfire on the condition of transmission line assets.

TasNetworks also owns a small number of 110 kV underground cables which also require an easement to facilitate installation, inspections and maintenance, and fault response activities. The easement width will typically be 10m wide for 110 kV cables.

In addition to the requirements of easement listed above, for underground cables there is a need for:

- Access to screen link boxes; and
- Access for fault investigation / repairs.

5.1.2 Easements database

All of TasNetworks' easement agreements are recorded within SNWEBMAP as scanned images of the original documents.

Currently very few easements that are on title or are covered by statutory rights are displayed in SNWEBMAP.

All property owner information is stored within WASP and can be accessed from WASP directly or from SNWEBMAP via WASP. For confirmation of property owner data TasNetworks utilises the Department of Primary Industries, Parks, Water and Environment website 'theList'.

Property owner reports are available from within TasNetworks' report manager to facilitate easement management. Underground cable details as well as being recorded within SNWEBMAP are also shared with the "Dial before you dig" company. This is an important consideration as the need for publicly available information on the location of our cables is needed to ensure excavation works do not encroach or disturb our buried assets.

5.1.3 Access tracks

Access tracks are required by TasNetworks to facilitate the movement of vehicles and other resources for the purpose of construction, maintenance and other operational activities associated with the transmission network.

It is estimated that TasNetworks manages approximately 3000 km of access tracks across the state.

Where possible, access tracks have been constructed within the transmission line easement and are located as near as possible to the alignment of the transmission line it services. However, variations in the local terrain may preclude some tracks from being located in close proximity to the transmission line resulting in the requirement to provide access from public or private roads.

TasNetworks' access tracks are similar to typical logging tracks in that they are not designed to the same standards that apply to public roads. TasNetworks normally restores access tracks to Class 4 (as defined within the Tasmanian Forestry Practices Code 2000), however in some locations this may be too onerous and unnecessary given the local land use, terrain, soil type and forecast degradation rate. In these cases TasNetworks will restore the access track to a lesser, but more appropriate level of quality (all-weather 4WD), at lower cost.

Access tracks must be maintained in a 'serviceable' condition so as to allow maintenance vehicles to access the transmission line assets at times of emergency. By the very nature of emergencies it is not possible to plan these times, so serviceability of the tracks is based on accessibility at any time. For those tracks not owned by TasNetworks, TasNetworks will normally fund any necessary upgrades for the purposes of easement access. While TasNetworks does attempt to share costs wherever possible, particularly with larger landowners such as Forestry Tasmania and mining companies, most landowners do not benefit significantly from these upgrades.

Vehicular access varies significantly. This determines which maintenance vehicles/cranes can be utilised. There are frequent seasonal access restrictions in some areas due to snow, flooding and wildlife protection requirements. Sinkholes forming on/near tracks, bushfires and land slides also present additional access restriction risks.

Access track maintenance consists of:

- Sensitively trimming embankments and verges of undergrowth;
- Clearing debris and fallen trees from the tracks;
- Maintaining the access track surface in a serviceable condition; and
- Effective drainage management.

5.1.4 Access track structures

Maintaining the serviceability of access tracks requires attention to watercourse crossings and drainage infrastructure. Very few bridges are utilised, however culverts of varying construction are common.

TasNetworks is currently assessing the most effective way of capturing and recording this information.

5.1.5 Access track security systems

TasNetworks has implemented an access security system to provide controlled authorised access for TasNetworks and its contractors across TasNetworks' network of access tracks, and the public and private property on which it is located.

The access security system includes access track gates, locking systems (padlocks and keys) and databases for the registration and tracking of locks and keys. This access security system limits unauthorised access across TasNetworks' network of access tracks, managing safety, reducing track degradation and helping to minimise maintenance requirements and associated costs. This access security system also assists considerably in maintaining good relations with landowners.

A summary of locks in use on TasNetworks' transmission line easement assets is provided in Table 1.

Table 1 Locking system summary

Asset	Lock type	Approximate number in service
Access gates	Lockwood	650
	ABUS	650
Tower barriers and weather stations	Lockwood	3,000
	Total	4,300

5.2 Age profile

5.2.1 Easements

Over time, due to the construction of new transmission lines, TasNetworks has slowly increased the area of land covered by easements. The age of an easement has no bearing on the management strategies utilised in managing the easement. Instead, the management strategies are generally dependent on the terrain type, location, environmental influences and other characteristics of the easement.

5.2.2 Access track structures

TasNetworks does not currently record the age of its access track structures such as bridges and culverts.

TasNetworks is currently assessing the most effective way of capturing and recording this information.

5.2.3 Access track security systems

TasNetworks' Lockwood locks were installed in 1998.

TasNetworks' ABUS locks have been installed since 2003.

Asset management issues resulting from the age of these assets are discussed, and addressed, in section 5.1.5.

5.3 Capacity

5.3.1 Easements

Experience indicates existing transmission line easements are satisfactory to meet most renewal and augmentation requirements of the transmission network. Transmission network capacity increases can be accommodated in the first instance by increasing circuit numbers on existing towers or by increasing load carrying capacity in existing conductors. In some instances, older and lower capacity infrastructure (eg 88 kV towers and conductors) have been replaced with newer 110 kV or 220 kV equipment without requiring significant easement expansion. Where new substations or new load centres are incorporated, new easements may be required.

TasNetworks' current standard easement widths of:

- 50m for 110 kV overhead transmission lines;
- 60m for 220 kV overhead transmission lines; and
- 10m wide for 110 kV underground cables

continue to remain adequate in ensuring that TasNetworks is able to manage the risks and operational requirements highlighted within this asset management plan.

5.3.2 Access tracks and structures

The types of vehicles requiring access to TasNetworks' easements are normally dependent on the type of work being performed within the easement and Occupational Health & Safety requirements of service provider organisations. The use of cranes and other heavy vehicles is becoming more prevalent, both to reduce outage durations and to address the increasing Occupational Health & Safety requirements for working at heights. These requirements are

creating a need to improve the accessibility arrangements. In this regard, the load carrying capacity of tracks and structures may need to be progressively enhanced and capital works funding allocated as appropriate.

5.4 Condition summary

5.4.1 Access tracks and structures

Access track condition degrades over time due to weathering, erosion and utilisation, with tracks eventually becoming impassable and unsafe. Maintenance and emergency response activities become dangerous, resulting in increased fault response times and risking further damage to already deteriorated access tracks.

The most significant and rapid deterioration in access track condition is normally observed during Winter, however this can occur at any time of the year during rain, wind and/or snow storms. A defect priority standard for access tracks are currently being formalised, in line with the Transmission Line Easement Vegetation Prioritisation standard. This standard has been developed by TasNetworks' Asset Officers.

Remediation activities normally consist of resurfacing, construction of culverts and drains, bridge repairs, and procurement and installation of new gravel or stone. These activities would normally be undertaken for significant portions of a particular access track, as opposed to minor maintenance which may be undertaken at specific locations and funded under TasNetworks' operational budget.

TasNetworks' ongoing routine inspection regime and other planned operational and emergency response activities identifies that approximately 20 km of access tracks are in substandard condition and require renewal on an annual basis.

5.4.2 Easements database

The management of the easement database and population of easement data (both new and historical) is an ongoing task. There are currently over 3,000 property owner contact details recorded within WASP. TasNetworks will continue to identify and implement information management improvements to increase the accuracy and availability of property and land owner data, including linkages between WASP and the Tasmanian Government land registry database 'theList'.

5.5 Asset Issues

5.5.1 Access track utilisation and service requirements

Access to easements and associated transmission infrastructure is integral to the provision of a reliable electricity supply and imperative for the safety of TasNetworks' employees and service contractors. Access tracks are intended to provide for all-weather access to a majority of line structures for day-to-day and emergency operation and maintenance of transmission line infrastructure. The access tracks pass through a variety of topographic, geologic, vegetation and climatic zones.

Most track locations and alignments were established at the time of transmission line construction. While these were intended to be adequate for all-weather access, the standard of access varies significantly. Provision of suitable and adequate track drainage, culverts, bridges etc.

minimises track deterioration and environmental degradation while also striking a balance between the cost and benefit of maintenance effort.

Use of larger all terrain cranes and elevated platform vehicles, due to the changing nature of tower types and Occupational Health & Safety requirements, may require tracks to be upgraded and maintained to higher standards in the future.

5.5.2 Transmission line security

In 1998, at the time of disaggregation, TasNetworks replaced all old locks with new Lockwood locks on all its access gates and on those tower barriers where a barrier gate had been installed. These locks comprise a brass body and nickel plated steel shackle. These dissimilar metals have caused corrosion problems in some locations, preventing correct operation of the lock. In these locations TasNetworks has had to replace locks within only a few years of installation.

All new locks installed by TasNetworks since 2003 are of the ABUS type, comprising a nickel plated steel body and an alloy steel shackle (access gates), or a brass body and brass shackle (tower barriers), both of which provide significantly longer life than the Lockwood locks. The ABUS locks utilise a tumbler cylinder that can be replaced on expiration of the lock patent, without the need to replace the whole lock (unlike the old Lockwood locks).

TasNetworks lock patents apply for between 10 and 15 years, after which any member of the public can obtain a copy of a TasNetworks padlock key (if they have come into possession of an original TasNetworks key). The patent associated with locks installed between 1998 and 2005 has expired and these locks were replaced. In the case of Lockwood locks, the replacement was with a new ABUS lock. In the case of ABUS locks, the replacement comprised of a changeover of the tumbler cylinder. This replacement is currently underway in the 2014-19 regulatory control period.

Over time, as a result of insufficient rigour and consistency in monitoring and recording changes in lock utilisation across the network, the accuracy of access gate information recorded in TasNetworks access security database has deteriorated. While this has not significantly exposed TasNetworks to an increased risk of unauthorised access, it has prevented TasNetworks from ensuring its population of locks is managed in the most effective way possible. As part of its future security system upgrade project TasNetworks will establish and maintain a new database for the storage of this information.

5.5.3 Access track navigation

As transmission line access tracks don't follow roads and are not normally marked on publicly available maps, staff and service providers can find it difficult to locate the correct access track that will provide access to the asset of concern.

TasNetworks installs signposting to assist personnel in locating and navigating access tracks. TasNetworks has also recently completed registration of access track locations within GIS. This information is utilised by field crews for fault response and other maintenance activities.

5.5.4 Narrow easements

Most of TasNetworks easements are at least 50m or 60m wide, however for a number of historic reasons there are some locations where a narrower easement exists. In most of these cases the easement is still wide enough to provide TasNetworks with adequate transmission line access and to reduce the risk exposure due to vegetation or infrastructure adjacent to the easement. However, there are a small number of transmission lines where the associated easement is unacceptably narrow, exposing TasNetworks to an undesirable level of risk.

These locations, and the corresponding affected transmission line length, are known to exist at:

- Hadspen–Norwood 110 kV transmission line – 500m;
- Chapel Street–Creek Road–Risdon 110 kV transmission line – 500m.

To date it has been TasNetworks strategy to deal with the issues arising from these narrow easements on a case-by-case basis. This strategy has involved TasNetworks enforcing the existing easement terms within the narrow corridor, and recommending that developers and landowners not build within a wider safety clearance width.

This approach is becoming increasingly problematic for the following reasons;

- Real estate prices are growing disproportionately to the CPI, making ‘case by case’ easement purchase increasingly expensive;
- In urban areas particularly, there is active development of land adjacent to powerlines as ‘in-fill’ housing. At present there is no mechanism for enforcing measures against inappropriate development in areas outside of our narrow easements. This means that TasNetworks has to negotiate voluntary modifications to developments where we have safety concerns. Voluntary changes to designs are becoming increasingly unlikely as the land increases in value;
- Current wayleave search processes do not identify our safety concerns with these narrow easements to potential land purchasers/developers and we have less opportunity for early intervention to negotiate voluntary changes to designs;
- The lack of an adequate, legally enforceable, easement right constrains the power of councils to refuse inappropriate developments on TasNetworks behalf;
- Opportunities to acquire a more appropriate easement are diminishing as vacant land is progressively earmarked for further development. As soon as a landowner takes active steps to prepare land for development (eg. applies to have it rezoned), TasNetworks must pay compensation for any acquired easements; and
- If TasNetworks is proposing to inhibit development in these high-value urban areas, there is a community expectation that TasNetworks will compensate landowners for this lost opportunity (i.e. the community expects TasNetworks to purchase an appropriate easement at a fair price).

TasNetworks has explored a number of options to resolve this issue, with the preferred solution being to acquire additional easement at the identified locations.

It should be noted that other narrow easements do exist elsewhere in the network; however the risk at these locations has been deemed to be sufficiently low to not require any remedial action.

5.5.5 Easement enquiries

Every year TasNetworks receives numerous enquiries regarding its easements. The most common enquiries consist of:

- Requests for general information regarding TasNetworks’ easement and associated assets, including permitted and restricted activities;
- Requests to alter easement widths;
- Requests for comment regarding proposed construction activities, generally emanating from government agencies, that may or may not impact on TasNetworks’ easement and associated assets; and
- Enquiries regarding electric and magnetic fields (EMFs).

To assist TasNetworks in responding to these enquiries, in a consistent and effective manner, the 'Management of easement enquiries' guideline was created. This document identifies the key stakeholders and their respective roles within the transmission easement enquiry management process. It also defines the manner in which TasNetworks maintains records of its internal and external stakeholder communications.

6 Standard of Service

6.1 Technical Standards

Technical requirements and legislation applying to easements are detailed in the following documents:

- Environmental Management and Pollution Control Act 1994;
- Threatened Species Protection Act 1995;
- National Parks and Wildlife Act 1970;
- Aboriginal Relics Act 1975;
- Historic Cultural Heritage Act 1995;
- Forest Practices Act 1985;
- Water Management Act 1999;
- Weed Management Act 1999;
- TasNetworks Environment Management System (EMS)
- D10/44728 - Transmission Lines Environmental Work Methods
- D11/33095 - Management of Aboriginal Archaeology
- D11/45100 - Management of Easement Enquiries Guideline

6.2 Service obligations for network assets

Transmission line easement condition impacts directly on TasNetworks overall network service obligations, which include specific performance requirements for transmission assets. TasNetworks is committed to providing high levels of transmission system service to meet all agreed legal, regulatory and customer obligations.

TasNetworks performance incentive (PI) scheme, which has been produced in accordance with the Australian Energy Regulator's (AER's) Service Standards Guideline, is based on plant and supply availability. The PI scheme includes the following specific measures:

- plant availability:
- transmission line (critical and non-critical) circuit availability; and
- transformer circuit availability,
- supply availability:
- number of events in which loss of supply exceeds 0.1 system minutes; and
- number of events in which loss of supply exceeds 1.0 system minutes.

Details of the PI scheme and performance targets can be found in TasNetworks TSMP.

Easement condition substantially contributes to achievement of TasNetworks performance outcomes. In particular, poor easement condition may result in TasNetworks failing to respond rapidly enough to fault events on the transmission network, resulting in loss of supply events of a greater magnitude that would otherwise be necessary.

In this regard, the policies that guide easement management include:

- setting a high performance target for 'within easement' vegetation fault outages. The target for this measure is zero faults, as it is TasNetworks view that all vegetation fault outages within the easement are preventable;
- setting a less onerous target for 'out-of-easement' vegetation fault outages. The target for this measure is no more than two per year, whilst recognising that at all times TasNetworks has no direct control over vegetation management outside of its easements. TasNetworks must work with landowners, government and other stakeholders to achieve this outcome; and
- ensuring that access tracks are maintained to a standard that facilitates prompt and effective response to system fault events.

TasNetworks is also committed to providing high levels of transmission system service and meeting legal, regulatory and customer contractual service agreements.

7 Associated Risk

TasNetworks has adopted the risk management principles detailed in Australian Standard AS/NZS ISO 31000:2009 'Risk management – principles and guidelines' in managing risks associated with its easements. The primary goals of the risk management strategy are to:

- ensure the safety of personnel and the public as far as practicable;
- reduce the risk of a fire start to an acceptable level; and
- manage the impact of easement condition on transmission system performance.

7.1 Risk Management Framework

Easements are strategic assets which are integral to the construction, operation, maintenance and performance of the transmission system. Deterioration in easement condition would place undue constraints on construction and maintenance activities, prevent effective fault response, and would increase safety and environmental risks.

TasNetworks has developed a Risk Management Framework for the purposes of

- Demonstrating the commitment and approach to the management of risk – how it is integrated with existing business practices and processes and ensure risk management is not viewed or practiced as an isolated activity;
- Setting a consistent and structured approach for the management of all types of risk; and
- Providing an overview on how to apply the risk management process.

Assessment of the risks associated with the transmission line support structure foundations has been undertaken in accordance with the Risk Management Framework. The risk assessment involves:

- Identification of the individual risks including how and when they might occur
- Risk analysis of the effectiveness of the existing controls, the potential consequences from the risk event and the likelihood of these consequences occurring to arrive at the overall level of risk.
- Risk evaluation where risks are prioritised based on their ratings and whether the risk can be treated) or managed at the current level.

The likelihood and consequence of risk events occurred are assessed using the following risk rating matrix in Figure 1.

Figure 1 Risk Ranking Matrix

		CONSEQUENCE				
LIKELIHOOD		1 NEGLIGIBLE	2 MINOR	3 MODERATE	4 MAJOR	5 SEVERE
<ul style="list-style-type: none"> • $\geq 99\%$ probability • Impact occurring now • Could occur within “days to weeks” 	5 ALMOST CERTAIN	MEDIUM	MEDIUM	HIGH	VERY HIGH	VERY HIGH
<ul style="list-style-type: none"> • 50% - 98% probability • Balance of probability will occur • Could occur within “weeks to months” 	4 LIKELY	LOW	MEDIUM	HIGH	HIGH	VERY HIGH
<ul style="list-style-type: none"> • 20% - 49% probability • May occur shortly but a distinct probability it won’t • Could occur within “months to years” 	3 POSSIBLE	LOW	LOW	MEDIUM	HIGH	HIGH
<ul style="list-style-type: none"> • 1% - 19% probability • May occur but not anticipated • Could occur in “years to decades” 	2 UNLIKELY	LOW	LOW	MEDIUM	MEDIUM	HIGH
<ul style="list-style-type: none"> • $\leq 1\%$ probability • Occurrence requires exceptional circumstances • Only occur as a “100 year event” 	1 RARE	LOW	LOW	LOW	MEDIUM	MEDIUM

The Risk Management Framework requires that each risk event is assessed against all of the following consequence categories:

- Safety and People
- Financial
- Customer
- Regulatory Compliance
- Network Performance
- Reputation
- Environment and Community

This asset management plan describes the major risks associated with transmission line insulator assemblies and the current or proposed treatment plans.

7.2 Risk identification

The following areas have been identified as risk areas in the management of easements and are discussed below and summarised in Table 2:

7.2.1 Poorly maintained access to transmission assets

Access tracks, by nature of their rudimentary construction and exposure to the elements, can quickly deteriorate and not fulfil their required function. Failure to maintain access tracks will lead to longer response times to transmission line faults and failures and increases the risk of vehicle related incidents accessing transmission line assets.

7.2.2 Inaccuracies within landowner contact base

Missing or inaccurate landowner information creates delays for planned and unplanned maintenance.

7.2.3 Inspection methods and frequency

Lack of diversity in inspection methods and/or overreliance on an inspection method increases the risk of easement defects being missed or incorrectly identified. Any inspection regime also requires a back-up and audit arrangement so that reliance on only one approach is avoided. Combining aerial and ground based assessments in an operational cycle can mitigate the risk of unidentified defects.

7.2.4 Encroachments

Encroachments in transmission line easements can impact on TasNetworks ability to safely operate the network, respond to faults, comply with clearances and present a risk to employees and the public. Unauthorised encroachments need to be addressed in a consistent and timely manner as part of risk mitigation. Encroachments may come in the form of structures or items under overhead transmission lines or unauthorised digging in the vicinity of underground transmission cables. HV induction from placement of fences and long irrigators also present a significant risk to the public in easements.

7.3 Risk analysis

These risks have been analysed using TasNetworks' asset risk methodology and have all been assessed to be high risk situations as shown in Table 2.

Any other access related issues that have been identified in the normal course of business have been assessed to be of a lower risk and are deemed manageable under the routine inspection and condition assessment regime currently in place. If these issues emerge as a higher risk they will be addressed specifically and strategies formulated will be incorporated into future revisions of this asset management plan.

7.4 Mitigating strategies

Risk mitigation takes the form of identifiable actions in the form of operations and maintenance or capital expenditure which seek to either manage or remove the risk.

The assumption is that if the mitigation action is taken, the likelihood of the risk occurring is reduced to a lower risk profile. Table 2 contains the mitigation actions.

7.5 Monitoring and review

The management strategies adopted to mitigate the risks associated with transmission line easements are monitored on an ongoing basis to ensure that they are effective and relevant to achieving TasNetworks' risk management objectives.

Risk assessment is reviewed and where the risk level has been evaluated to have changed, a review based on a monitoring and evaluation program may initiate changes to the asset management plan strategies.

7.6 Summary of Risk

Table 2 Risk issues related to transmission line easement management

RISK IDENTIFICATION		RISK ANALYSIS				RISK MITIGATION	
Risk	Detailed Risk	Category	Likelihood	Consequence	Risk Rank	Mitigating Action(s)	Residual Risk Rating
Poorly maintained access to transmission assets	Failure to maintain access tracks to safe standards results in vehicle accident and significant injury/death to staff/contractors.	Safety and People	Rare	Severe	Medium	<p>Maintain minimum of four wheel drive access (Grade 4) where appropriate.</p> <p>Track remedial works of access track defects to ensure high priority work is completed in the required timeframe.</p>	Medium
	Failure to maintain access tracks results in inability to reach transmission line assets under fault scenarios, increased fault durations, network constraints and interruptions to customers.	Customer	Unlikely	Minor	Low		Low
		Financial	Unlikely	Minor	Low		Low
		Regulatory Compliance	Unlikely	Minor	Low		Low
		Network Performance	Unlikely	Moderate	Medium		Medium
		Reputation	Unlikely	Minor	Low		Low
	Failure to maintain access track drainage results erosion damage and negative impact of threatened species in World Heritage Area.	Environment & Community	Rare	Minor	Low		Low
Inaccuracies within landowner contact base	Missing or inaccurate landowner information results in poor relationships with landowners and difficulty accessing assets for planned and unplanned maintenance.	Reputation	Possible	Moderate	Medium	Ensure property records are up to date and records of “difficult” landowners are easily accessible. Continue programs for stakeholder right of way (ROW) management.	Low
		Financial	Possible	Negligible	Low	<p>Ensure property contact procedures are followed and reviewed all staff and contractors are appropriately trained in dealing with landowners.</p> <p>Where conflict is identified ensure business procedures for resolution are followed to minimise/prevent escalation</p>	Low
Inspection methods and frequency	<p>Infrequent assessment of asset tracks results in tracks not fit for purpose through degradation and inability to access transmission assets safely and in a timely manner.</p> <p>Over reliance on one inspection method results in defects being missed in the inspection cycle and tracks not fit for purpose safe to use or creating environmental damage in culturally significant areas.</p>	Safety and People	Rare	Severe	Medium	<p>Ensure access tracks and easements are assessed and defects reported as part of:</p> <ul style="list-style-type: none"> 3 yearly detailed assessment of transmission overhead transmission assets (aerial for 97% and ground based for 3% which can't be flown); Annual aerial inspection for vegetation; and Annual vegetation management works within the easement. 	Medium
		Customer	Unlikely	Minor	Low		Low
		Financial	Unlikely	Minor	Low		Low
		Regulatory Compliance	Unlikely	Minor	Low		Low
		Network Performance	Unlikely	Moderate	Medium		Medium
		Reputation	Unlikely	Minor	Low		Low
		Environment & Community	Rare	Minor	Low		Low

RISK IDENTIFICATION		RISK ANALYSIS				RISK MITIGATION	
Risk	Detailed Risk	Category	Likelihood	Consequence	Risk Rank	Mitigating Action(s)	Residual Risk Rating
Encroachments	Unauthorised digging in the vicinity of cables results in cable fault, outage and/or injury or death.	Safety and People	Rare	Severe	Medium	Ensure unauthorised encroachments in easements are identified in inspections and appropriate actions are completed in the specified timeframes.	Medium
		Customer	Unlikely	Minor	Low		Low
	Unauthorised structure in the transmission easement results in transmission line fault, outage and/or injury or death.	Financial	Unlikely	Minor	Low		Ensure “dial before your dig” database is kept updated.
		Regulatory Compliance	Unlikely	Minor	Low	Low	
	Integrity of cable or tracks compromised during authorised work (i.e. gas/water pipes) in easements and/or easement is not re-constructed back to original compromising load capacity	Network Performance	Unlikely	Moderate	Medium	Ensure local marker signs are in-place and legible.	Medium
		Reputation	Unlikely	Minor	Low		Low
	HV induction from moving irrigators or fences results in a serious injury or death.	Environment & Community	Rare	Severe	Medium	Ensure clear information exchanged with developers and inspections are undertaken to ensure compliance with development requirements	Low
							Medium

8 Demand analysis

8.1 Planned augmentations

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

- load forecasts;
- new customer connections;
- new generation projects;
- network performance obligations defined in Electrical Supply Industry (ESI) regulations; and
- NER compliance.

Details of planned network augmentation works can be found in TasNetworks' Regional Development Plans and Annual Planning Report, which are updated on an annual basis.

8.2 Asset specific implications

Proposed network augmentation projects identified in the Area Development Plans and Annual Planning Report will have a minimal impact on the transmission line support structures from an asset management perspective.

In addition to internal requirements, TasNetworks is under increasing pressure to permit shared use of its easements, including longitudinal developments such as the installation of gas, water and telecommunications infrastructure within transmission line easements. TasNetworks continues to work with government and private agencies in resolving these access issues on an ongoing basis. At no time will TasNetworks permit these activities to increase the risk to safety or performance to an unacceptable level.

9 Life-cycle Management Plan

Table 3 summarises life cycle management issues pertaining to transmission line easements.

Table 3 Life cycle issues

Asset	Issue
Access tracks and structures	Access track and structure deterioration will occur as a result of environmental conditions (eg. storms) and track utilisation, particularly during wet conditions. Deterioration can occur at any time, but is more prevalent during late autumn, winter and early spring. Deterioration of structures is also dependent on increased utilisation as a result of capital works.
Security systems	Locks utilised on access gates and tower barriers are subject to deterioration due to their exposure to the environment. This is particularly prevalent on locks comprising a brass body and nickel plated steel shackle. Locks are also subject to a patent applying for between 10 and 15 years, preventing unauthorised copying of access keys. To maintain its risk exposure at an acceptable level it is necessary for TasNetworks to replace its locks, or the associated tumbler cylinder, every 10 to 15 years.

In establishing this asset management plan, the following efficiency gains have been taken into consideration:

- integration of vegetation inspections as a part of the three-yearly transmission line condition assessment inspections;
- increased frequency of aerial inspections over ground-based patrols to increase efficiency and reduce overall costs; and
- management of easement access data in a geospatial format has improved the transfer of easement access knowledge to Asset Officers.

Maintenance activities are undertaken using external contractors with some longer term contracts in place. Emergency and minor operations and maintenance tasks are undertaken through a long-term contract with a local service provider.

Major tasks are subject to a competitive tendering process. Planned aerial inspections of easements are performed using a period contract with an aerial service provider. Emergency inspections are locally sourced from helicopter companies in Tasmania.

Table 4 summarises TasNetworks' easement management strategies.

Table 4 TasNetworks easement management strategies

Strategy	Frequency	Description
Aerial vegetation inspection	Annual	Inspect all easements where access by helicopter is permitted (97 per cent) prior to the potential 'fire season'
Ground based vegetation inspection	Annual	Perform ground inspections in areas where 'no fly' zones exist (3 per cent).
'Detailed methodical' aerial inspection	3 year cycle 33% pa	TasNetworks performs an aerial 'detailed methodical' inspection of 33 per cent of all transmission line assets every year. These inspections also include an assessment of the easement.
Security systems	As required	Lock replacement is required on expiration of the lock patent.
Underground easements	Annually	Inspect for signs of unauthorised access or development along easement. Inspect local marker signs are present and legible.
Other inspections	As required	Easement defects are also noted on an 'exceptions basis' when any other work is carried out on transmissions assets eg tower inspections, lines maintenance, etc. at any time.

9.1 Action plan

Table 5 summarises the action plans utilised in the management of TasNetworks' easements. These actions detail the specific activities undertaken by TasNetworks and its service providers in managing TasNetworks' easements in a proactive, cost effective and efficient manner. Vegetation management requirements identified in the VAMPS are managed in conjunction with other easement activities identified in this asset management plan.

Table 5 TasNetworks easement action plans

Action	Description
Access track management	<ul style="list-style-type: none"> includes vegetation management, drains and culverts maintenance, track surface repair and grading, gates and security management, signage and general damage repairs. service providers attend to vegetation issues and manage other repairs and maintenance. TasNetworks Asset Officers coordinate work based on routine inspections, ad-hoc defect reports and in response to targeted improvement programs eg signage improvement, security upgrades, etc. TasNetworks Asset Officers undertake the program to map positions of access tracks using GPS/GIS technologies and initiate a system of condition assessment and reporting. the changing OH&S environment for service providers creates the need for wider use of cranes and all-purpose vehicles in the maintenance of lines. This is creating the need to improve access arrangements and improve the standard of access tracks.
Environmental management	<ul style="list-style-type: none"> TasNetworks' commitment to its environmental responsibilities is supported by a formal environmental policy as well as an environmental management

Action	Description
	<p>system (EMS) that complies with the international standard for environment management ISO 14001.</p> <ul style="list-style-type: none"> all TasNetworks staff and service providers are required to comply with the EMS, and in particular, prior to undertaking any easement vegetation clearing activity TasNetworks Asset Officers are required to complete an easement clearing environmental assessment record for each site. environmental management includes responses to sensitive areas, cultural issues (e.g. Aboriginal sites), and species management and weed control. It also includes the coordination of involvement with other stakeholders, research studies and other 'good corporate citizen' actions.
Information and data management	<ul style="list-style-type: none"> TasNetworks continues to establish and maintain a database of easement details (cadastral) and property owner contacts information. TasNetworks continues to investigate available systems and where necessary support development of specialised systems to enhance TasNetworks' application of Information Technologies e.g. GIS, GPS, data processing tools. TasNetworks continues to develop specific tools and processes that allow information to drive efficiencies in herbicide applications, access track management, field data capture and database updates, on-going information management.
Stakeholder management and community relations	<ul style="list-style-type: none"> educate property owners about suitable species of low growing vegetation that can co-exist with transmission lines and provide information to property owners on safety, legal and in general typical issues arising between TasNetworks and property owners. TasNetworks (or its service providers) is required to notify property owners of upcoming works, record outcomes of property owner negotiations, compliments and complaints and remove, if applicable, felled timber and tree stumps impacting on the customer. TasNetworks manages a number of community information and education initiatives including a presence at AGFEST and other rural exhibitions, mail outs and media articles.
Ongoing technical support and asset management	<ul style="list-style-type: none"> develop management programs that will satisfactorily deliver TasNetworks' obligations for effective easements management commensurate with the least cost to TasNetworks. audit external contractors that execute the inspection, clearing, and maintenance work associated with easement management to ensure work is completed to TasNetworks' requirements and store records of audits electronically within TasNetworks' WASP System.
Easement relinquishment	<ul style="list-style-type: none"> easement relinquishment only occurs when it is clear that there is no likelihood of further corridors in that location. These assets (either land ownership or encumbrance on the land) are valuable and expensive to replace or acquire now and will be more so in future.
Light detection and ranging program (LiDAR)	<ul style="list-style-type: none"> TasNetworks has used LiDAR to produce accurate models of the easement and transmission lines as part of a developing strategy for aerial inspection of the overhead network. These models allow TasNetworks to accurately identify under clearances and vegetation defects within easements and manage the risk associated with clearances.

9.2 Capital plan

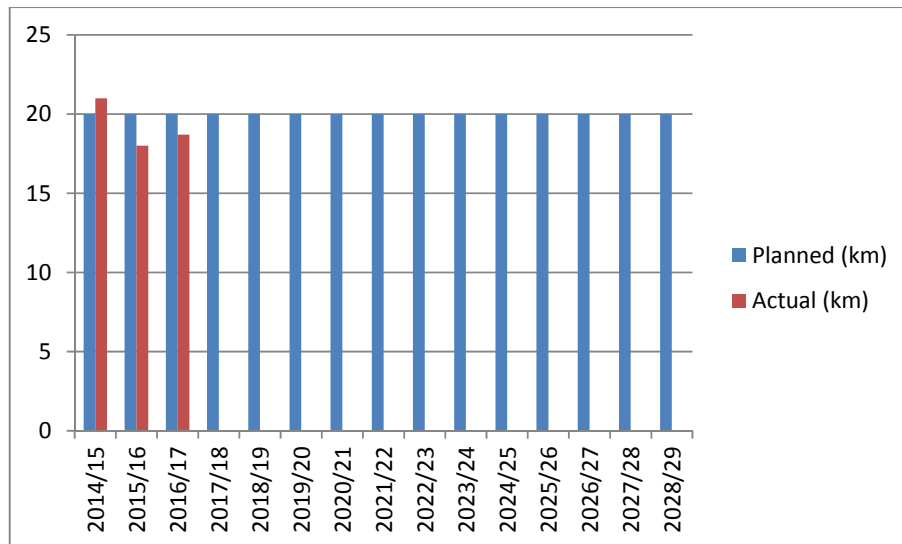
The cost of asset renewal activities meeting the capitalisation requirements outlined within TasNetworks' Asset Accounting Standard can be capitalised. These capital programs are detailed below. Asset replacement activities not meeting these requirements will be undertaken as operational expenditure.

9.2.1 Transmission line access track renewal program

Through long term condition assessment TasNetworks has identified that approximately 20 km of access tracks require renewal each year due to substandard condition. Figure The cost of asset replacement activities that meet the capitalisation requirements outlined within TasNetworks Asset Accounting Standard can be capitalised.

Asset replacement activities not meeting these requirements will be undertaken as operational expenditure.

Figure 2 – Access track renewal program (km)



10 Financial summary

Requirements for operating expenditure are a function of the defined periodic condition monitoring regimes, defined maintenance requirements and expected easement works.

The planned costs for each differing task type are derived from either unit rates from Contractors or averaged historical costs.

10.1 Capital expenditure

Transmission line easement capital works are combined with other works where possible to optimise system performance and mitigate network and business risk.

The projected capital expenditure required to implement the easements capital program is subject to change and optimisation as the integrated works plan is refined and further developed.

Each project is then subjected to a detailed investment evaluation.

10.2 Investment evaluation

For each program or project to be included within the upcoming revenue proposal, an Investment Evaluation Summary (IES) is prepared describing the condition, performance and risk issues identified within this and other asset management plans.

The IES then identifies a preferred option using cost estimates that have been developed in line with TasNetworks' estimation process. Each option is evaluated on both technical and financial merits and the preferred option is submitted for regulatory approval.

The Investment Evaluation Summaries associated with the proposed 2019–2024 capital program are located at:

- Transmission line access track renewal.