Investment Evaluation Summary (IES)

Project Details:

Project Name:	Replace low voltage CONSAC cable
Project ID:	00671
Thread:	Underground System
CAPEX/OPEX:	CAPEX
Service Classification:	Standard Control
Scope Type:	A
Work Category Code:	REUCS
Work Category Description:	Replace LV cables UG CONSAC
Preferred Option Description:	Option 1: Replacement of defective sections of CONSAC cable [Preferred Option] Replacement of defective sections of CONSAC cables with new PVC cable. Advantages: • Reduces the likelihood of electric shocks/electrocution Disadvantages: • Capital expenditure required This is the lowest cost option to reduce the business risks to manageable.
Preferred Option Estimate (Nominal Dollars):	$22,000,000

	17/18	18/19	19/20	20/21	21/22	22/23	23/24	24/25	25/26	26/27
Unit ($)	$400	$400	$400	$400	$400	$400	$400	$400	$400	$400
Volume	5,500	5,500	5,500	5,500	5,500	5,500	5,500	5,500	5,500	5,500
Estimate ($)	$2,200,000	$2,200,000	$2,200,000	$2,200,000	$2,200,000	$2,200,000	$2,200,000	$2,200,000	$2,200,000	$2,200,000
Total ($)	$2,200,000	$2,200,000	$2,200,000	$2,200,000	$2,200,000	$2,200,000	$2,200,000	$2,200,000	$2,200,000	$2,200,000

Governance:

Project Initiator:	Michael Healy	**Date:**	26/03/2015
Thread Approved:	David Ellis	**Date:**	02/11/2015
Project Approver:	David Ellis	**Date:**	02/11/2015

Document Details:

Version Number:	1

Related Documents:

Description	URL
Replace low voltage CONSAC cable - IES	http://projectzone.tnad.tasnetworks.com.au/business-projects/nis-program/DD17SAM/Deliverables/Underground%20Systems/DRAFT%20IES%20REUCS%20Low%20voltage%20CONSAC%20replacement.docx

Section 1 (Gated Investment Step 1)

1. Background

Concentric Neutral Solid Aluminium Conductor (CONSAC) cables are low voltage (LV) cables with the neutral conductor in the form of concentric aluminium sheath acting as a combined neutral and earth connection. These cables are paper insulated and covered with bitumen corrosion proof coating and PVC over sheath.

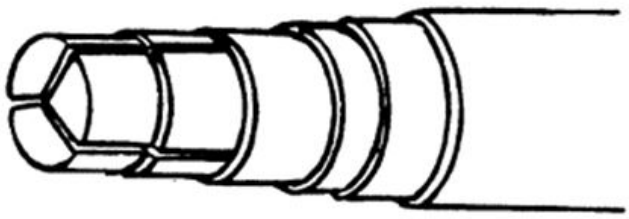

Figure 1 - CONSAC Cable internal extruded view (Guide)

The cables were installed on the distribution network in underground residential subdivisions from 1971 until 1980. Currently records indicate there are 221 km of CONSAC cable in the system.

As CONSAC cables have neutrals connected directly onto the aluminium sheath, if these are not adequately sealed to prevent moisture ingress, they oxidise. This can eventually cause an open circuited, or broken neutral which can pose a serious public safety risk due to the potential for electric shock

On the distribution network there are approximately 20 LV cable failures per year. There were 19 LV cable failures on the network in the 14/15 financial year, of which 13 where CONSAC cable. With CONSAC cable only representing approximately 15 per cent of the network, the number of failures are disproportionately high.

Figure 2 - CONSAC cable failure

The primary driver of this program is to reduce the public risk from a broken neutral that has the potential to result in an electric shock or electrocution. The secondary driver is to reduce the failure rate for these cables so that it is comparable to other cables. A reduction in the failure rate will reduce the operational expenditure associated with the repair of these cables under fault.

As the primary failure mode of CONSAC cables leads to a broken neutral, the introduction of CablePI somewhat reduces the risk associated with CONSAC cable failures.

The distribution side of the business currently has replacement program in place targeting replacement of CONSAC in areas where failures had been experienced in the past, as the failures appear to be clustered in geographical areas. It is thought that local jointing practices, soil type and other environmental conditions were contributing to the failures.

1.1 Investment Need

Replacement of low voltage CONSAC cable to reduce the likelihood of electrical shocks/electrocution occurring as a result of defect cables.

1.2 Customer Needs or Impact

TasNetworks continues to undertake consumer engagement as part of business as usual and through the voice of the customer program. This engagement seeks in depth feedback on specific issues relating to:

- How it prices impact on its services;
- Current and future consumer energy use;
- Outage experiences (frequency and duration) and expectations;
- Communication expectations;
- STPIS expectations (reliability standards and incentive payments); and
- Increasing understanding of the electricity industry and TasNetworks;

Consumers have identified safety, restoration of faults/emergencies and supply reliability as the highest performing services offered by TasNetworks.

Consumers also identified that into the future they believe that affordability, green, communicative, innovative, efficient and reliable services must be provided by TasNetworks.

This project specifically addresses the requirements of consumers in the areas of safety and affordability.

1.3 Regulatory Considerations

This project is required to achieve the following capital and operational expenditure objectives as described by the National Electricity Rules section 6.5.7(a).

(4) Maintain the safety of the distribution system through the supply of standard control services.

2. Project Objectives

The objective of this project is to continue the replacement of the low voltage CONSAC cable on the distribution network to reduce the likelihood of electrical shocks/electrocution occurring as a result of defect cables.

3. Strategic Alignment

3.1 Business Objectives

Strategic and operational performance objectives relevant to this project are derived from TasNetworks 2014 Corporate Plan, approved by the board in 2014. This project is relevant to the following areas of the corporate plan:

- We understand our customers by making them central to all we do;
- We enable our people to deliver value; and
- We care for our assets, delivering safe and reliable networks services while transforming our business.

3.2 Business Initiatives

The business initiatives that relate to this project are as follows:

- Safety of our people and the community, while reliably providing network services, is fundamental to the TasNetworks business and remains our immediate priority; and
- We care for our assets to ensure they deliver safe and reliable network services

The strategic key performance indicators that will be impacted through undertaking this project are as follows:

- Price for customers – lowest sustainable prices;
- Zero harm – significant and reportable incidents; and
- Sustainable cost reduction – efficient operating and capital expenditure

4. Current Risk Evaluation

If TasNetworks does not replace all the CONSAC on the distribution network there is a risk that a cable fault could result in death or serious injury to a member of the public or customer.

The business risk associated with these assets has been evaluated by using the TasNetworks risk framework.

4.1 5x5 Risk Matrix

TasNetworks business risks are analysed utilising the 5x5 corporate risk matrix, as outlined in TasNetworks Risk Management Framework.

Relevant strategic business risk factors that apply are follows:

Risk Category	Risk	Likelihood	Consequence	Risk Rating

Customer	Loss of supply	Possible	Minor	Low
Network Performance	Partial disconnection of network	Possible	Minor	Low
Reputation	Damage to reputation from harm to member of the public	Possible	Minor	Low
Safety and People	Personal injury or death to member of the public	Unlikely	Major	Medium

Section 1 Approvals (Gated Investment Step 1)

Project Initiator:	Michael Healy	**Date:**	26/03/2015
Line Manager:		**Date:**	
Manager (Network Projects) or Group/Business Manager (Non-network projects):		**Date:**	
[Send this signed and endorsed summary to the Capital Works Program Coordinator.]			

Actions			
CWP Project Manager commenced initiation:		**Assigned CW Project Manager:**	
PI notified project initiation commenced:		**Actioned by:**	

Section 2 (Gated Investment Step 2)

5. Preferred Option:

The preferred option is to replace CONSAC cable on the distribution network where:

- A section of CONSAC cable has previously failed
- Locations where defective installations have been identified
- The CONSAC cable is connected to assets that are scheduled in for replacement e.g. replacement of ground mounted substations.

5.1 Scope

Cable sections would be replaced when they meet the criteria defined in section 5.

The scope would entail replacement of 5500 metres of CONSAC cable annually with new low voltage PVC insulated cable. In addition to the cable replacement of other supporting infrastructure would be required to connect it to the distribution network e.g. turrets, cabinets, reconnection of customer mains.

5.2 Expected outcomes and benefits

Following the completion of this program the likelihood of electric shocks/electrocution occurring from defective CONSAC cables installations would reduce to “Unlikely”.

5.3 Regulatory Test

Not applicable.

6. Options Analysis

6.1 Option Summary

Option description	
Option 0	Option 0: Do Nothing All CONSAC cable installations remain in service with only repairs undertaken when defects identified. Advantages: • Lowest cost solution. Disadvantages: • Does not reduce the likelihood of electric shocks/electrocution from defective COSNAC cable • Increase in OPEX expenditure as failure rates increase • Resourcing required to accommodate reactive events This option does not address the risks previously identified in Section 4.
Option 1 (preferred)	Option 1: Replacement of defective sections of CONSAC cable [Preferred Option] Replacement of defective sections of CONSAC cables with new PVC cable. Advantages: • Reduces the likelihood of electric shocks/electrocution Disadvantages: • Capital expenditure required This is the lowest cost option to reduce the business risks to manageable.

6.2 Summary of Drivers

Option	

Option 0	• Customer impact from asset failures will increase over time. • Network impact from asset failures will increase over time. • Risk to reputation from failures occurring that causes personal harm. • Does not address safety risk.
Option 1 (preferred)	• Reduces the risk of customer impact from asset failures. • Reduces the risk network impact from asset failures. • Reduces the risk to reputation from failures occurring that causes personal harm. • Reduces the likelihood and risk of electric shocks/electrocution from defective cable.

6.3 Summary of Costs

Option	Total Cost ($)
Option 0	$0
Option 1 (preferred)	$22,000,000

6.4 Summary of Risk

Option 0: Do nothing

Public safety risk remains at 'Medium' with the potential to increase further over time as the failure rate increases.

Option 1: Replacement of all high voltage cast iron cable terminations [Preferred Option]

The likelihood of a failure causing harm to a member of the public reduces over time, with it being completely eliminated in approximately two years.

6.5 Economic analysis

Option	Description	NPV
Option 0	Option 0: Do Nothing All CONSAC cable installations remain in service with only repairs undertaken when defects identified. Advantages: • Lowest cost solution. Disadvantages: • Does not reduce the likelihood of electric shocks/electrocution from defective COSNAC cable • Increase in OPEX expenditure as failure rates increase • Resourcing required to accommodate reactive events This option does not address the risks previously identified in Section 4.	$0
Option 1 (preferred)	Option 1: Replacement of defective sections of CONSAC cable [Preferred Option] Replacement of defective sections of CONSAC cables with new PVC cable. Advantages: • Reduces the likelihood of electric shocks/electrocution Disadvantages: • Capital expenditure required This is the lowest cost option to reduce the business risks to manageable.	$0

6.5.1 Quantitative Risk Analysis

Not applicable.

6.5.2 Benchmarking

Minimising the safety risk that the electrical distribution network presents to the public is also considered a high priority to other DNSPs around Australia.

6.5.3 Expert findings

Not applicable.

6.5.4 Assumptions

Not applicable.

Section 2 Approvals (Gated Investment Step 2)

Project Initiator:	Michael Healy	**Date:**	26/03/2015
Project Manager:		**Date:**	

Actions			
Submitted for CIRT review:		**Actioned by:**	
CIRT outcome:			