Investment Evaluation Summary (IES)

Project Details:

Project Name:	Major System - Augment 33 kV Sub-transmission Circuits (Capacity)
Project ID:	00831
Thread:	System Development
CAPEX/OPEX:	CAPEX
Service Classification:	Standard Control
Scope Type:	A
Work Category Code:	CAZNC
Work Category Description:	Zone Substation Upgrades - Capacity
Preferred Option Description:	Augment the overhead line to operate at a higher operating temperature (preferred solution)
Preferred Option Estimate (Nominal Dollars):	$0

	17/18	18/19	19/20	20/21	21/22	22/23	23/24	24/25	25/26	26/27
Unit ($)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Volume	31	34	0	0	0	0	0	0	0	0
Estimate ($)										
Total ($)	$861,900	$944,755	$0	$0	$0	$0	$0	$0	$0	$0

Governance:

Project Initiator:	Ewan Sherman	**Date:**	30/03/2015
Thread Approved:	Stephen Jarvis	**Date:**	19/10/2015
Project Approver:	Stephen Jarvis	**Date:**	19/10/2015

Document Details:

Version Number:	1

Related Documents:

Description	URL
Summary Report - Major System Capacity	-
Network Development Management Plan	-

Section 1 (Gated Investment Step 1)

1. Background

The Major System planning level includes development of existing and new zone substations and subtransmission feeders.

A number of existing capacity issues associated with peak loading on the 33 kV sub-tramsnission circuits within the Hobart plannign area have been identified, particularly on the summer rated overhead networks.

Generally the overhead subtransmission sections utilise the largest conductor size (19/3.25 AAC equivalent) used in the distribution network.

To manage these issues, TasNetworks proposes to re-rate relevant subtransmission overhead feeder sections at a higher operating temperature. This will involve a line audit and minor augmentation (re-tensioning, reduced clearances, taller poles etc). As these constraints are existing, TasNetworks proposes to manage these augmentations during the 16/17-18/19 years.

Through the audit, some conductor sections may not be capable of re-rating due to physical limitations of the pole construction or feeder route. In these situations, altenrative solutions will be explored which may include asset and understrung service relocation; such as establishing new line, or undergrounding.

Additionally the re-rating may not be possible due to the conductor condition. In these situations, alternative solutions will be explored in conjuction with related renewal programs.

1.1 Investment Need

TasNetworks has well established security planning standards based on the n-1 philosophy for zone substation assets and their subtransmission feeders. This includes full firm and ‘switched’ firm arrangements where economical.

By design the zone substation capacity is determined by the cyclic rating of the power transformers. in practice, many of the zone subatation firm capacities are limited by lower rated components such as the sub-transmission circuits.

System analysis has determined that the n-1 rating limitations of the sub-transmission circuits is currently exceeded, limitng the rating of the zone substations and placing significant network elements at risk.

1.2 Customer Needs or Impact

TasNetworks continues to undertake a consumer engagement as part of business as usual and through the voice of the customer program. Consumers have identified safety, restoration of faults/emergencies and supply reliability as the highest performing services offered by TasNetworks. This project specifically addresses the requirements of consumers in the areas of; • safety, restoration of faults/emergencies and supply reliability Customers will continue to be consulted through routine TasNetworks processes, including the Voice of the customer program, the Annual Planning Review and ongoing regular customer liaison meetings.

1.3 Regulatory Considerations

This project is required to achieve the following capital expenditure objectives as described by the National Electricity Rules section 6.5.7(a) 6.5.7 (a) Forecast capital expenditure (1) meet or manage the expected demand for standard control services over that period; (2) comply with all applicable regulatory obligations or requirements associated with the provision of standard control services; (3) to the extent that there is no applicable regulatory obligation or requirement in relation to: (i) the quality, reliability or security of supply of standard control services; or (ii) the reliability or security of the distribution system through the supply of standard control services, to the relevant extent: (iii) maintain the quality, reliability and security of supply of standard control services; and (iv) maintain the reliability and security of the distribution system through the supply of standard control services; and (4) maintain the safety of the distribution system through the supply of standard control services.

2. Project Objectives

Remove network risk associated with limitations of the sub transmission networks.

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 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 • We care for our assets to ensure they deliver safe and reliable network services • We will transform our business with a focus on: - an appropriate approach to the management and allocation of risk The strategic key performance indicators that will be impacted through undertaking this project are as follows: • Customer engagement and service – customer net promoter score • Price for customers – lowest sustainable prices • Network service performance – meet network planning standards

4. Current Risk Evaluation

The current risk evaluation is Medium to High, depending on the overloaded circuit section, asset condition and suplly substation.

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	Existing risk control measures (if any) are not effective	Likely	Minor	Medium
Environment and Community	Existing risk control measures (if any) are not effective	Possible	Minor	Low
Financial	Existing risk control measures (if any) are not effective	Possible	Minor	Low
Network Performance	Existing risk control measures (if any) are not effective	Likely	Minor	Medium
Regulatory Compliance	Existing risk control measures (if any) are not effective	Possible	Minor	Low
Reputation	Not Applicable	Rare	Negligible	Low
Safety and People	Existing risk control measures (if any) are not effective	Likely	Minor	Medium

Section 1 Approvals (Gated Investment Step 1)

Project Initiator:	Ewan Sherman	**Date:**	30/03/2015
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:

Minor augmentation of the overhead circuit sections to operate at a higher conductor temperature, thereby managing asset loading for normal or contingency network configurations.

5.1 Scope

Augment the overhead HV line to operate at a higher conductor temperature i.e. increase from 50 to 70 DegC operating temperature over the two year determination.

The total length of the 33 kV overhead systems are 65.4 km. It is proposaed to re-rate 80% of this conductor only. The remaining 20% has been allocated to new OH (15%) and UG (5%) infrastructure, under the provision that some circuits will not be able to operate at a higher temperature due to pole top configuration and circuit location – requiring relocation.

Augmentation rates used are:

- Line re-rating $55,250/km
- New Overhead (Urban) $111,657/km
- New Underground (33 kV Urban) $351,313/km

In 16/17 a line audit of the 33 kV overhead circuits will be undertaken to confirm the works requried. Minor (and major as required) augmentations will occur in 17/18 and 18/19.

5.2 Expected outcomes and benefits

The capacity constraint is limited by the Summer Day or Winter Day design rating of the overhead HV line. By rerating the line (which involves tensioning conductors, reducing span lengths, relocating understrung services) the constraint can be managed without upgrading the conductor.

5.3 Regulatory Test

Not Applicable

6. Options Analysis

The following tables provide a brief summary of the options considered as part of a desk top assessment and in accordance with the Network Development Management plan.

6.1 Option Summary

Option description	
Option 0	Do nothing

Option 1 (preferred)	Augment the overhead line to operate at a higher operating temperature (preferred solution)
Option 2	Upgrade the conductor.

6.2 Summary of Drivers

Option	
Option 0	This option includes the operation of the sub transmission network in excess of established planning standards. As the backbone of the Greater Hobart power network, the reduction of supply security is not considered acceptible or good industry practice.
Option 1 (preferred)	The proposed project has the following Drivers: • Community values and expectations, • Network Performance outcomes • System security of key network elements, • Public safety and • Environmental impacts
Option 2	This option includes replacing the limiting conductor segments with a higher rated conductor type; meeting the drivers of Option 1. Currently TasNetwork do not install a standard conductor type greater with a higher rating than the existing sections used in the sub transmission networks. In addition to being a higher cost option, upgrading the conductor type would requrie non-satandard materials and designs, which would introduce additional asset management issues.

6.3 Summary of Costs

Option	Total Cost ($)
Option 0	$0
Option 1 (preferred)	$0
Option 2	$0

6.4 Summary of Risk

The Target Risk evaluation is Low to Medium, depending on the overloaded circuit section, asset condition and suplly substation.

Medium risk may still exist for other sub-transmission elements that will not be addressed through augmentations. this includes:

- Underground 33 kV cables;
- Zone Substation swithcboards and components;

- elements operating in excess of rated fault levels;
- location of pole structures along public access roads.

These risks will be addressed through other treatment methods (including to monitor) and programs.

6.5 Economic analysis

Option	Description	NPV
Option 0	Do nothing	$0
Option 1 (preferred)	Augment the overhead line to operate at a higher operating temperature (preferred solution)	$0
Option 2	Upgrade the conductor.	$0

6.5.1 Quantitative Risk Analysis

Not Applicable

6.5.2 Benchmarking

Not Applicable

6.5.3 Expert findings

Not Applicable

6.5.4 Assumptions

Existing overhead sections are in an adequate asset condition to enable contuinuous operation at a higher conductor temperature.

Section 2 Approvals (Gated Investment Step 2)

Project Initiator:	Ewan Sherman	**Date:**	30/03/2015
Project Manager:		**Date:**	

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