



Regulatory Investment Test for Distribution (RIT-D)

Addressing Reliability Requirements in the Maleny Network Area

Notice of No Non-Network Options

11 August 2021

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EXECUTIVE SUMMARY

About Energex

Energex Limited (Energex) is a subsidiary of Energy Queensland Limited and manages the electricity distribution network in the growing region of South East Queensland which includes the major urban areas of Brisbane, Gold Coast, Sunshine Coast, Logan, Ipswich, Redlands and Moreton Bay. Our electricity distribution area runs from the New South Wales border towards north to Gympie and towards west to the base of the Great Dividing Range.

Our electricity network consists of approximately 54,200 kilometres of powerlines and 680,000 power poles, along with associated infrastructure such as major substations and power transformers.

Today, we provide distribution services to more than 1.4 million domestic and business connections, delivering electricity to a population base of around 3.4 million people.

Identified Need

Maleny Zone Substation (SSMLY) provides electricity supply to approximately 4,200 predominantly residential customers in the surrounding suburbs of Bald Knob, Bellthorpe, Boorobin, Conondale, Maleny, Montville, North Maleny, Reesville, Sandy Creek, Witta and Wootha. Approximately 88% of the total number of customers supplied from SSMLY are residential customers amounting to 60% of the total energy supplied, while 12% of the total number of customers supplied are commercial and industrial customers, amounting to 40% of the total energy supplied.

SSMLY is normally supplied from Nambour Bulk Supply Substation (SST16) 33kV network via 33kV feeder F344. It can also be supplied from the Beerwah Bulk Supply Substation (SSBWH) 33kV network via 33kV feeder F477.

A substation condition assessment of SSMLY has identified some primary and secondary plant and equipment that are recommended for retirement based on Condition Based Risk Management (CBRM) analysis. These include 33kV and 11kV air break switches on the outdoor pipework bus, air break switches and associated components on wood poles on 11kV feeders and protection relays.

The deterioration of these primary and secondary system assets poses safety risks to staff working within the switchyard and reliability risks to the customers supplied from SSMLY.

Approach

The National Electricity Rules (NER) require that, subject to certain exclusion criteria, network business investments for meeting service standards for a distribution business are subject to a Regulatory Investment Test for Distribution (RIT-D). Energex has determined that network investment is essential in this case for it to continue to provide electricity to the consumers in the SSMLY supply area in a reliable, safe and cost-effective manner. Accordingly, this investment is subject to a RIT-D. An internal assessment has been conducted and it has been determined that

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there is not a non-network option that is potentially credible, or that forms a significant part of a potential credible option that will meet the identified need or form a significant part of the solution. This Notice has hence been prepared by Energex in accordance with the requirements of clause 5.17.4(d) of the NER.

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1. BACKGROUND

1.1. Geographic Region

Maleny Zone Substation (SSMLY) provides electricity supply to approximately 4,200 predominantly residential customers in the surrounding suburbs of Bald Knob, Bellthorpe, Booroobin, Conondale, Maleny, Montville, North Maleny, Reesville, Sandy Creek, Witta and Wootha. Approximately 88% of the total number of customers supplied from SSMLY are residential customers amounting to 60% of the total energy supplied, while 12% of the total number of customers supplied are commercial and industrial customers, amounting to 40% of the total energy supplied.

SSMLY is normally supplied from the Nambour Buk Supply Substation (SST16) 33kV network via 33kV feeder F344. It can also be supplied from the Beerwah Bulk Supply Substation (SSBWH) 33kV network via 3-ended 33kV feeder F477 (SSBWH-SSWFD-SSMLY, normally open at SSMLY end).

The geographical location of the Energex's sub-transmission network in the area and the areas supplied by SSMLY are shown in Figure 1 and Figure 2 respectively.

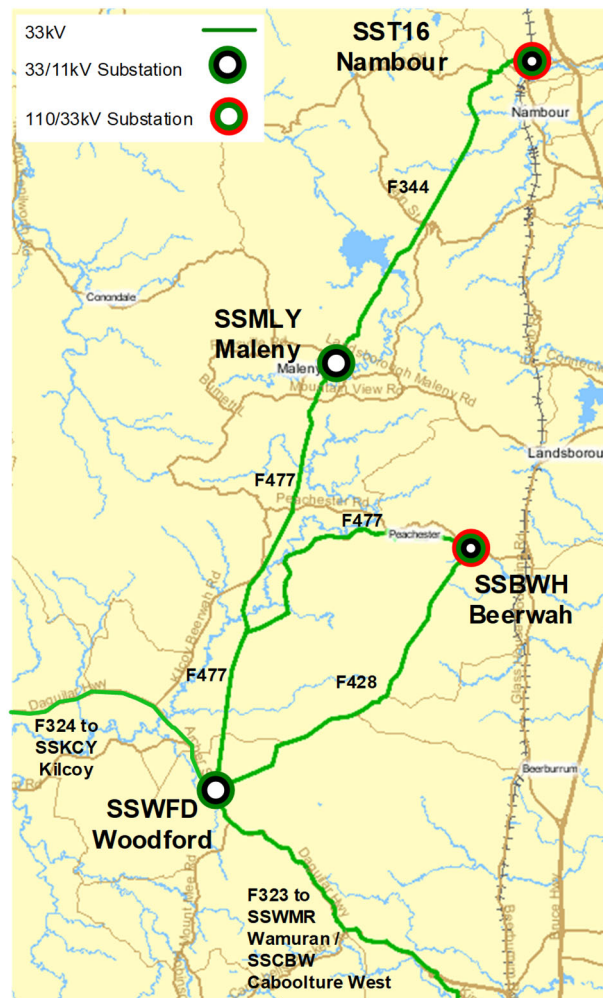


Figure 1: Existing network arrangement (geographic view)

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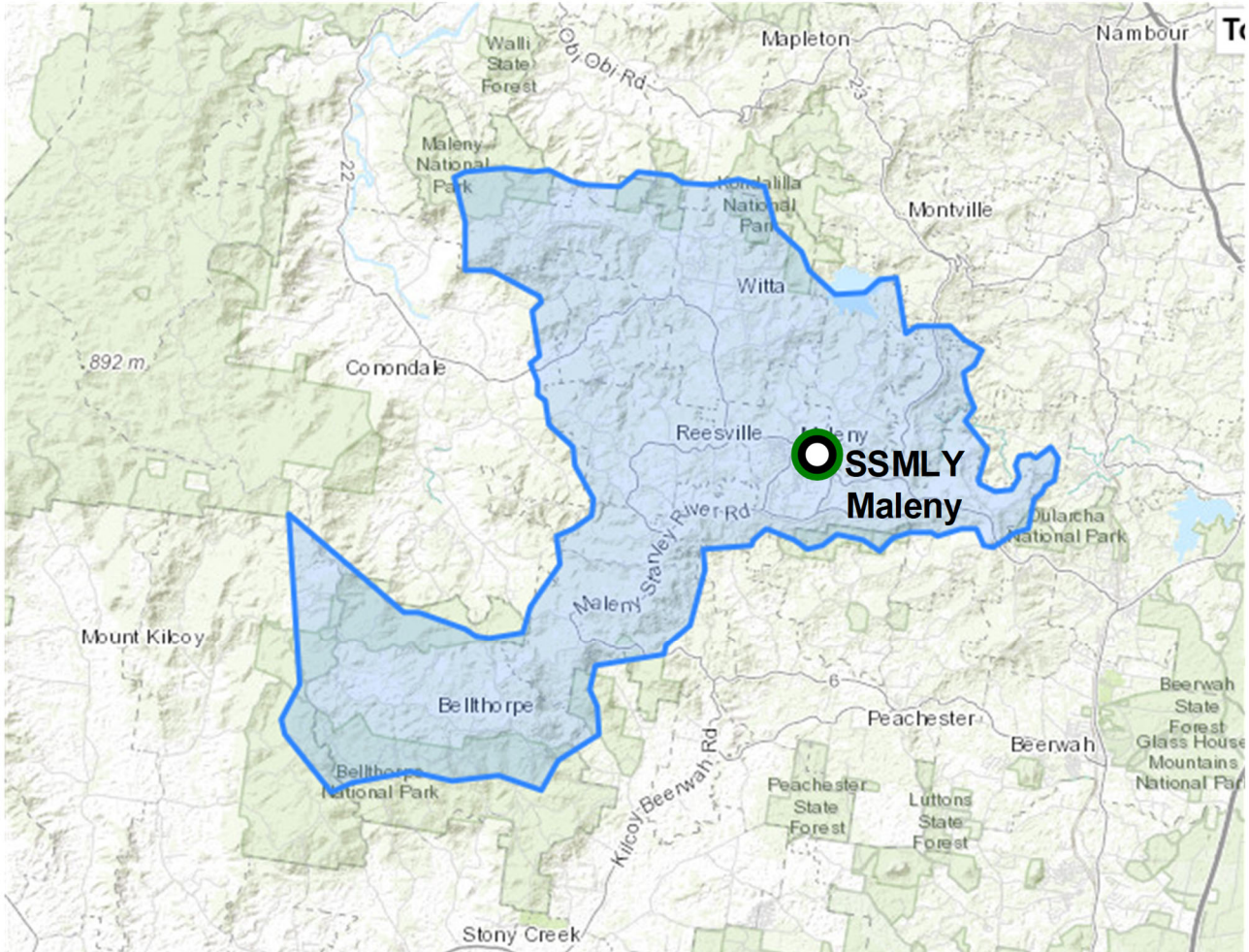


Figure 2: Areas supplied by SSMLY (geographic view)

1.2. Existing Supply System

SSMLY is located approximately 90km north of Brisbane in the Sunshine Coast hinterland township of Maleny.

It has outdoor 33kV and 11kV switchyards, 2 x 5MVA 33/11kV power transformers and a small protection and control building. SSMLY supplies four 11kV distribution feeders at present and it has been proposed establish two new 11kV feeders emanating from SSMLY.

A schematic view and a geographic view of SSMLY are provided in Figure 3 and Figure 4 respectively.

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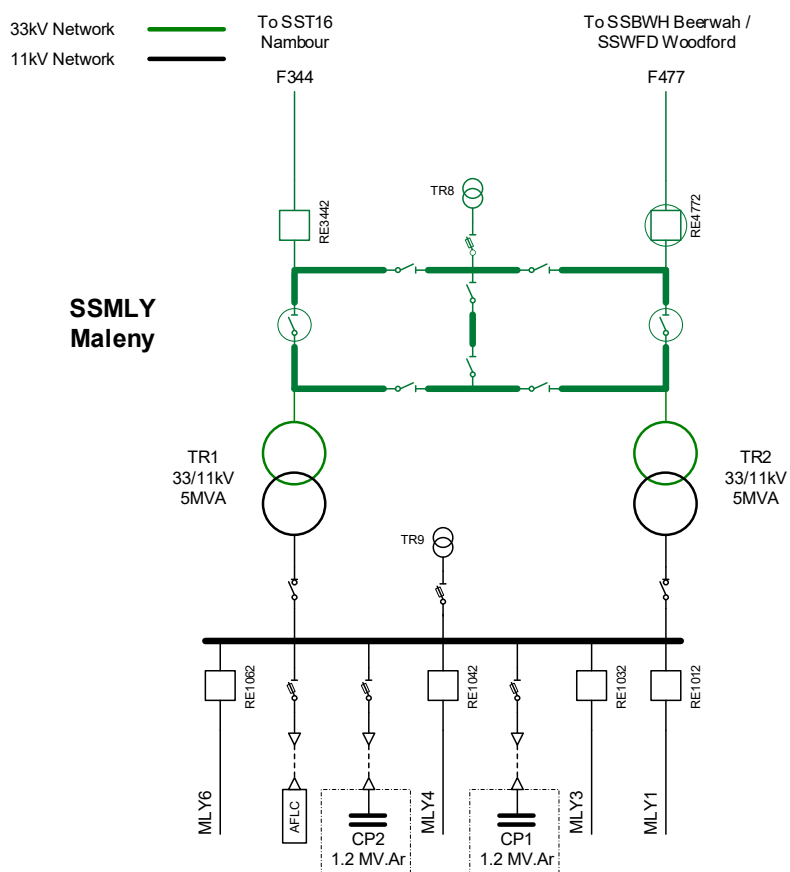


Figure 3: Existing network arrangement (schematic view)

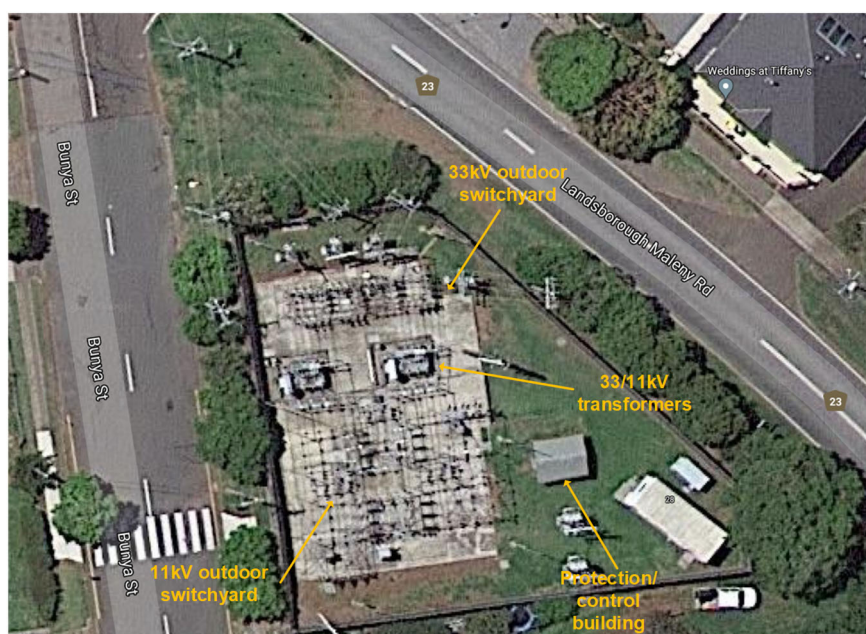


Figure 4: SSMLY Substation (geographic view)

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1.3. Load Profiles / Forecasts

The load at SSMLY comprises a mix of residential and commercial/industrial customers. The load is winter peaking.

1.3.1. Annual Load Profile

The annual load profile of SSMLY for 2020 is shown in Figure 5.

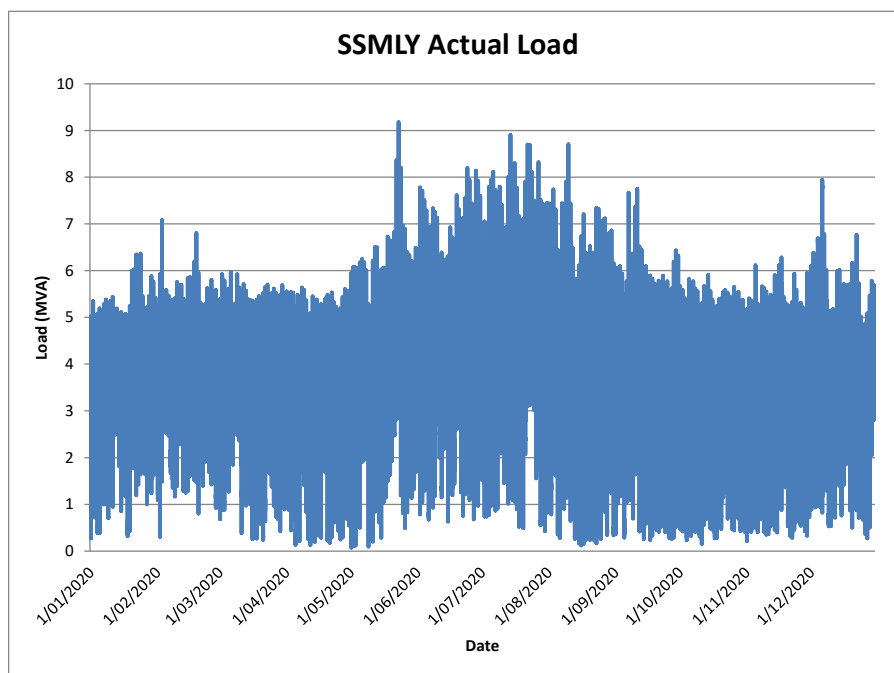


Figure 5: Substation actual annual load profile

1.3.2. Load Duration Curve

The load duration curve of SSMLY for 2020 is shown in Figure 6.

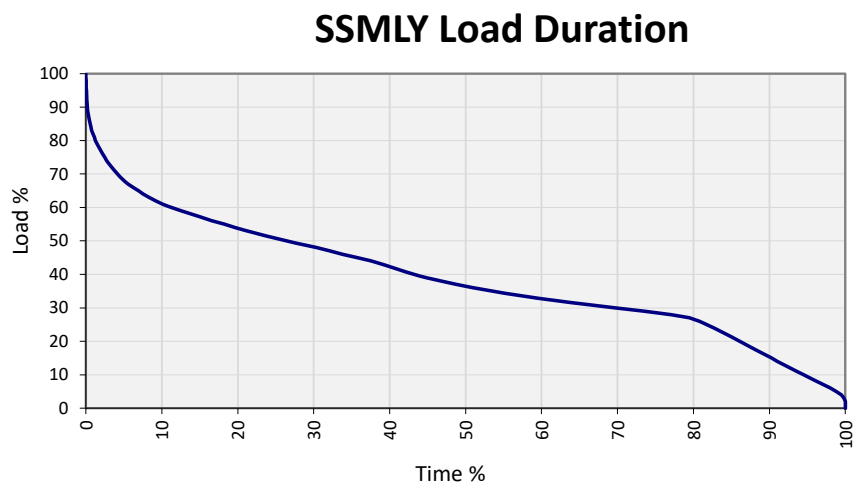


Figure 6: Substation load duration curve

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1.3.3. Peak Day Load Profile

The daily load profile of SSMLY for the peak day during 2020 is shown in Figure 7.

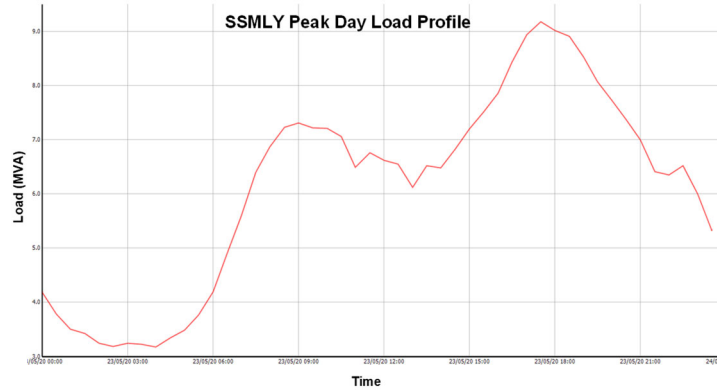


Figure 7: Substation peak day load profile

1.3.4. Base Case Load Forecast

SSMLY is equipped with 2 x 5MVA 33/11kV transformers. The substation capacity is limited by transformers, providing a Normal Cyclic Capacity of 12MVA. The 10 year 10 PoE and 50 PoE load forecasts, and the existing Normal Cyclic Capacity (NCC), Emergency Cyclic Capacity (ECC), Two Hour Emergency Capacity (2HEC), Residual Load at Risk (RLAR) and available mobile equipment, are shown in Figure 8.

SSMLY Load Forecast - Existing

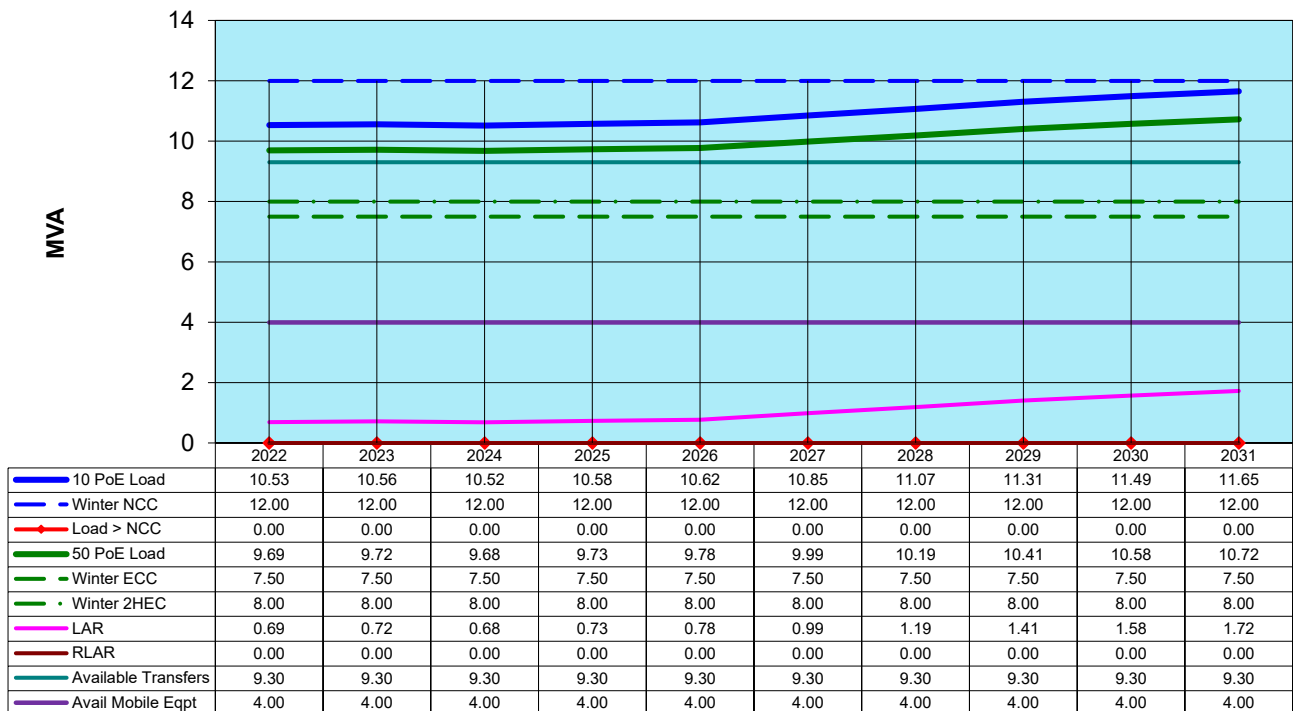


Figure 8: Substation base case load forecast

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2. IDENTIFIED NEED

2.1. Description of the Identified Need

2.1.1. Substation condition

A recent condition assessment has highlighted that a number of critical assets are at their end-of-life and are in a poor condition. The condition of these assets presents a considerable safety risk.

Based on a Condition Based Risk Management (CBRM) analysis of the effect of current condition and ageing on the expected life of the asset, the following assets have been identified as reaching their end-of-life:

- 33kV and 11kV disconnectors;
- the crossarm and insulators for 33kV feeder F344;
- crossarms and surge arresters for 11kV feeders MLY1, MLY3;
- surge arresters for 11kV feeder MLY6;
- 33kV fuse-switch-disconnector and surge arresters for TR8;
- 11kV fuse-switch-disconnector and surge arresters for TR9;
- 11kV fuse-switch-disconnector for CP2; and
- identified protection relays at SSMLY .

Additionally, a civil assessment of SSMLY also identified many issues including the poor condition of the outdoor pipework structures due to significant rusting and the poor condition of the control building due to water leaks, deteriorated doors and rusting base frame.

The deterioration of these primary and secondary system assets poses safety risks to staff working within the switchyard and operating the aged assets. Additionally, the poor condition of these assets significantly increases the likelihood of outages, resulting in a reduction in the level of reliability experienced by the customers supplied from SSMLY.

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3. INTERNAL OPTIONS CONSIDERED

In the process of determining the most cost-effective solution to address the identified network limitations, Energex has sought to identify a practicable range of technically feasible, alternative options that could satisfy the network requirements in a timely and efficient manner.

3.1. Non-Network Options Identified

Energex has not identified any viable non-network solutions internally that will provide a complete or a hybrid (combined network and non-network) solution to provide the magnitude of network support required in the SSMLY area to address the identified need.

3.2. Network Options Identified

In addition to the following option that has been assessed as meeting the identified need, no other practically feasible and economically equivalent option has been identified in this analysis.

3.2.1. Replace aged 33kV and 11kV outdoor buses/switchgear at SSMLY with indoor switchgear

This option involves establishing two new masonry buildings for the new 33kV and 11kV switchgear and recovering and scrapping the aged outdoor 33kV and 11kV outdoor pipework buses at SSMLY in order to address the identified need.

A schematic diagram of the proposed network arrangement for this option is shown in Figure 9.

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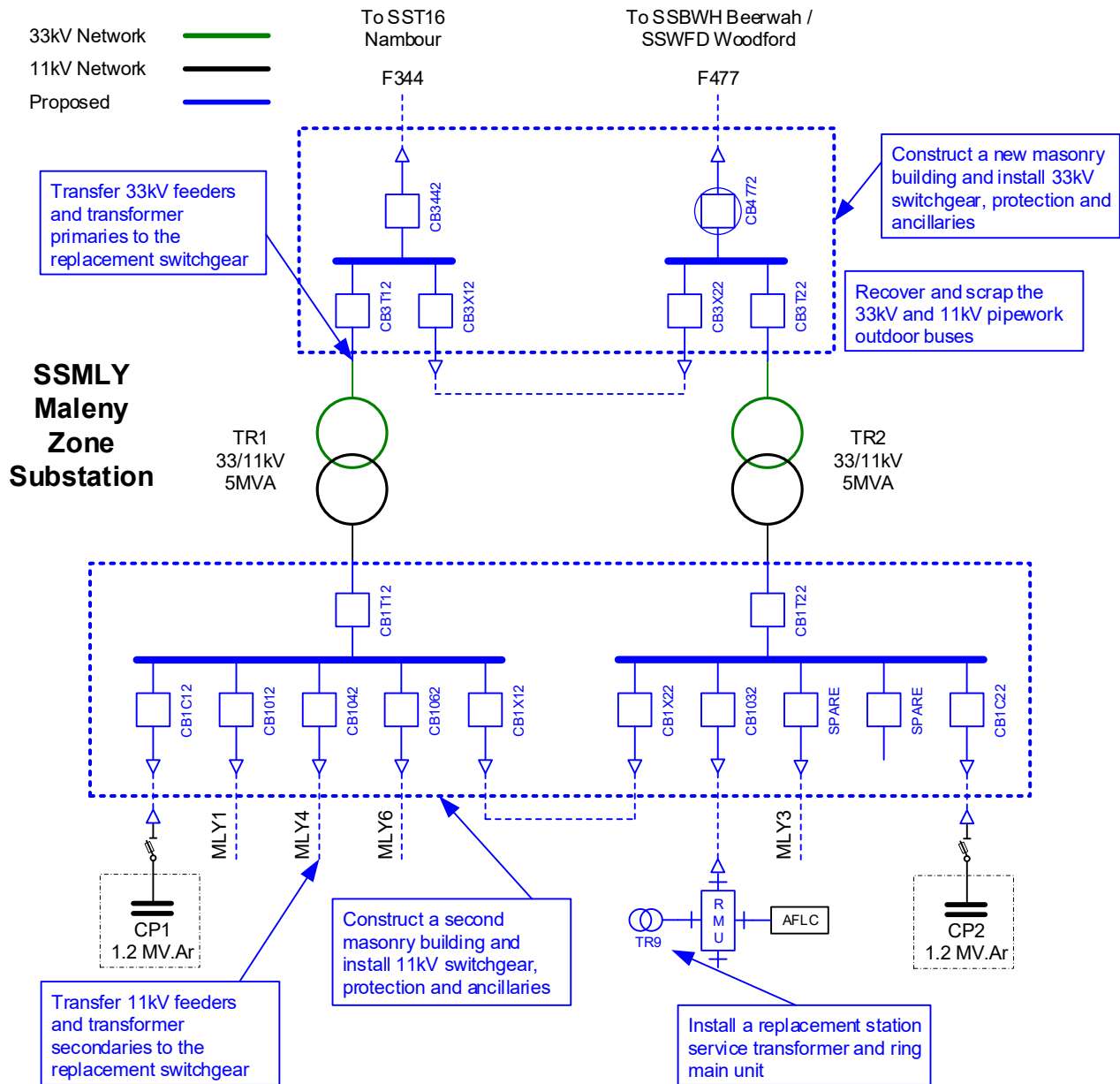


Figure 9: Proposed network arrangement (schematic view)

3.3. Preferred Network Option

Upon completion of these works, the asset safety and reliability risks at SSMLY will be addressed. The preferred option will provide the greatest reliability benefit for customers, whilst also reducing expenditure on obsolete and non-compliant assets while ensuring more efficient use of design and construction resources.

The estimated capital cost of this option inclusive of interest and overheads is \$10.4 million. Annual operating and maintenance costs are anticipated to be 0.5% of the capital cost. The

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estimated project delivery timeframe is the design and construction to be completed by May 2022 and November 2023 respectively.

4. ASSESSMENT OF NON-NETWORK SOLUTIONS

Energex's Demand & Energy Management (DEM) team has assessed the potential non-network alternative (NNA) options required to defer the network option and determine if there is a viable option to replace or reduce the need for the network options proposed.

Credible options must be technically and commercially viable and must be able to be implemented in sufficient time to satisfy the identified risk to the public and/or the network due to the identified constraints.

Once the aged, identified 33kV and 11kV assets at SSMLY reach their retirement age and can no longer be safely operated, the existing load must be supplied via non-network alternative solutions while satisfying the Service Safety Net Targets as specified in the Distribution Authority issued to Energex.

As confirmed by DEM, it is considered that no available demand management products or strategies can provide sufficient demand support at SSMLY to address the identified need. It is evident that an economically feasible non-network option would not be available to defer or eliminate the requirement to replace the aged 33kV and 11kV outdoor buses/switchgear at SSMLY with indoor switchgear and continue to provide a safe, sufficient and reliable supply to customers at SSMLY.

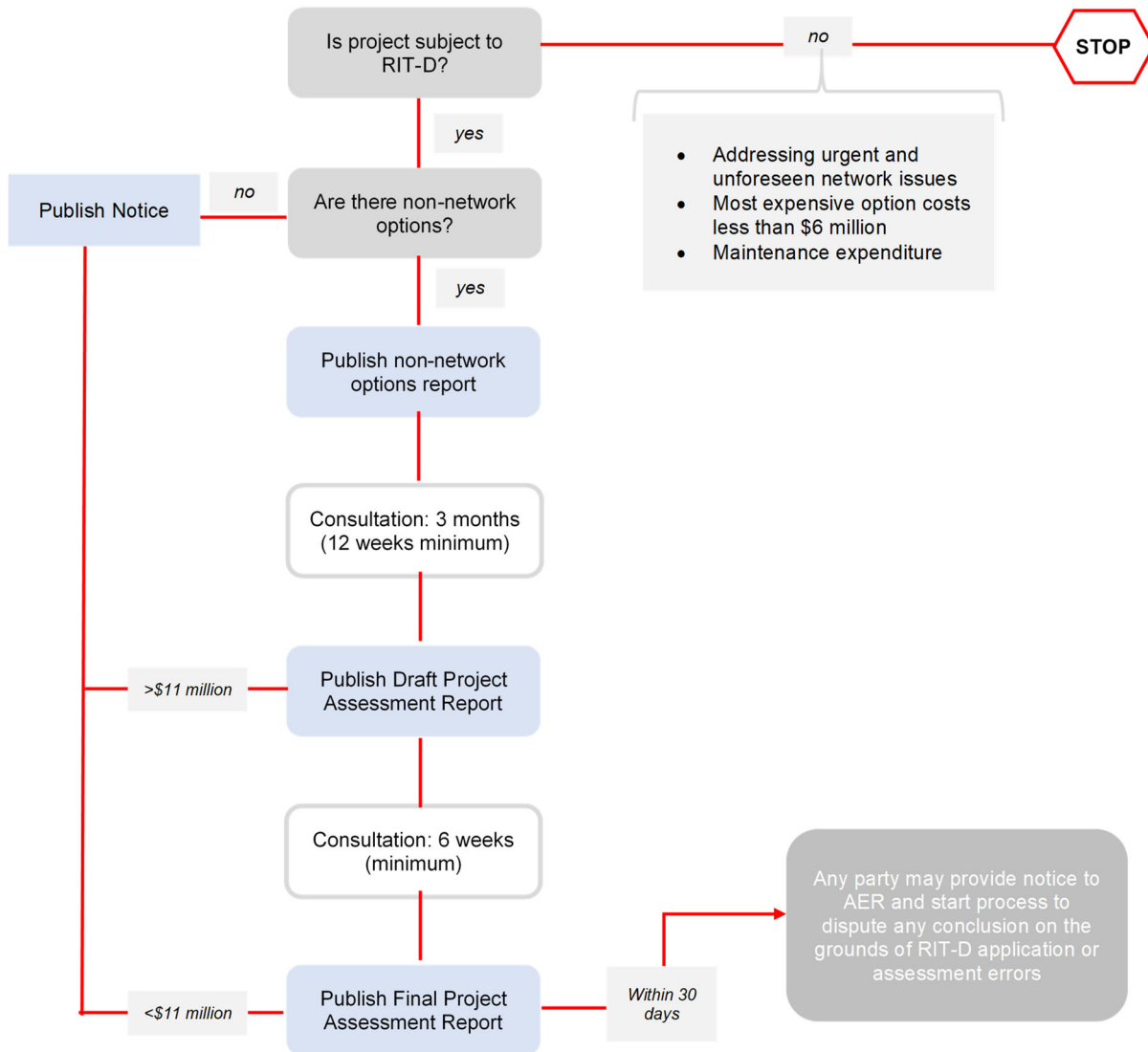
5. CONCLUSION AND NEXT STEPS

Considering the nature of the project, being the safety risk from failure of aged assets and as per clause 5.17.4(c) of the NER, Energex has determined that there are no credible non-network options to address the identified need at SSMLY.

The preferred network option is to replace aged 33kV and 11kV outdoor buses/switchgear at SSMLY with indoor switchgear. This Notice of No Non-Network Options is therefore published in accordance with rule 5.17.4(d) of the National Electricity Rules. As the next step in the RIT-D process, Energex will now proceed to publish a Final Project Assessment Report.

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APPENDIX A – THE RIT-D PROCESS



Source: AEMC, *Rule determination: National Electricity Amendment (Replacement expenditure planning arrangements) Rule 2017*, July 2017, p. 64.