This document describes the identified need for investment at Cannonvale. It includes description of the likely network options and to the extent possible, the characteristics of non-network options which may, either alone or in combination with network or other non-network options, represent a feasible solution for addressing the identified need.

Consultation Period Starts: 24 June 2019
Consultation Period Closes: 19 September 2019

Disclaimer
While care was taken in preparation of the information in this Non Network Options Report, and it is provided in good faith, Ergon Energy Corporation Limited accepts no responsibility or liability for any loss or damage that may be incurred by any person acting in reliance on this information or assumptions drawn from it. This document has been prepared for the purpose of inviting information, comment and discussion from interested parties. The document has been prepared using information provided by a number of third parties. It contains assumptions regarding, among other things, economic growth and load forecasts which may or may not prove to be correct. All information should be independently verified to the extent possible before assessing any investment proposal.
Executive Summary

Ergon Energy Corporation Limited (Ergon Energy) is responsible (under its Distribution Authority) for electricity supply to the Cannonvale / Airlie Beach area in North Queensland.

The Airlie Beach region is a nationally and internationally renowned tourism hub in North Queensland located approximately 100 km north of Mackay. In addition to being a holiday destination in its own right, Airlie Beach is the major tourism gateway to the Whitsunday Islands.

The region is supplied by four key substations, with Cannonvale (CANN) and Jubilee Pocket (JUPO) being the main substations supplying the mainland, and Mount Rooper (MORO) and Shuthaven (SHUT) supplying the Whitsunday Islands. Ergon Energy’s 66 kV sub-transmission and distribution networks supply approximately 7,198 premises in the area, with major customers including Proserpine Sugar Mill, Hamilton Island, Hayman Island, South Molle Island, Daydream Island and numerous hotels and marinas.

From Cannonvale substation (CANN) which is the main substation in the area, the radial 66 kV network supplying the other three substations has a load of approximately 16.4 MVA. A credible fault on this network would mean that load cannot be restored within the requirements of the Safety Net security criteria, with this situation worsening as load increases.

In addition, the current 66 kV supply contains sections of aged 1980s vintage XLPE cable, with similar batches known to have recently failed and with any restoration of such a failure likely to result in extended outage durations to customers and island resorts. The combination of both the existing 66 kV switching arrangement at Cannonvale and the radial supply to customers beyond Cannonvale has resulted in frequent outages. This has contributed to over half of the urban and short rural feeders supplied from this network experiencing ‘Amber’ or ‘Red’ class reliability in three of the last four years. This has also contributed to regular supply interruptions to the island resorts.

The combination of these drivers has prompted a coordinated plan to review and reinforce the 66kV supply arrangement to meet security criteria obligations, address aged asset issues, improve supply reliability to customers and provide capacity for future growth and development.

Ergon Energy’s preferred internal solution at this stage is:

- Duplication and management of the radial 66 kV cables to Shute Harbour and the future establishment of a second 66 kV feeder between Cannonvale and Jubilee Pocket 66/11 kV substations.

This is a Non-Network Options Report, where Ergon Energy is seeking information about possible solutions to address the identified need, which may be able to be provided by parties other than Ergon Energy.

Ergon Energy is committed to the implementation of Non-Network Solutions to reduce the scope or need for traditional network investments. Our approach to demand management is listed in Chapter 7 of our Distribution Annual Planning Report but involves early market engagement around emerging constraints as well as effective use of existing mechanisms such as the Demand Side Engagement Strategy and Regulatory Investment Test for Distribution (RIT-D). We see that the increasing penetration and improving functionality of customer energy technology, such as embedded generation, Battery Storage Systems and Energy Management Systems, have the potential to present a range of new non-network options into the future.
The primary investment driver for this project is AUGEX, supporting customer growth and network security. A successful Non-Network Solution may be able to assist in reducing the scope or timing for this project.

Submissions in writing (electronic preferably) are due by **19 September 2019** and should be lodged to Ergon Energy’s “Regulatory Investment Test for Distribution (RIT-D) Partner Portal”. The portal is available at:


For further information and inquiries please refer to the “Regulatory Investment Test for Distribution (RIT-D) Partner Portal”.
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1. Introduction

This Non Network Options Report has been prepared by Ergon Energy in accordance with the requirements of clause 5.17.4(e) of the National Electricity Rules (NER).

This report represents the first stage of the consultation process in relation to the application of the Regulatory Investment Test for Distribution (RIT-D) on potential credible options to address the identified limitations in the distribution network that supplies the Cannonvale / Airlie Beach area.

This report:
- Provides background information on the network capability limitations of the distribution network supplying the Cannonvale / Airlie Beach area.
- Identifies the need which Ergon Energy is seeking to address, together with the assumptions used in identifying and quantifying that need.
- Describes the credible options that Ergon Energy currently considers may address the identified need, including for each:
  - Its technical definitions;
  - The estimated commissioning date; and
  - The total indicative cost (including capital and operating costs).
- Sets out the technical characteristics that a non-network option would be required to deliver in order to address the identified need.
- Is an invitation to registered participants and interested parties to make submissions on credible options to address the identified need.

In preparing this RIT-D, Ergon Energy is required to consider reasonable future scenarios. With respect to possible future loads and development, Ergon Energy has, in good faith, included as much detail as possible while maintaining necessary customer confidentiality. At the time of writing, Ergon Energy considers the most probable future scenario to be that there will be significant future development in the Airlie Beach, Cannonvale and Riordanvale area, and has developed this Non Network Options Report (including Internal Options) principally on this basis. It is noted that customer activity can occur over the consultation period and may change the timing and/or scope of any proposed solutions.

Submissions in writing (electronic preferably) are due by 19 September 2019 and should be lodged to Ergon Energy’s “Regulatory Investment Test for Distribution (RIT-D) Partner Portal”. The portal is available at:


For further information and inquiries please refer to the “Regulatory Investment Test for Distribution (RIT-D) Partner Portal”.

2. Background

2.1. Geographic Region

The geographic region covered by this RIT-D is the Cannonvale substation and surrounding 66 kV sub-transmission network. The network in this area consists of approximately 7,198 customers, with major customers including Proserpine Sugar Mill, Hamilton Island, Hayman Island, South Molle Island and Daydream Island, and is located in the Mackay area of the Northern Region of Ergon Energy’s Network.

The geographical location of Ergon Energy’s 66 kV sub-transmission network and substations in the Cannonvale / Airlie Beach area is illustrated in the Google Earth image below.

Figure 1: Cannonvale / Airlie Beach 66 kV Sub-transmission Network
2.2. Existing Supply System

The Cannonvale / Airlie Beach area is supplied from Cannonvale (CANN) 66/11 kV, Jubilee Pocket (JUPO) 66/11 kV, Mount Rooper (MORO) 66/11 kV and Shutehaven (SHUT) 66/22 kV zone substations.

Cannonvale (CANN) substation presently supplies 5,442 customers and has two 15 MVA 66/11 kV transformers which have an N-1 transformer cyclic and long term emergency cyclic rating of 18.9 MVA and 20.0 MVA respectively. Two 4.8 MVAr 11 kV capacitor banks can minimise the transformer load and improve the substation power factor however their primary function is to provide voltage support during 66 kV feeder outages and network re-configuration.

Jubilee Pocket (JUPO) substation currently supplies 1,674 customers via one 32 MVA 66/11 kV OLTC transformer, three 11 kV feeders and a 4.8 MVAr 11 kV capacitor bank which also provides 66 kV network support under contingency conditions. JUPO was constructed with a fully switched 66 kV bus and outgoing 66 kV feeder to Mt Rooper. A spare 66 kV feeder bay will accommodate a future second feeder from CANN. There is also a second cold standby 32 MVA 66/11 kV OLTC transformer on-site which has been retained as an in-situ spare.

Mount Rooper (MORO) substation currently supplies 80 customers including the major 11 kV customer Daydream Island/South Molle Island via privately owned submarine cables and an 11 kV mainland connection point and recloser. The substation has a single 5 MVA 66/11 kV fixed tap transformer that supplies unregulated 11 kV to the islands, however a set of 100 A voltage regulators supplies the 11 kV Shute Harbour feeder and approx. 79 customers. There is a N/O 11 kV feeder tie to the Mandalay feeder from JUPO.

Shutehaven (SHUT) substation currently supplies two customers including the major 22 kV customer Long Island/Hamilton Island via privately owned 22 kV submarine cables and a 22 kV mainland connection point and recloser. The 22 kV submarine cable to Hayman Island is owned by Ergon Energy. On the island, a fixed tap 5 MVA 22/11 kV transformer supplies the resort via an 11 kV connection point. SHUT has one 25 MVA 66/22 kV OLTC transformer.

Proserpine Mill (PRMI) substation has a single 10/12 MVA 66/11 kV OLTC transformer that currently supplies the township of Proserpine (i.e. 80 customers) and the embedded generator Proserpine Sugar Mill. The Authorised Demand of Proserpine Mill is 10 MVA (10 MW) export and 4 MVA (3.6 MW) import.

The Cannonvale / Airlie Beach area zone substations are supplied via two radial 66 kV feeders (119 Cannonvale No. 1 and 118 Cannonvale No. 2 feeders) out of T39 Proserpine (PROS) 132/66 kV substation. Cannonvale No. 2 (CANN-02) supplies Cannonvale substation while Cannonvale No. 1 (CANN-01) bypasses Cannonvale to supply Jubilee Pocket, Shutehaven and Mount Rooper substations.

The 66 kV feeders between Proserpine and Cannonvale are predominantly timber pole, timber crossarm construction but no overhead earthwire. One line is constructed in 1984 and the other in 2000. The summer day (SD) overhead line ratings of CANN-01 and CANN-02 are 43.0 MVA and 45.6 MVA respectively. The backbone circuit distance from Proserpine to Cannonvale is approx. 24.9 km (CANN-01) and 27 km (CANN-02).

CANN-01 has a hard tee (of approx. 1.0 km O/H and 0.37 km U/G) to Proserpine Mill (PRMI) 66/11 kV substation, 4.0 km from Proserpine.
The existing 66 kV network arrangement is shown schematically in the figure below.

![Figure 2: Existing 66 kV Sub-transmission Network](image)

There are also plans for a future 66/11 kV substation at Riordanvale to in order to accommodate further load growth in the distribution network to the south-west of Cannonvale.

### 3. Identified Need

#### 3.1. Description of the Identified Need

The identified need can be broken down into two major components as detailed below.

##### 3.1.1. Safety Net Non-Compliance

The existing sub-transmission network configuration has all customers downstream of Jubilee Pocket substation reliant on the CANN-01 66 kV line between Cannonvale and Jubilee Pocket. Currently, a fault on this section of line will result in an outage for all Jubilee Pocket, Mount Rooper and Shutehaven customers which combine for a peak load at risk of approximately 16.4 MVA. The section at the highest risk of causing an extended outage is the 1.41 km underground cable passing through the main tourist centre of Airlie Beach.

##### 3.1.2. Aged and Poor Condition Cable Replacement

The CANN-01 feeder cable entering the switchyard at Cannonvale recently failed in January 2017 due to the flashover of the phase conductor to the screen as a result of the development of water trees.

The cable construction is single core XLPE insulated aluminium conductor with a light duty copper screen and no insect protection. Analysis of the XLPE insulation by The University of Queensland (UQ) on both the faulted phase and a healthy phase cable was conducted. The conclusions from this testing are summarised below:
“It was postulated that the failure resulted from the flashover of the phase conductor to the screen due to the progressive development into electrical trees of vented trees and/or the cumulative effects of multiple bow-tie trees over time. The true root cause could not be determined without doubt, however given the age of this cable and the fact significant numbers of water trees were discovered in un-faulted phases, this is the most likely cause in this instance. It is probable that other failures in cables of this same type and age will occur over the next few years.”

Additionally, testing of the CANN-02 exit cable was performed. On-line Partial Discharge (PD) testing confirmed the presence of PD on this section of cable using two different test sets.

There are three radial cable sections between Cannonvale and Shutehaven/Mt Rooper that are first generation XLPE cables (circa 1980) of similar type and vintage as the failed 66 kV CANN-01 entry cable:

- CANN to JUPO 1.41 km Abell Point to Port of Airlie 66 kV cable (circa 1987);
- JUPO to SHUT/MORO 0.186 km Mandalay hill slope 66 kV cable (circa 1987); and
- JUPO to SHUT/MORO 0.38 km airport crossing 66 kV cable (circa 1987).

The radial nature of these three 66 kV underground circuits combined with significant sections of direct buried trench sections, the constrained geographic location to install an emergency 66 kV overhead bypass (i.e. Airlie Lagoon route, airport flight path restrictions and to a lesser degree the Mandalay Hill slope), and cable replacement logistics including cable manufacture lead times, cost, installation approvals and construction timelines escalate this risk.

These cable sections represent a Safety Net risk, high probability VCR cost and reputational risk exposure to both Ergon Energy and the Whitsunday tourism industry.

3.2. Quantification of the Identified Need

3.2.1. Safety Net Non-Compliance

Cannonvale substation has two 66 kV incoming feeders (CANN-01 and CANN-02) and two 15 MVA transformers that ensure supply can be fully restored to Cannonvale customers within Safety Net requirements. On the other hand, Jubilee Pocket, Mount Rooper and Shutehaven do not have N-1 security and are reliant on the 66 kV radial feeder between Cannonvale and Jubilee Pocket. Currently, a fault on this section of line will result in an outage for all Jubilee Pocket, Mount Rooper and Shutehaven customers which combine for a peak load at risk of approximately 16.4 MVA.

There is load transfer capacity of 4 MVA to transfer Jubilee Pocket customers to Cannonvale via 11 kV switching. This 11 kV switching combined with mobile generation is sufficient to restore supply to all LV Customers within the Safety Net requirement. The major customers of Hayman, Hamilton, Daydream and South Molle islands would experience an outage for the full duration of the time it takes to locate and restore the fault.

As these are major resorts that play an integral role in the success of the tourism industry in the Airlie Beach region, an extended outage for these customers is undesirable and will likely have a significant business impact.
The section at highest risk of causing an extended outage is the 1.41 km underground cable passing through the main tourist centre of Airlie Beach (highlighted in Figure 3 as Section A). Fault finding and repair of this cable would be very time consuming and likely result in an outage that spans days or even weeks instead of hours for the island customers. This section of cable is also the same XLPE type and of similar age to the recently failed 66 kV CANN-01 entry cable and tested CANN-02 entry cable at Cannonvale and has been identified as having a high risk of failure within the next few years.

![Figure 3: Overview of the 66 kV Sub-transmission Network Downstream of CANN](image)

**3.2.2. Long Term Cable Failure Outage Cost**

The long term cost due to a sustained cable failure (e.g. 1.41 km Airlie Lagoon cable) from water treeing has been considered in the context of a similar submarine cable failure.

Considering manufacturing and sea freight lead times for 66 kV cables of 16 weeks, this would be considered a catastrophic outage scenario. The islands are presently exposed to similar risk during a privately owned submarine cable failure and should have standby operating protocols to manage fuel supply and storage for an outage of a similar long term duration outage.

If the estimated cost of a 4-6 month outage (i.e. $8M-$12M) is borne entirely by the island resort operators, Ergon will bear significant political pressure and brand damage.

**4. Value of Customer Reliability**

Value of Customer Reliability (VCR) is an economic value applied to customers’ unserved energy for any particular year. Any reduction in unserved energy a solution that addresses the identified need described in Section 3 will bring will be treated as a benefit based on the corresponding reduction in customer financial consequence.

Based on historical reliability performance of the 66 kV sub-transmission network in the Cannonvale / Airlie Beach area, forecast load growth and load duration; probability weighted values of unserved energy at Cannonvale have been calculated. These values have been converted into a dollar figure which reflects the customer financial consequence of the unserved energy.
Customer impact of the sub-transmission network configuration has increased substantially in the last four years. This is reflected in the Value of Customer Reliability (VCR) values based on analysis of historical outages over the past eight years as shown in the figure below.

![Figure 4: Lost Energy VCR Values due to Lack of Switchyard at Cannonvale](image)

The unit rate for Value of Customer Reliability that has been used for this analysis is $28/kWh. This is a location specific value for Cannonvale / Airlie Beach based on the customer mix shown in Table 2 and the VCR values for different customer types shown in Table 3 as published by AEMO.

### Table 1: Cannonvale / Airlie Beach Supply Region Customer Breakdown

<table>
<thead>
<tr>
<th>Substation</th>
<th>Number of Premises</th>
<th>Domestic Premises</th>
<th>Commercial Premises</th>
<th>Industrial Premises</th>
</tr>
</thead>
<tbody>
<tr>
<td>CANN</td>
<td>5,504</td>
<td>4,573</td>
<td>0</td>
<td>930</td>
</tr>
<tr>
<td>JUPO</td>
<td>1,515</td>
<td>1,335</td>
<td>0</td>
<td>180</td>
</tr>
<tr>
<td>MORO</td>
<td>78</td>
<td>55</td>
<td>0</td>
<td>22</td>
</tr>
<tr>
<td>SHUT</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>PRMI</td>
<td>114</td>
<td>42</td>
<td>0</td>
<td>72</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>7,211</strong></td>
<td><strong>6,005</strong></td>
<td>0</td>
<td><strong>1,204</strong></td>
</tr>
</tbody>
</table>

### Table 2: AEMO VCR Values for Different Customer Types

<table>
<thead>
<tr>
<th>Sector</th>
<th>$/kWh</th>
<th>VCR ($/MWh)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domestic</td>
<td>$25.42</td>
<td>$25,420</td>
</tr>
<tr>
<td>Commercial</td>
<td>$44.72</td>
<td>$44,720</td>
</tr>
<tr>
<td>Industrial</td>
<td>$44.06</td>
<td>$44,060</td>
</tr>
<tr>
<td>Rural</td>
<td>$47.67</td>
<td>$47,670</td>
</tr>
</tbody>
</table>
5. Load Profiles

The load at Cannonvale / Airlie Beach comprises a mix of residential and industrial customers. Daily peak loads generally occur in the late afternoon and evening. The load is summer peaking, and annual peak loads are predominantly driven by air-conditioning.

5.1. Cannonvale (CANN) 66/11 kV Substation

The historical load of Cannonvale substation for the summer day (SD), summer night (SN), winter day (WD) and winter night (WN) periods since 2004 is shown in the figure below.

![Figure 5: Historical Load of Cannonvale Substation (Since 2004)](image)

The sudden drop in load seen between 2010 and 2011 is a result of Jubilee Pocket substation being energised and taking some of the load from Cannonvale.

Taking into account historical feeder growth and the forecast population growth a load growth of 2 % is expected. The peak load by 2030 will then be 19.15 MVA. Under an extreme load growth of 4 %, the load would increase to 24.18 MVA.

It should be noted that the Cannonvale substation summer peaks were being experienced between 1.30 pm to 4.00 pm in the afternoon, however in recent years (2015 to 2018 inclusive), the summer peak is now being experienced from 4.30 pm to 7.30 pm due to the installation of customer-owned rooftop solar PV systems (refer to the figure below).
5.2. Jubilee Pocket (JUPO) 66/11 kV Substation

The historical load of Jubilee Pocket substation for the summer day (SD), summer night (SN), winter day (WD) and winter night (WN) periods since its energisation in 2010 is shown in the figure below.
With a 2% load growth, the load will peak at 6.62 MVA in 2030 which is well below the Jubilee Pocket transformer nameplate rating of 32 MVA. However as upstream supply reliability improves it will allow more 11 kV feeder load to be transferred from Cannonvale to Jubilee Pocket. Point loads like Port of Airlie will likely proceed and be supported by the adjacent residential locality of Jubilee Pocket. The substation load will increase accordingly.

The daily load profile is also shown in the figure below.
5.3. Mount Rooper (MORO) 66/11 kV Substation

The historical load of Mount Rooper substation for the summer day (SD), summer night (SN), winter day (WD) and winter night (WN) periods since 2002 is shown in the figure below.

As the majority of load on this substation is from the Daydream/South Molle feeder, the forecast growth of this substation will be heavily dependent on the resorts on these islands.
Daydream Island has recently undergone refurbishment and therefore the load is expected to increase as the resort begins taking more tourists. Daydream Island bore the brunt of Category 4 Cyclone Debbie in March 2017 with 260 km/hr wind gusts and a tidal surge that caused significant damage to the iconic island 4.5 star resort. Cyclone Debbie is responsible for the drop in demand experienced in 2017.

Repair and development works are currently being undertaken, and the luxury island 277 room resort and associated facilities are expected to re-open at the end of the first quarter 2019.

The yearly daily load profile of Mount Rooper substation since 2014/15 is also shown in the figure below.

![Mount Rooper Substation - Average and Peak Weekday kW Profile (Summer)](image)

**Figure 12: Mount Rooper Average & Peak Weekday Load Profile (Summer)**

![Load Duration Curve for MORO Mount Rooper - 66/11 kV Substation Total](image)

**Figure 13: Mount Rooper Load Duration Curve**
5.4. Shutehaven (SHUT) 66/11 kV Substation

The historical load of Shutehaven substation for the summer day (SD), summer night (SN), winter day (WD) and winter night (WN) periods since 2000 is shown in the figure below.

Similarly to Mount Rooper, the load on Shutehaven substation is dependent on the load of the two connected islands, Hayman Island and Hamilton Island.

Before damage from cyclone Debbie forced the resorts on the Hayman and Hamilton islands to partly close, the authorised demands were 3.3 MVA and 11.0 MVA respectively. Consequently, it can be expected that the peak load on Shutehaven substation can return to previous peak demands of 11.0 MVA and potentially increase to 13.3 MVA (being the combined island authorised demand).

The recent daily summer load profiles for Shutehaven substation can be seen in the figure below.
6. Assumptions in Relation to Identified Need

Below is a summary of key assumptions that have been made when the Identified need has been analysed and quantified.

It is recognised that the below assumptions may prove to have various levels of correctness, and they merely represent a ‘best endeavours’ approach to predict the future identified need.

6.1. Forecast Maximum Demand

It has been assumed that peak demand at Jubilee Pocket substation will grow as forecasted.

Factors that have been taken into account when the load forecast has been developed include the following:

- load history
- known future developments (new major customers, network augmentation, etc.)
- temperature corrected start values (historical peak demands)
- forecast growth rates for organic growth
6.2. Load Profile

Characteristic peak day load profiles shown in Section 5 are unlikely to change significantly from year to year, i.e. the shape of the load profile will remain virtually the same with increasing maximum demand.

6.3. System Capability – Line Ratings

The thermal ratings of the sub-transmission lines that supply Cannonvale have been calculated based on the main parameters listed in the table below.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Summer Day (9am – 5pm)</th>
<th>Summer Evening (5pm – 10pm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambient Temperature</td>
<td>35°C</td>
<td>31°C</td>
</tr>
<tr>
<td>Wind Velocity</td>
<td>1.3 m/s</td>
<td>0.8 m/s</td>
</tr>
<tr>
<td>Wind Angle to Conductor Axis</td>
<td>45°</td>
<td>45°</td>
</tr>
<tr>
<td>Direct Solar Radiation</td>
<td>910 W/m²</td>
<td>200 W/m²</td>
</tr>
<tr>
<td>Diffuse Solar Radiation</td>
<td>210 W/m²</td>
<td>20 W/m²</td>
</tr>
</tbody>
</table>

7. Technical Characteristics of Non-Network Options

This section describes the technical characteristics of the identified need that a non-network option would be required to comply with.

7.1. Size

To meet Ergon Energy's ongoing operational needs it is expected that any alternate solution must deliver the required load reduction and/or local generation listed in the table below.

<table>
<thead>
<tr>
<th>Year</th>
<th>Total Demand Reduction Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>2020</td>
<td>12.5 MVA</td>
</tr>
<tr>
<td>2021</td>
<td>12.9 MVA</td>
</tr>
<tr>
<td>2022</td>
<td>13.1 MVA</td>
</tr>
<tr>
<td>2023</td>
<td>13.3 MVA</td>
</tr>
<tr>
<td>2024</td>
<td>13.6 MVA</td>
</tr>
<tr>
<td>2025</td>
<td>13.8 MVA</td>
</tr>
<tr>
<td>2026</td>
<td>14.0 MVA</td>
</tr>
<tr>
<td>2027</td>
<td>14.3 MVA</td>
</tr>
<tr>
<td>2028</td>
<td>14.6 MVA</td>
</tr>
<tr>
<td>2029</td>
<td>14.9 MVA</td>
</tr>
</tbody>
</table>
7.2. Location

The location where network support and load restoration capability will be measured / referenced is on the 66 kV bus at Jubilee Pocket substation; however alternative options may be located anywhere downstream on the 66 kV network, so long as they can be operationally utilised when required.

7.3. Timing

7.3.1. Implementation Timeframe

In order to ensure compliance with Ergon Energy’s planning criteria and the National Electricity Rules, a non-network solution will need to be implemented by September 2023.

7.3.2. Time of Year

Load restoration capability (for Service Safety Net Targets) may be required at any time of the year, although required magnitude will be significantly lower during seasons with low to moderate daily peak loads, e.g. late autumn, winter and early spring.

7.4. Compliance with Regulations & Standards

As a distribution network service provider (DNSP), Ergon Energy must comply with regulations and standards, including the Queensland Electricity Act and Regulation, Distribution Authority, National Electricity Rules and applicable Australian Standards.

These obligations must be taken in consideration when choosing a suitable solution to address the identified need at Cannonvale / Airlie Beach as discussed in this RIT-D report.

7.5. Longevity

Proposed non-network options will typically be required to provide solutions to the identified need for a period of at least 10 years. However, alternative solutions that can defer additional network investment for a smaller number of years may also be considered.

8. Feasible vs Non Feasible Options

8.1. Potentially Feasible Options

The identified need presented in this RIT-D report is driven by the capability and reliability of the existing 66 kV network that supplies the Cannonvale / Airlie Beach area, and the replacement of aged and poor condition assets. As such, solutions that cost effectively provide increased contingency load restoration capability are likely to represent reasonable options.
A non-exhaustive list of potentially feasible options includes:

- New embedded dispatchable network generation
- Existing customer generation
- Load curtailment or “Call-off-load” opportunities (this refers to contracting existing customers to be partially or fully curtailed when called upon by Ergon Energy)
- Embedded energy storage systems.

8.2. Options that are Unlikely to be Feasible

Without attempting to limit a potential proponent’s ability to innovate when considering opportunities, some technologies / approaches are unlikely to represent a technically or financially feasible solution.

A non-exhaustive list of options that are unlikely to be feasible includes:

- Renewable generation not coupled with energy storage and/or dispatchable generation
- Unproven, experimental or undemonstrated technologies.

9. Internal Options Identified

9.1. Non-Network Options Identified

Ergon Energy has not identified any viable internal non-network solutions that will address the identified need.

9.2. Distribution Network Options Identified

Ergon Energy’s preferred internal option at this stage is to duplicate and manage the radial 66 kV cable sections to Shute Harbour and establish a future second 66 kV feeder between Cannonvale and Jubilee Pocket 66/11 kV substations.

TMR are planning to upgrade the section of Shute Harbour road between Island Drive and Waterson Way, and it is recommended that 66 kV conduits be installed and at risk cable sections (Airlie Lagoon, Mandalay and Airport) are duplicated during the proposed TMR roadworks. The second feeder between Cannonvale and Jubilee Pocket is a long term network development strategy but not required immediately.

Upon completion of these works, the network downstream of Cannonvale would be Safety Net compliant. The subsequent reliability improvement to Jubilee Pocket and Mount Rooper will also allow permanent Airlie Beach load transfers from Cannonvale to Jubilee Pocket and commissioning of new ‘Urban’ category MSS 11 kV feeders without becoming a ‘RED’ feeder immediately upon commissioning (i.e. as is currently the case with the Port of Airlie 11 kV feeder). Additionally, it will also resolve the MORO Shute Harbour (108) 11 kV ‘RED’ SR feeder status.
### 10. Submissions & Next Steps

#### 10.1. Submissions from Solution Providers

Ergon Energy invites written submissions on this report from registered participants and interested parties.

With reference to Section 7, all submissions should include sufficient technical and financial information to enable Ergon Energy to undertake comparative analysis of the proposed solution against other options.

The proposals should include, but are not limited to:

- Full costs of completed works including delivery and installation where applicable
- Whole of life costs including operational costs
- Project execution strategy including design, testing and commissioning plans
- Engineering network system studies and study reports
- Verified and approved engineering designs if available

Ergon Energy will not be legally bound in any way or otherwise obligated to any person who may receive this RIT-D report or to any person who may submit a proposal. At no time will Ergon Energy be liable for any costs incurred by a proponent in the assessment of this RIT-D report, any site visits, obtainment of further information from Ergon Energy or the preparation by a proponent of a proposal to address the identified need specified in this RIT-D report.

Submissions in writing are due by 19 September 2019 and should be lodged to Ergon Energy’s “Regulatory Investment Test for Distribution (RIT-D) Partner Portal” The portal is available at:


#### 10.2. Next Steps

Ergon Energy intends to carry out the following process to assess what action should be taken to address the identified need at Cannonvale:

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
<th>Date Released/ Due Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Step 1</td>
<td>Publish Non Network Options Report (this report) inviting non-network options from interested participants</td>
<td>Date Released: 24 June 2019</td>
</tr>
<tr>
<td>Step 2</td>
<td>Submissions in response to the Non Network Options Report</td>
<td>Due Date: 19 September 2019</td>
</tr>
<tr>
<td>Step</td>
<td>Description</td>
<td>Anticipated Completion Date</td>
</tr>
<tr>
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<tr>
<td>Step 3</td>
<td>Review and analysis of proposals by Ergon Energy. This is likely to involve further consultation with proponents and additional data may be requested.</td>
<td>Anticipated to be completed by: 7 October 2019</td>
</tr>
<tr>
<td>Step 4</td>
<td>Release of the Draft Project Assessment Report (DPAR)</td>
<td>Anticipated to be released by: 14 October 2019</td>
</tr>
<tr>
<td>Step 5</td>
<td>Submissions in response to the Draft Project Assessment Report.</td>
<td>Due Date: 29 November 2019</td>
</tr>
<tr>
<td>Step 6</td>
<td>Review and analysis by Ergon Energy. This is likely to involve further consultation with proponents and additional data may be requested.</td>
<td>Anticipated to be completed by: 20 December 2019</td>
</tr>
<tr>
<td>Step 7</td>
<td>Release of Final Project Assessment Report (FPAR) including summary of submissions received</td>
<td>Anticipated to be released by: 23 December 2019</td>
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</tbody>
</table>

Ergon Energy reserves the right to revise this timetable at any time. The revised timetable will be made available on the Ergon Energy website.

Ergon Energy will use its reasonable endeavours to maintain the consultation program listed above. However, due to changing power system conditions or other circumstances beyond the control of Ergon Energy this consultation schedule may change. Up-to-date information will be available on the Partner Portal.

During the consultation period, Ergon Energy will review, compare and analyse all internal and external solutions. At the conclusion of the consultation process, Ergon Energy will publish a final report which will detail the most feasible option. Ergon Energy will then proceed to take steps to progress the recommended solution to ensure any statutory non-compliance is addressed and undertake appropriately justified network reliability improvement, as necessary.