20 November 2017

ElectraNet

South Australia's electricity transmission specialist

Eyre Peninsula electricity supply options investigation

Project Assessment Draft Report

Port Lincoln Public Forum

Security Classification: Public

electranet.com.au

Purpose

ElectraNet is committed to running an open and transparent process to find the best options for affordable and reliable electricity supply

- Present the findings of the Project Assessment Draft Report (PADR) published on 16 November 2017
- Provide the opportunity to clarify understanding
- Invite feedback from customers and stakeholders as input to the next phase of ElectraNet's investigation

Outline

Item	Presenter/ Facilitator
1. Background and overview	Rainer Korte
2. Options considered	Brad Parker
3. Economic assessment and key outcomes	Ann Whitfield and Tom Graham from HoustonKemp
4. Q & A session	Rainer Korte
5. Next steps	Rainer Korte

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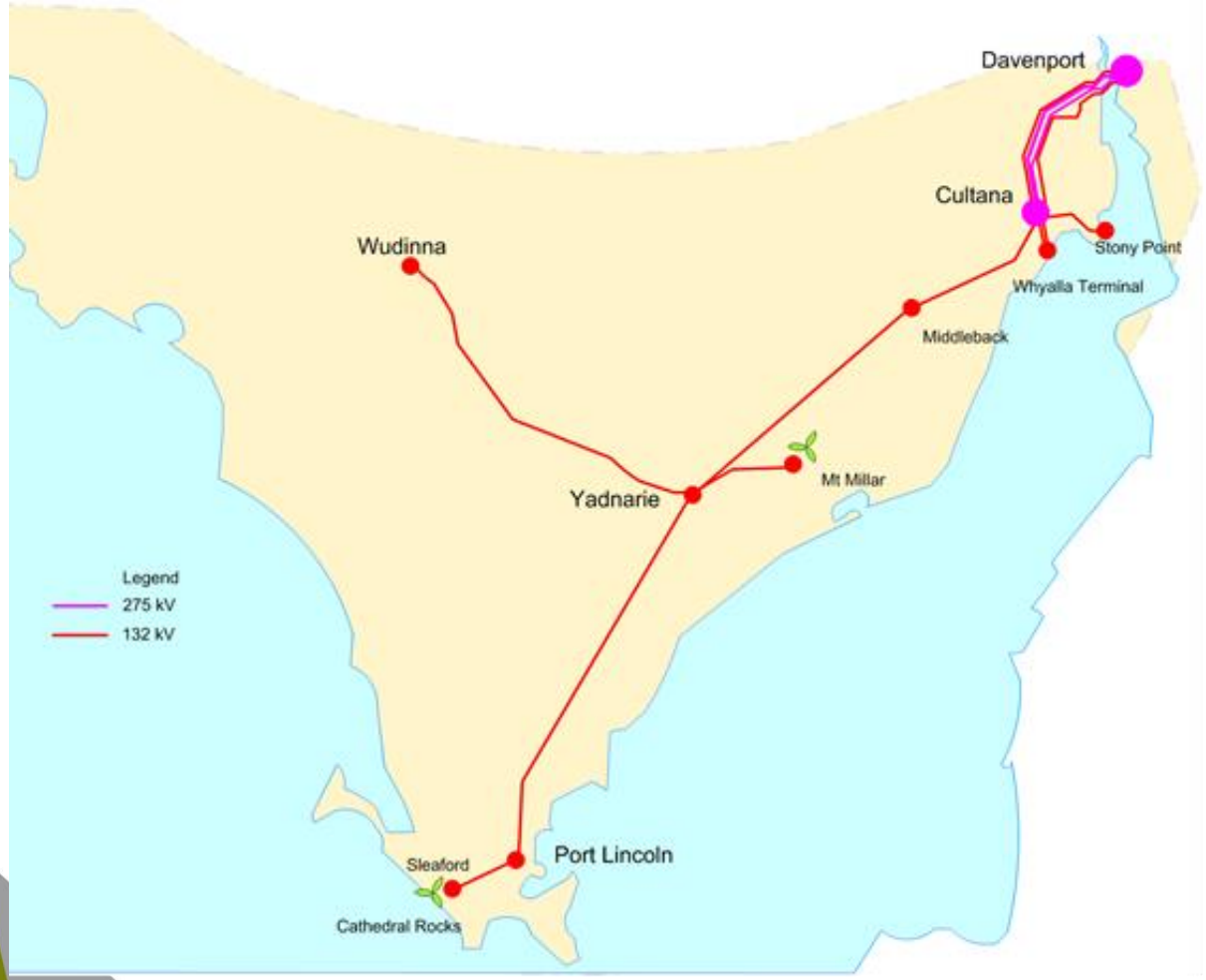
Background and overview

Rainer Korte
Executive Manager Asset Management

Eyre Peninsula transmission network



Current maximum demand is about 55 MW southwest of Cultana with about 35 MW at Port Lincoln

- Existing 132 kV radial line is close to full capacity with limited potential to meet increased demand
- Asset condition challenges with line >45 years old
- Port Lincoln supply reliability includes network support from 3 x 25 MW diesel-fired gas turbines

Identified need

Providing reliable electricity supply to Port Lincoln most cost effectively in the future

Key drivers:

- The need to **replace existing transmission line components** in the next few years
- The upcoming **expiry of the network support arrangement** at Port Lincoln (at end 2018)

ElectraNet is investigating the best option for meeting this need via a formal **Regulatory Investment Test for Transmission (RIT-T)** process under the National Electricity Rules

Eyre Peninsula reliability standards

Electricity Transmission Code[1] specifies minimum reliability standards

Exit point	Description[2]
Middleback (Category 1)	• Provide "N" equivalent line and transformer capacity for 100% of contracted demand (i.e. with all transmission elements in service)
Wudinna and Yadnarie (Category 2)	• Provide "N" equivalent line capacity for 100% of contracted demand (i.e. with all transmission elements in service) • Provide "N-1" equivalent transformer capacity for 100% of contracted demand (i.e. with any one element out of service)
Port Lincoln (Category 3)	• Provide "N-1" equivalent line and transformer capacity for 100% of contracted demand (i.e. with any one element out of service), including the use of post-contingent network support operation

[1] TC09 July 2018
[2] Restoration standards also apply in each case

For more information see www.escosa.sa.gov.au

Regulatory Investment Test (RIT-T)

- The economic cost benefit test that applies to all major network investments in the National Electricity Market
- Is overseen by the Australian Energy Regulator (AER)
- Applies to network investments expected to cost more than $6m
- Considers all technically and economically feasible options to meeting an identified need (such as a network limitation or constraint)
- Both network and non-network solution options are considered
- Involves an open and transparent public consultation process

For more information see www.aer.gov.au

RIT-T process

TNSP identifies network limitation and possible options

TNSP prepares project specification consultation report (PSCR)

TNSP assesses submissions and determines credible options

TNSP undertakes cost benefit assessment and determines "preferred" option

12 weeks for submissions

We are here (PADR published 16 Nov 2017)

TNSP prepares project assessment draft report (PADR)

TNSP assesses submissions and makes adjustments as necessary

TNSP issues project assessment conclusions report (PACR)

AER undertakes dispute process if the outcome is disputed

6 weeks for submissions

30 days to raise a dispute

TNSP = Transmission Network Service Provider

Consultation to date

Milestone	Timing
Project consultation report (PSCR) published	28 April 2017
Public forums (Port Lincoln and Adelaide)	26 and 29 June 2017
Submissions on PSCR (15 received)	21 July 2017
Draft report (PADR) published	16 Nov 2017
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Submissions due on PADR	19 Jan 2018
Final report (PACR)	April 2018
AER makes ruling on final report	Mid-2018

Key issues in submissions to PSCR

Issue Raised	ElectraNet Comment
A 500 kV line option should be considered, to enable the connection of more renewable generation	ElectraNet will assess whether the additional benefits of a 500 kV option would exceed the additional costs
Eyre Peninsula should be considered for inclusion as a Renewable Energy Zone in the Integrated Grid Plan recommended by the Finkel Review	We agree and are working with AEMO on development of an Integrated Grid Plan
The ability for new wind farms to export renewable energy to the Eastern States will be influenced by whether or not a new interconnector to the eastern states is constructed	Economic analysis will consider scenarios with and without a new interconnector
• There are community concerns about the historical performance of the existing Port Lincoln Power Station • Battery storage should be considered as a short-term option	We are analysing a range of generation and other technology proposals that were received in response to the PSCR

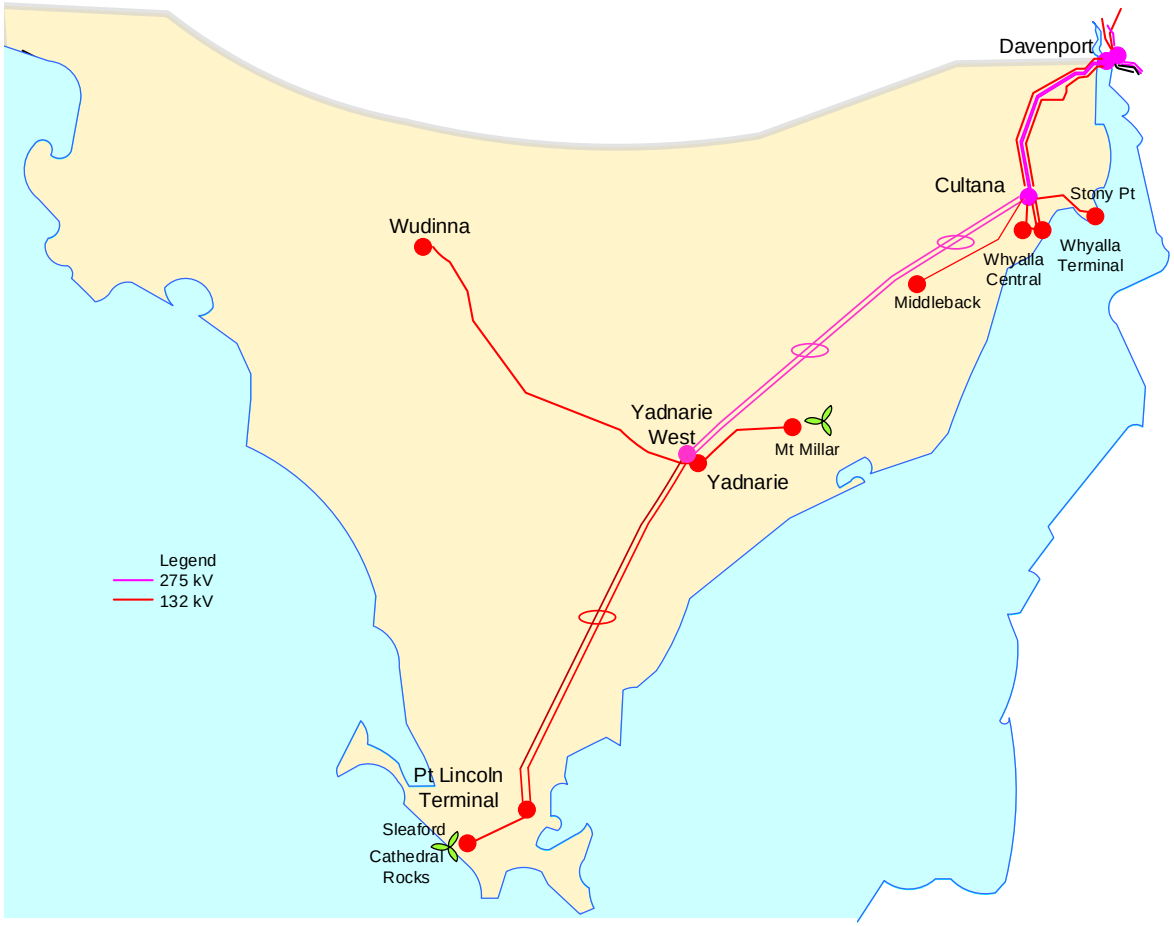
Key issues in submissions to PSCR

Issue Raised	ElectraNet Comment
• There are potential future large mining load connections on the Eyre Peninsula • There is significant uncertainty regarding whether potential new projects will proceed	We are assessing “option value” of staged developments as a component of the economic analysis
A ring route for the Eyre Peninsula should be considered	The viability of new transmission line options including from Cultana to Port Lincoln via Wudinna has been explicitly considered in the analysis
Upgrades to the Eyre Peninsula transmission system will be paid for by South Australian consumers more broadly, and need to be considered in the light of recent extreme electricity price increases	Full line replacement would proceed only if benefits to customers exceed costs

Draft report overview

- Report considers most economic long-term electricity supply solution for the Eyre Peninsula
- Variants of five credible options have been assessed, including staged options for future proofing
- Report finds that building a new transmission line to supply the Eyre Peninsula is the most cost effective long-term solution
- We've tested this draft conclusion under a range of alternative assumptions about the future and with detailed sensitivity analysis
- We seek your feedback on the draft report and its findings

Draft preferred option[1]



- A new double circuit 275 kV transmission line from Cultana to Yadnarie and a new double circuit 132kV line from Yadnarie to Port Lincoln
- Estimated to cost $300m
- Adding less than $3 to transmission component of the annual electricity bill for average residential customer in SA
- Net market benefits of $120m over 20 years
- Broader economic benefits will also be realised

1 The preferred option is the one that delivers the greatest expected net benefits under the RIT-T economic assessment

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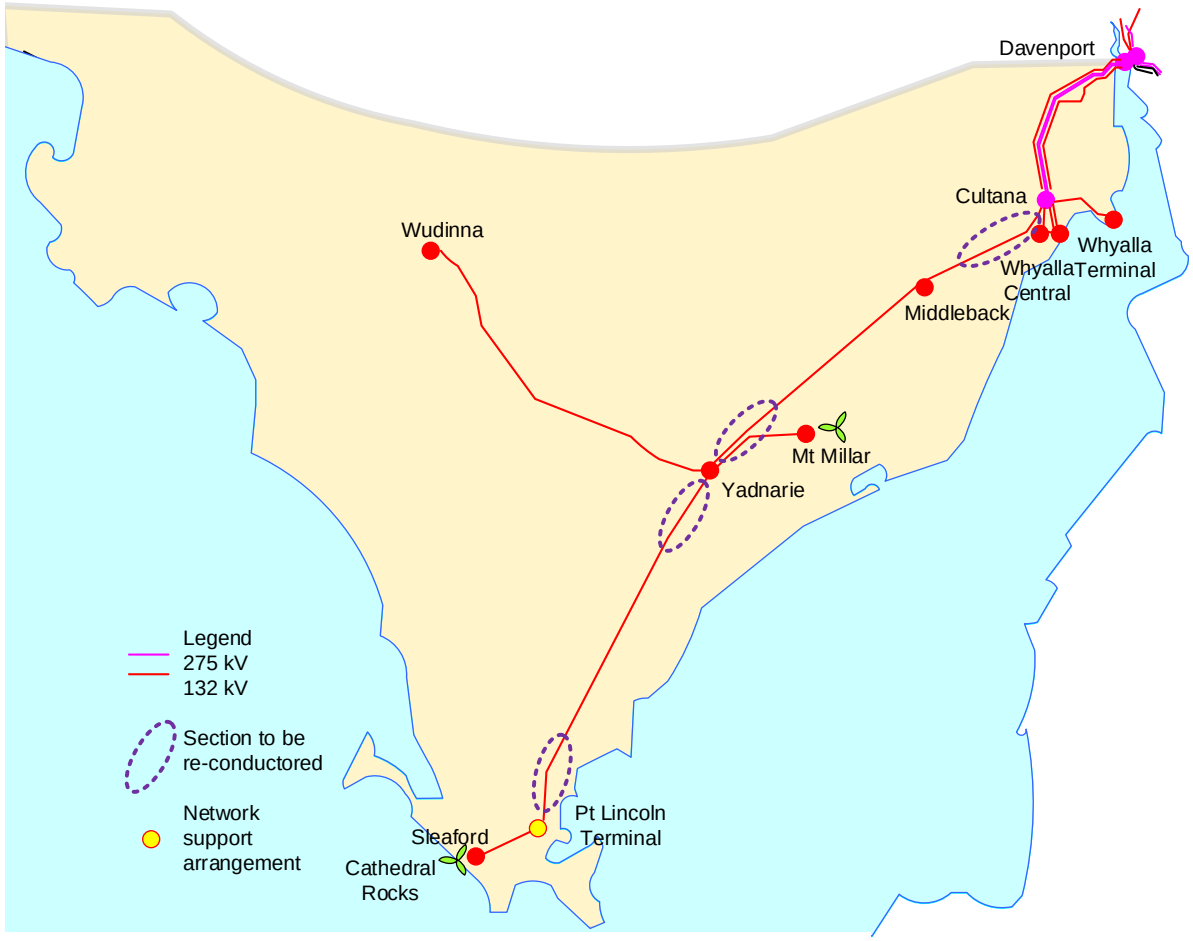
Options considered

Brad Parker
Network Planning Manager

Five broad options considered

Supply Option	Description
Option 1	Replace components of the existing 132 kV single-circuit line between Cultana and Port Lincoln and continue network support at Port Lincoln
Option 2	Replace the existing single-circuit 132 kV line between Cultana and Port Lincoln with a new double-circuit 132 kV line
Option 3	Replace the existing single-circuit 132 kV line between Cultana and Port Lincoln with two new single-circuit 132 kV lines along different routes
Option 4	Replace the existing single-circuit 132 kV line between Cultana and Port Lincoln with a new double-circuit line, at least part of which is capable of 275 kV operation
Option 5	Replace the existing single-circuit 132 kV line between Cultana and Port Lincoln with two new single-circuit lines along different routes, at least some of which are capable of 275 kV operation

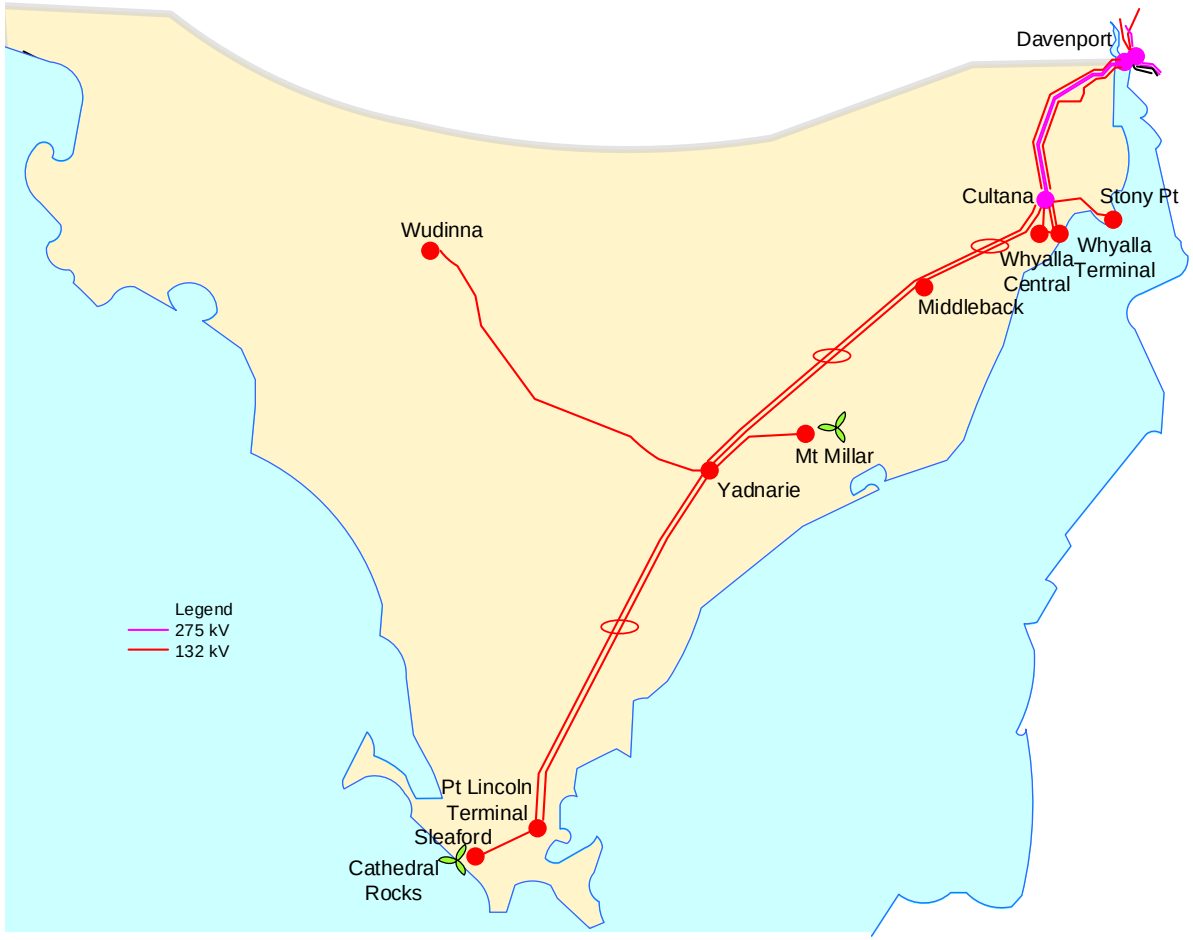
Option 1



Cost: $80 million

- New long-term network support arrangement required at Port Lincoln
- Maintains existing capacity
- No capability to connect potential future medium or large mining loads
- Any new generators likely to be significantly constrained

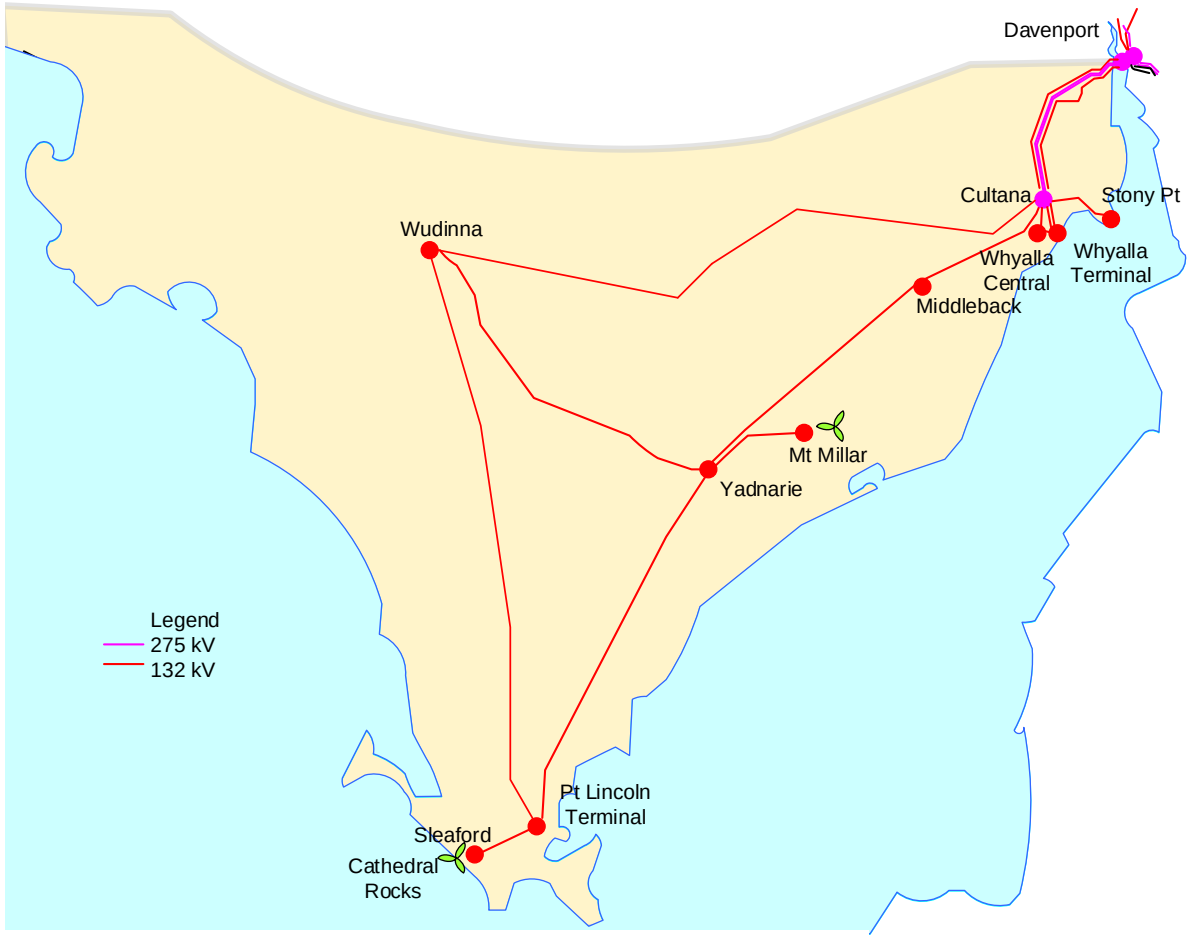
Option 2



Cost: $220 million

- Each new 132 kV line would have about 300 MVA capacity
- Capable of accommodating potential future small to medium mining loads
- Can facilitate new generator connections of up to about 300 to 400 MW

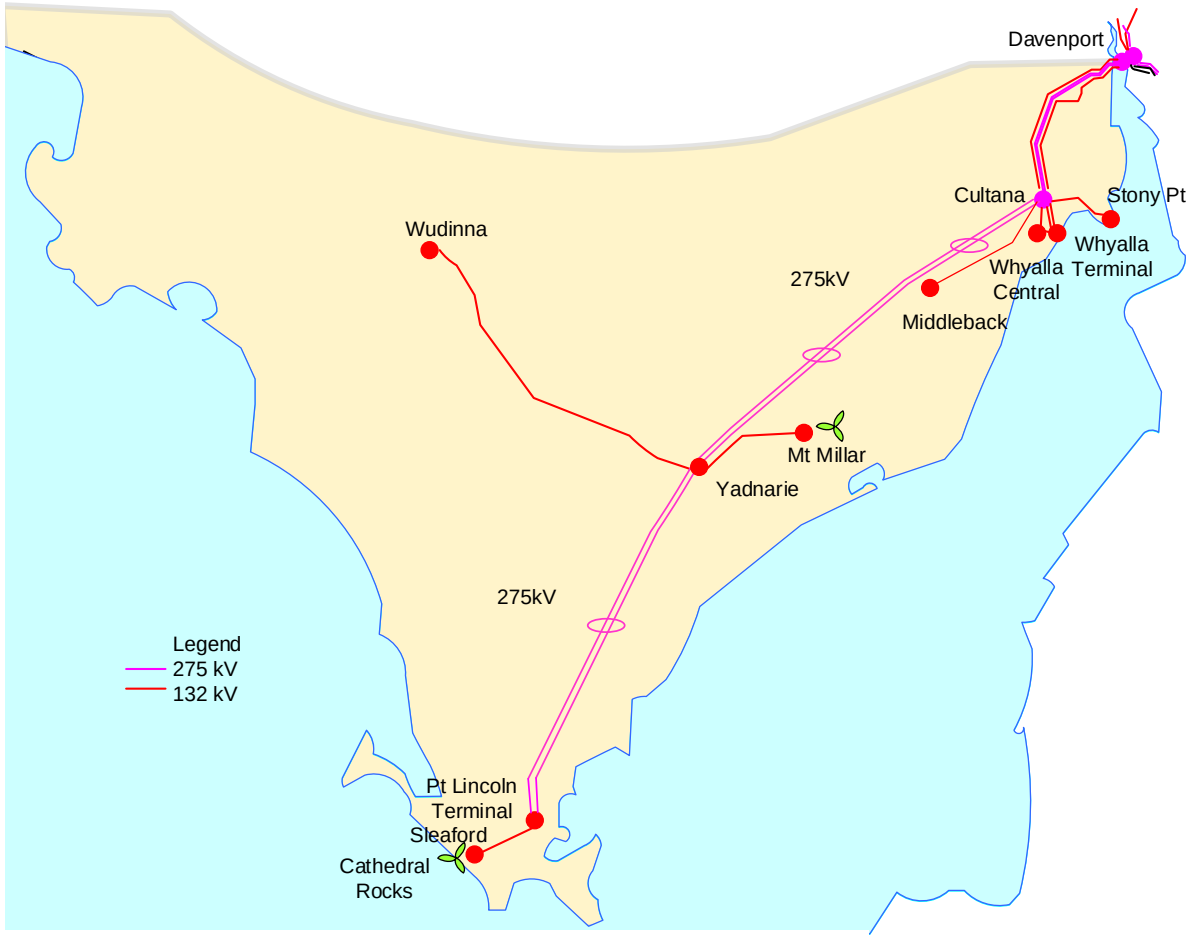
Option 3



Cost: $390 million

- Each new 132 kV line would have about 300 MVA capacity
- Capable of accommodating potential future small to medium mining loads
- Can facilitate new generator connections of up to about 300 to 400 MW

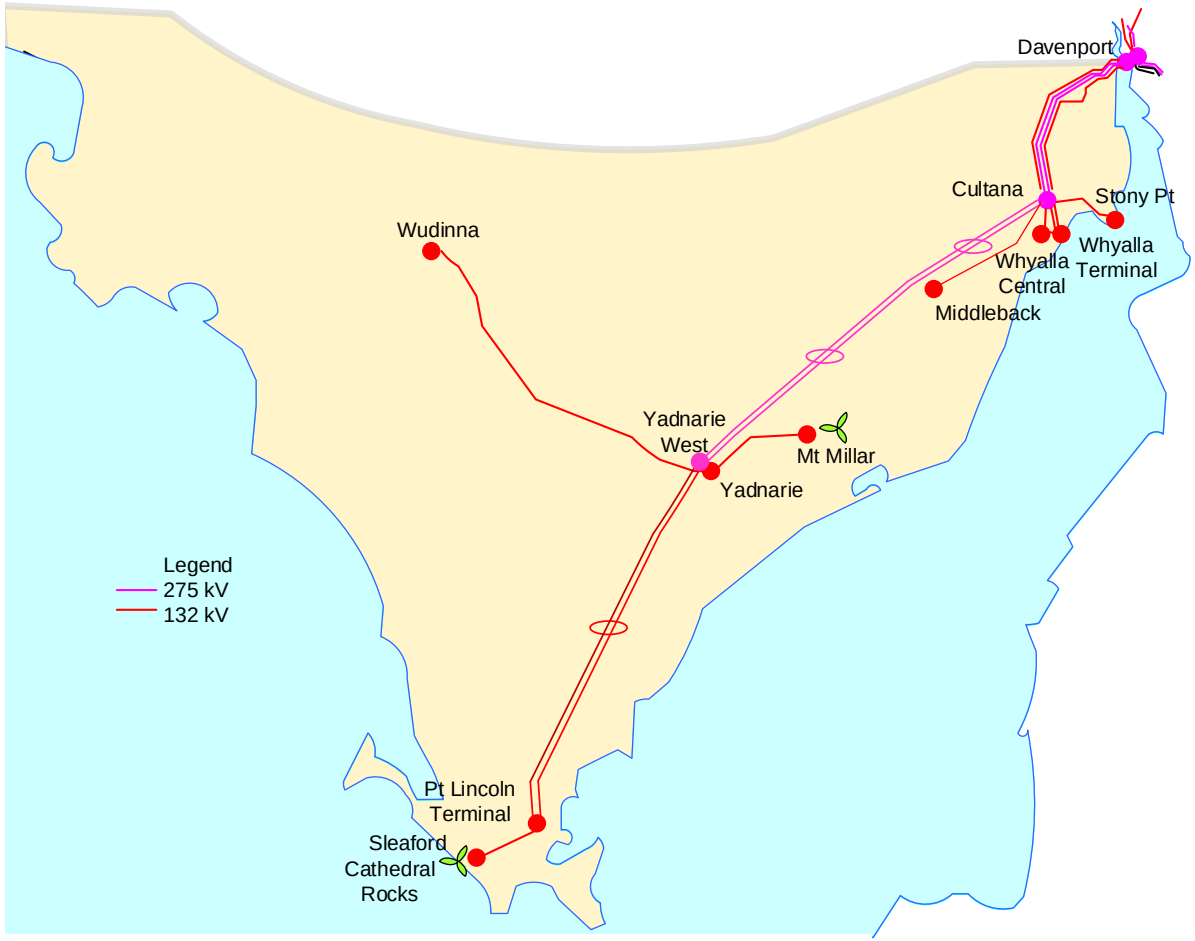
Option 4A



Cost: $390 million

- Each new 275 kV line would have about 600 MVA capacity
- Capable of accommodating potential future large mining loads
- Can facilitate new generator connections of up to about 1000 MW

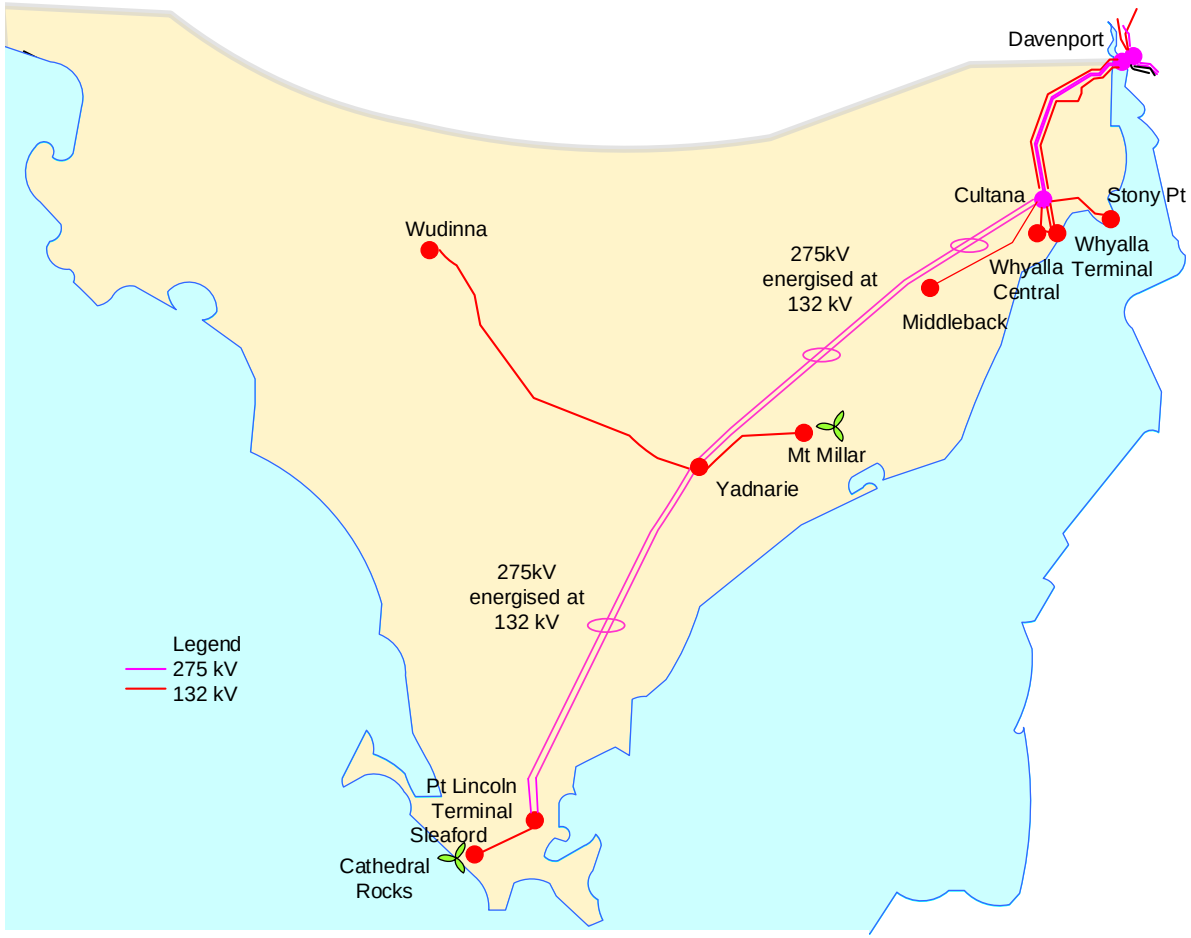
Option 4B



Cost: $300 million

- Each new 132 kV line would have about 300 MVA capacity
- Each new 275 kV line would have about 600 MVA capacity
- Capable of accommodating potential future large mining loads
- Can facilitate new generator connections of up to about 1000 MW

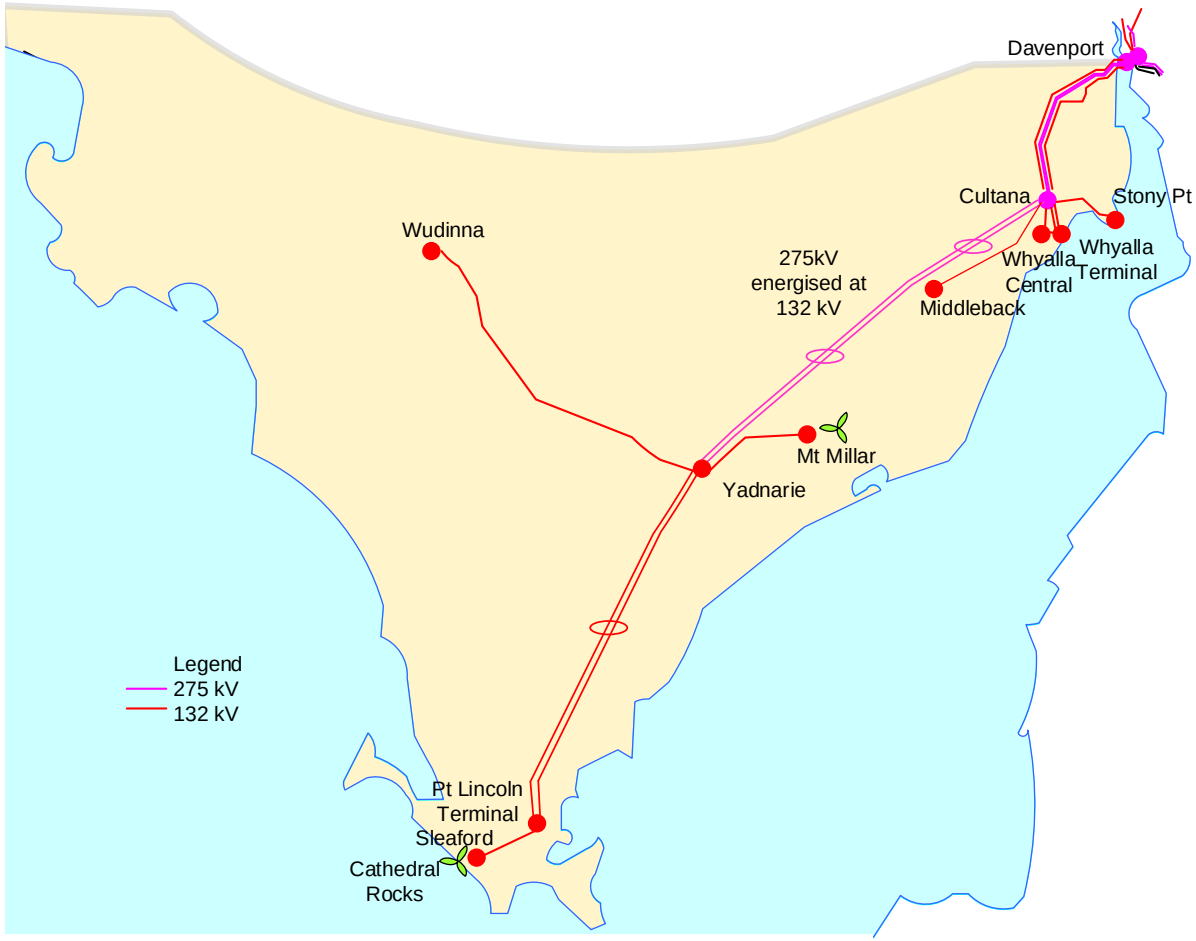
Option 4C



Cost: $310 million

- Each new line would initially be operated at 132 kV, with a capacity of about 300 MVA
- If upgraded to 275 kV in future, each line would have capacity of about 600 MVA
- Capable of accommodating potential future large mining loads
- Can facilitate new generator connections of up to about 1000 MW after upgrade to 275 kV

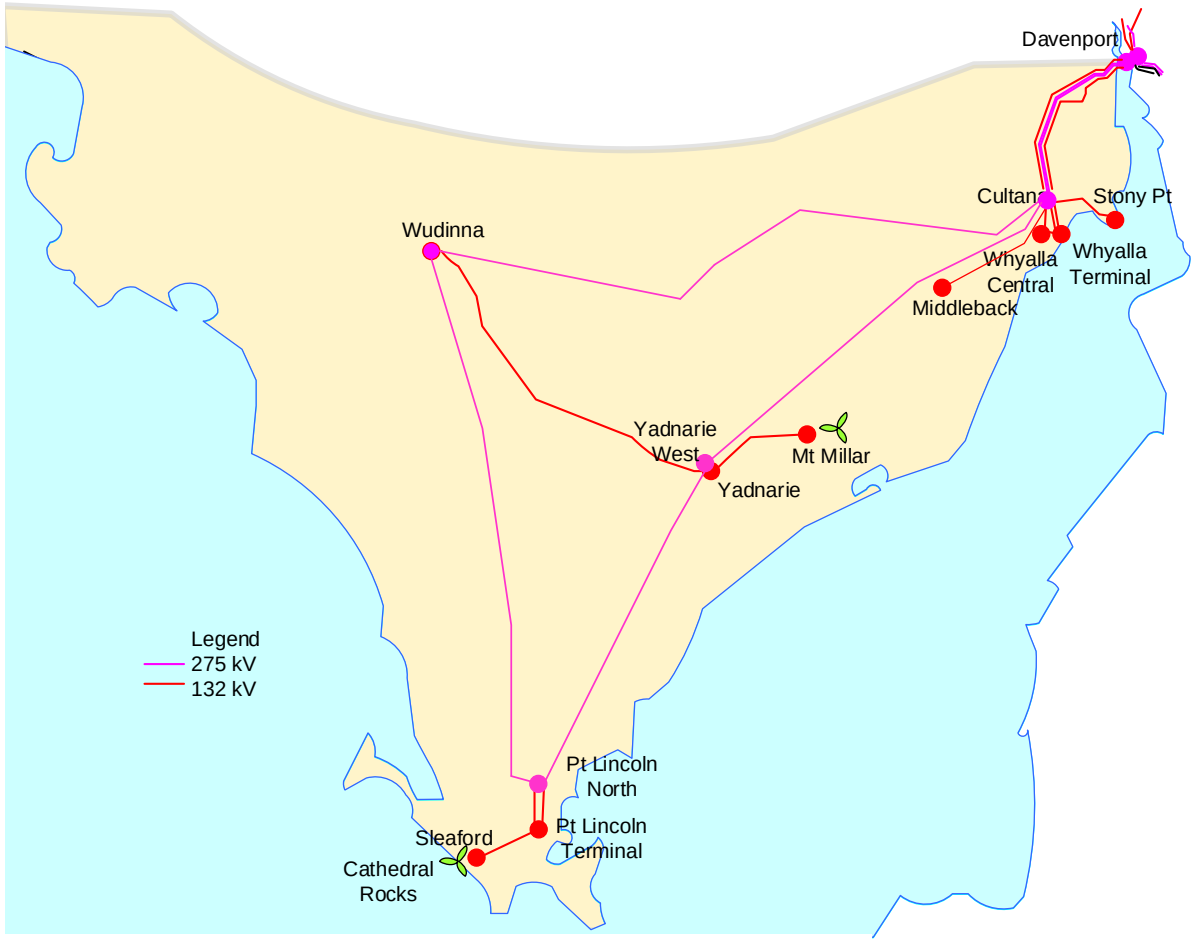
Option 4D



Cost: $270 million

- Each new line would initially be operated at 132 kV, with a capacity of about 300 MVA
- If upgraded to 275 kV in future, each line would have capacity of about 600 MVA
- Capable of accommodating potential future large mining loads
- Can facilitate new generator connections of up to about 1000 MW

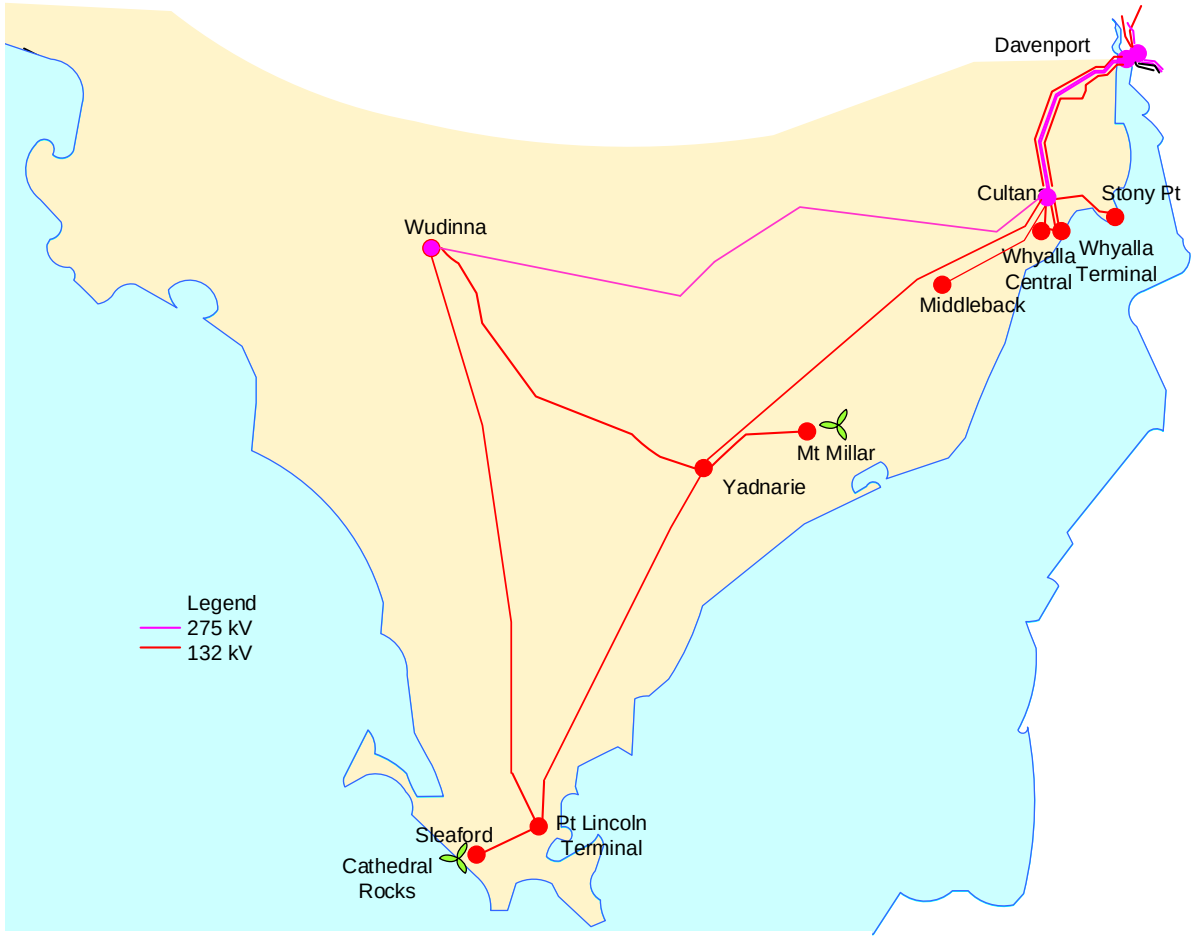
Option 5A



Cost: $610 million

- Each new 275 kV line would have capacity of about 600 MVA
- Capable of accommodating potential future large mining loads
- Can facilitate new generator connections of up to about 1000 MW

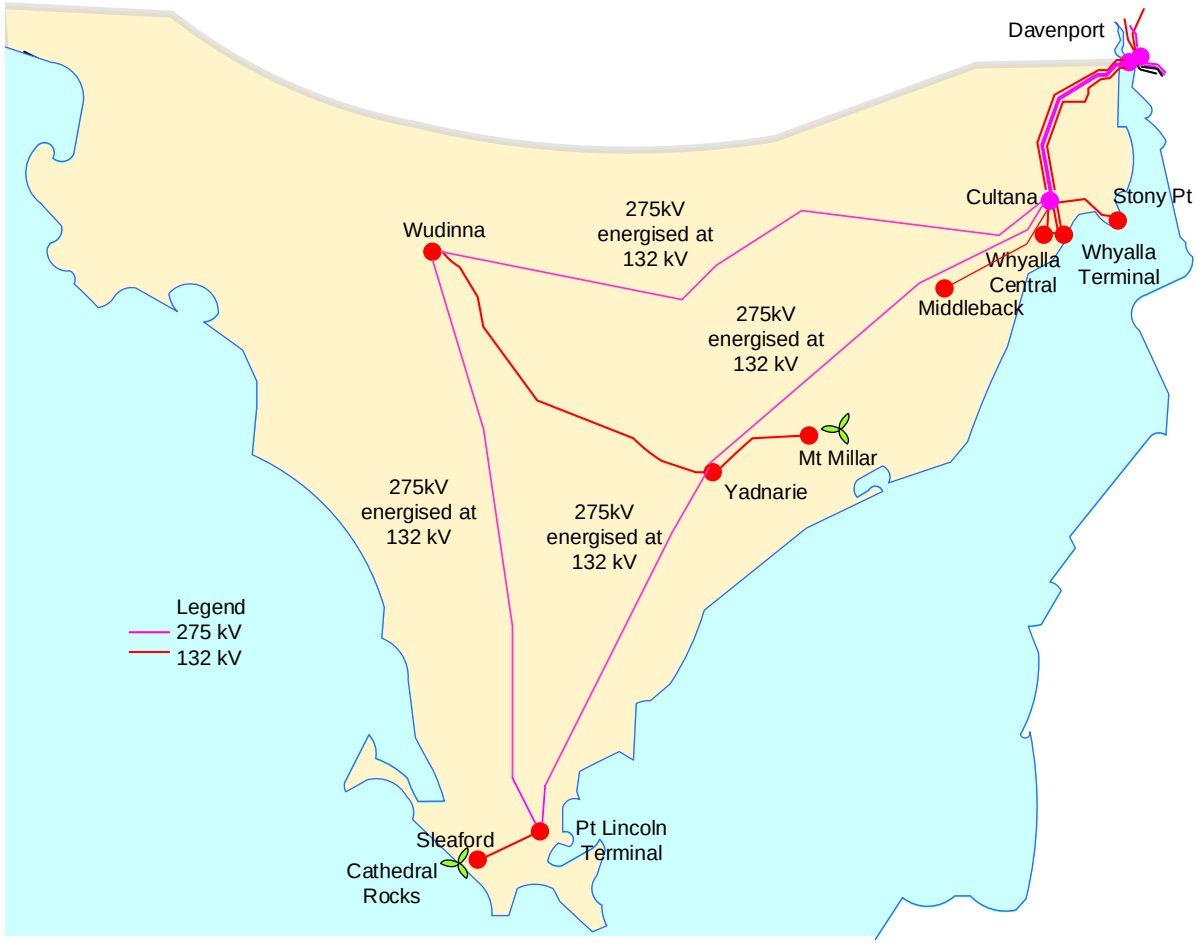
Option 5B



Cost: $450 million

- Each new 132 kV line would have a capacity of about 300 MVA
- Each new 275 kV line would have capacity of about 600 MVA
- Capable of accommodating potential future large mining loads
- Can facilitate new generator connections of up to about 400 to 600 MW

Option 5C



Cost: $500 million

- Each new line would initially be operated at 132 kV, with a capacity of about 300 MVA
- If upgraded to 275 kV in future, each line would have capacity of about 600 MVA
- Capable of accommodating potential future large mining loads
- Can facilitate new generator connections of up to about 1000 MW

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Economic assessment and key outcomes

Ann Whitfield and Tom Graham
HoustonKemp

Q & A session

Next steps

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