

Attachment 1 Diagrams and Net Present Costs (NPC) for options under consideration

Attachment 1

Single Line Diagrams

Existing Network Single Line Diagram

220kV Option – Stage 1 - CENTRAL Forecast Scenario

220kV Option – Stage 2 - HIGH Forecast Scenario 2013

220kV Option – Stage 3 - HIGH Forecast Scenario 2015

330kV single circuit option - Stage 1 - CENTRAL Forecast Scenario

330kV single circuit option - Stage 2 - HIGH Forecast Scenario 2015

275kV Option – Stage 1 - CENTRAL Forecast Scenario

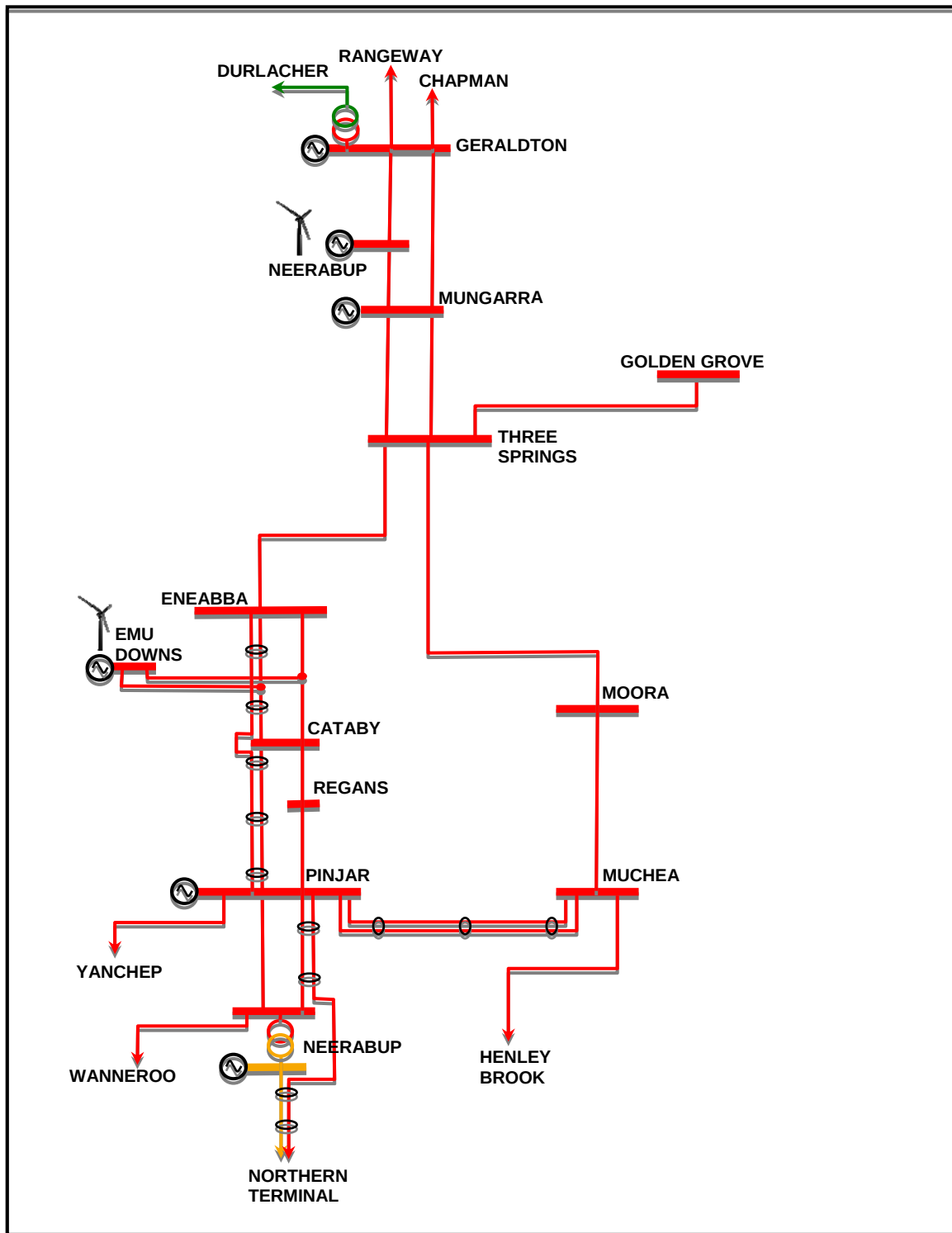
275kV Option – Stage 2 - HIGH Forecast Scenario 2014

275 kV Option Stage 3 - HIGH Forecast Scenario 2018

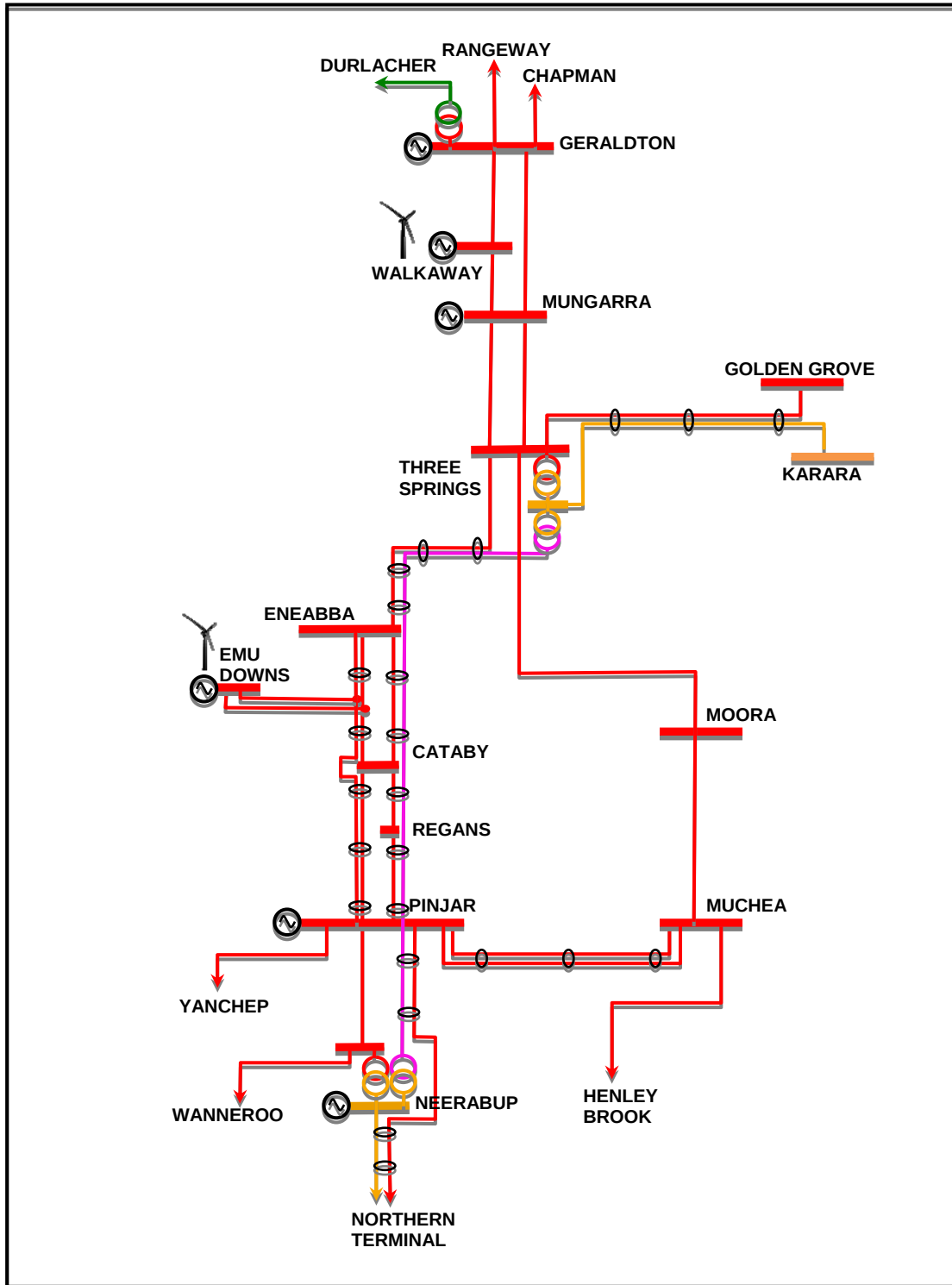
330kV double circuit option - Stage 1 - CENTRAL Forecast Scenario

330kV double circuit option - Stage 2 - HIGH Forecast Scenario 2015

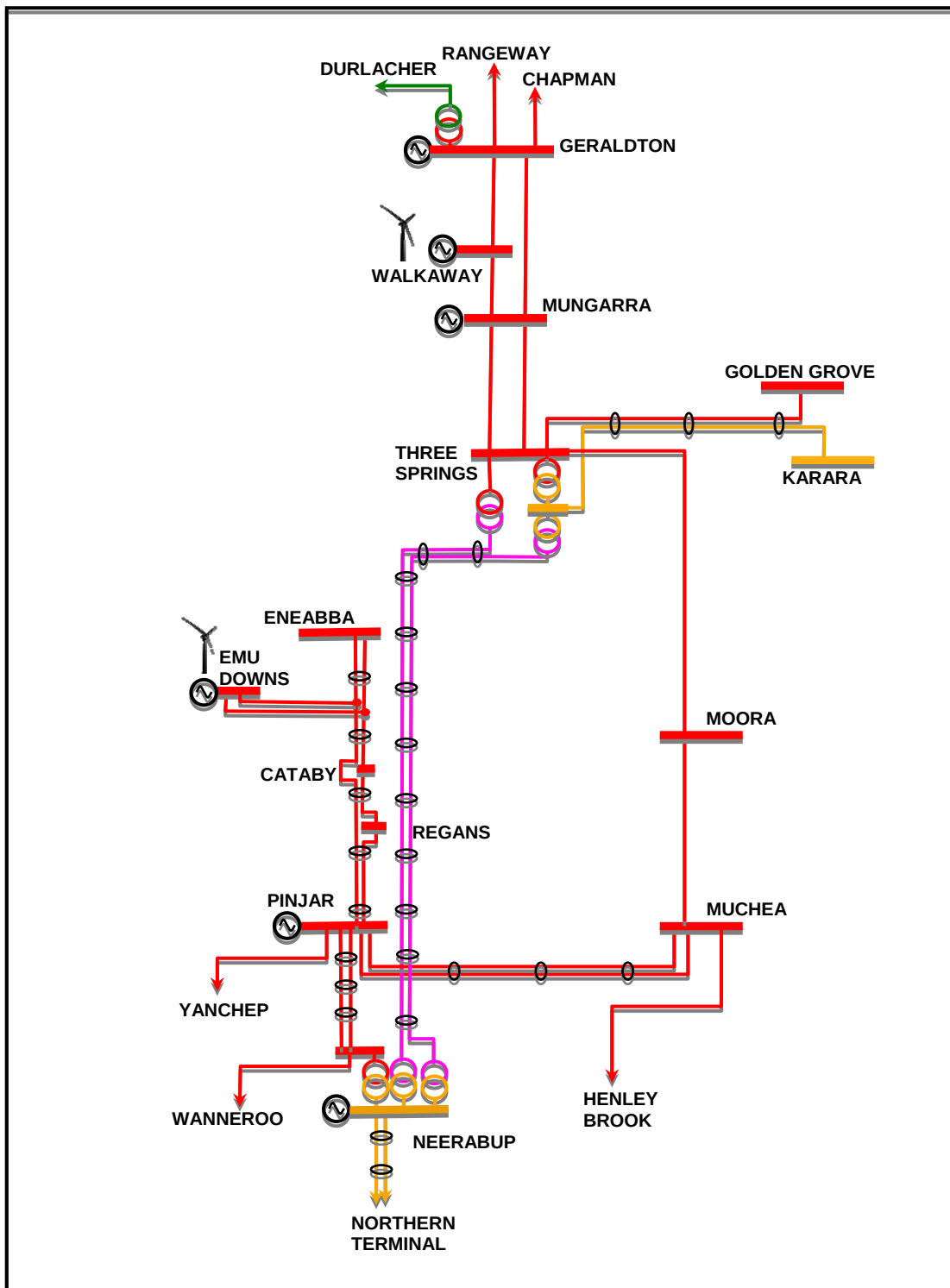
Existing Network Single Line Diagram



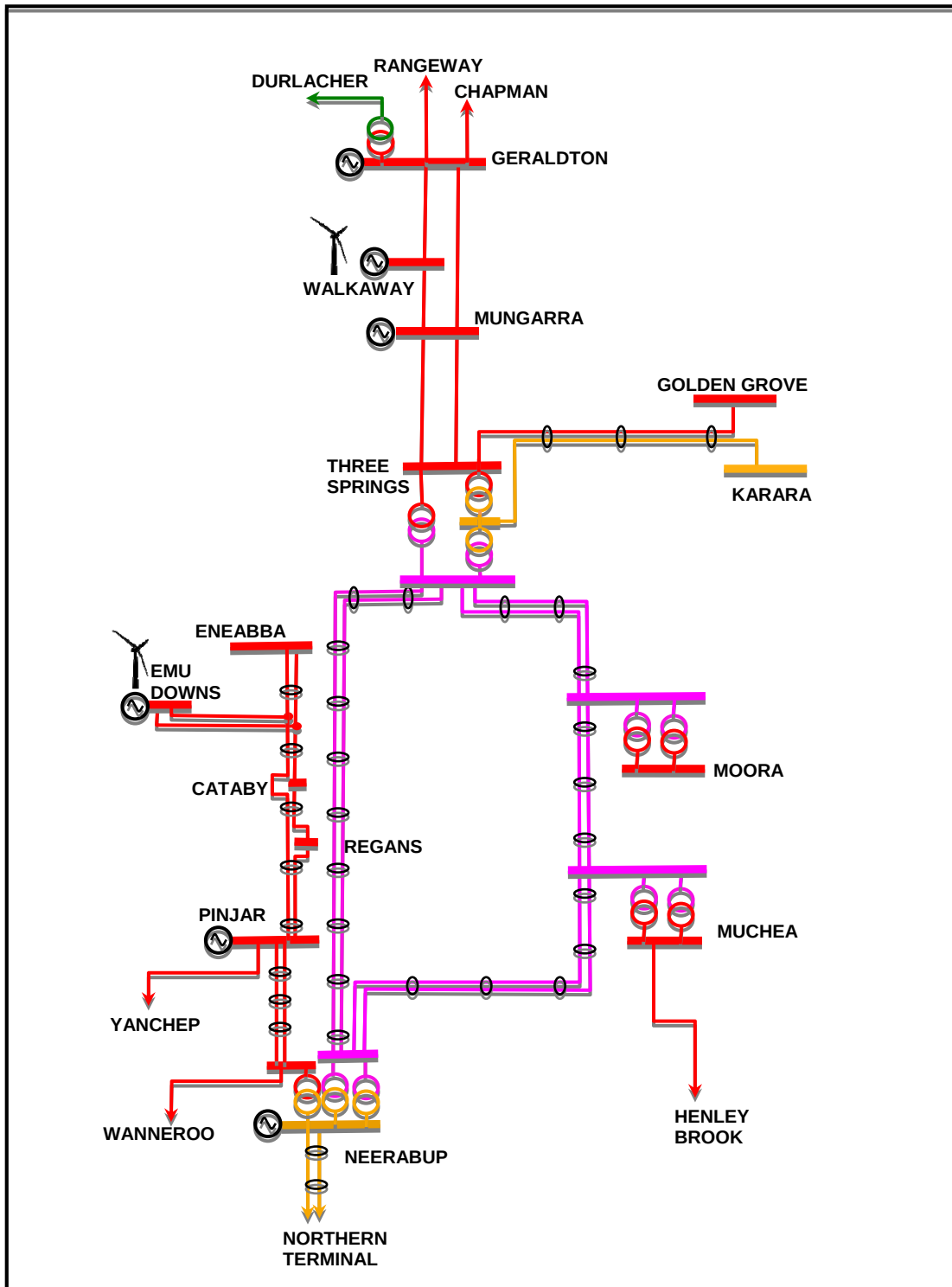
220kV Option – Stage 1



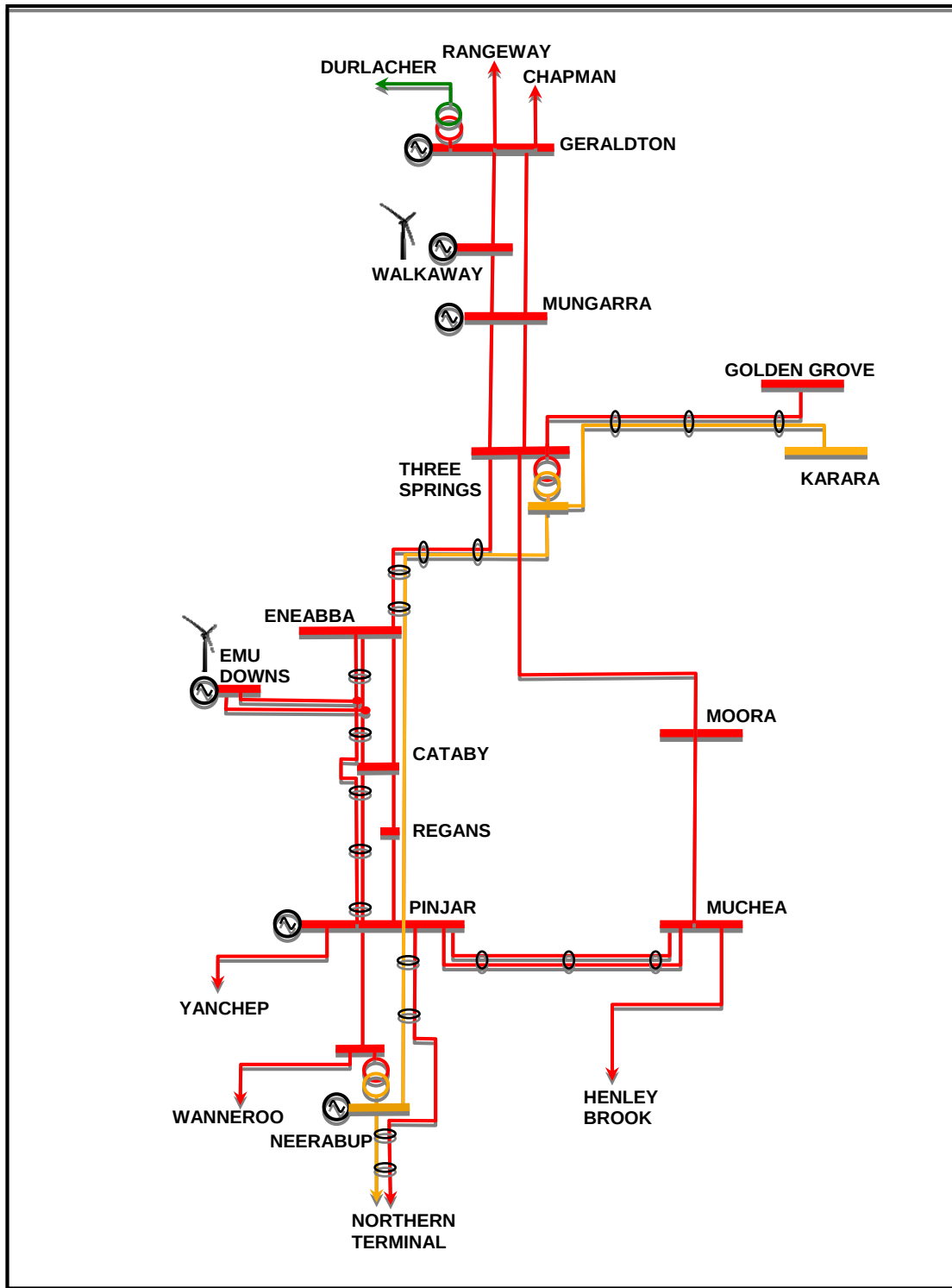
220kV Option – Stage 2 - HIGH Forecast Scenario 2013



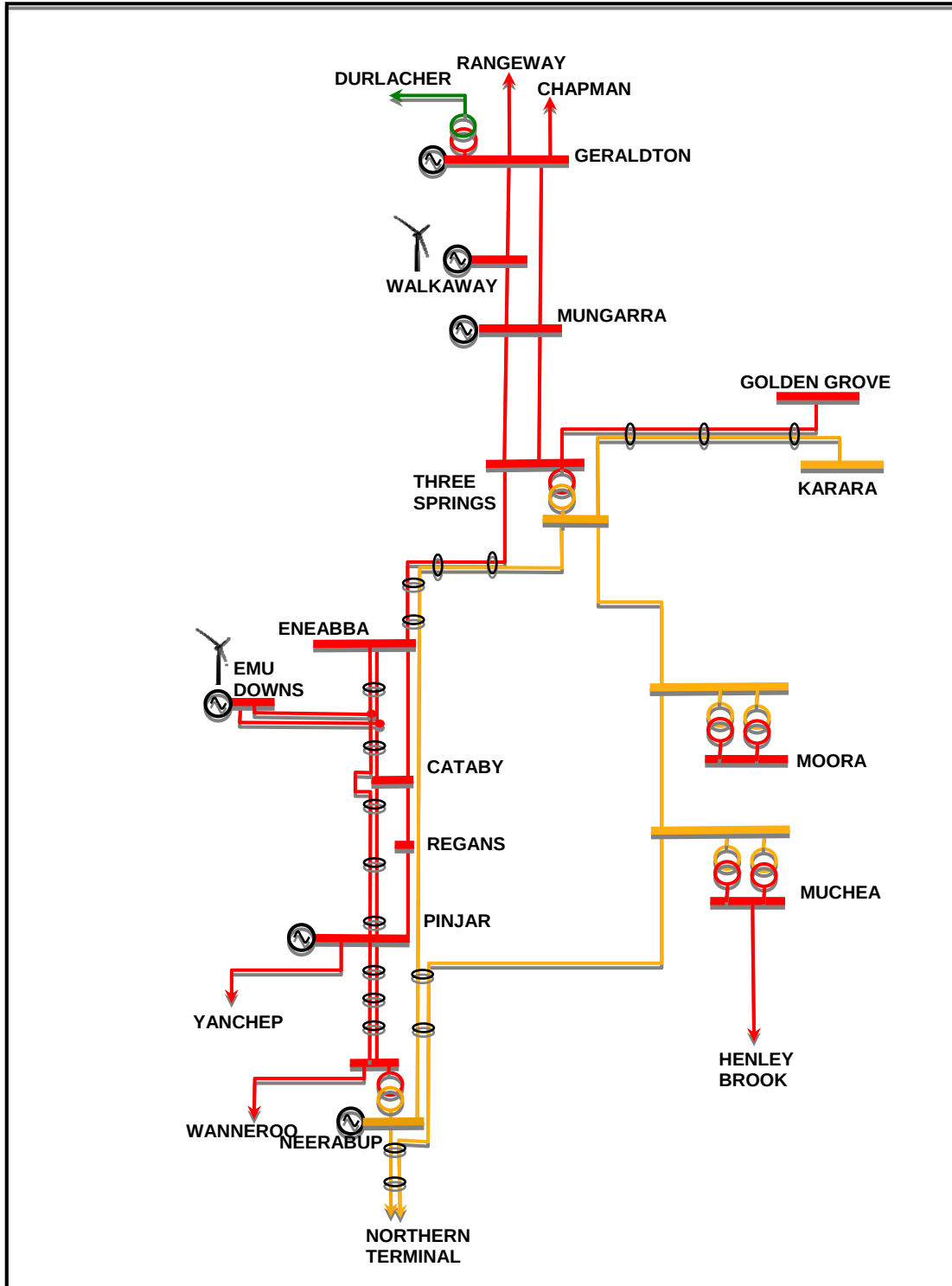
220kV Option – Stage 3 - HIGH Forecast Scenario 2015



330kV single circuit option (Stage 1)



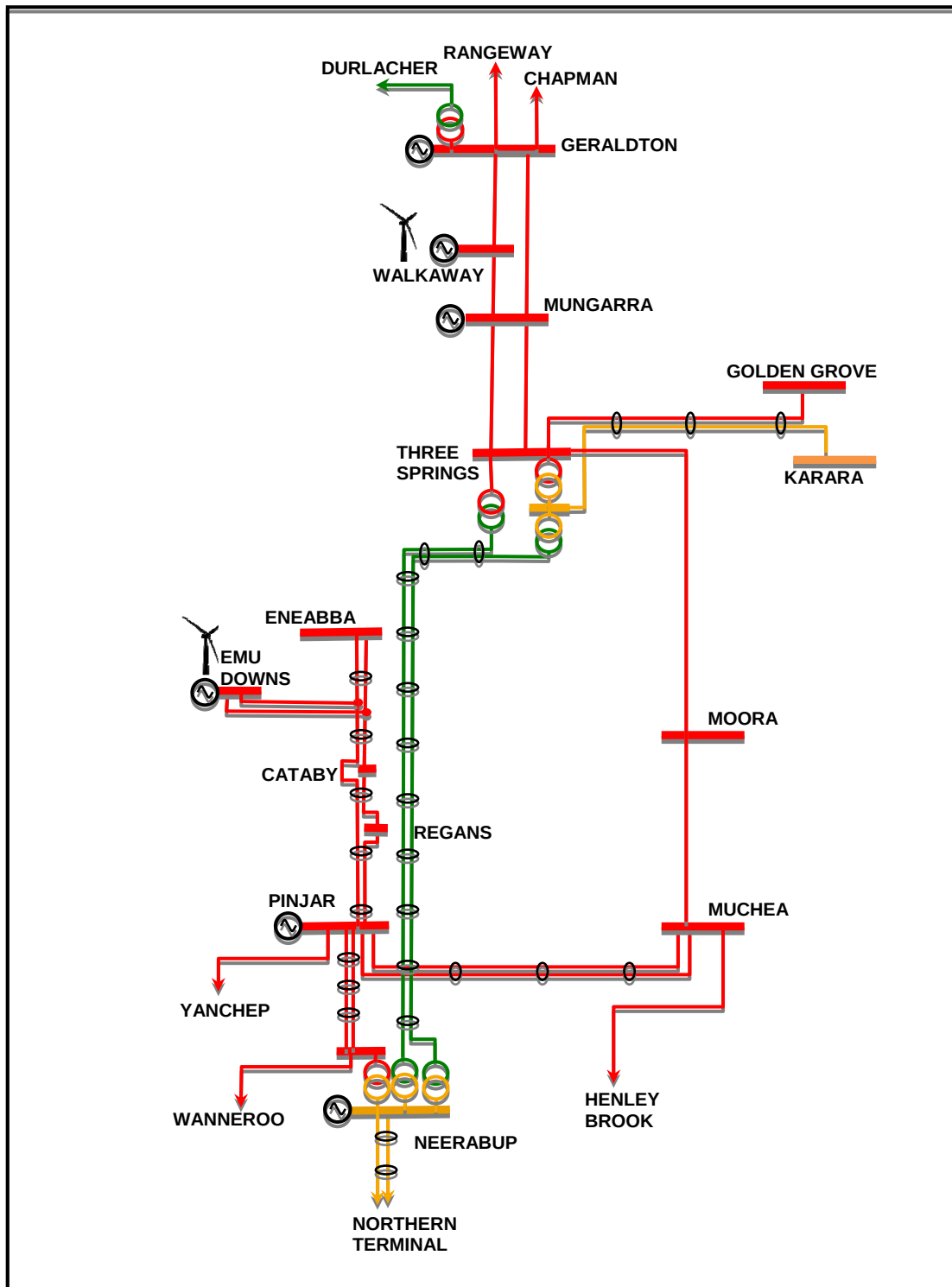
330kV single circuit option (stage 2) - HIGH forecast scenario 2015



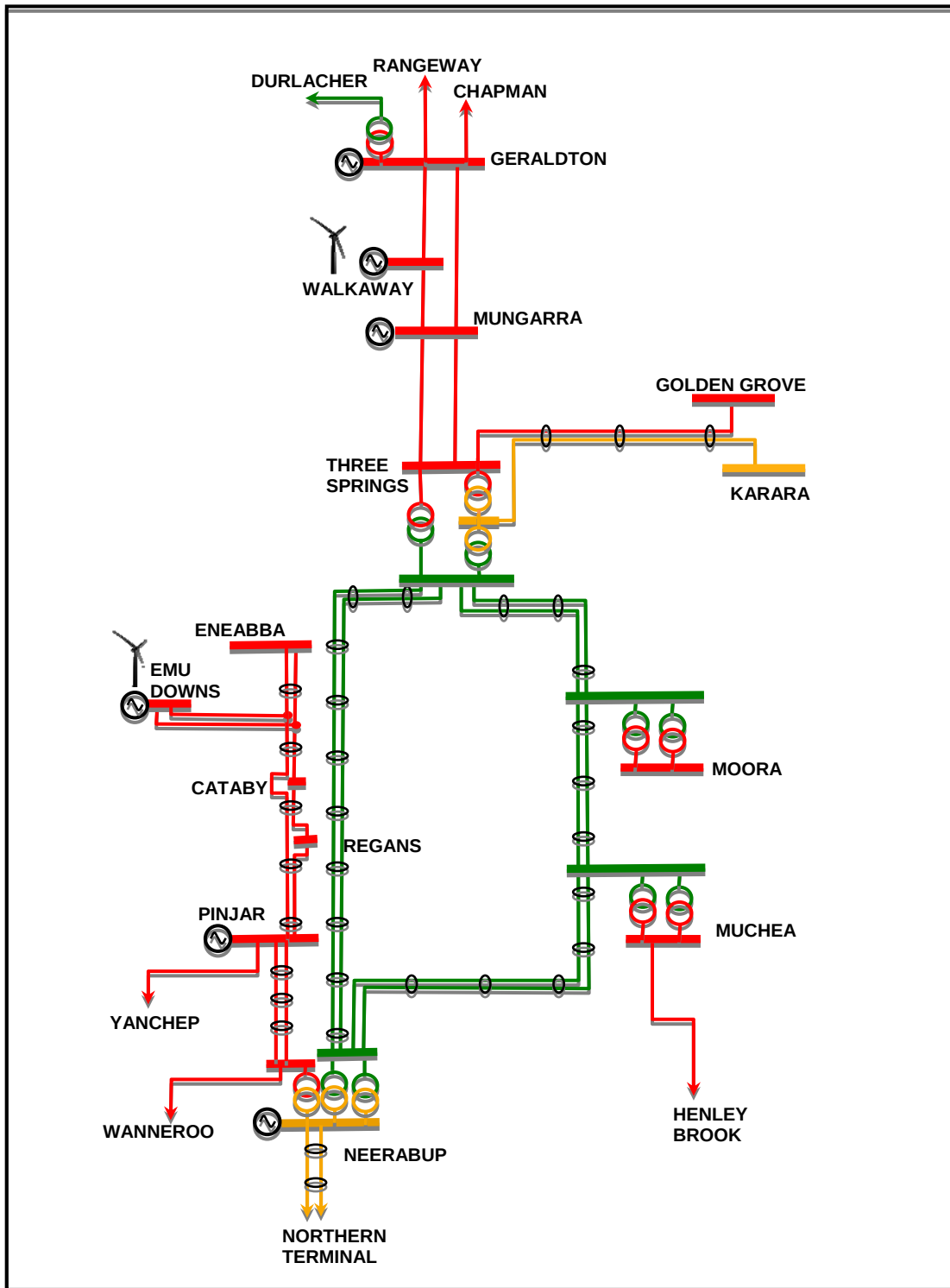
The diagram illustrates the Western Australian power transmission network, showing the following components and connections:

- Substations and Terminals:** DURLACHER, RANGEWAY, CHAPMAN, GERALDTON, WALKAWAY, MUNGARRA, THREE SPRINGS, GOLDEN GROVE, KARARA, ENEABBA, EMU DOWNS, CATABY, REGANS, PINJAR, MOORA, MUCHEA, YANCHEP, WANNEROO, NEERABUP, HENLEY BROOK, and NORTHERN TERMINAL.
- Power Lines:** Red lines represent the main transmission network. Green and yellow lines represent specific transmission paths or interconnectors.
- Interconnectors:** Yellow lines connect the main network to the YANCHEP, WANNEROO, and HENLEY BROOK networks. Green lines connect the main network to the NORTHERN TERMINAL.
- Geographical Layout:** The network is spread across Western Australia, with major hubs like GERALDTON, MUNGARRA, and ENEABBA.

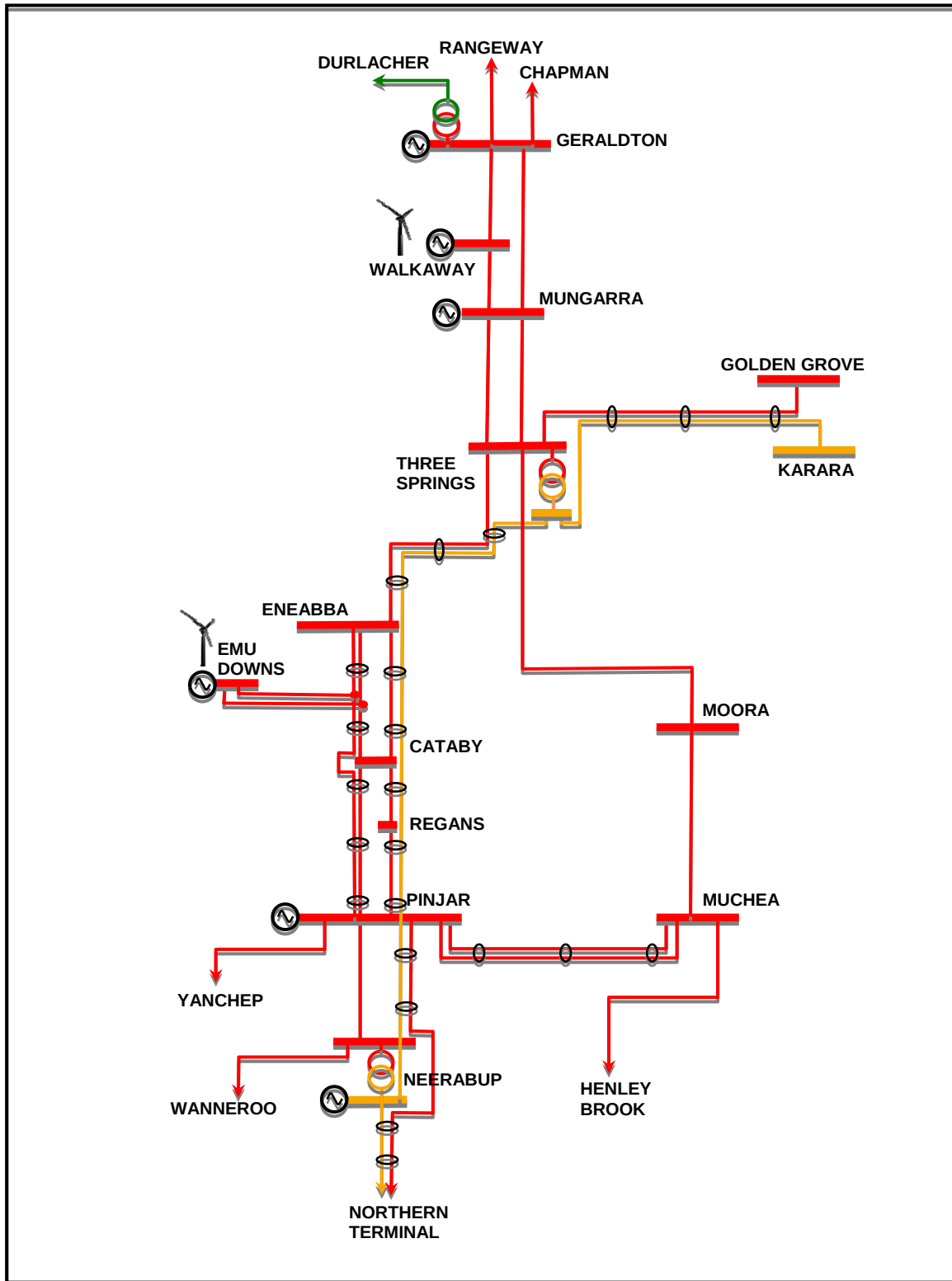
275kV Option – Stage 2 - HIGH Forecast Scenario 2014



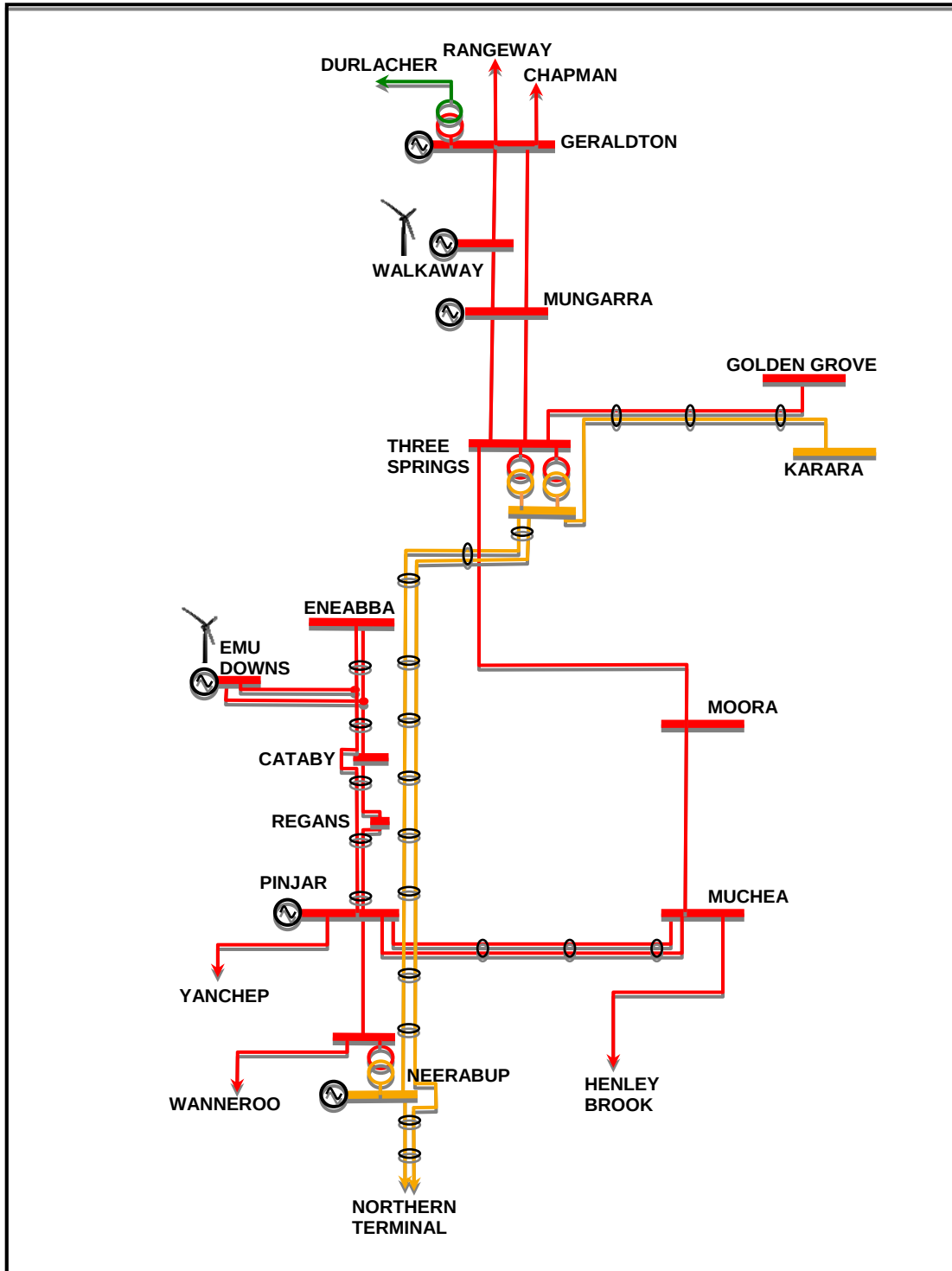
275 kV Option Stage 3 - HIGH Forecast Scenario 2018



330kV double circuit option (Stage 1)



330kV double circuit option (Stage 2) - HIGH forecast scenario 2015



Net Present Cost Tables

Central Forecast Scenario

- Option 1 (Central Scenario) – 220kV Double Circuit
- Option 2 (Central Scenario) – 330kV Single Circuit
- Option 3 (Central Scenario) – 275kV Double Circuit
- Option 4 (Central Scenario) – 330kV Double Circuit

High Forecast Scenario

- Option 1 (High Scenario) – 220kV Double Circuit
- Option 2 (High Scenario) - 330kV Single Circuit
- Option 3 (High Scenario) - 275kV Double Circuit
- Option 4 (High Scenario) – 330kV Double Circuit

Central Forecast Scenario

Option 1 (Central Scenario) – 220 kV Double Circuit

WORKS	YEAR	CAPITAL	NPC
NBT-ENT 220 kV double circuit, one side operated 132 kV	2012	C in C*	C in C*
Three Springs Terminal plus 220kV transformer	2012	C in C*	C in C*
Neerabup 220 kV transformer (incl yard works)	2012	C in C*	C in C*
KML works (Leased Assets) ENT-TST-Karara DC 330kV Line	2013	C in C*	C in C*
TOTAL (\$M)		492	420.8

Option 2 (Central Scenario) – 330kV Single Circuit

WORKS	YEAR	CAPITAL	NPC
NBT-ENT 91 - 330kV single circuit line	2012	C in C*	C in C*
Three Springs Terminal plus 330kV transformer	2012	C in C*	C in C*
KML works (Leased Assets) ENT-TST-Karara DC 330kV Line	2013	C in C*	C in C*
MUC-MOR 81 - Line Uprate	2019	C in C*	C in C*
TOTAL (\$M)		485	400.7

Option 3 (Central Scenario) – 275 kV Double Circuit

WORKS	YEAR	CAPITAL	NPC
NBT-ENT 275 kV double circuit, one side operated 132 kV	2012	C in C*	C in C*
Three Springs Terminal plus 275kV transformer	2012	C in C*	C in C*
Neerabup 275 kV transformer (incl yard works)	2012	C in C*	C in C*
KML works (Leased Assets) ENT-TST-Karara DC 330kV Line	2013	C in C*	C in C*
TOTAL (\$M)		515	440.8

Option 4 (Central Scenario) – 330kV Double Circuit

WORKS	YEAR	CAPITAL	NPC
NBT-ENT - 330kV double circuit, one side operated 132kV	2012	C in C*	C in C*
Three Springs Terminal plus 330kV transformer	2012	C in C*	C in C*
KML works (Leased Assets) ENT-TST-Karara DC 330kV Line	2013	C in C*	C in C*
TOTAL (\$M)		504	430.0

*C in C – Commercial in Confidence

High Forecast Scenario

Option 1 (High Scenario) – 220 kV Double Circuit

WORKS	YEAR	CAPITAL	NPC
Central Forecast Reinforcements	2012	C in C*	C in C*
NBT-ENT Conversion of 2 nd side to 220, resupply of RGN	2013	C in C*	C in C*
Three Springs Terminal 220/132kV transformer	2013	C in C*	C in C*
Neerabup – second 330/220kV transformer	2013	C in C*	C in C*
NBT-MOR-TST 220 kV DC, transformers at MUC and MOR	2015	C in C*	C in C*
TOTAL (\$M)		873	731.9

Option 2 (High Scenario) - 330kV Single Circuit

WORKS	YEAR	CAPITAL	NPC
Central Forecast Reinforcements (less 2019 line uprate)	2012	C in C*	C in C*
NBT-MOR-TST 91 - 330kV single circuit line	2015	C in C*	C in C*
Muchea and Moora 330kV/132kV transformers (two each)	2015	C in C*	C in C*
TOTAL (\$M)		748	591.8

Option 3 (High Scenario) - 275 kV Double Circuit

WORKS	YEAR	CAPITAL	NPC
Central Forecast Reinforcements	2012	C in C*	C in C*
NBT-ENT Conversion of 2 nd side to 275, resupply of RGN	2014	C in C*	C in C*
Three Springs Terminal 275/132kV transformer,	2014	C in C*	C in C*
Neerabup – second 330/275kV transformer	2014	C in C*	C in C*
NBT-MOR-TST 275 kV DC, step down transformers at MUC and MOR	2018	C in C*	C in C*
TOTAL (\$M)		889	663.0

Option 4 (High Scenario) – 330kV Double Circuit

WORKS	YEAR	CAPITAL	NPC
Central Forecast Reinforcements	2012	C in C*	C in C*
NBT-ENB 92 - Conversion of 2 nd side to 330, resupply of RGN	2015	C in C*	C in C*
Three Springs Terminal - Second 330/132kV transformer & line switching reactor	2015	C in C*	C in C*
TOTAL (\$M)		538	455.0

*C in C – Commercial in Confidence