



Southland Electrical Network

Supplementary Information - Substation Load Characteristics

EECA

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1. Introduction

The following figures illustrate the characteristics of the major electrical substations (both GXPs and Zone Substations) in the Southland Region. This document supplements the main report titled "Southland Electrical Network – Spare Capacity and Load Conversion Opportunity Report".

For each GXP, the 2020 apparent (MVA) and reactive loadings (MVAr) are presented. For each Zone Substation, the apparent (MVA) loadings only are presented. The data is presented in graphs of:

- The load profile for the entire year.
- The maximum and minimum loads for each of the 365 days.
- Load profiles for two weeks in summer and two weeks in winter.
- Typical daily summer and winter load profiles.
- A load duration curve for the entire year.

2. Transmission/GXP Substations

The characteristics of the transmission substation **apparent and reactive power loadings** are shown in the following:

- **Balclutha GXP**
 - Figure 1 Balclutha: Apparent power (MVA) load characteristics
 - Figure 2 Balclutha: Reactive power (MVAr) load characteristics
- **Brydon GXP**
 - Figure 3 Brydone: Apparent power (MVA) load characteristics
 - Figure 4 Brydone: Reactive power (MVAr) load characteristics
- **Edendale GXP**
 - Figure 5 Edendale: Apparent power (MVA) load characteristics
 - Figure 6 Edendale: Reactive power (MVAr) load characteristics
- **Gore GXP**
 - Figure 7 Gore: Apparent power (MVA) load characteristics
 - Figure 8 Gore: Reactive power (MVAr) load characteristics
- **Halfway Bush GXP**
 - Figure 9 Halfway Bush: Apparent power (MVA) load characteristics
 - Figure 10 Halfway Bush: Reactive power (MVAr) load characteristics
- **Invercargill GXP**
 - Figure 11 Invercargill: Apparent power (MVA) load characteristics
 - Figure 12 Invercargill: Reactive power (MVAr) load characteristics
- **Naseby GXP**
 - Figure 13 Naseby: Apparent power (MVA) load characteristics
 - Figure 14 Naseby: Reactive power (MVAr) load characteristics
- **Naseby GXP**
 - Figure 15 North Makarewa: Apparent power (MVA) load characteristics
 - Figure 16 North Makarewa: Reactive power (MVAr) load characteristics
- **Tiwai GXP**
 - Figure 17 Tiwai: Apparent power (MVA) load characteristics
 - Figure 18 Tiwai: Reactive power (MVAr) load characteristics

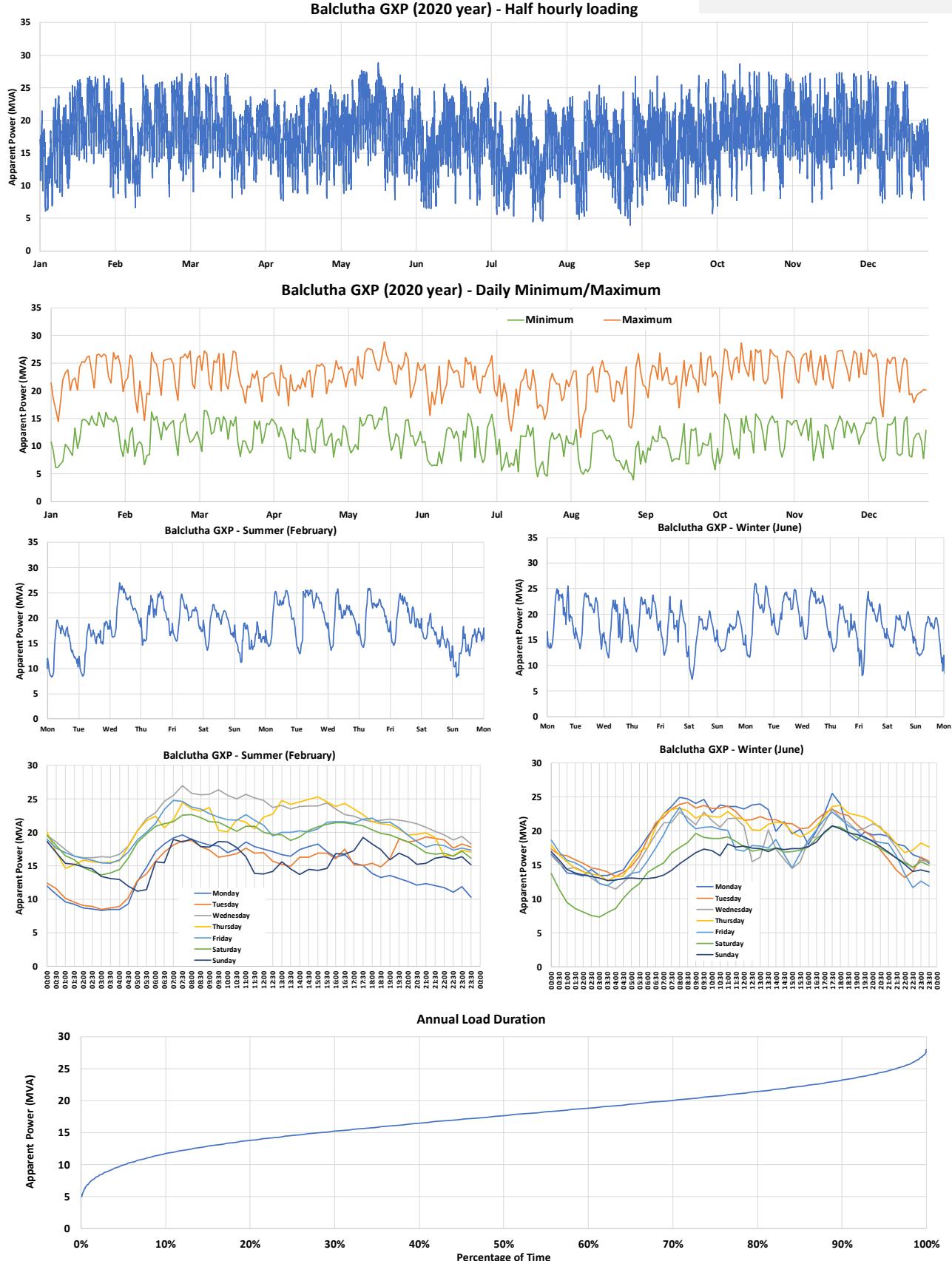
BALCLUTHA MVA


Figure 1 Balclutha: Apparent power (MVA) load characteristics

BALCLUTHA MVAR

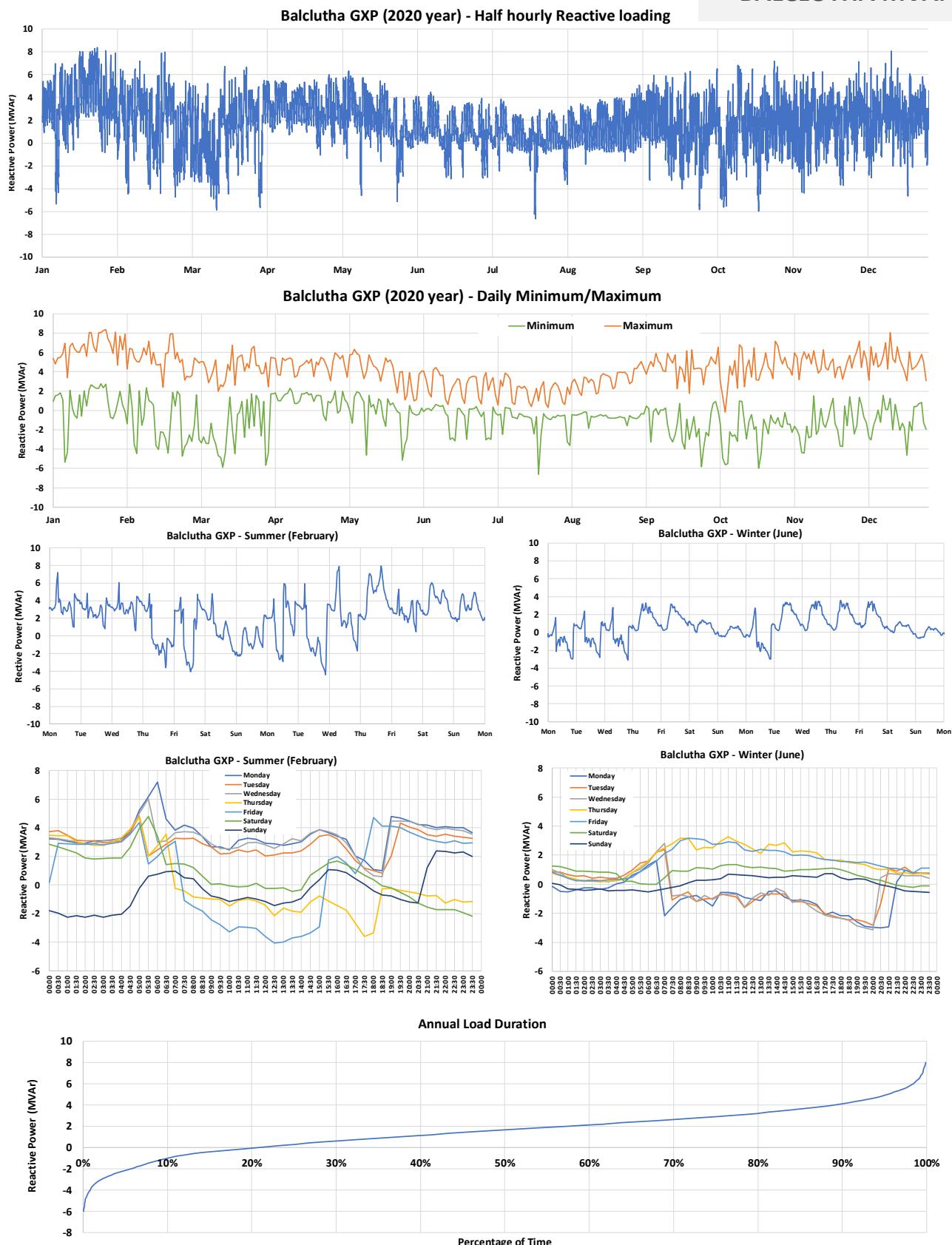


Figure 2 Balclutha: Reactive power (MVar) load characteristics

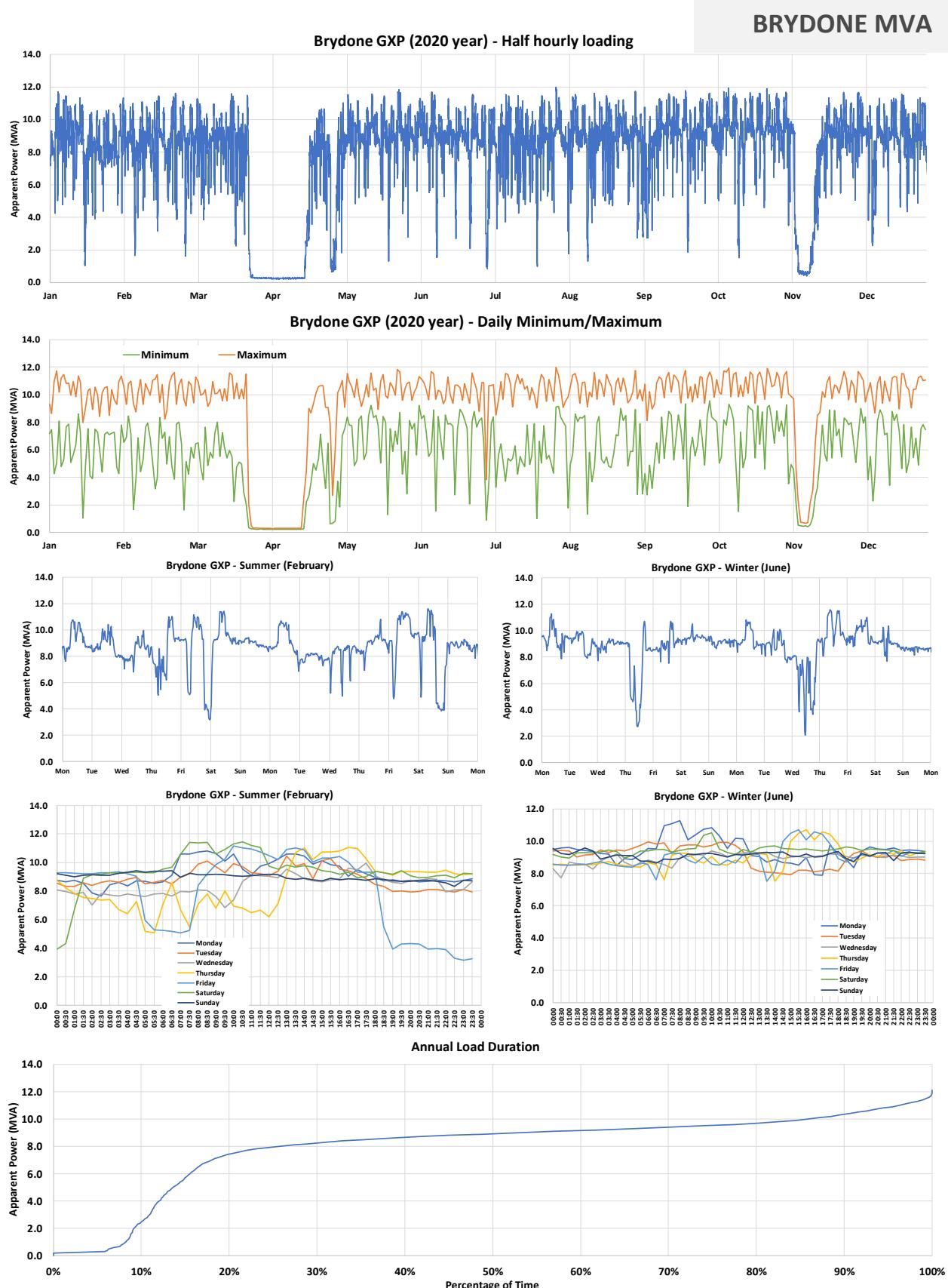


Figure 3 Brydone: Apparent power (MVA) load characteristics

BRYDONE MVAr

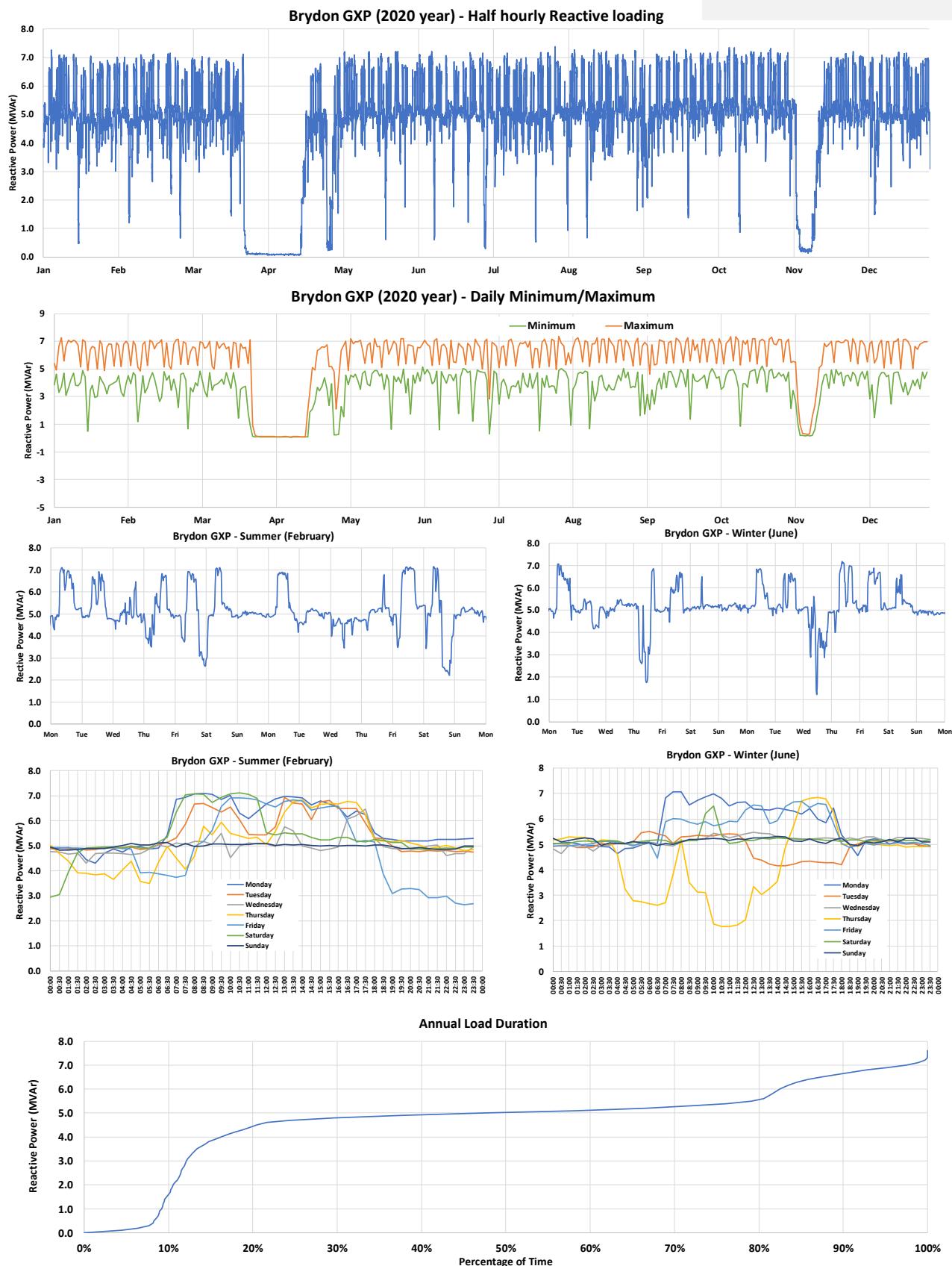


Figure 4 Brydone: Reactive power (MVAr) load characteristics

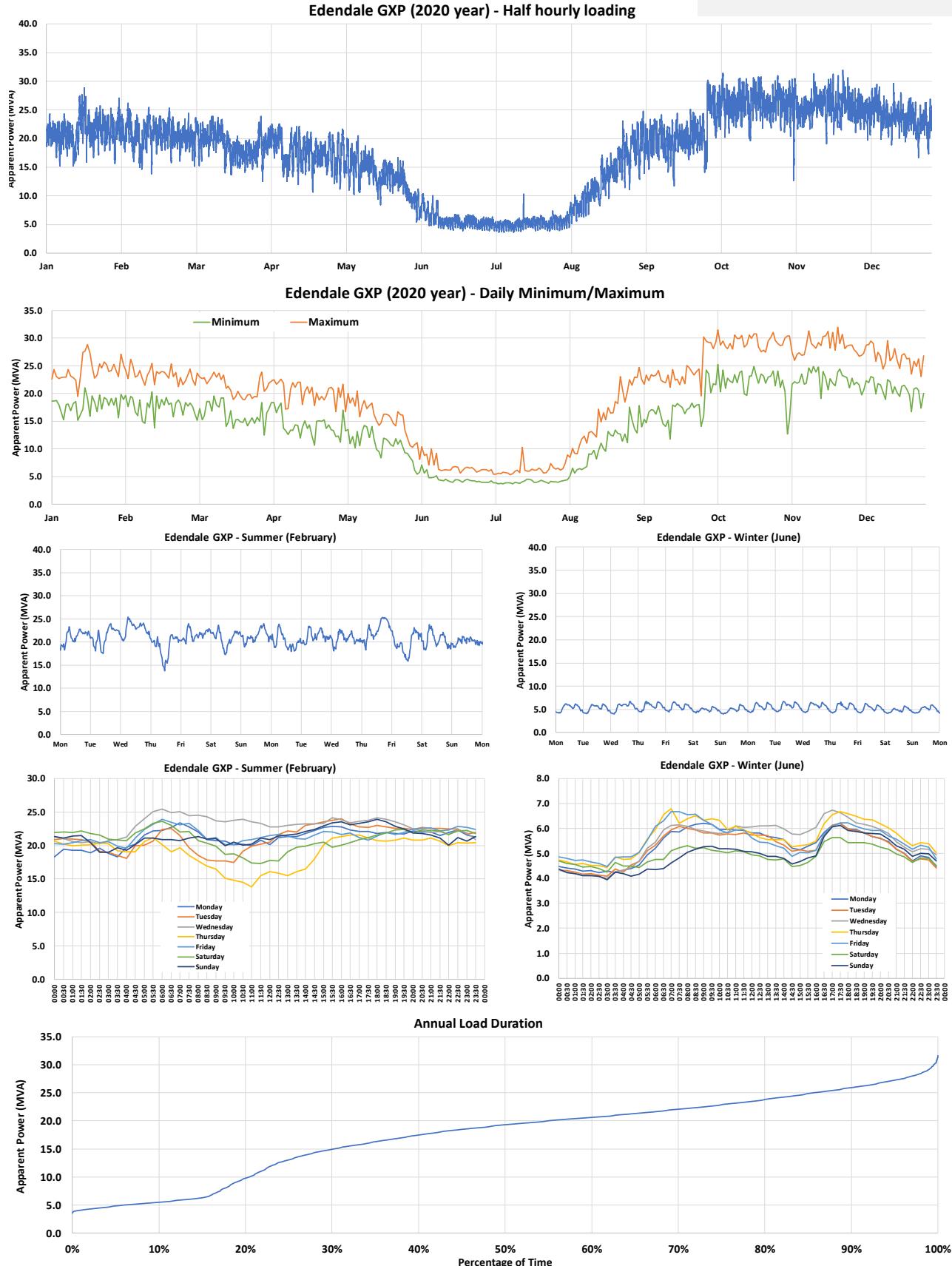
EDENDALE MVA


Figure 5 Edendale: Apparent power (MVA) load characteristics

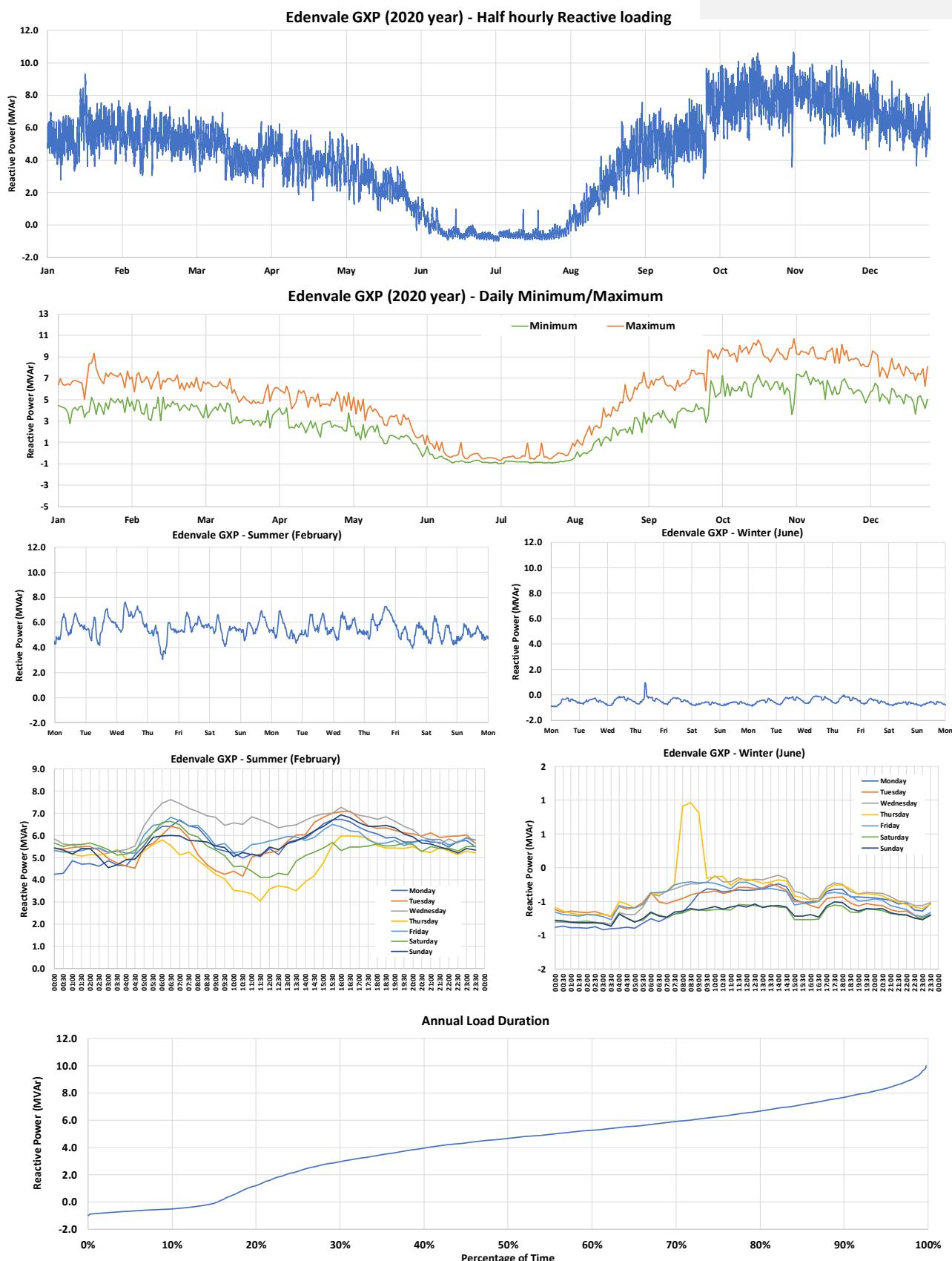
EDENDALE MVAr


Figure 6 Edendale: Reactive power (MVAr) load characteristics

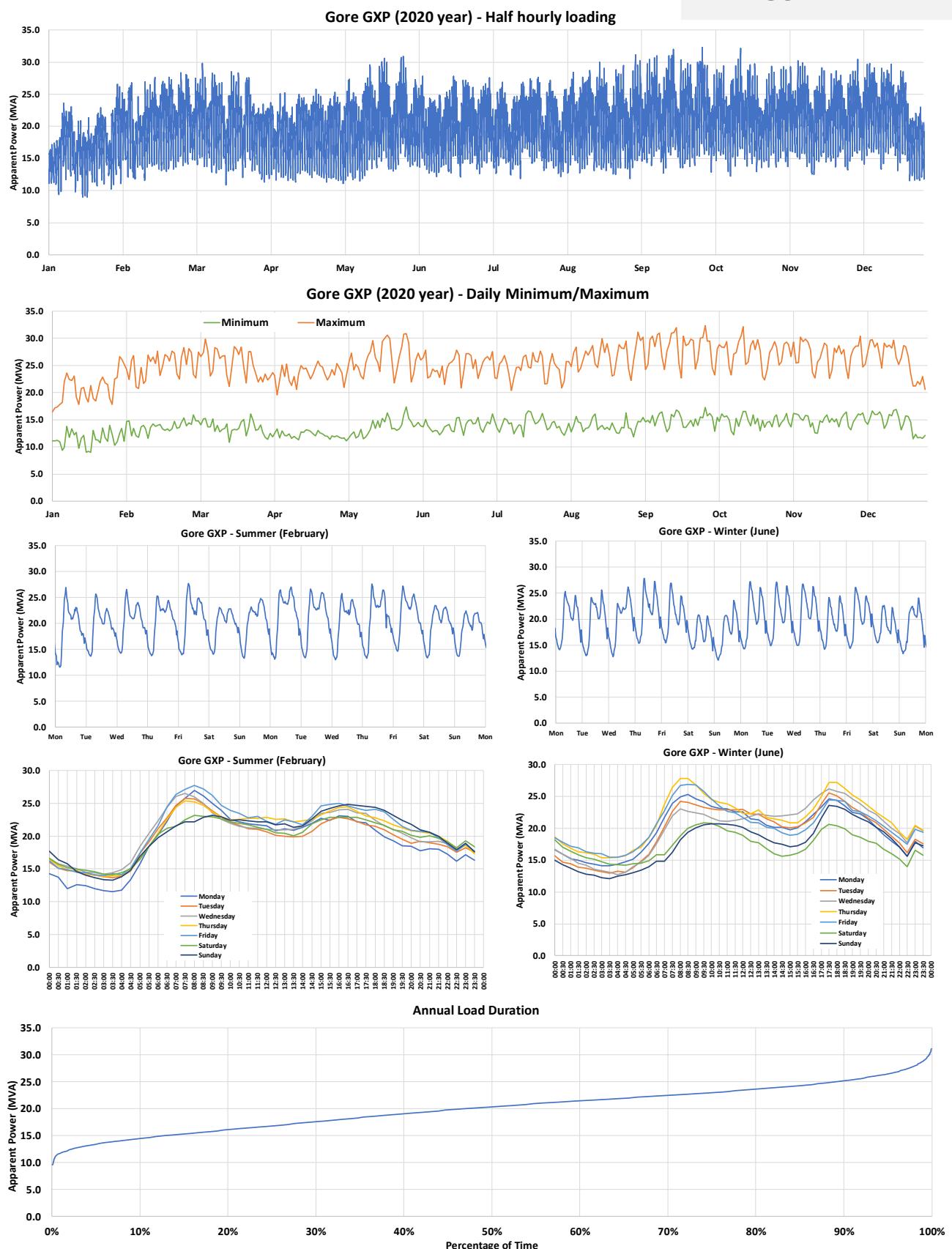
GORE MVA


Figure 7 Gore: Apparent power (MVA) load characteristics

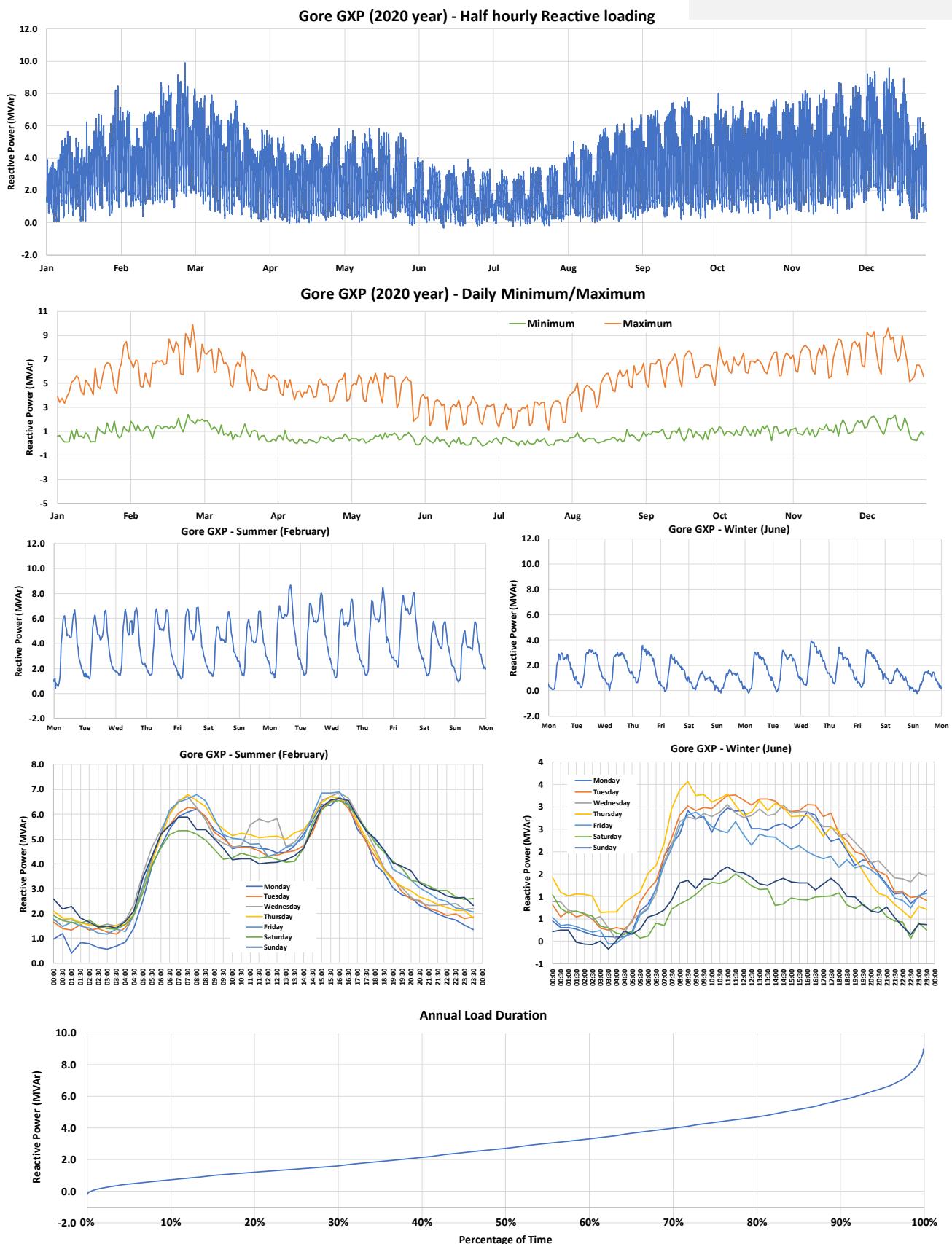
GORE MVAr


Figure 8 Gore: Reactive power (MVAr) load characteristics

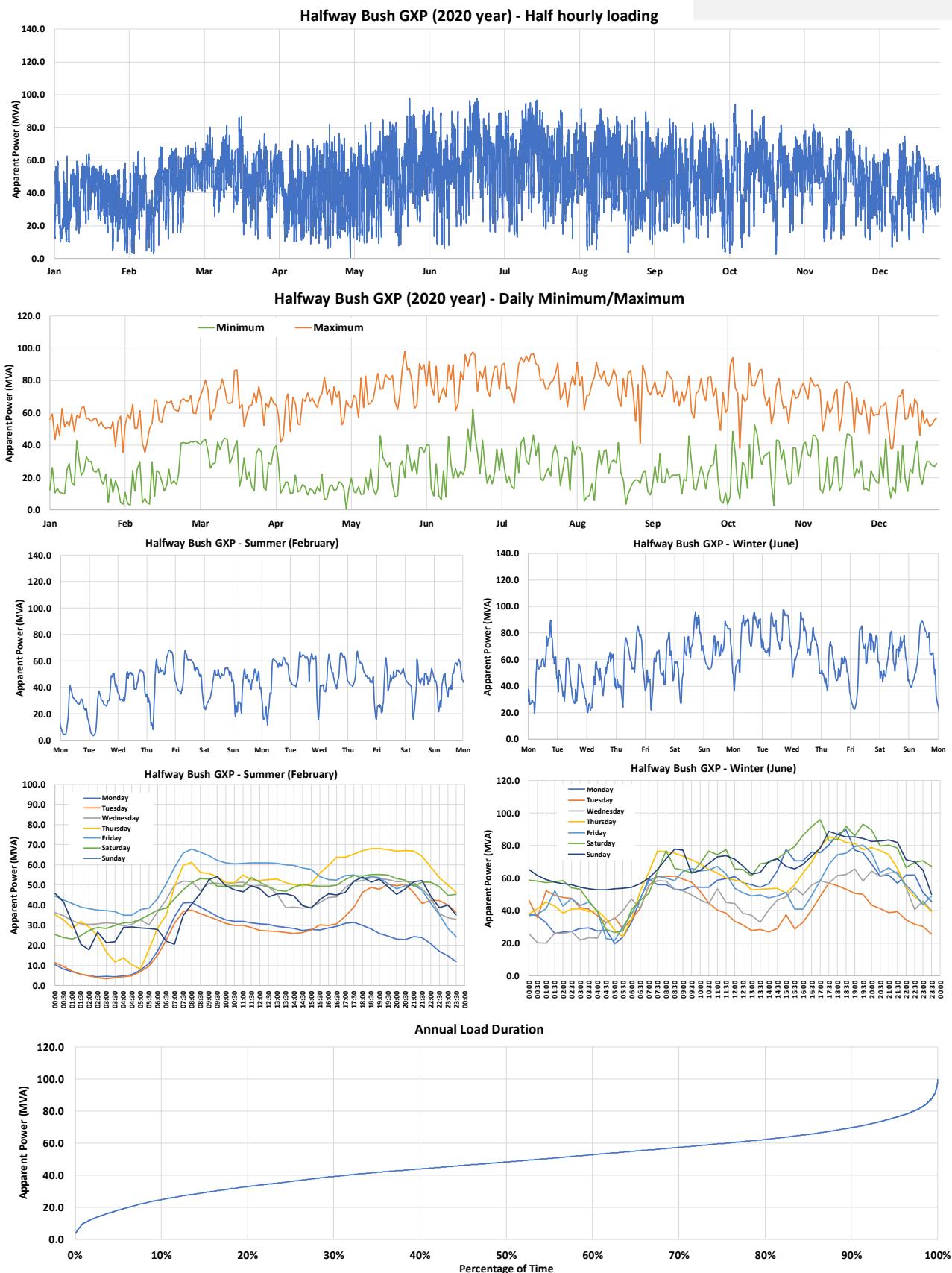
HALFWAY BUSH MVA


Figure 9 Halfway Bush: Apparent power (MVA) load characteristics

HALFWAY BUSH MVar

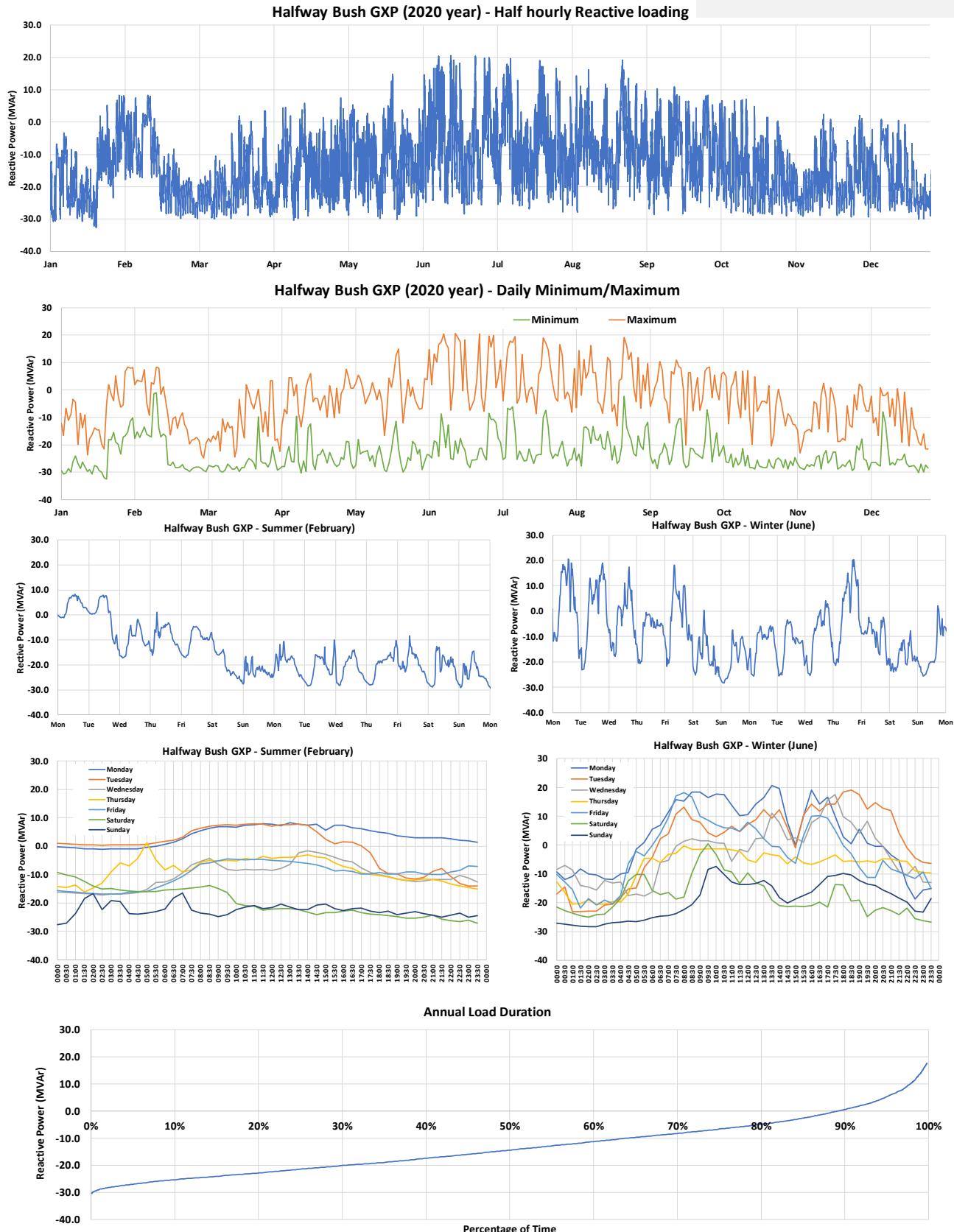


Figure 10 Halfway Bush: Reactive power (MVA) load characteristics

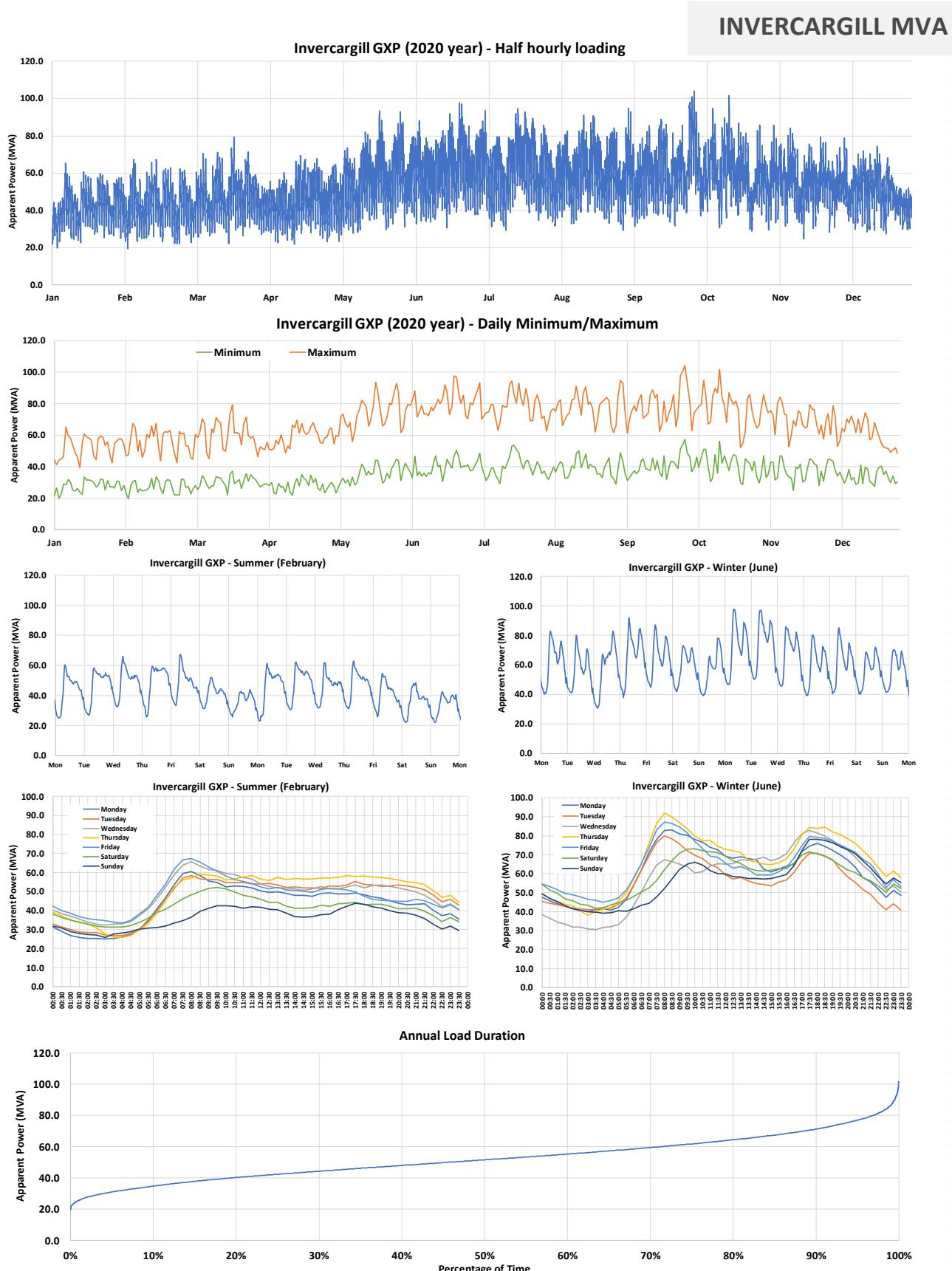


Figure 11 Invercargill: Apparent power (MVA) load characteristics

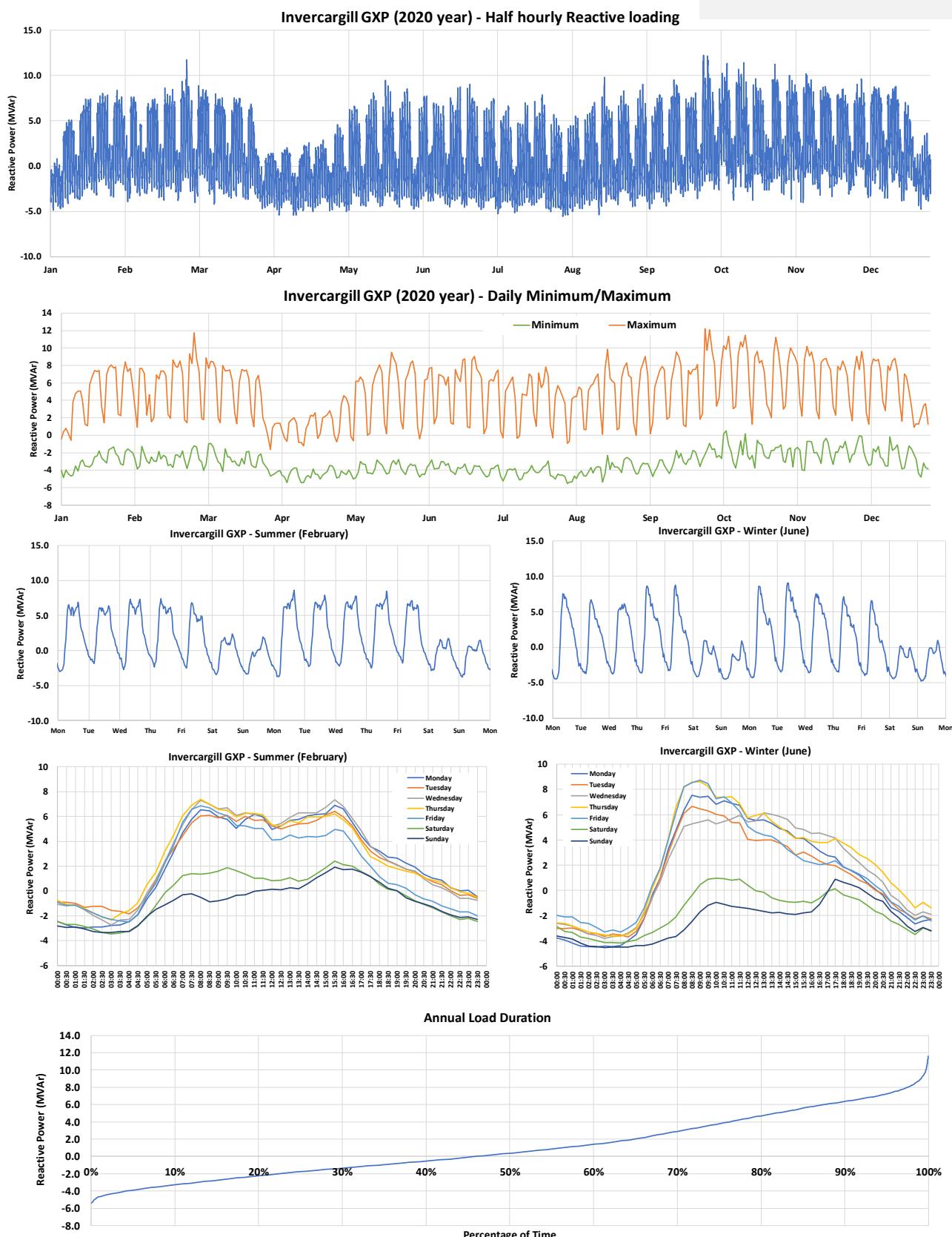
INVERCARGILL MVAr


Figure 12 Invercargill: Reactive power (MVAr) load characteristics

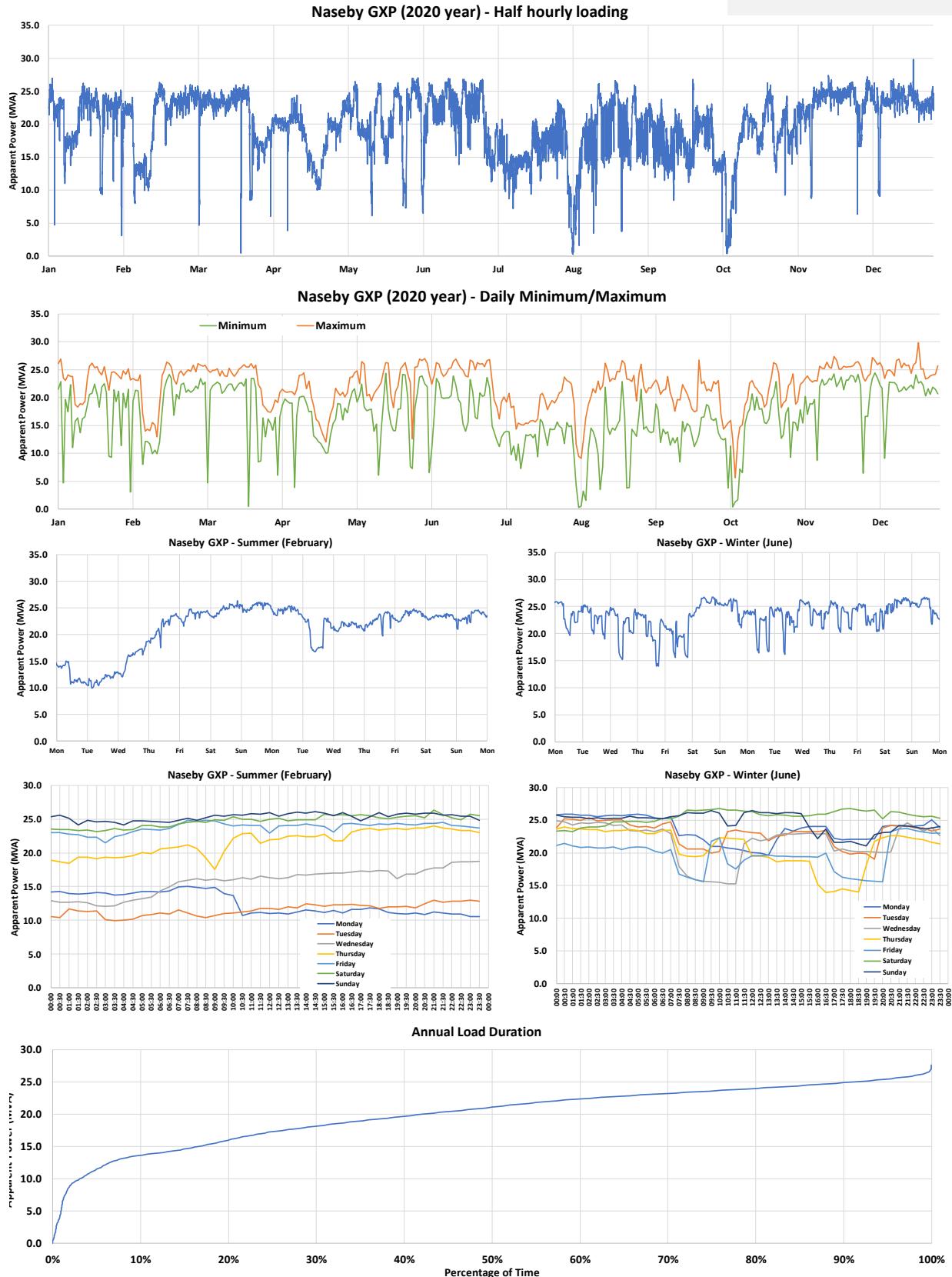
NASEBY MVA


Figure 13 Naseby: Apparent power (MVA) load characteristics

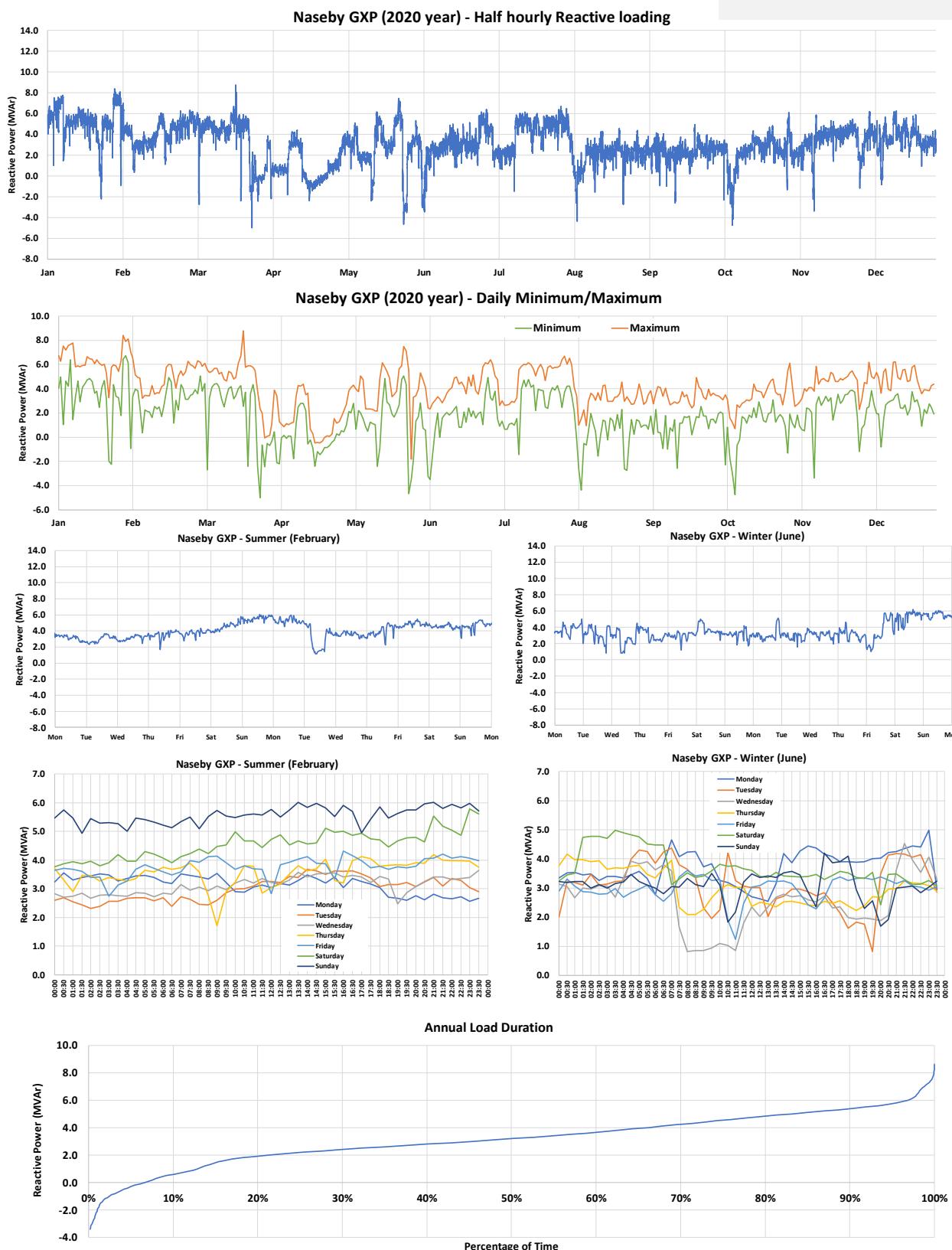
NASEBY MVAr


Figure 14 Naseby: Reactive power (MVAr) load characteristics

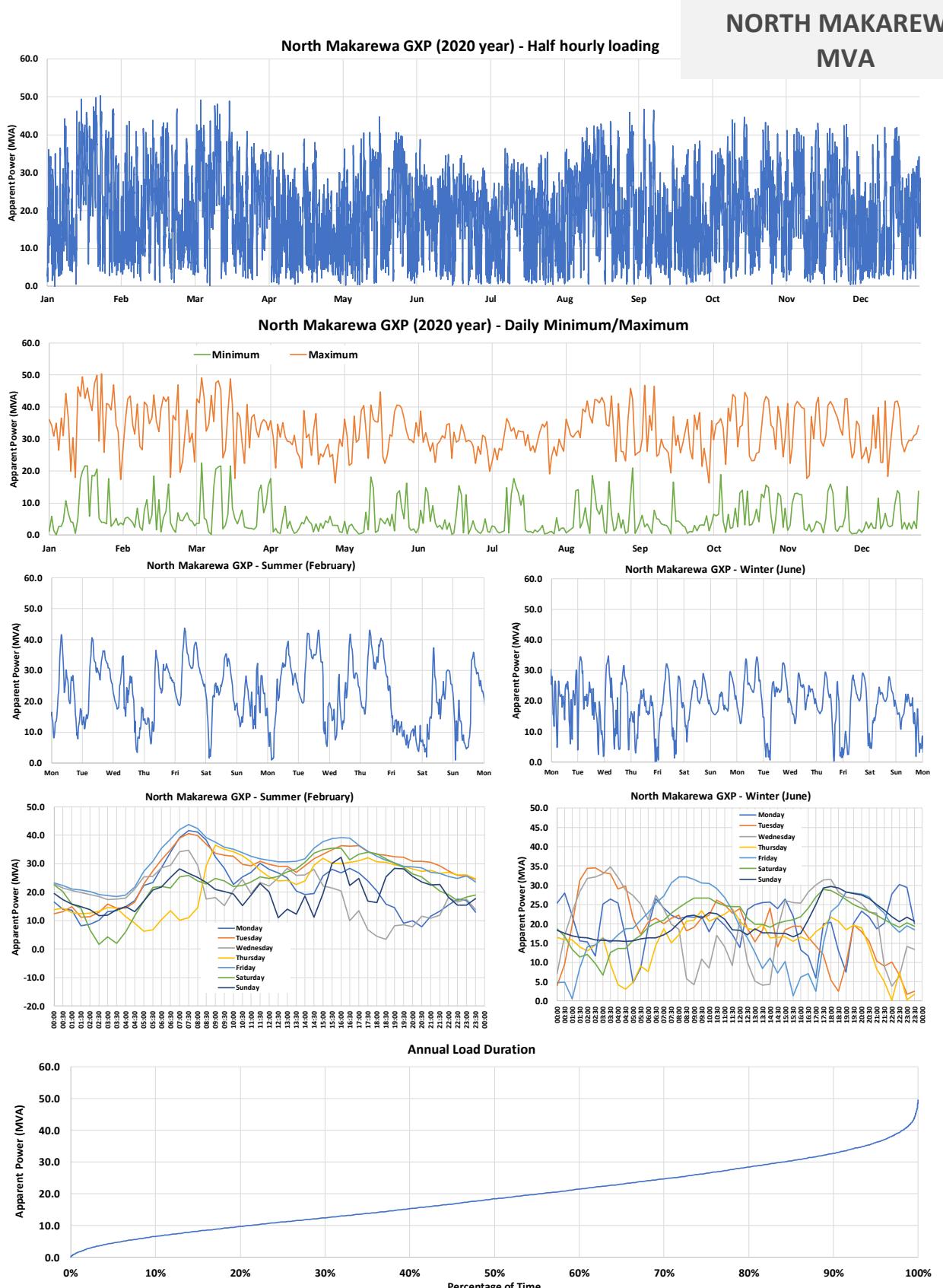


Figure 15 North Makarewa: Apparent power (MVA) load characteristics

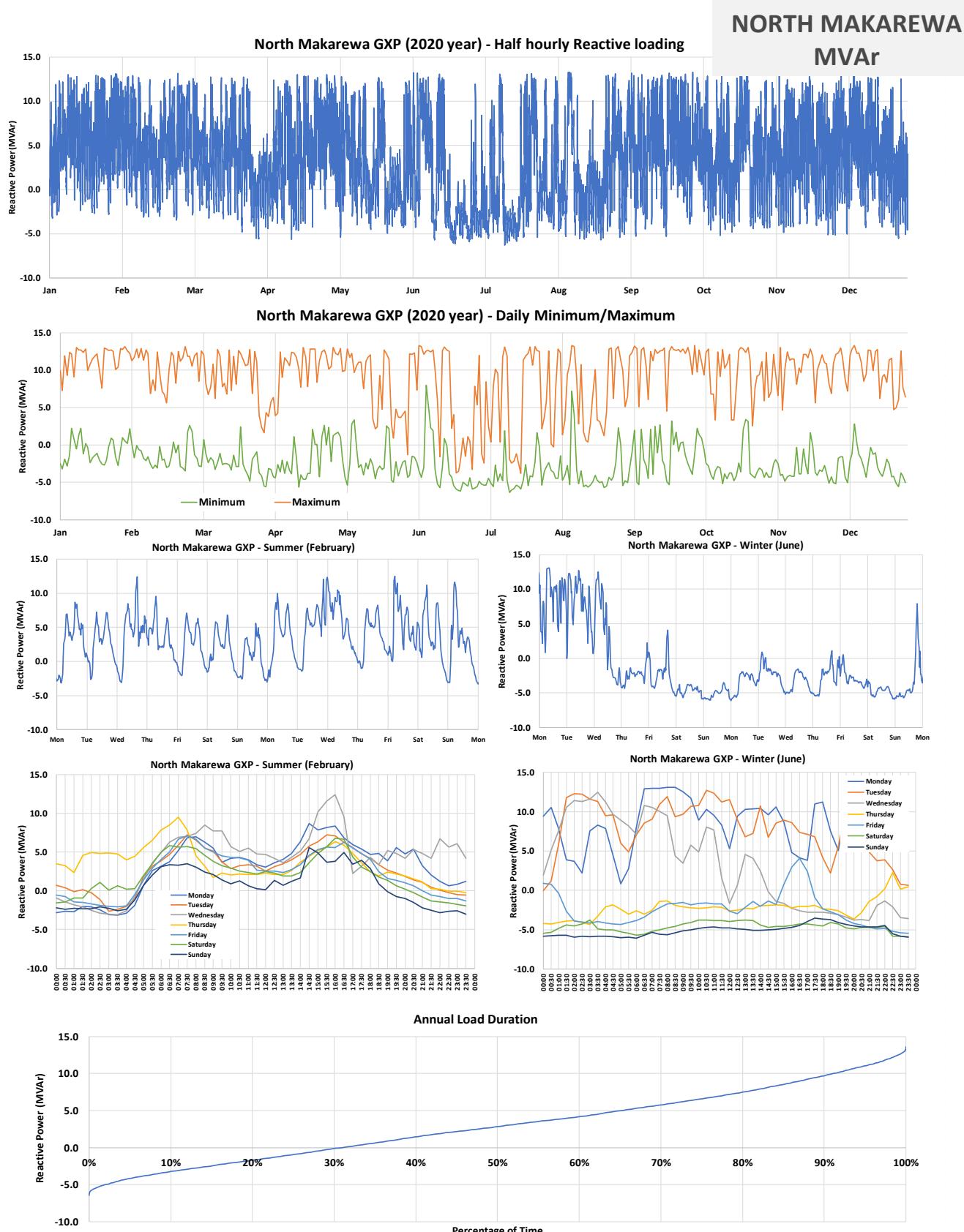


Figure 16 North Makarewa: Reactive power (MVar) load characteristics

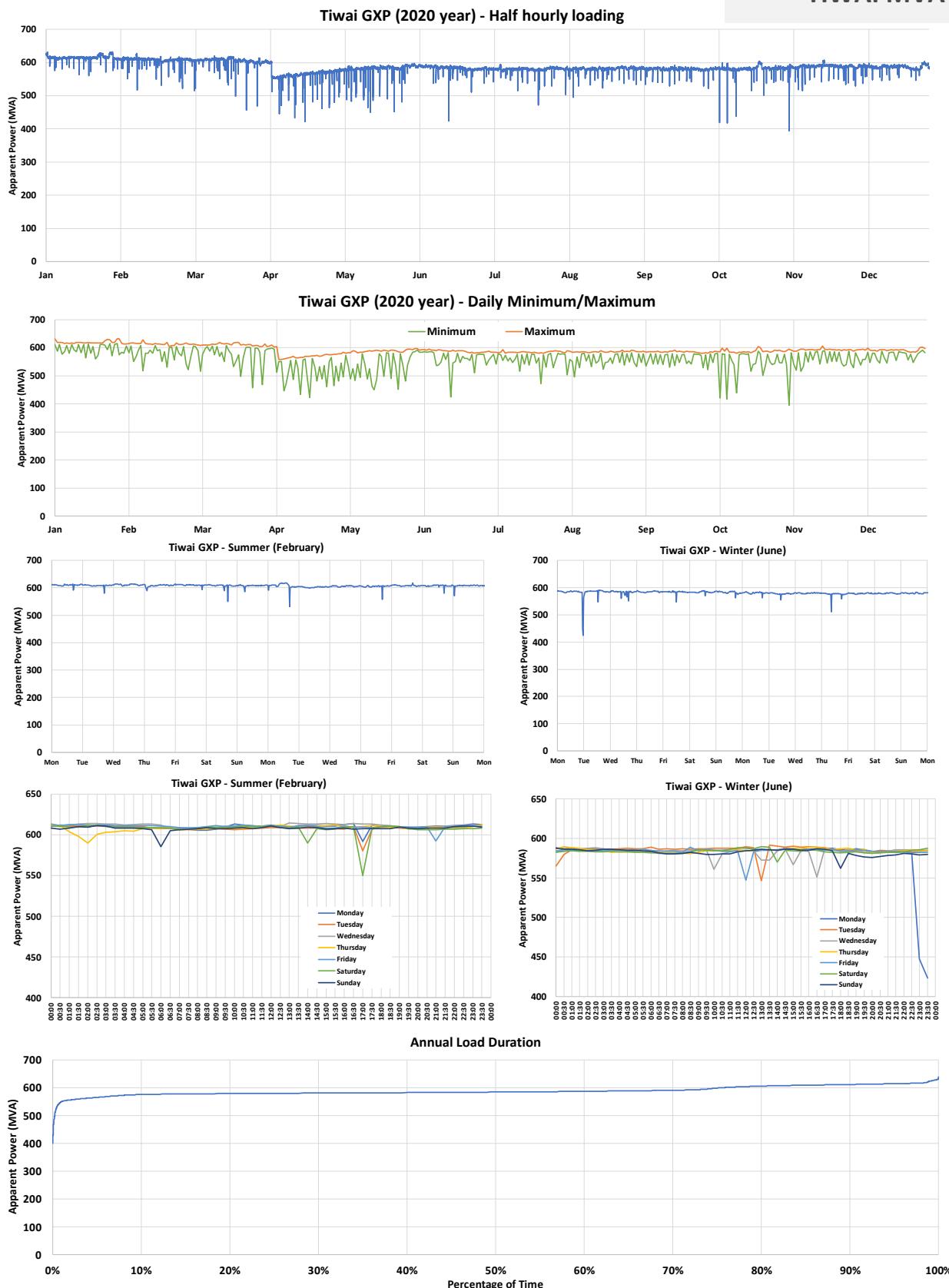
TIWAI MVA


Figure 17 Tiwai: Apparent power (MVA) load characteristics

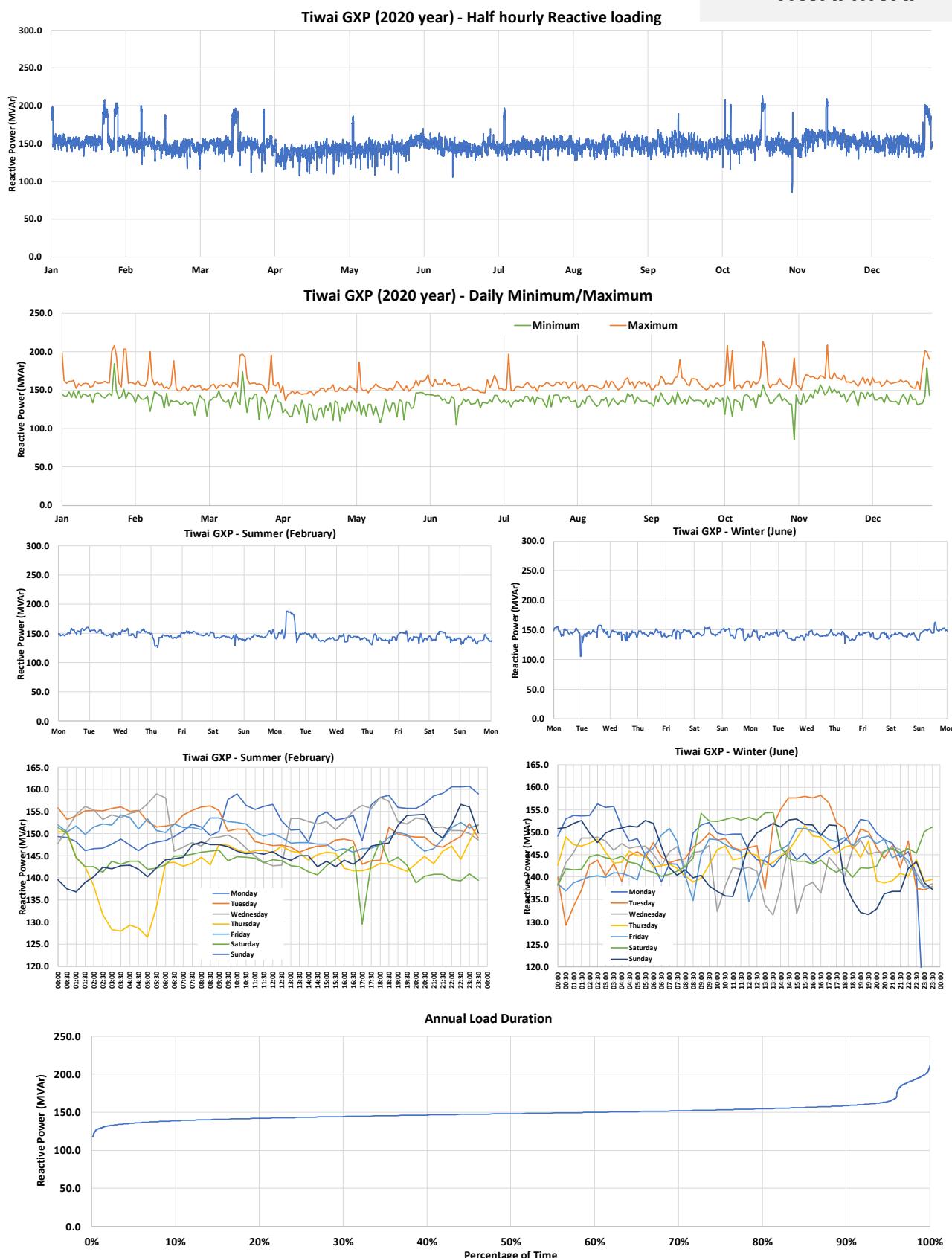
TIWAI MVAr


Figure 18 Tiwai: Reactive power (MVAr) load characteristics

3. Zone Substations

3.1 The Power Company

The characteristics of the zone substation **apparent power loadings** within The Power Company's network are shown in the following:

- **Figure 19** Athol 66/11kV zone substation: Apparent power (MVA) load characteristics
- **Figure 20** Awarua Chip Mill 33/11kV zone substation: Apparent power (MVA) load characteristics
- **Figure 21** Bluff 33/11kV zone substation: Apparent power (MVA) load characteristics
- **Figure 22** Centre Bush 33/11kV zone substation: Apparent power (MVA) load characteristics
- **Figure 23** Colyer Road 33/11kV zone substation: Apparent power (MVA) load characteristics
- **Figure 24** Conical Hill 33/11kV zone substation: Apparent power (MVA) load characteristics
- **Figure 25** Dipton 33/11kV zone substation: Apparent power (MVA) load characteristics
- **Figure 26** Edendale Fonterra 33/11kV zone substation: Apparent power (MVA) load characteristics
- **Figure 27** Edendale 33/11kV zone substation: Apparent power (MVA) load characteristics
- **Figure 28** Glenham 33/11kV zone substation: Apparent power (MVA) load characteristics
- **Figure 29** Gorge Road 33/11kV zone substation: Apparent power (MVA) load characteristics
- **Figure 30** Hedgehope 33/11kV zone substation: Apparent power (MVA) load characteristics
- **Figure 31** Hillside 33/11kV zone substation: Apparent power (MVA) load characteristics
- **Figure 32** Isla Bank 33/11kV zone substation: Apparent power (MVA) load characteristics
- **Figure 33** Kelso 33/11kV zone substation: Apparent power (MVA) load characteristics
- **Figure 34** Kennington 33/11kV zone substation: Apparent power (MVA) load characteristics
- **Figure 35** Lumsden 33/11kV zone substation: Apparent power (MVA) load characteristics
- **Figure 36** Makarewa 33/11kV zone substation: Apparent power (MVA) load characteristics
- **Figure 37** Mataura 33/11kV zone substation: Apparent power (MVA) load characteristics
- **Figure 38** Monowai 66/11kV zone substation: Apparent power (MVA) load characteristics
- **Figure 39** Mossburn 66/33/11kV zone substation: Apparent power (MVA) load characteristics
- **Figure 40** North Gore 33/11kV zone substation: Apparent power (MVA) load characteristics
- **Figure 41** North Makarewa 66/33/11kV zone substation: Apparent power (MVA) load characteristics
- **Figure 42** Ohai 66/11kV zone substation: Apparent power (MVA) load characteristics
- **Figure 43** Orawia 66/11kV zone substation: Apparent power (MVA) load characteristics
- **Figure 44** Otatara 33/11kV zone substation: Apparent power (MVA) load characteristics
- **Figure 45** Otautau 66/11kV zone substation: Apparent power (MVA) load characteristics
- **Figure 46** Riversdale 33/11kV zone substation: Apparent power (MVA) load characteristics
- **Figure 47** Riverton 33/11kV zone substation: Apparent power (MVA) load characteristics
- **Figure 48** Seaward Bush 33/11kV zone substation: Apparent power (MVA) load characteristics
- **Figure 49** South Gore 33/11kV zone substation: Apparent power (MVA) load characteristics
- **Figure 50** Te Anau 66/11kV zone substation: Apparent power (MVA) load characteristics
- **Figure 51** Tokanui 33/11kV zone substation: Apparent power (MVA) load characteristics
- **Figure 52** Underwood 33/11kV zone substation: Apparent power (MVA) load characteristics
- **Figure 53** Waikaka 33/11kV zone substation: Apparent power (MVA) load characteristics
- **Figure 54** Waikiwi 33/11kV zone substation: Apparent power (MVA) load characteristics
- **Figure 55** Winton 66/11kV zone substation: Apparent power (MVA) load characteristics

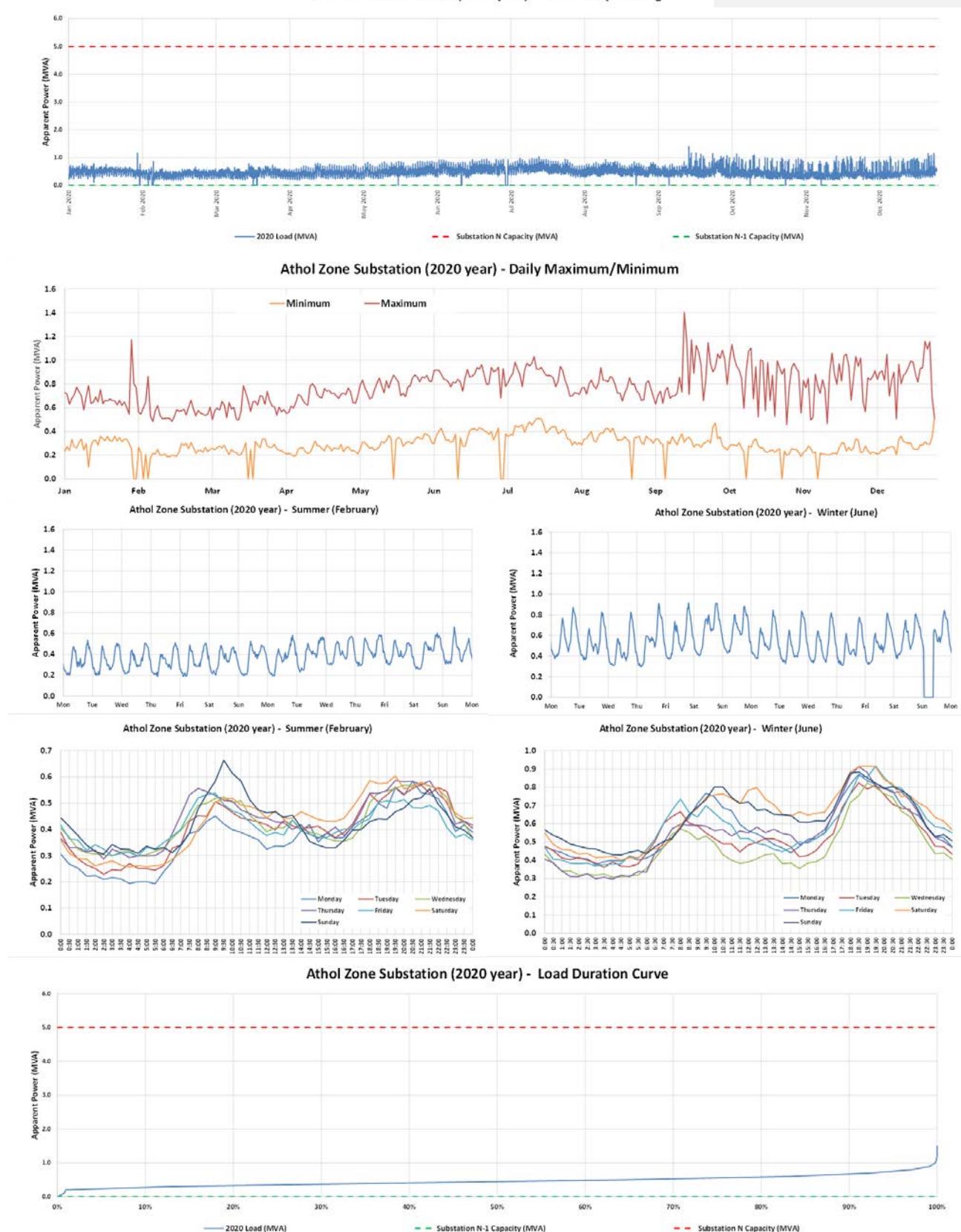
ATHOL MVA


Figure 19 Athol 66/11kV zone substation: Apparent power (MVA) load characteristics

AWARUA CHIP MILL MVA

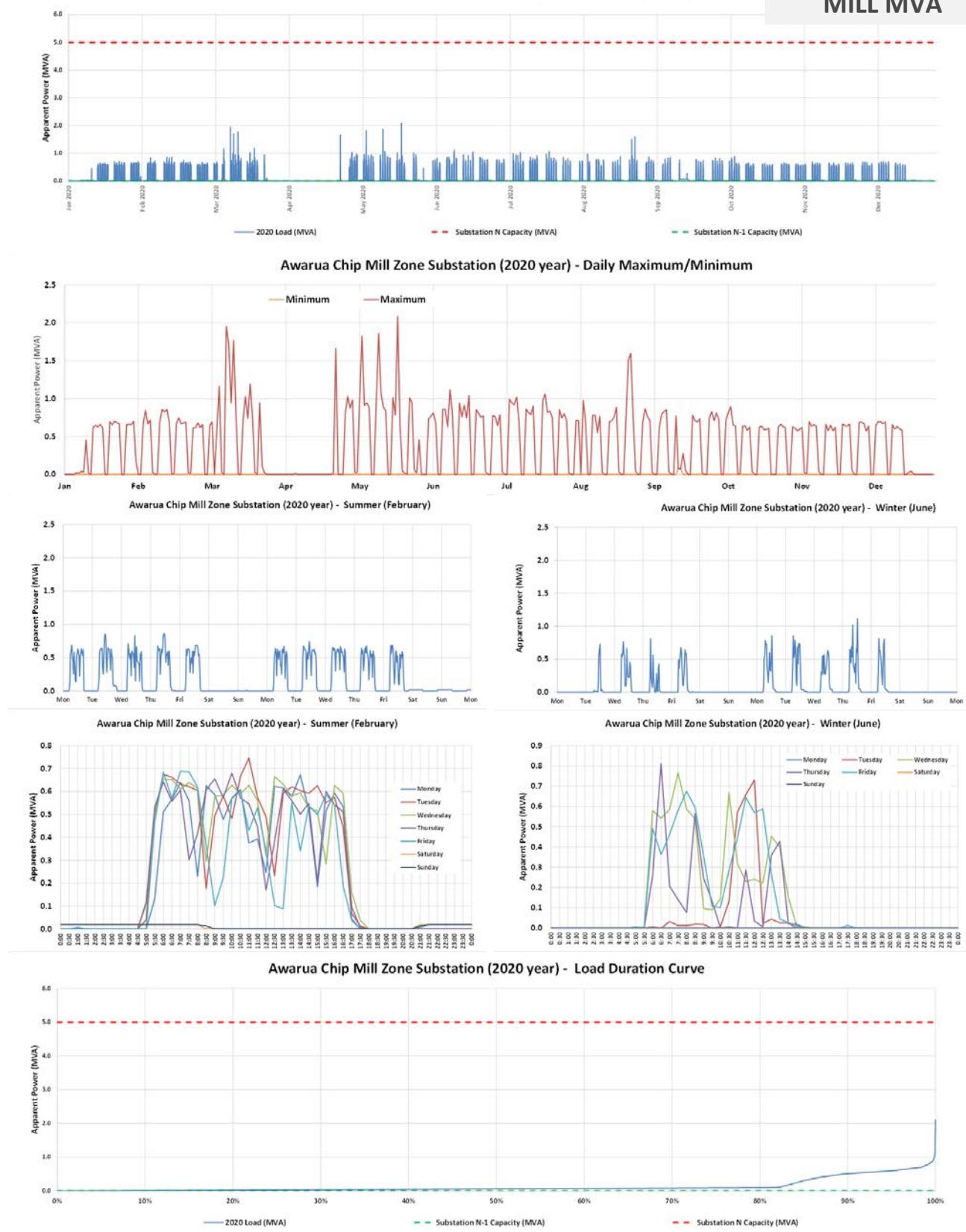


Figure 20 Awarua Chip Mill 33/11kV zone substation: Apparent power (MVA) load characteristics

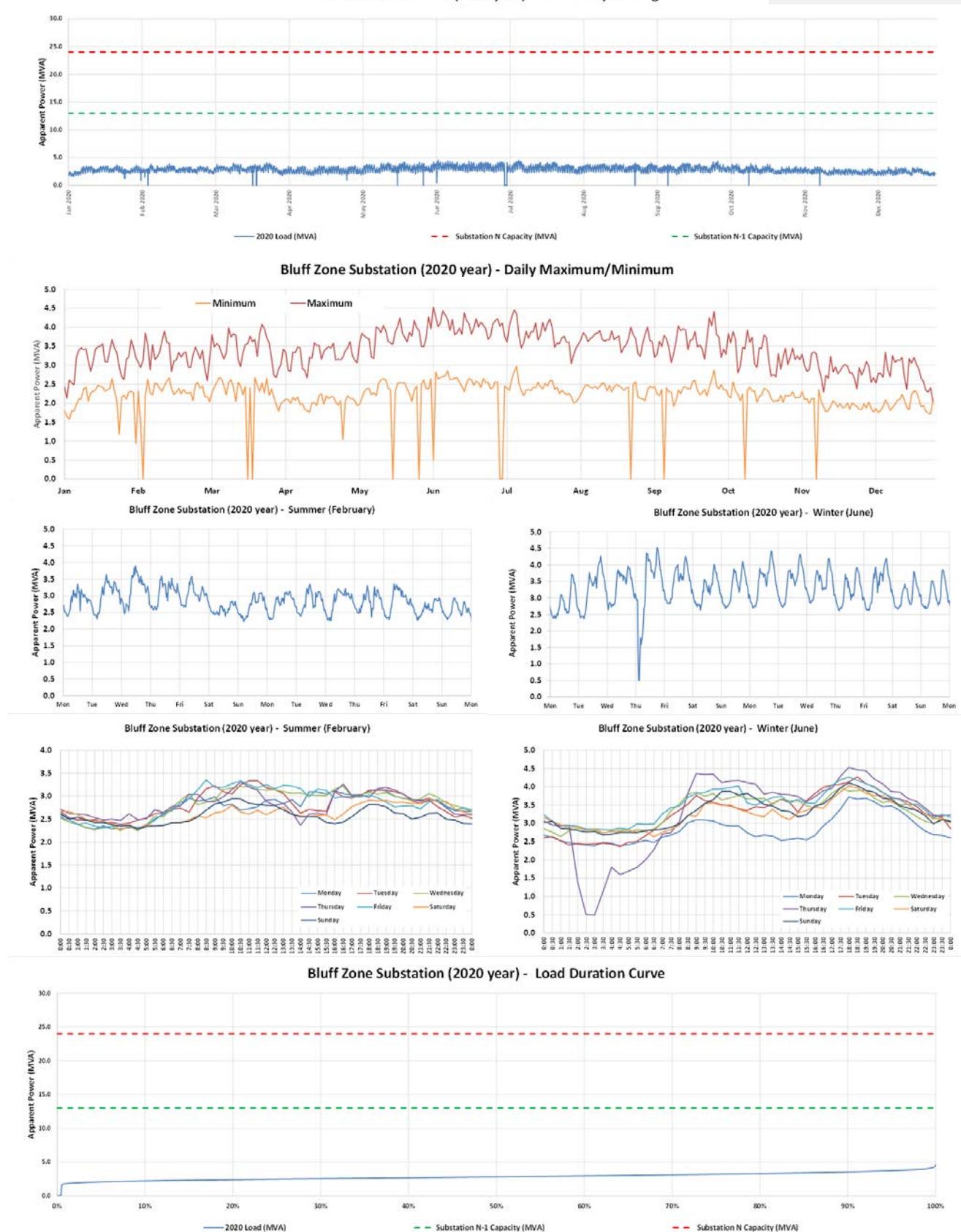
BLUFF MVA


Figure 21 Bluff 33/11kV zone substation: Apparent power (MVA) load characteristics

CENTRE BUSH MVA

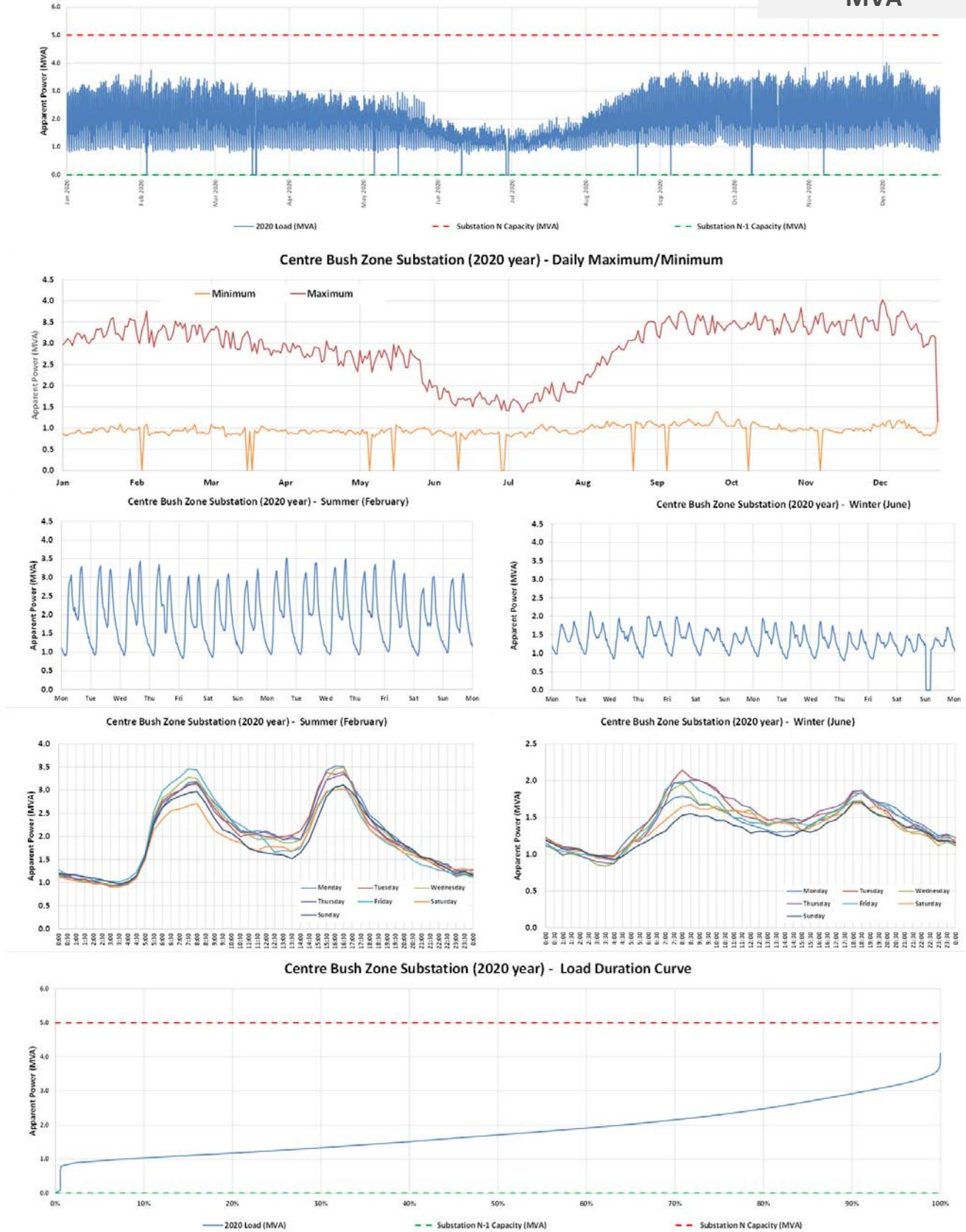


Figure 22 Centre Bush 33/11kV zone substation: Apparent power (MVA) load characteristics

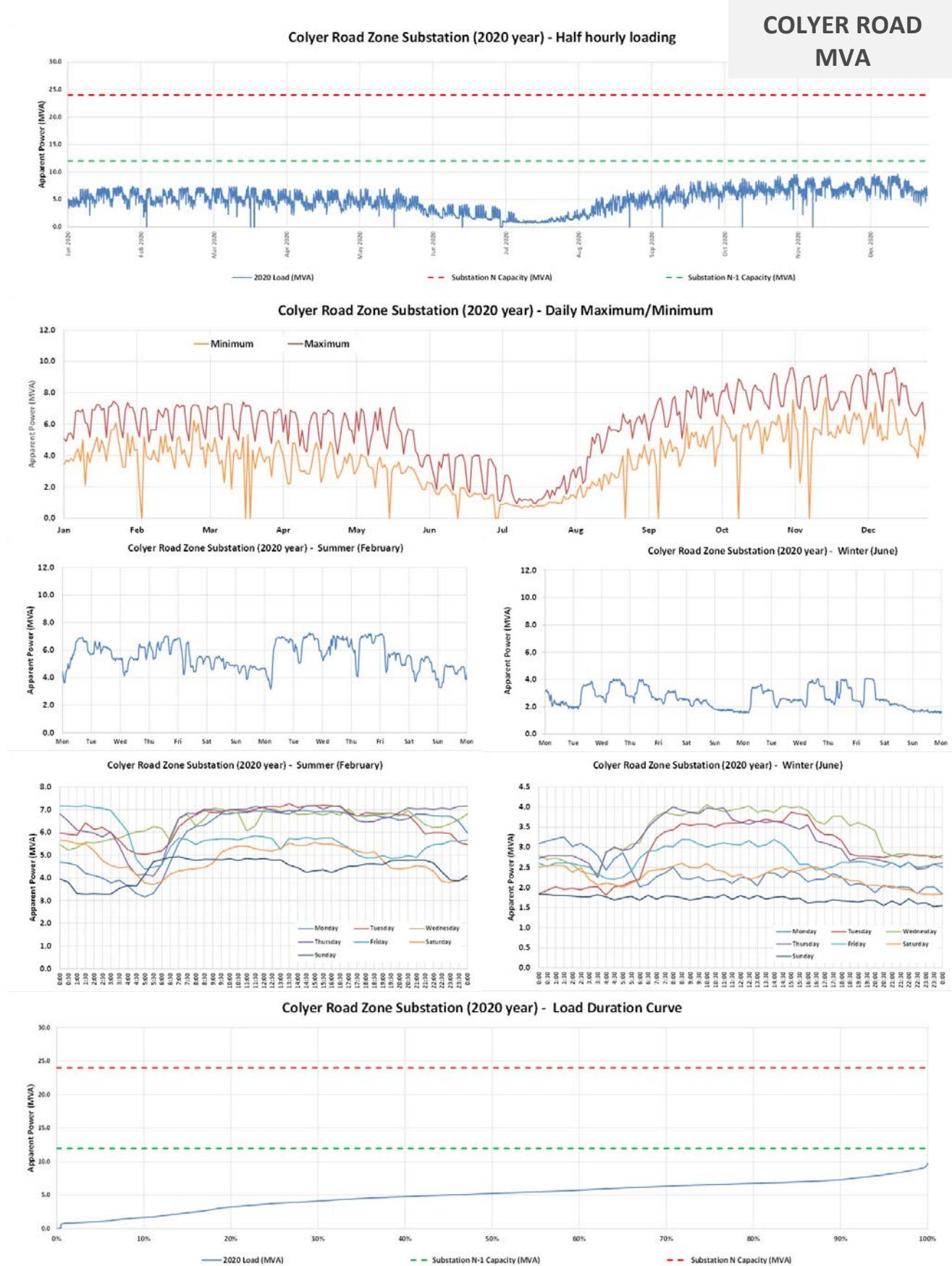


Figure 23 Colyer Road 33/11kV zone substation: Apparent power (MVA) load characteristics

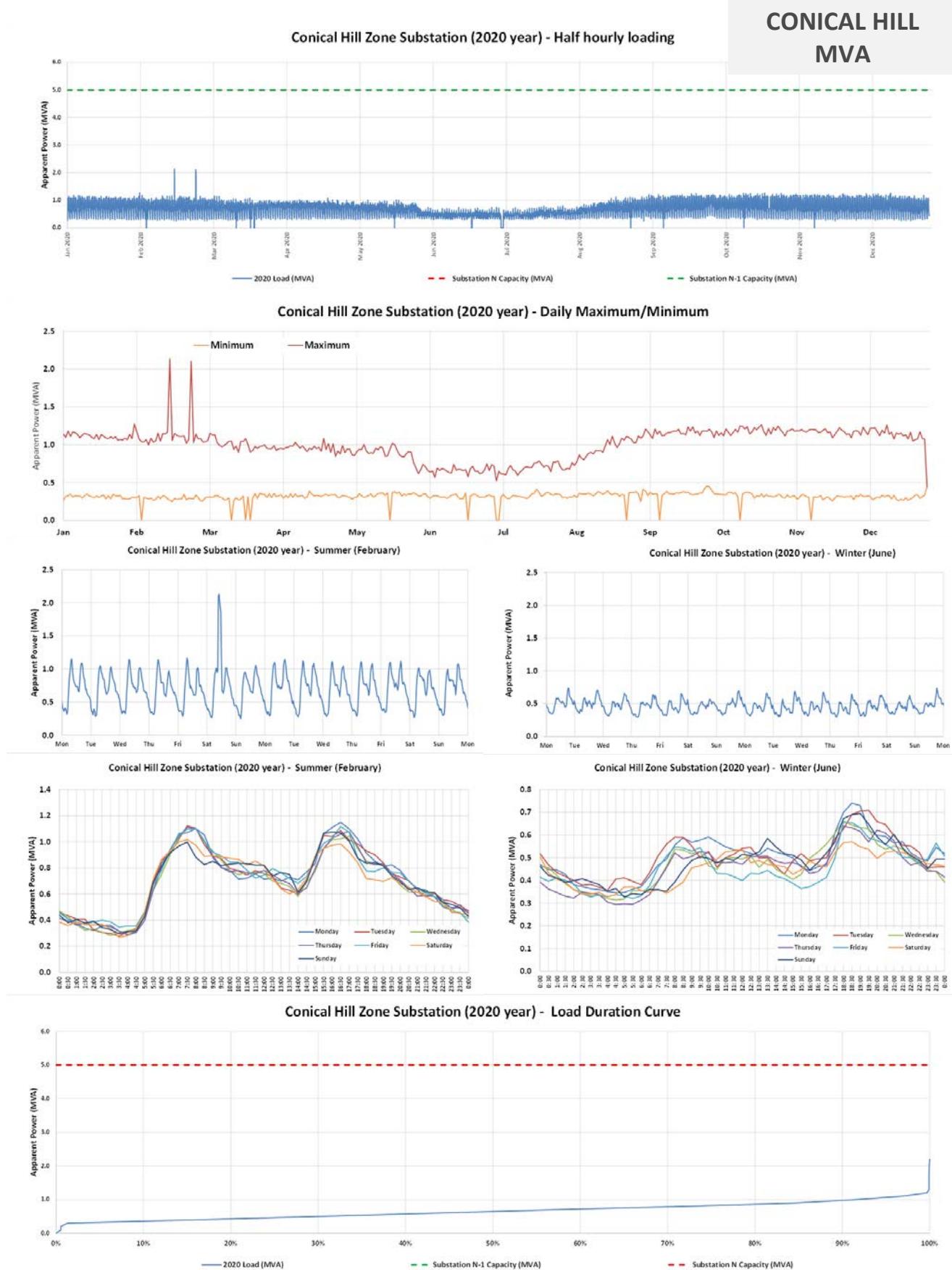


Figure 24 Conical Hill 33/11kV zone substation: Apparent power (MVA) load characteristics

DIPTON MVA

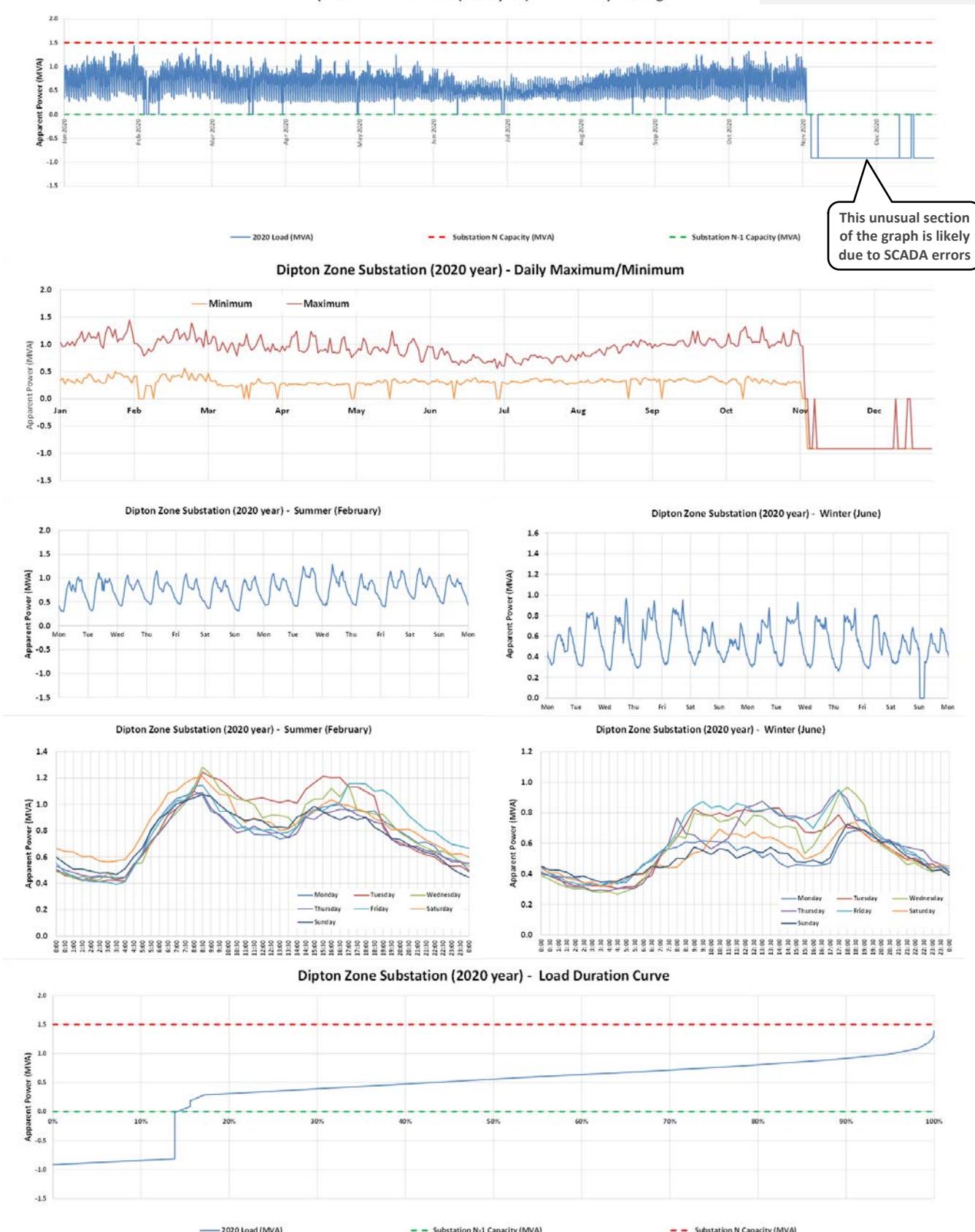


Figure 25 Dipton 33/11kV zone substation: Apparent power (MVA) load characteristics

Southland Electrical Network / Spare Capacity and Load Characteristics

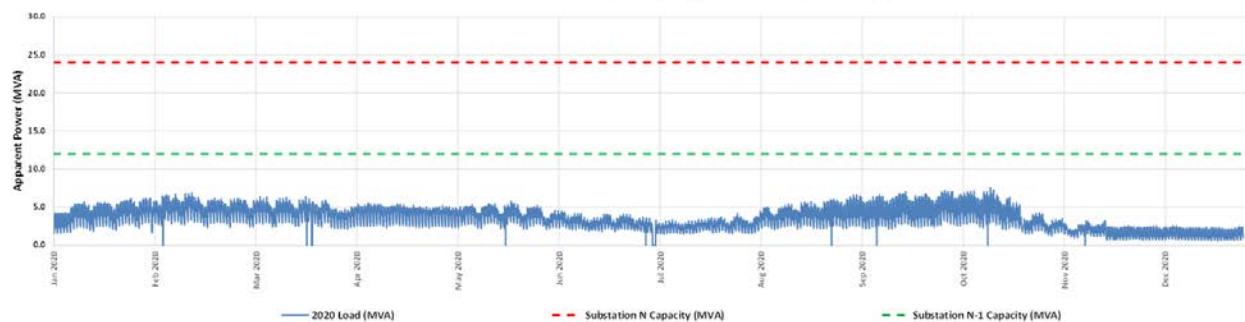
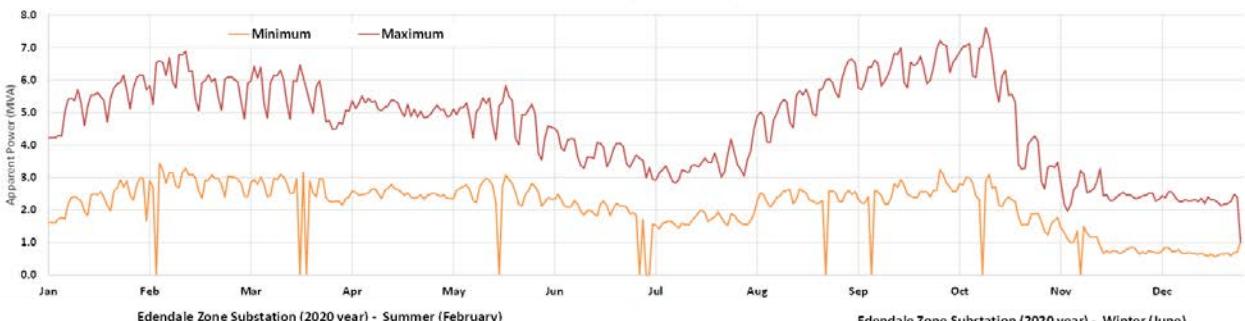
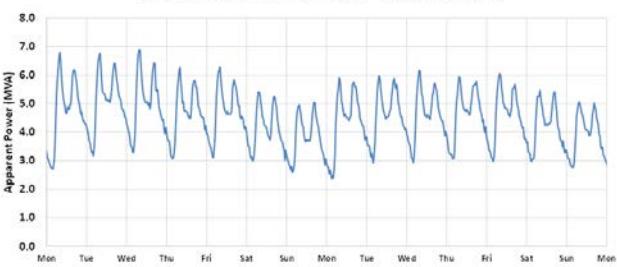
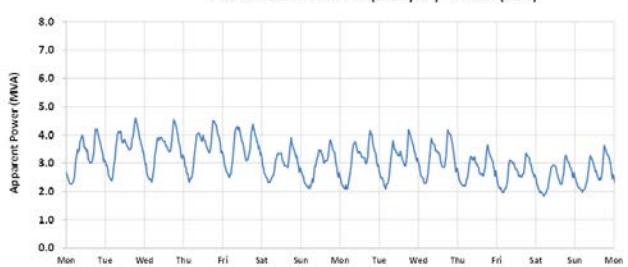
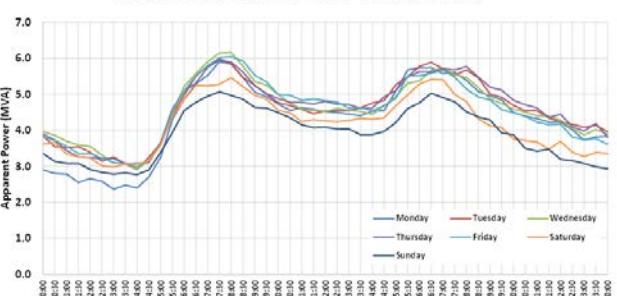
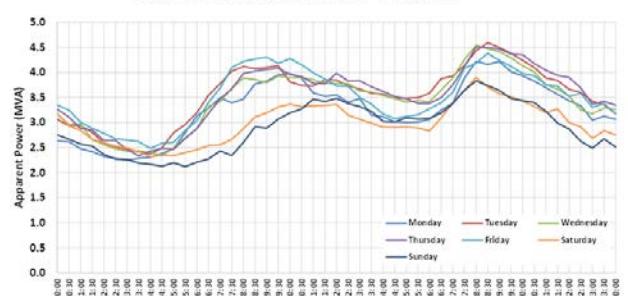
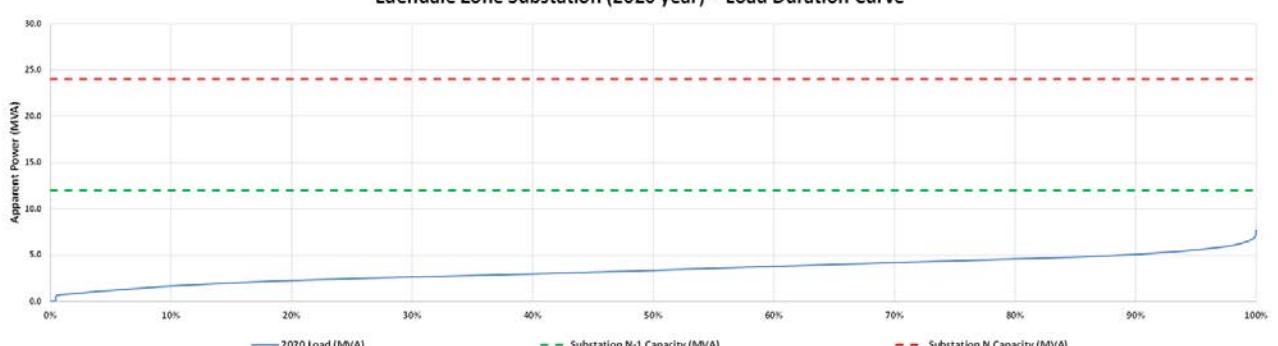
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INFORMATION NOT SUPPLIED

Figure 26 Edendale Fonterra 33/11kV zone substation: Apparent power (MVA) load characteristics

EDENDALE MVA
Edendale Zone Substation (2020 year) - Half hourly loading

Edendale Zone Substation (2020 year) - Daily Maximum/Minimum

Edendale Zone Substation (2020 year) - Summer (February)

Edendale Zone Substation (2020 year) - Winter (June)

Edendale Zone Substation (2020 year) - Summer (February)

Edendale Zone Substation (2020 year) - Winter (June)

Edendale Zone Substation (2020 year) - Load Duration Curve

Figure 27 Edendale 33/11kV zone substation: Apparent power (MVA) load characteristics

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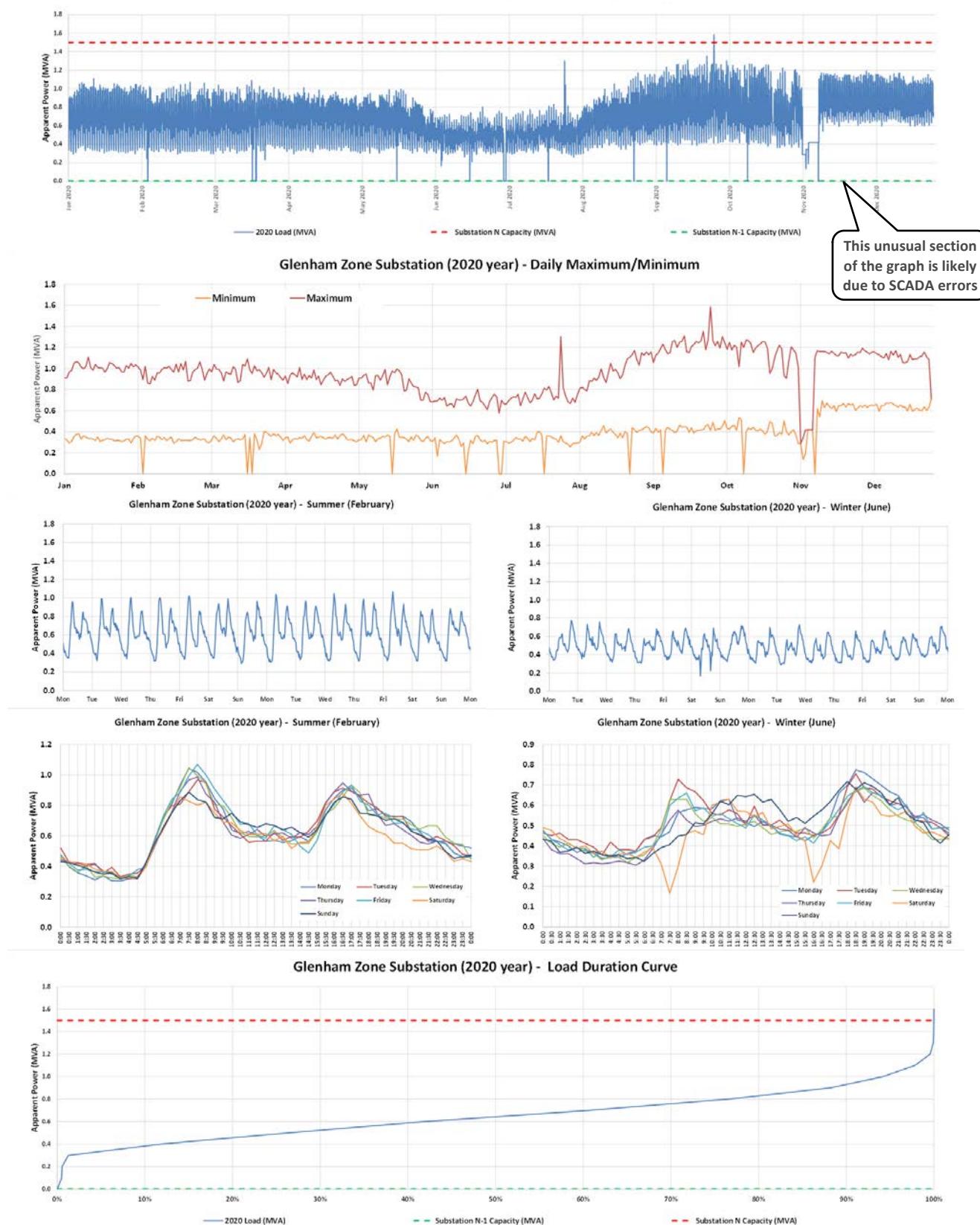
GLENHAM MVA


Figure 28 Glenham 33/11kV zone substation: Apparent power (MVA) load characteristics

GORGE ROAD MVA

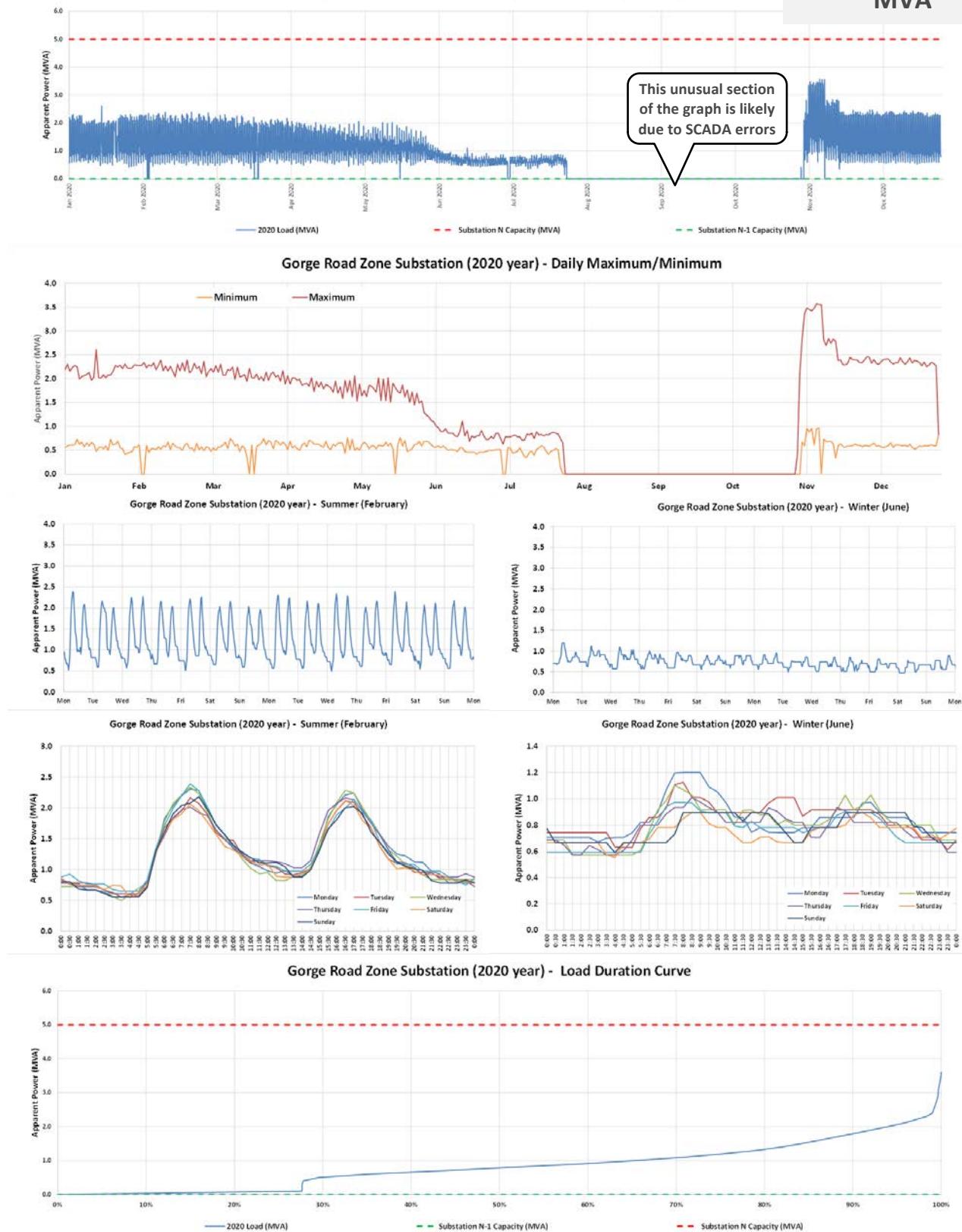


Figure 29 Gorge Road 33/11kV zone substation: Apparent power (MVA) load characteristics

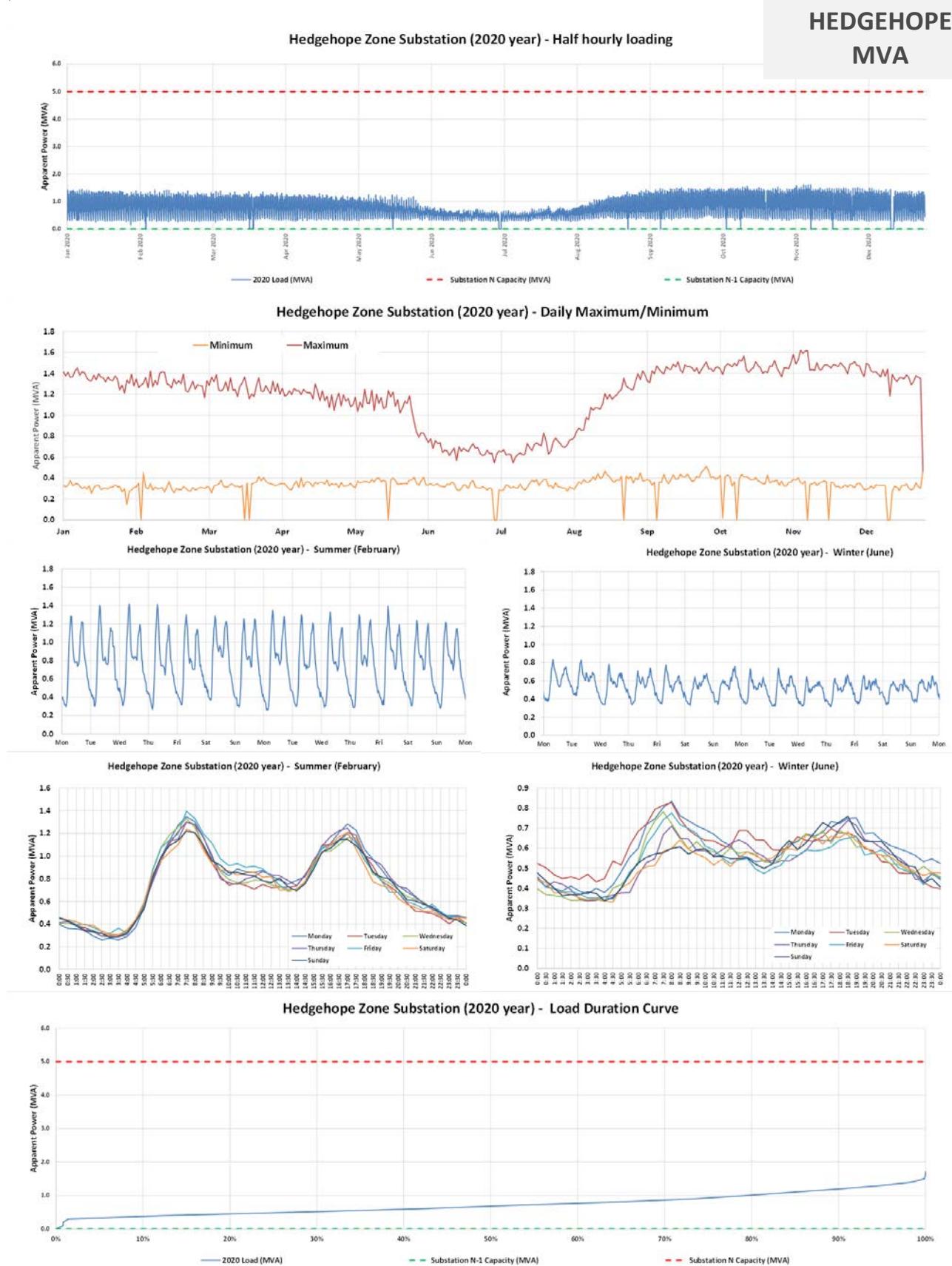


Figure 30 Hedgehope 33/11kV zone substation: Apparent power (MVA) load characteristics

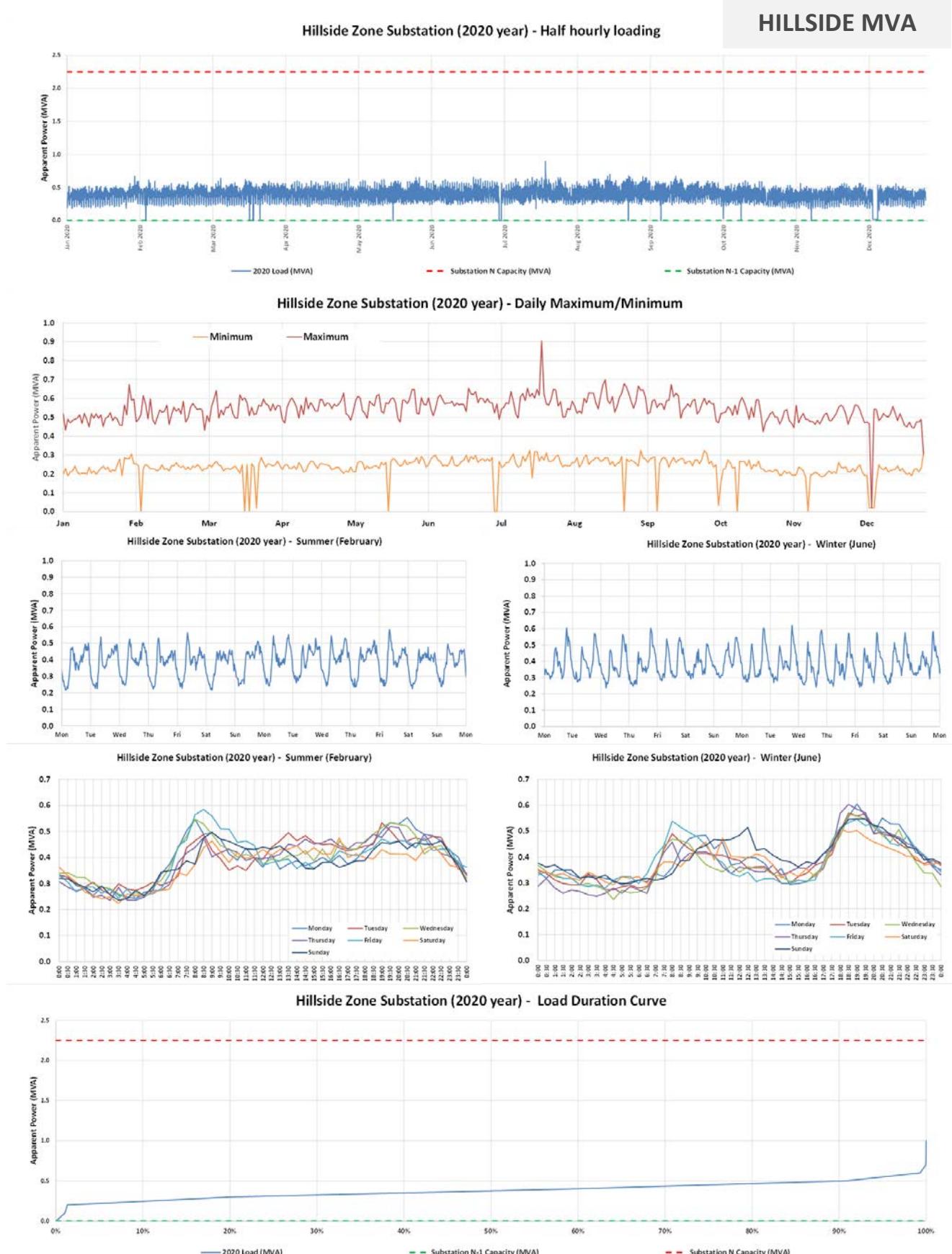


Figure 31 Hillside 33/11kV zone substation: Apparent power (MVA) load characteristics

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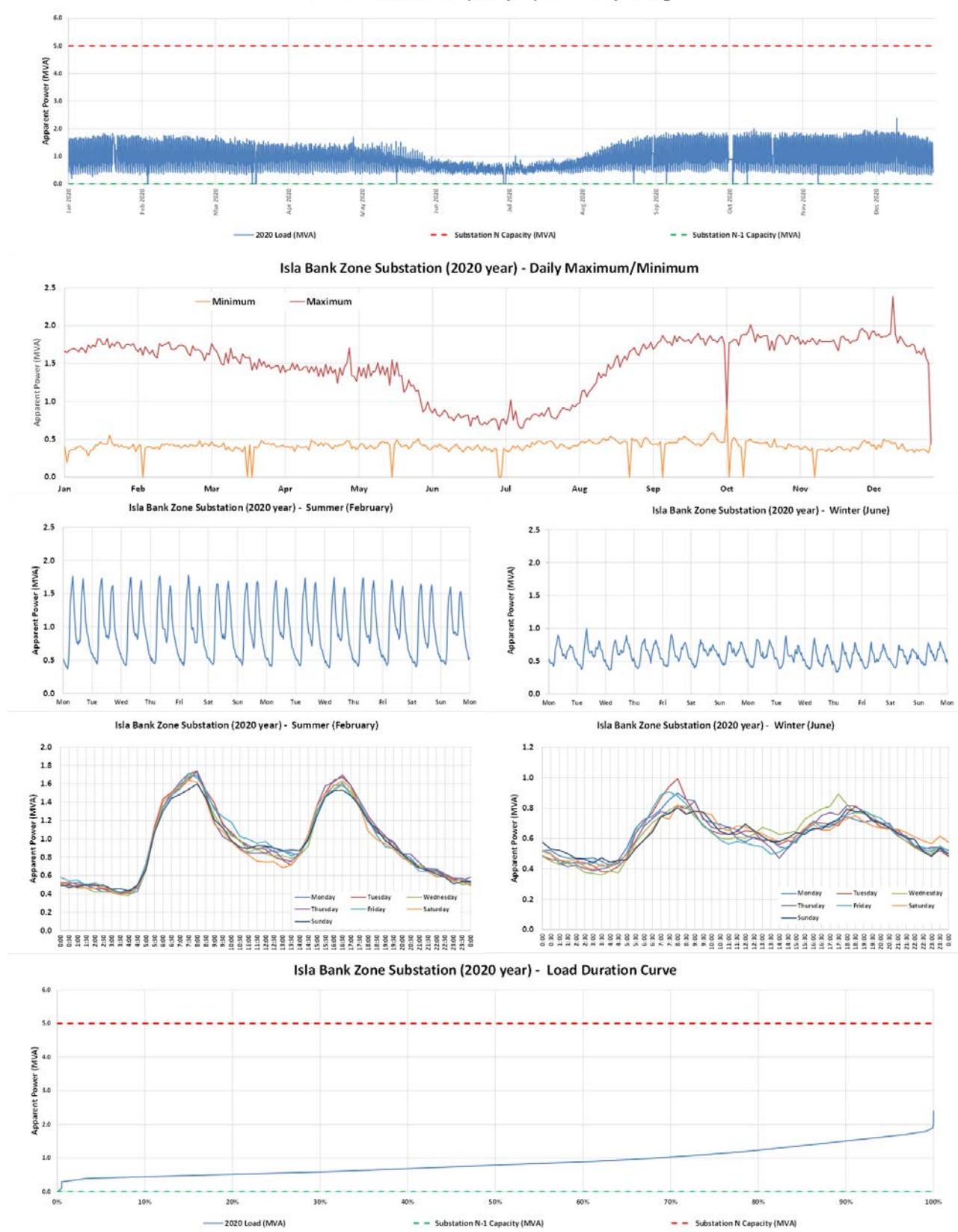
ISLA BANK MVA


Figure 32 Isla Bank 33/11kV zone substation: Apparent power (MVA) load characteristics

KELSO MVA

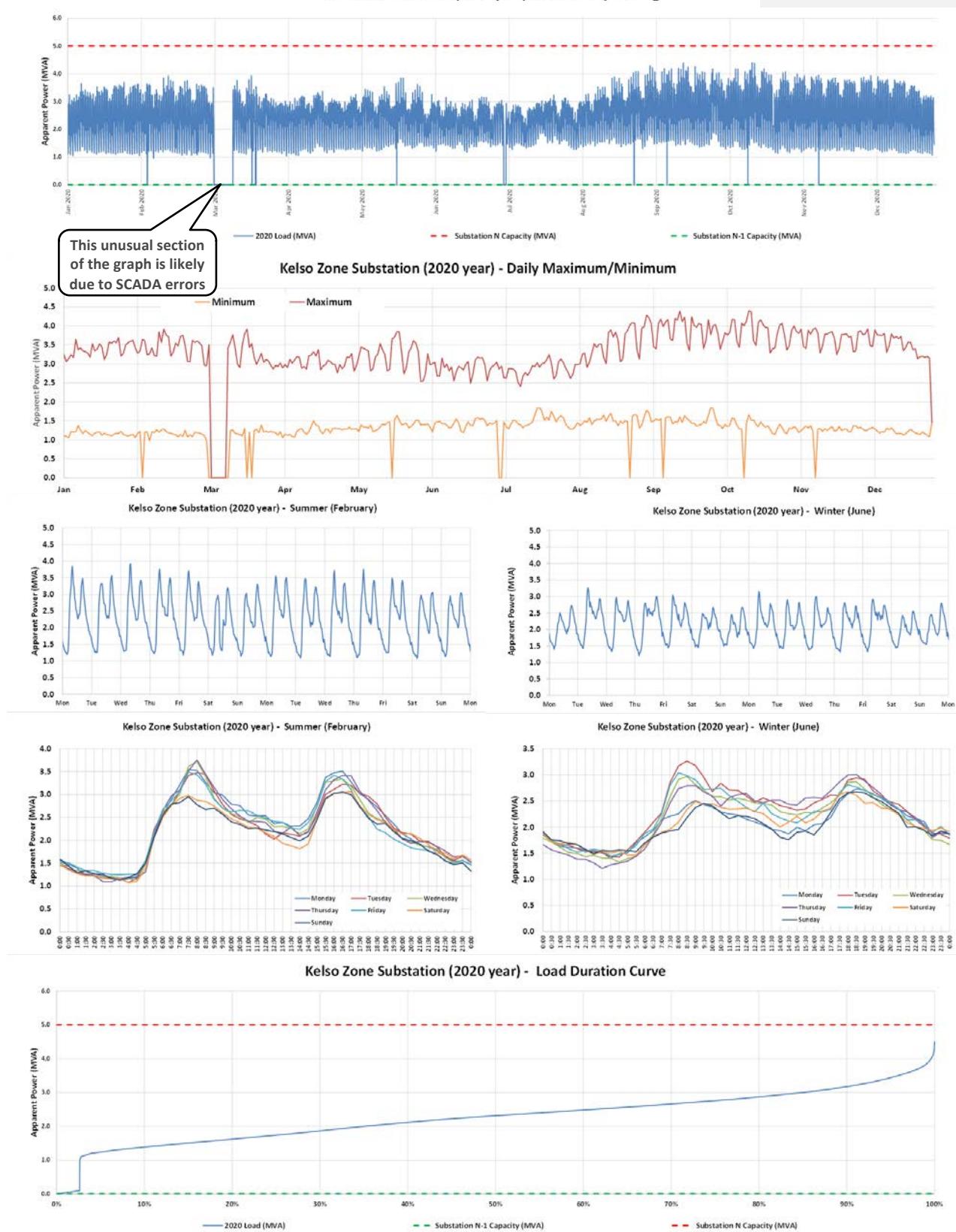


Figure 33 Kelso 33/11kV zone substation: Apparent power (MVA) load characteristics

KENNINGTON MVA

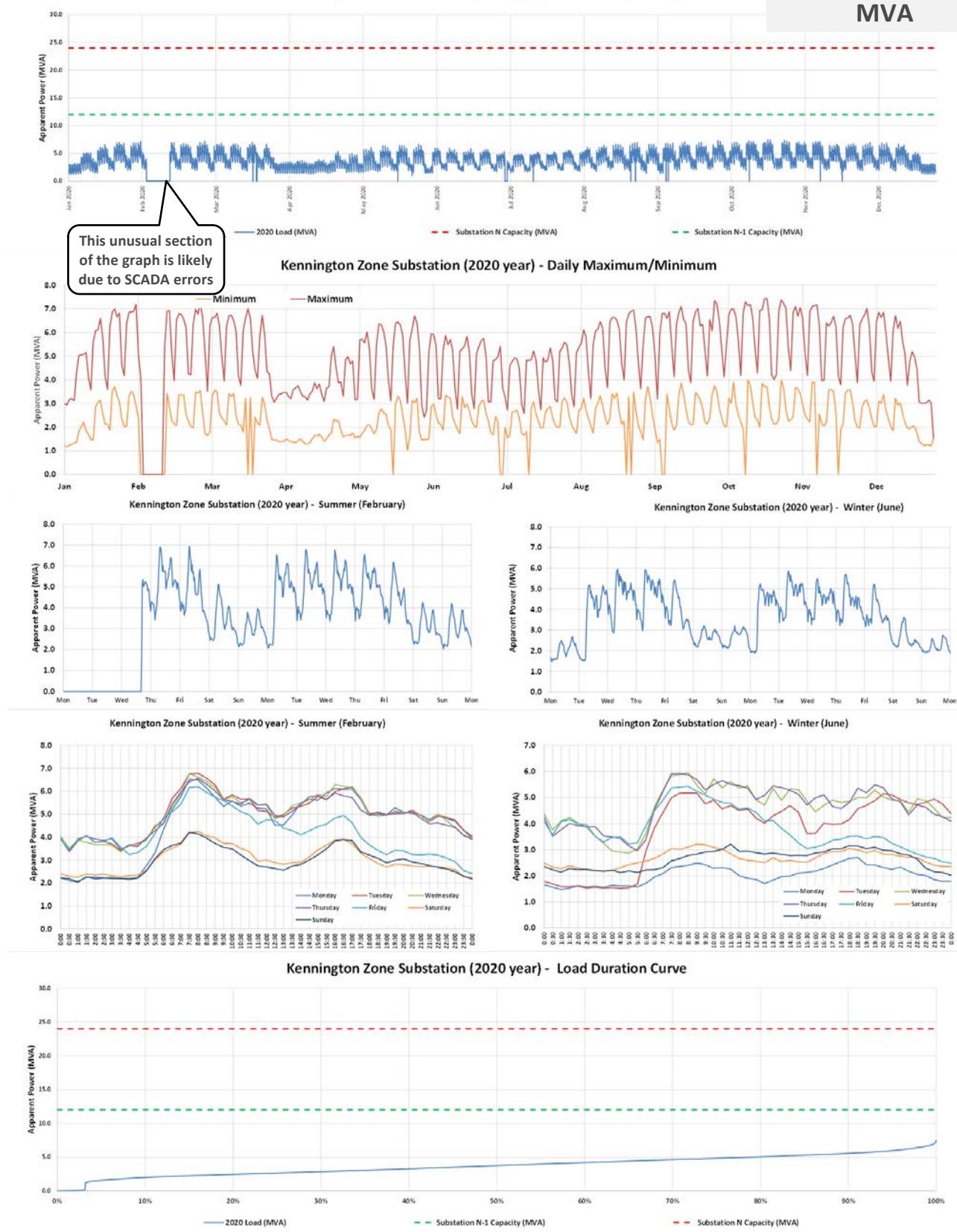


Figure 34 Kennington 33/11kV zone substation: Apparent power (MVA) load characteristics

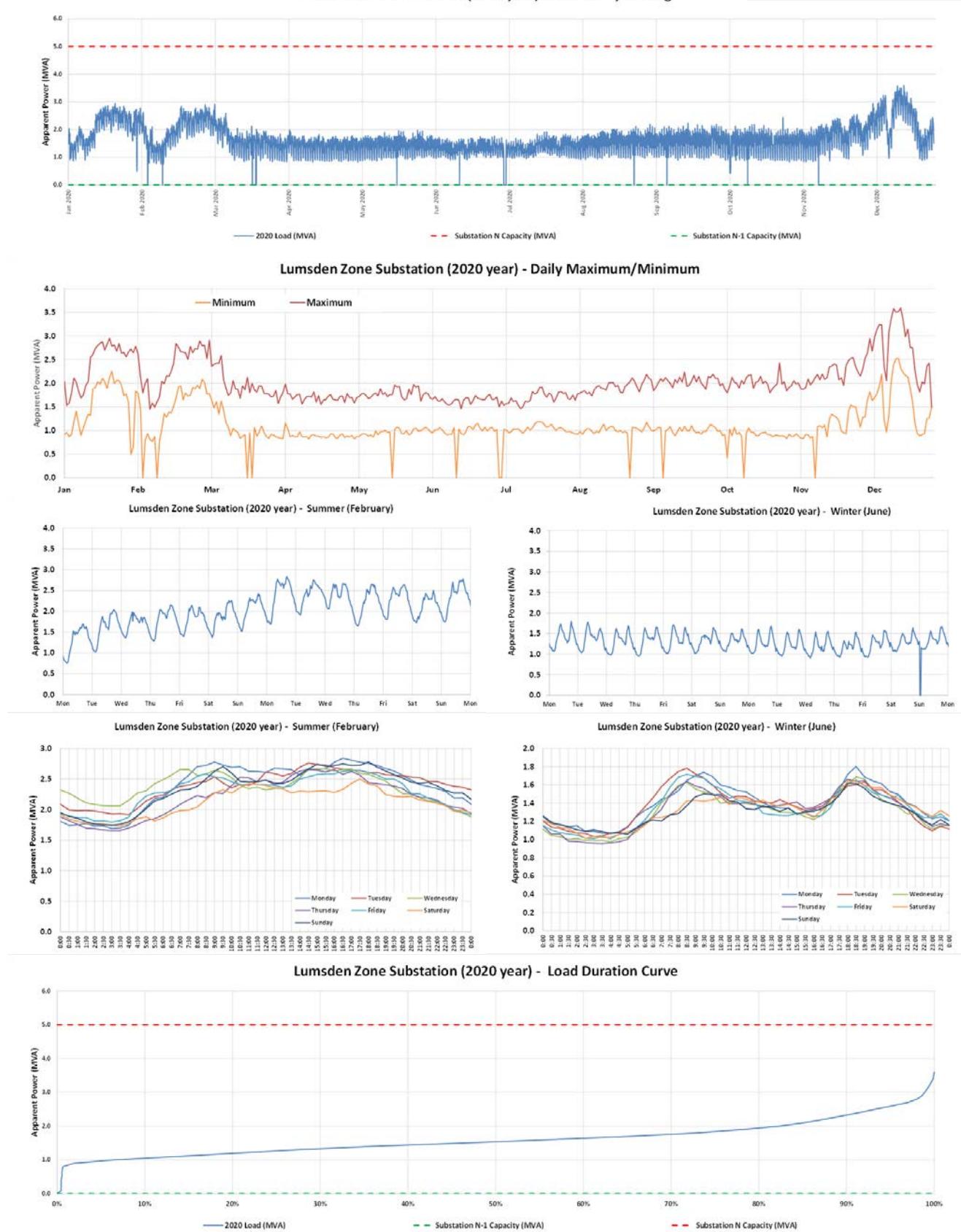
LUMSDEN MVA


Figure 35 Lumsden 33/11kV zone substation: Apparent power (MVA) load characteristics

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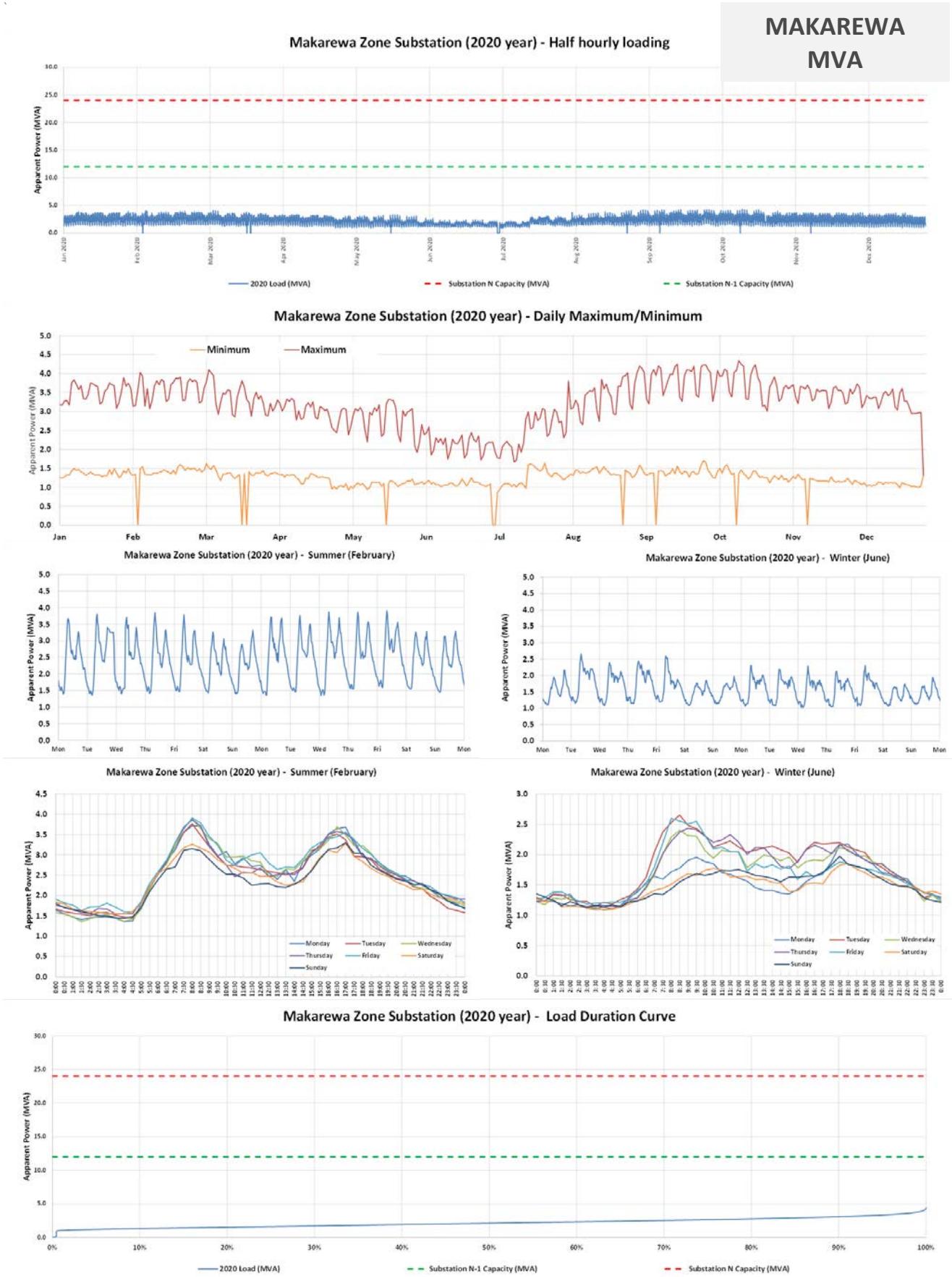


Figure 36 Makarewa 33/11kV zone substation: Apparent power (MVA) load characteristics

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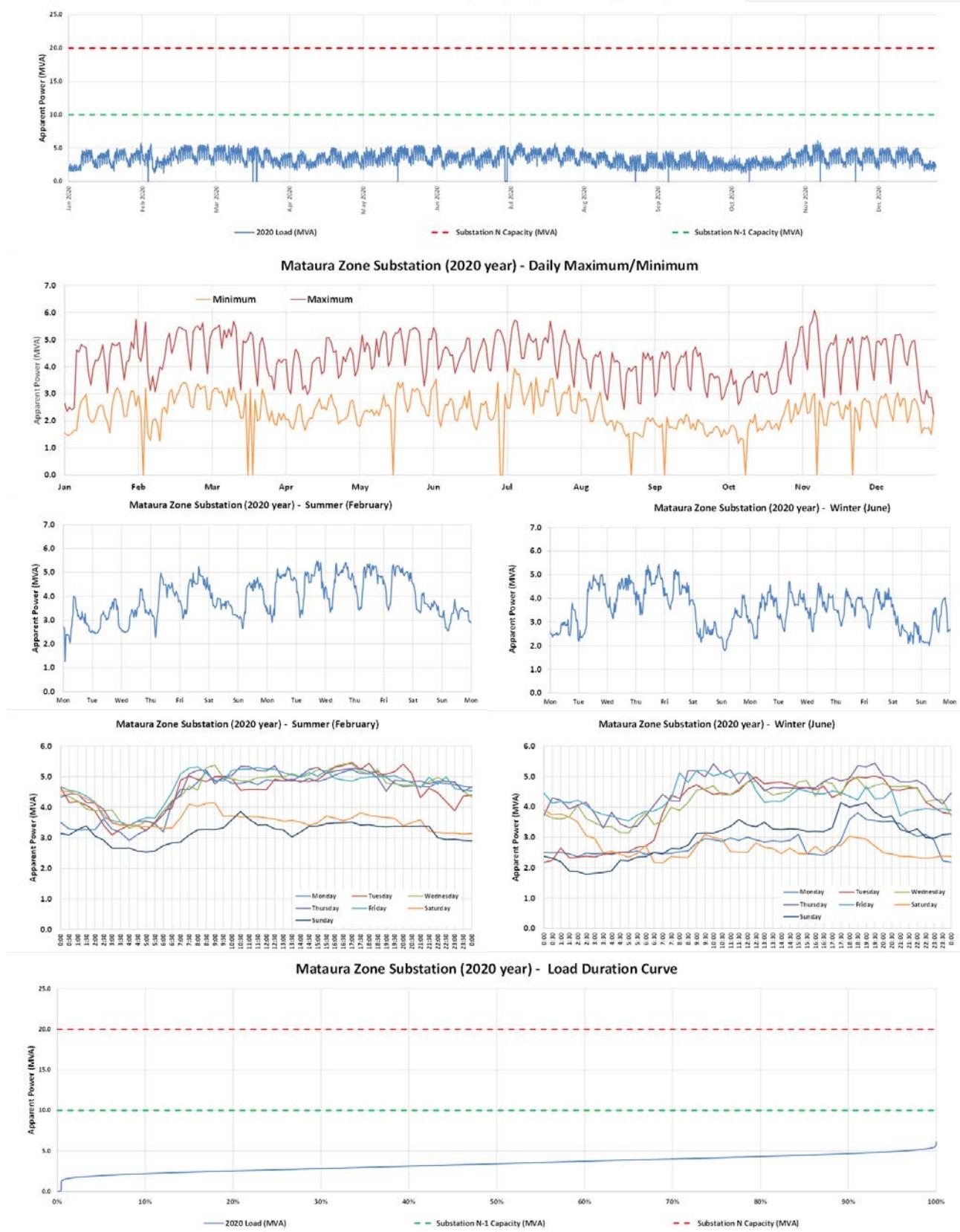
MATAURA MVA


Figure 37 Mataura 33/11kV zone substation: Apparent power (MVA) load characteristics

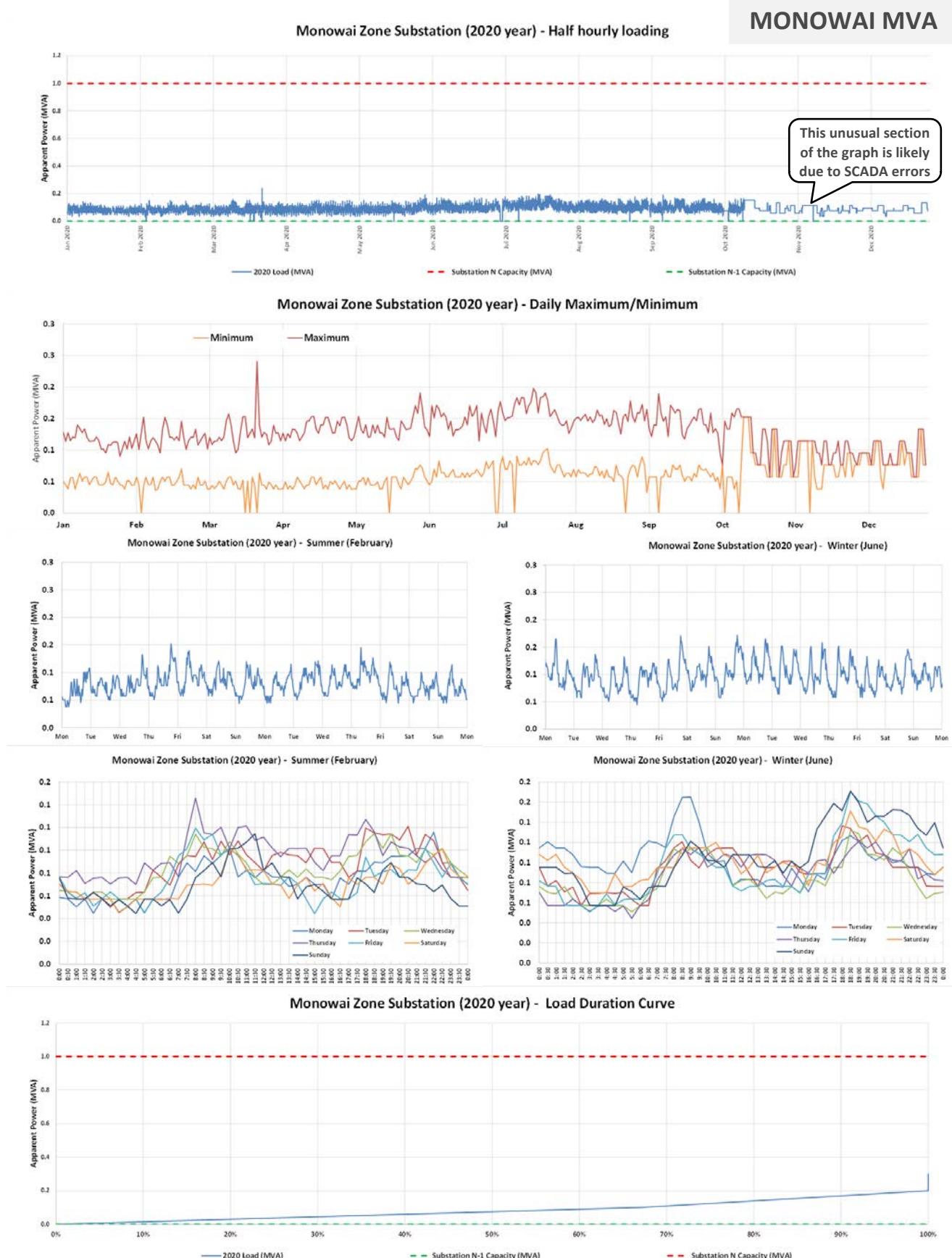


Figure 38 Monowai 66/11kV zone substation: Apparent power (MVA) load characteristics

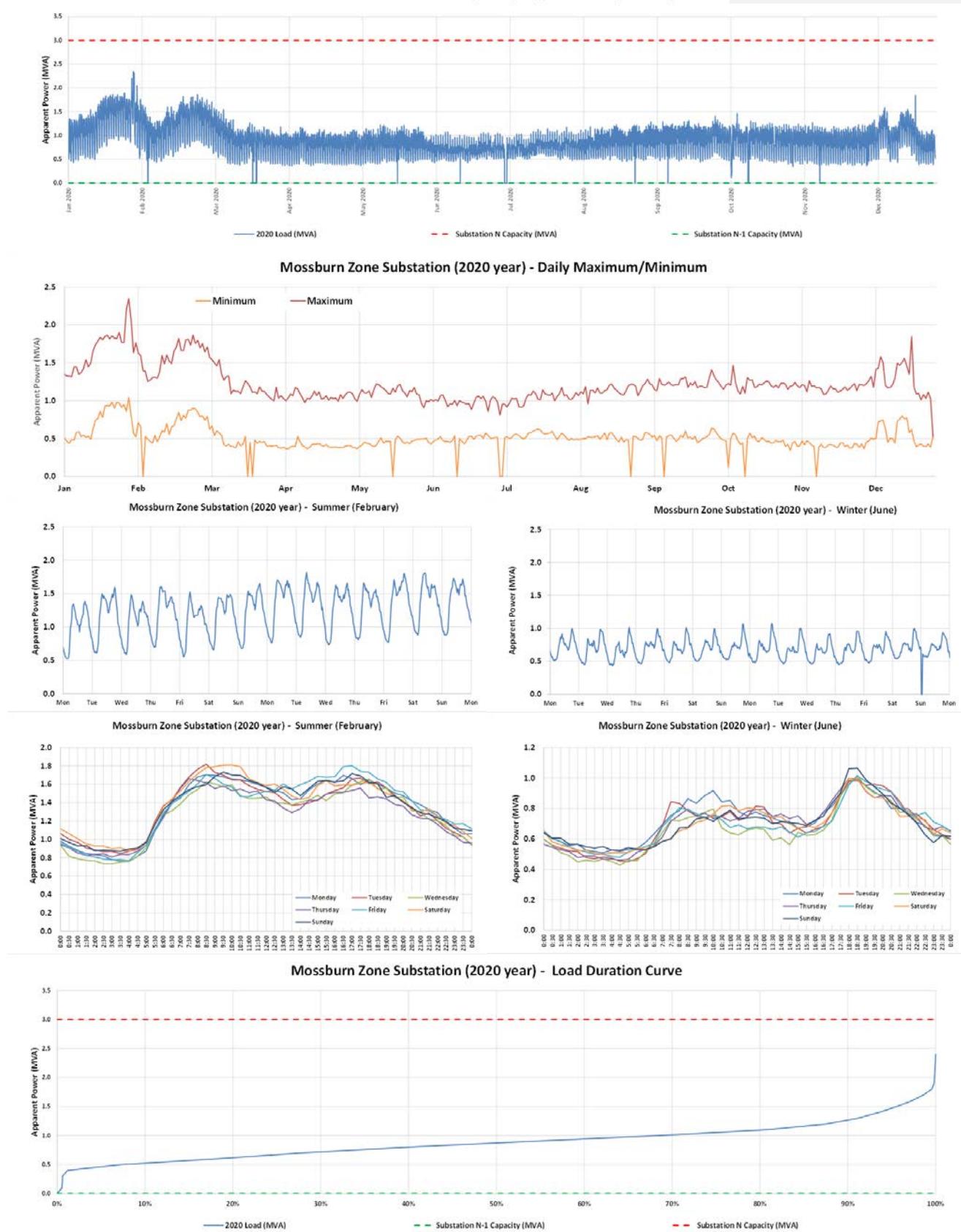
MOSSBURN MVA


Figure 39 Mossburn 66/33/11kV zone substation: Apparent power (MVA) load characteristics

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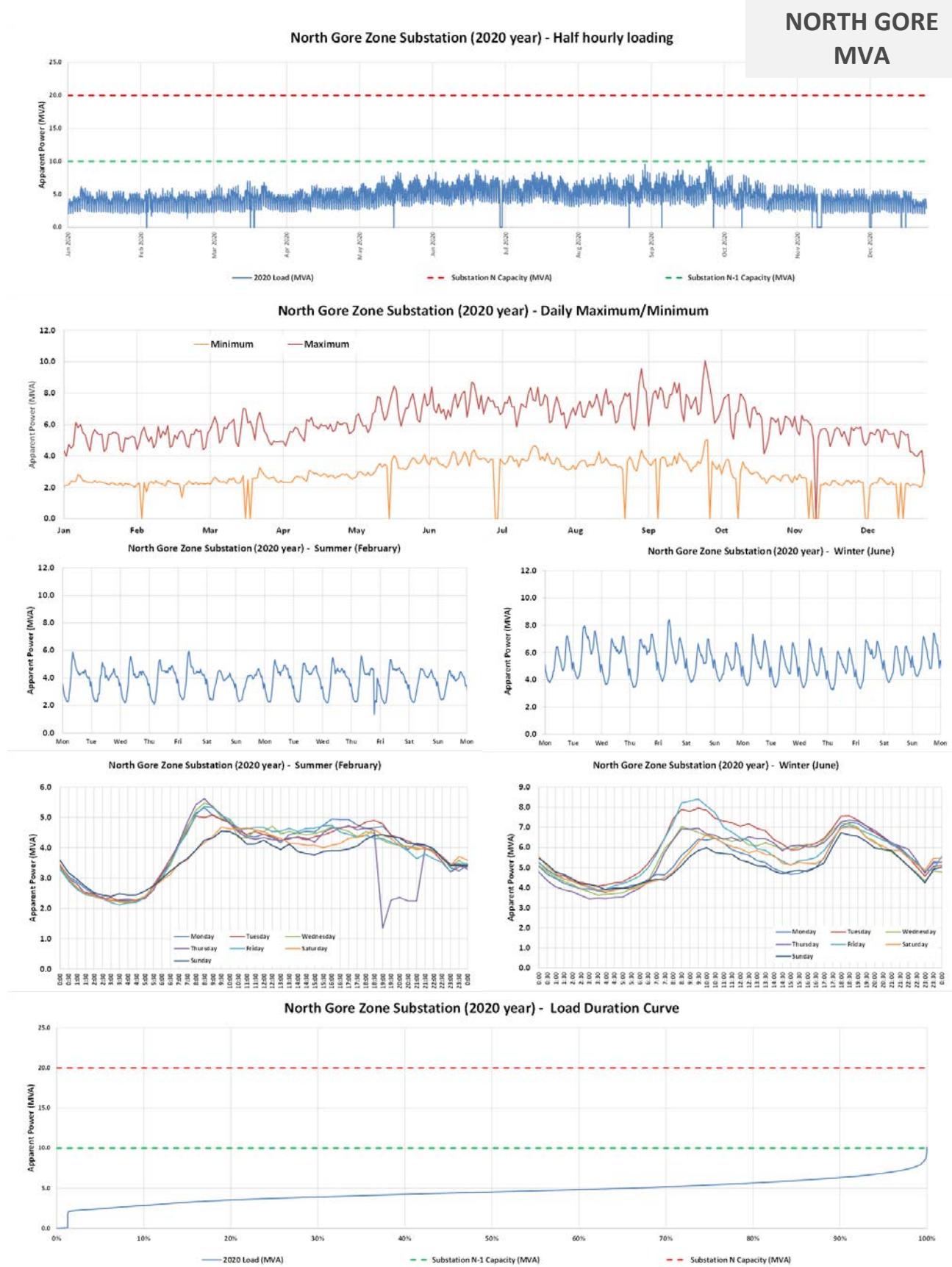


Figure 40 North Gore 33/11kV zone substation: Apparent power (MVA) load characteristics

INFORMATION NOT SUPPLIED

Figure 41 North Makarewa 66/33/11kV zone substation: Apparent power (MVA) load characteristics

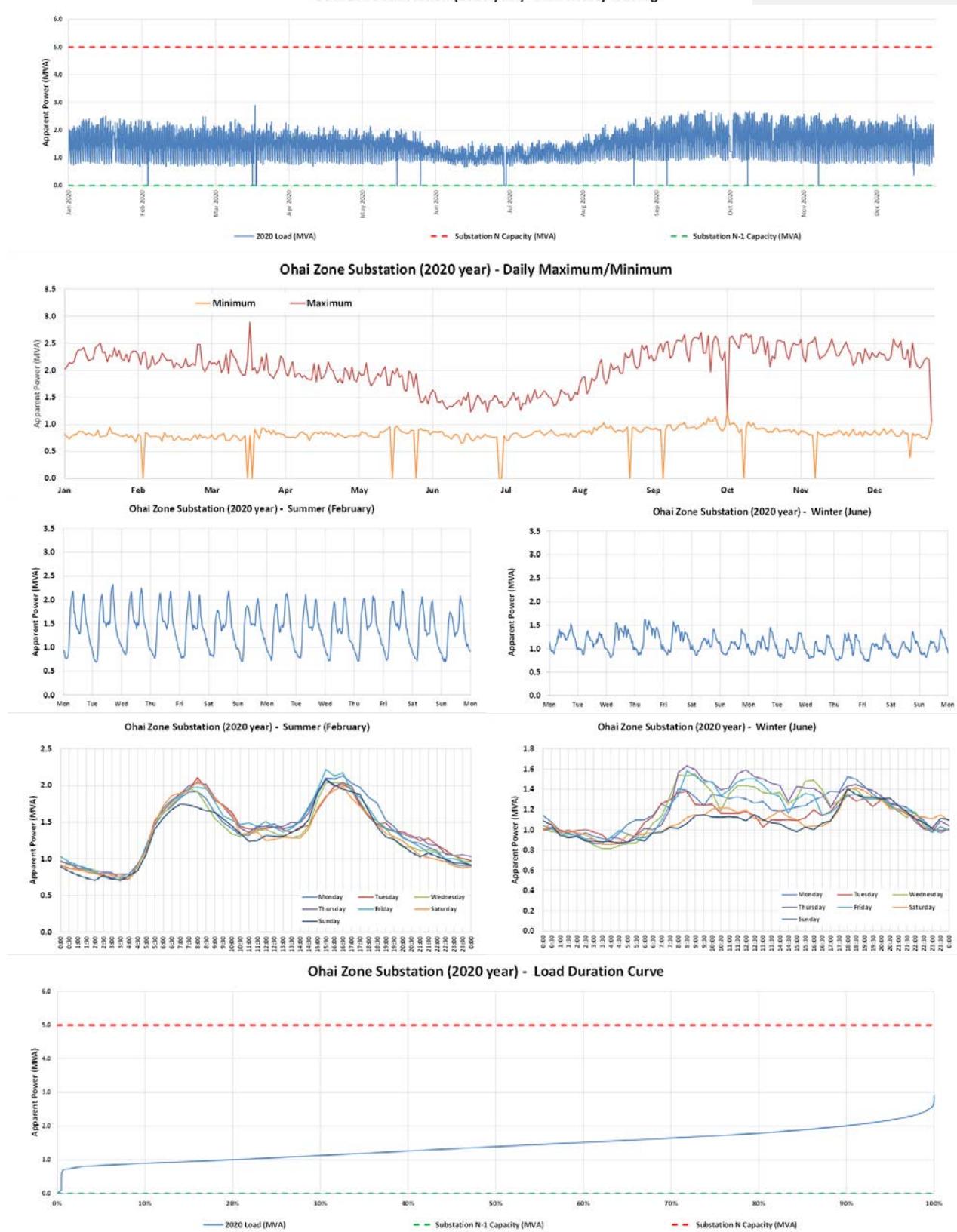
OHAI MVA


Figure 42 Ohai 66/11kV zone substation: Apparent power (MVA) load characteristics

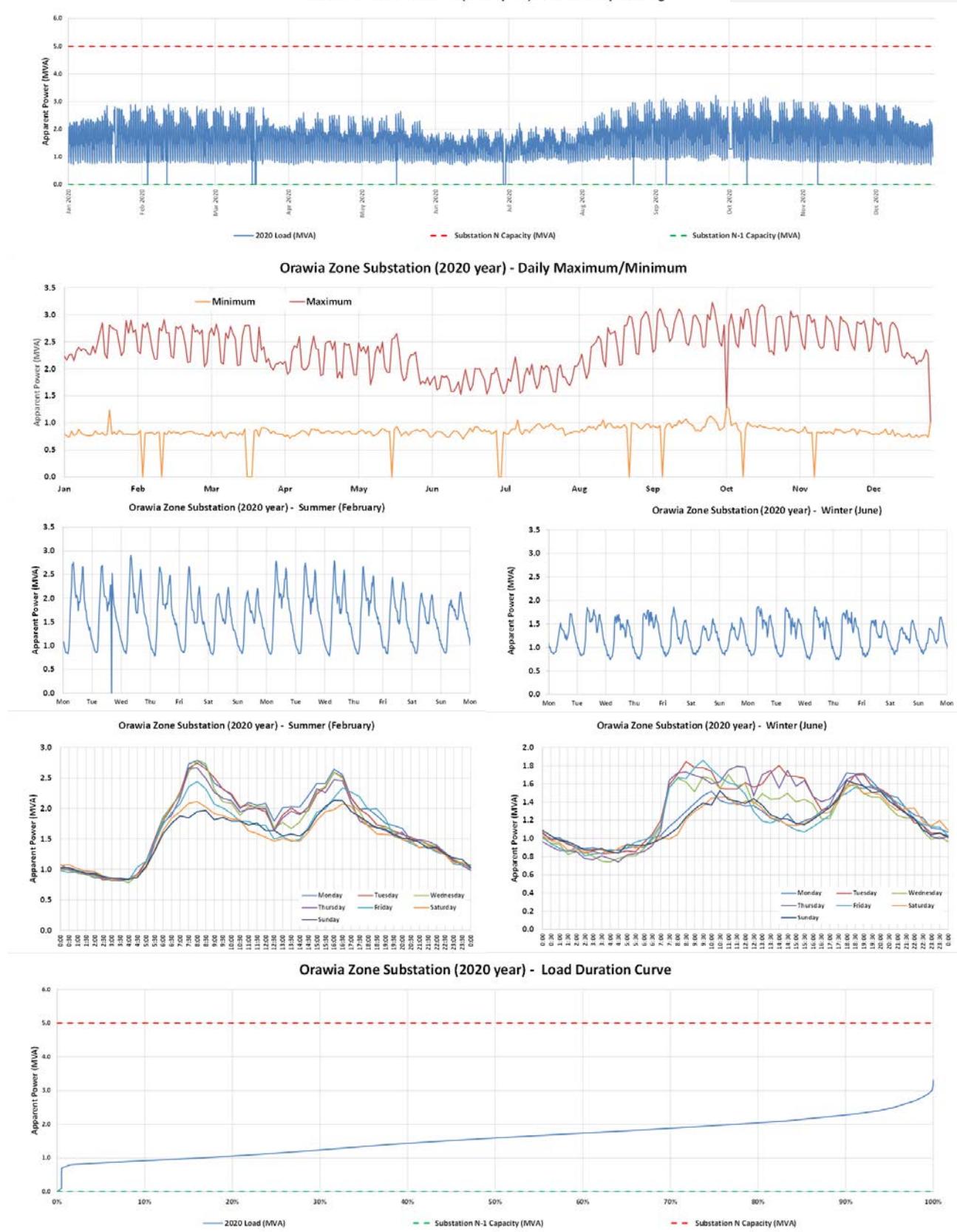
ORAWIA MVA


Figure 43 Orawia 66/11kV zone substation: Apparent power (MVA) load characteristics

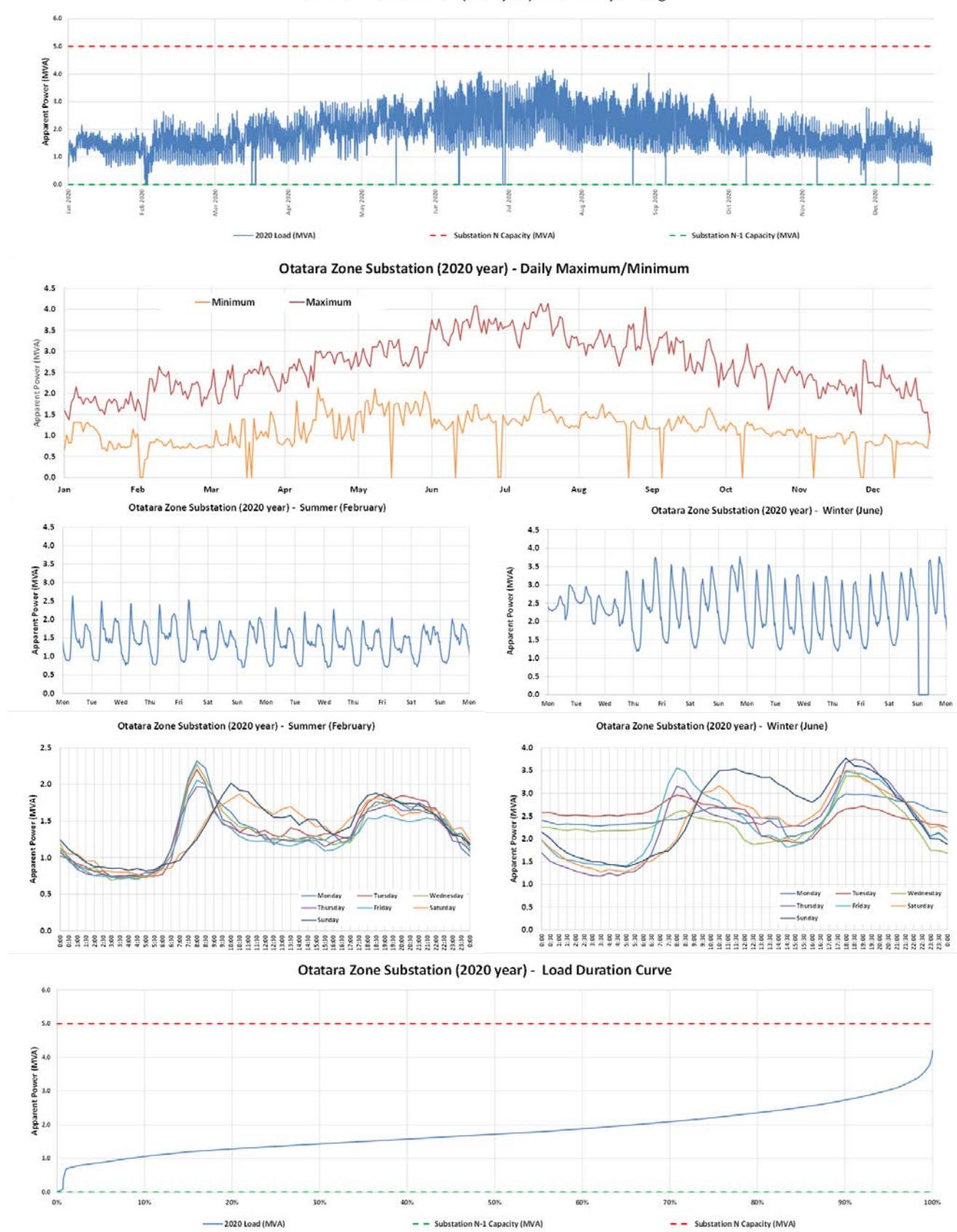
OTATARA MVA


Figure 44 Otatara 33/11kV zone substation: Apparent power (MVA) load characteristics

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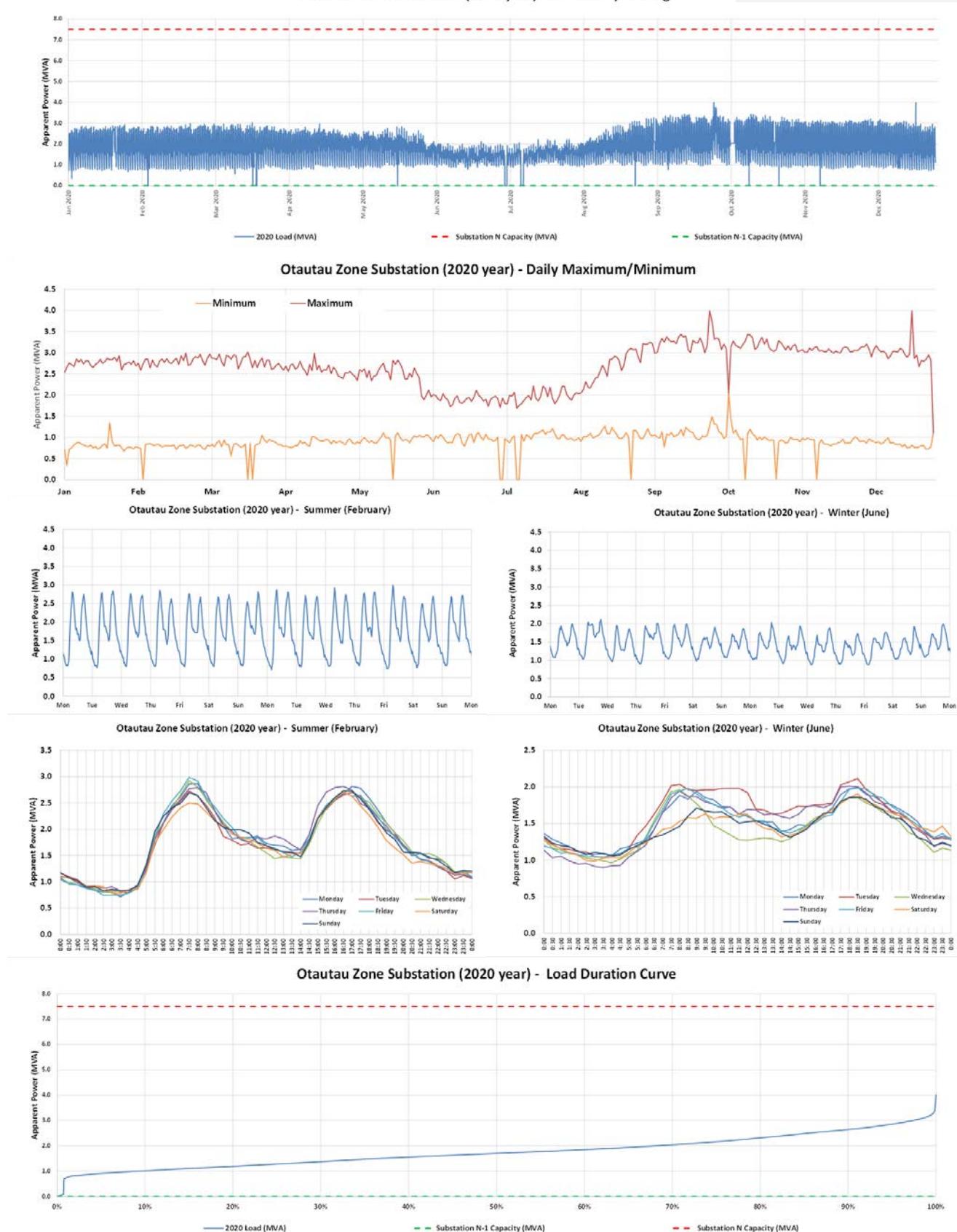
OTAUTAU MVA


Figure 45 Otautau 66/11kV zone substation: Apparent power (MVA) load characteristics

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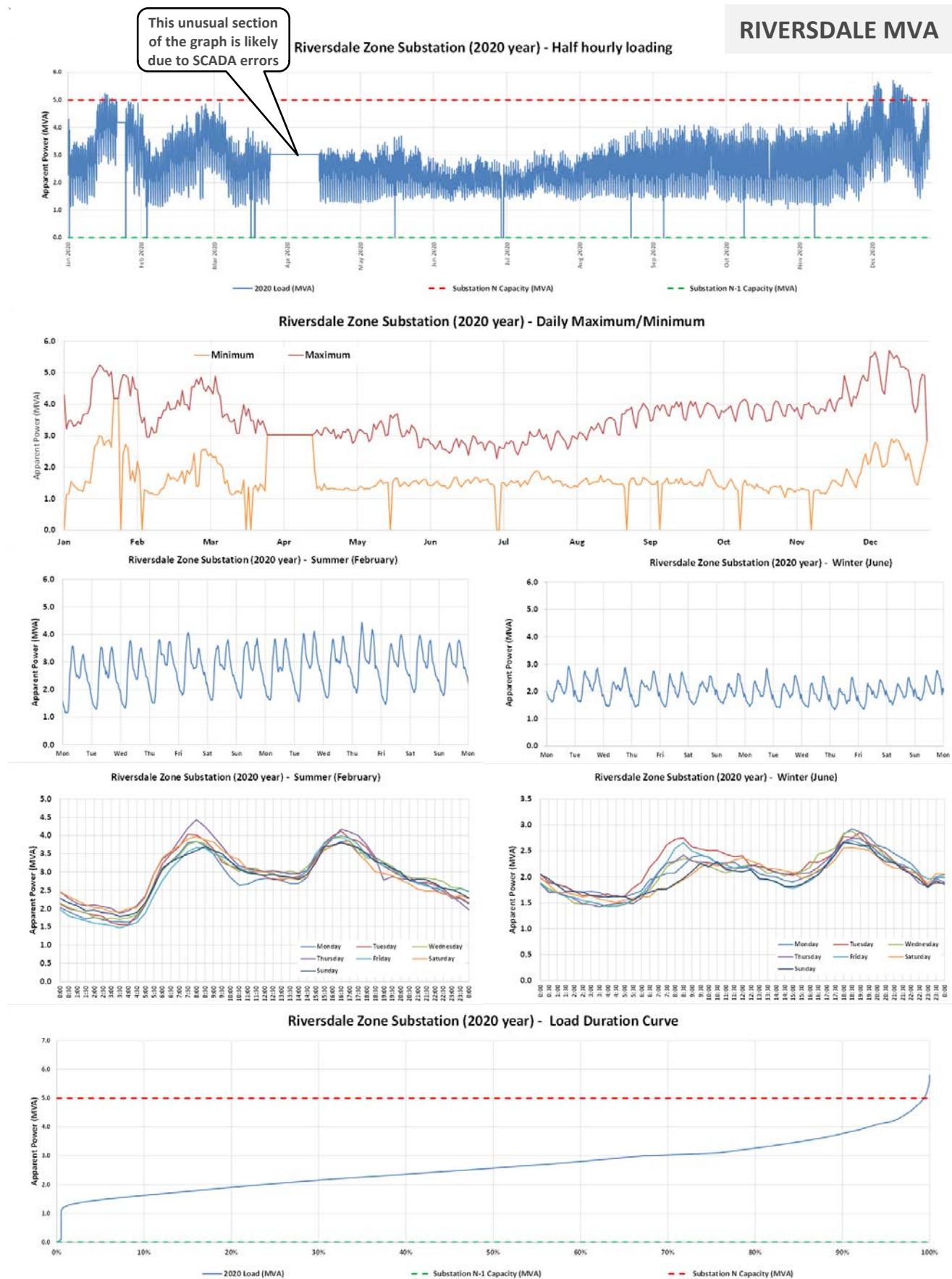
RIVERSDALE MVA


Figure 46 Riversdale 33/11kV zone substation: Apparent power (MVA) load characteristics

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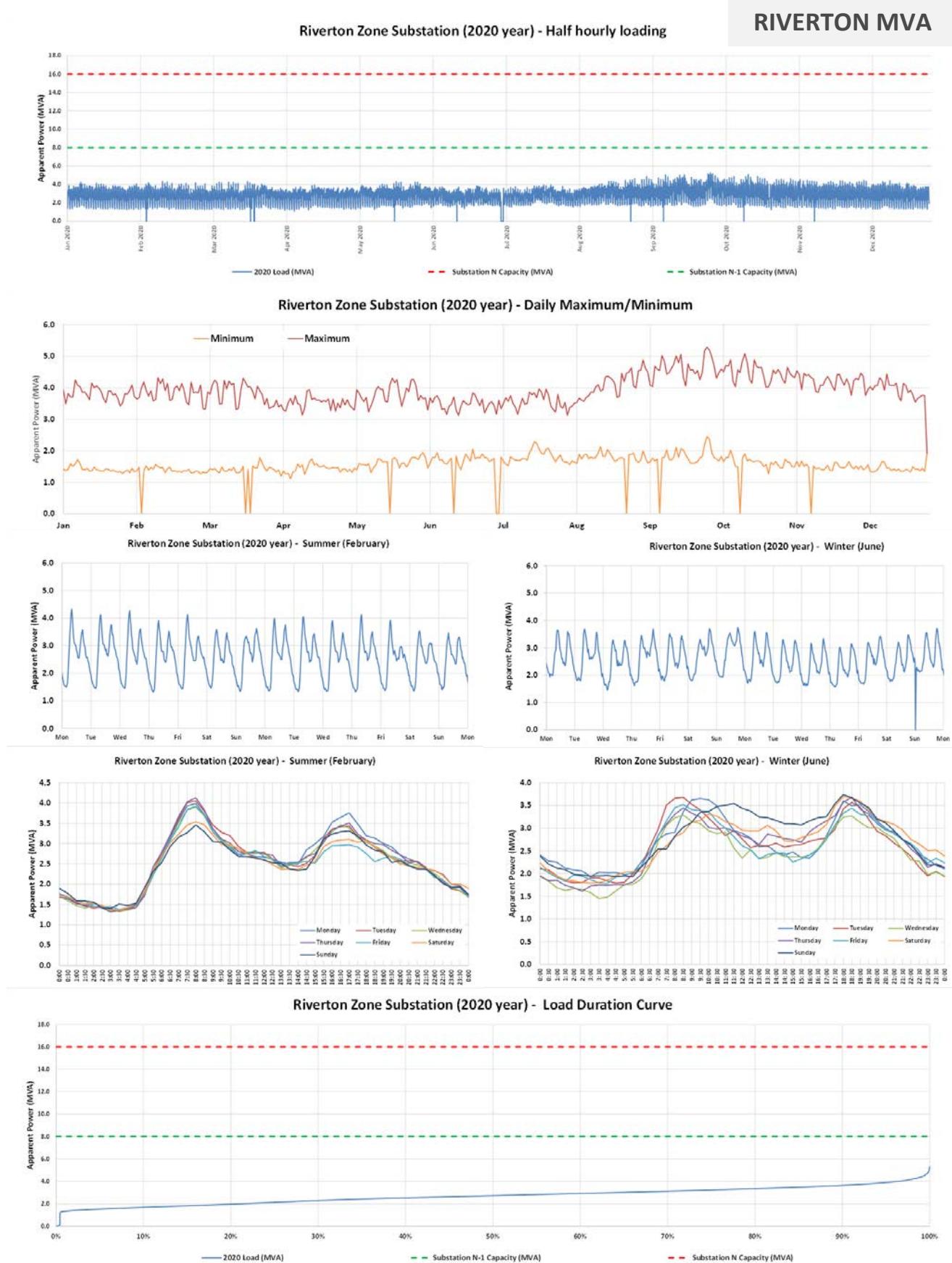


Figure 47 Riverton 33/11kV zone substation: Apparent power (MVA) load characteristics

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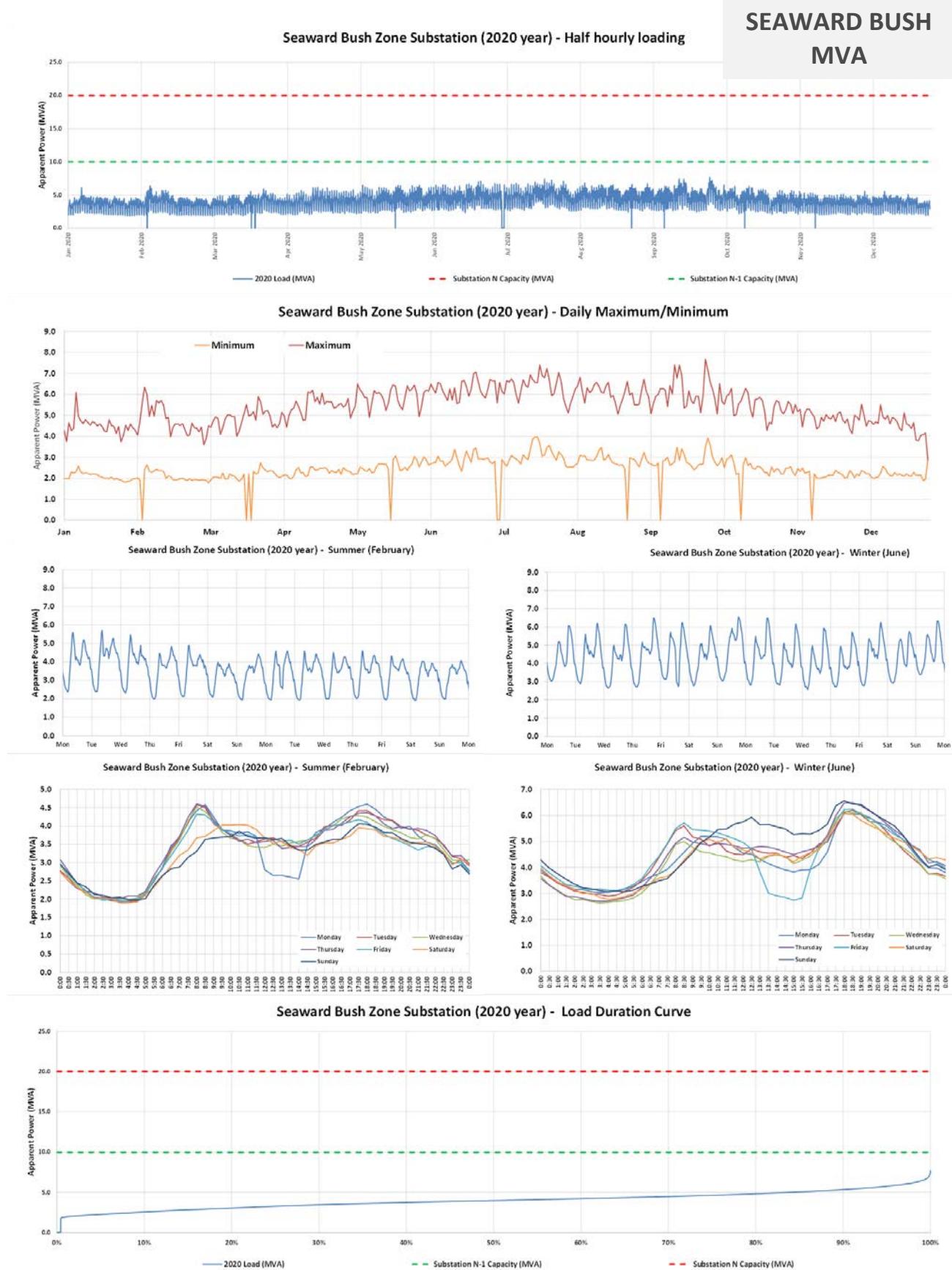


Figure 48 Seaward Bush 33/11kV zone substation: Apparent power (MVA) load characteristics

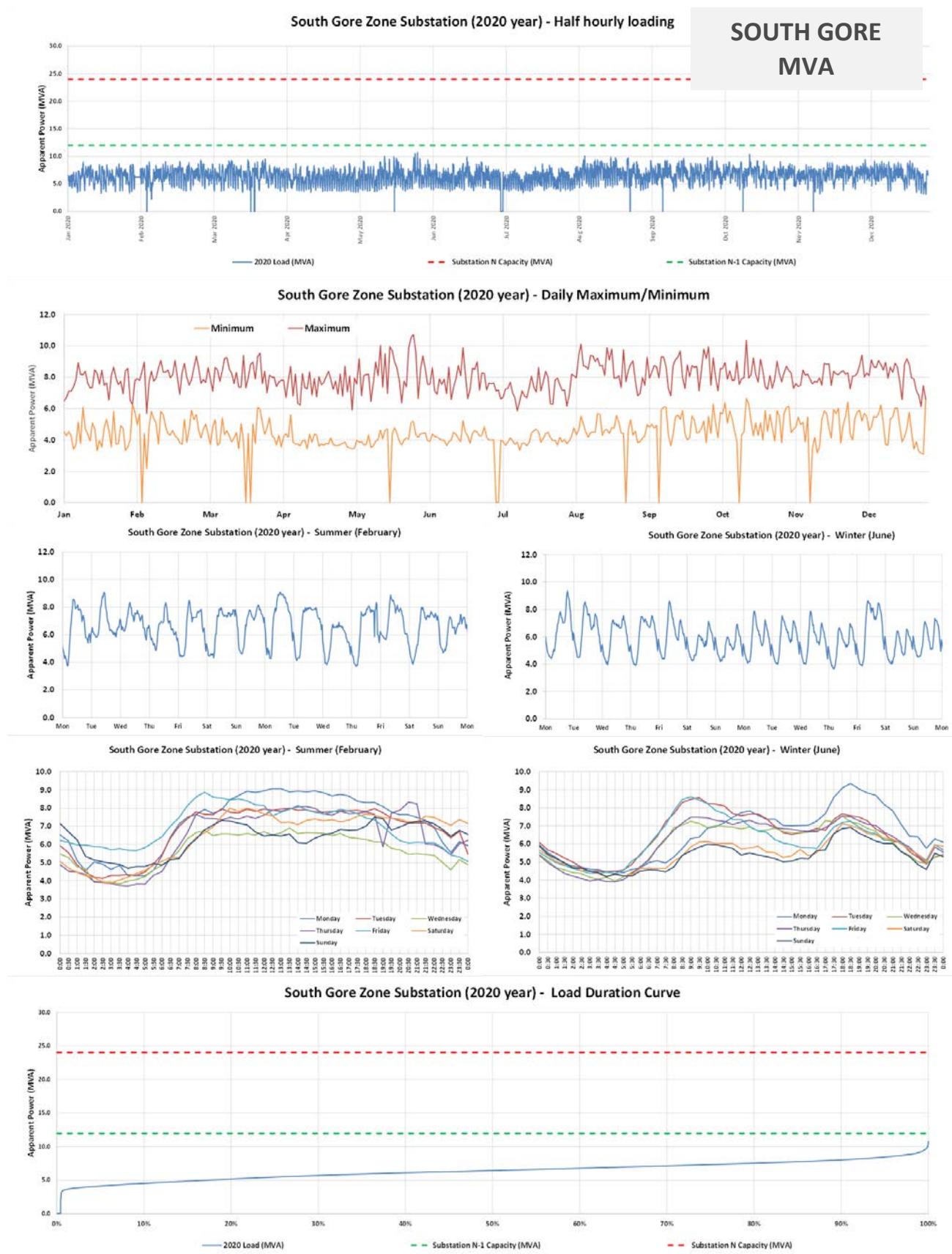


Figure 49 South Gore 33/11kV zone substation: Apparent power (MVA) load characteristics

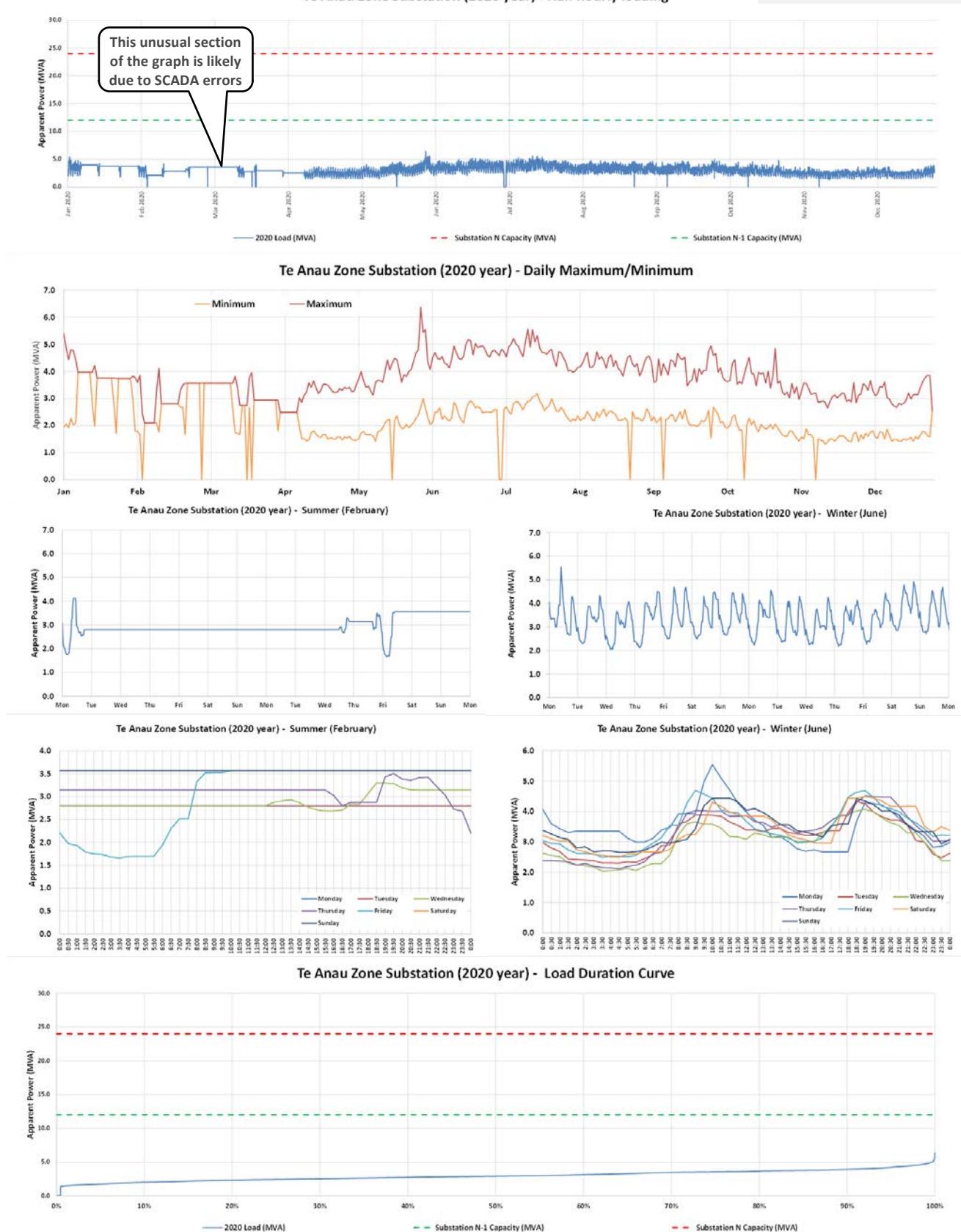
TE ANAU MVA


Figure 50 Te Anau 66/11kV zone substation: Apparent power (MVA) load characteristics

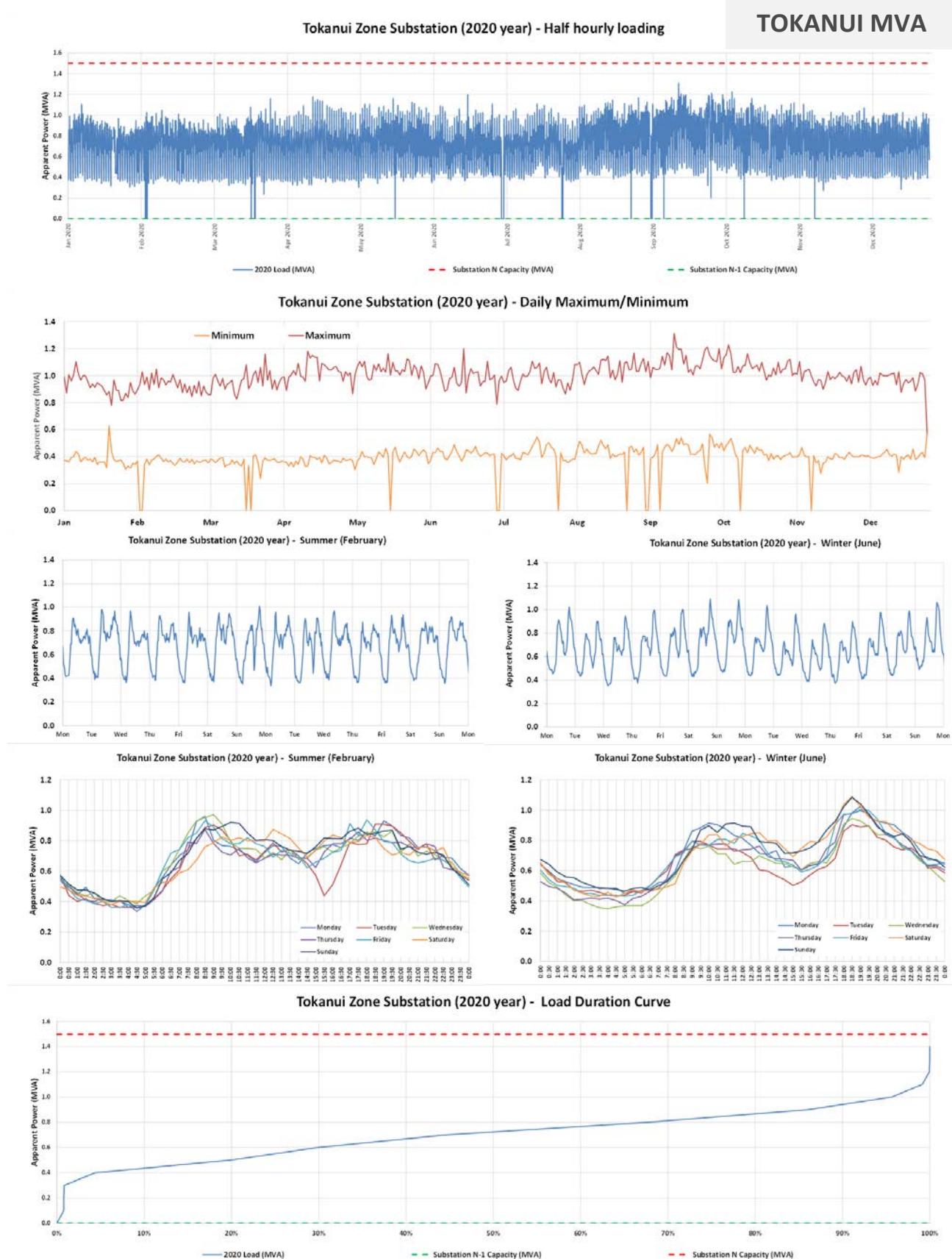


Figure 51 Tokanui 33/11kV zone substation: Apparent power (MVA) load characteristics

UNDERWOOD MVA

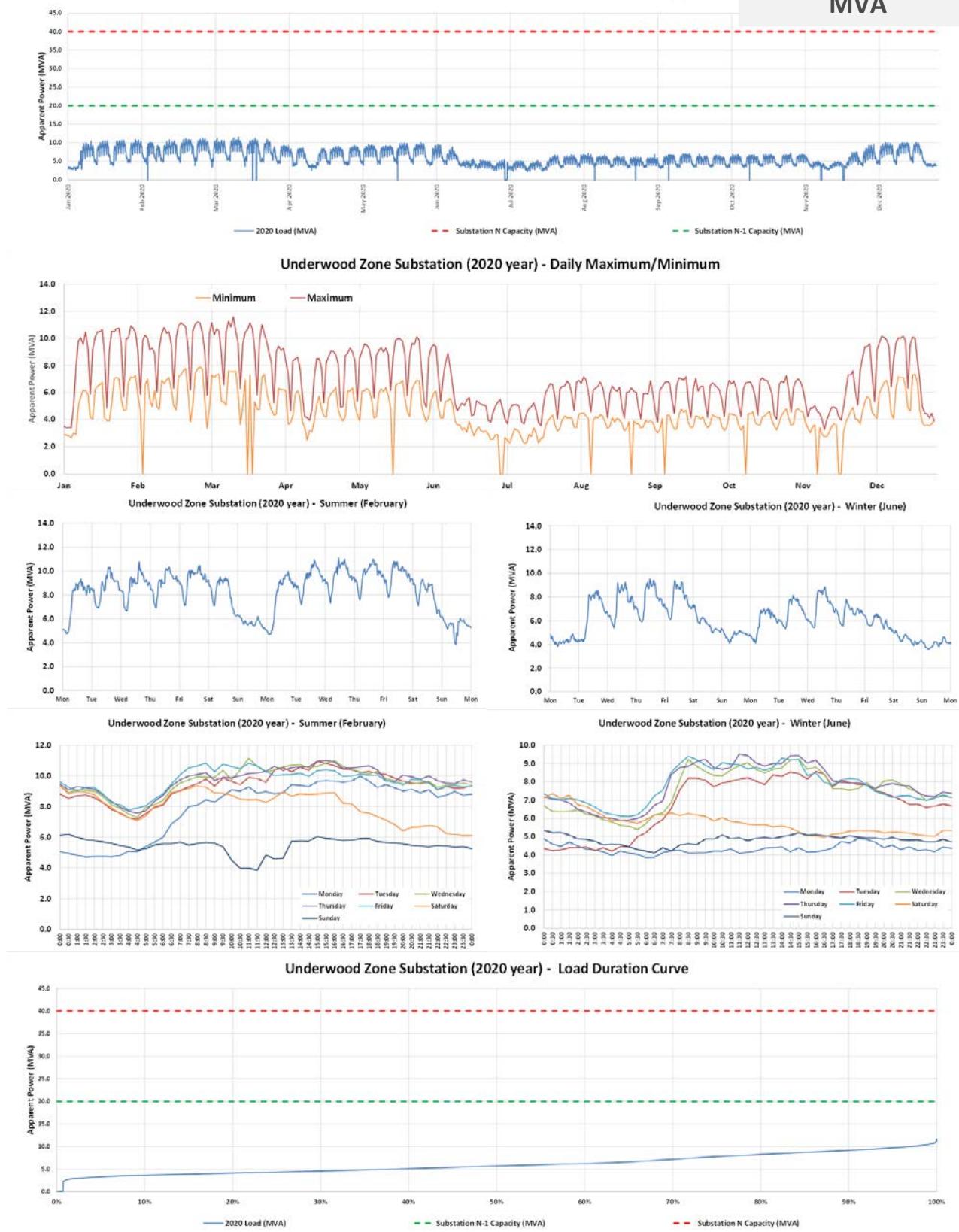
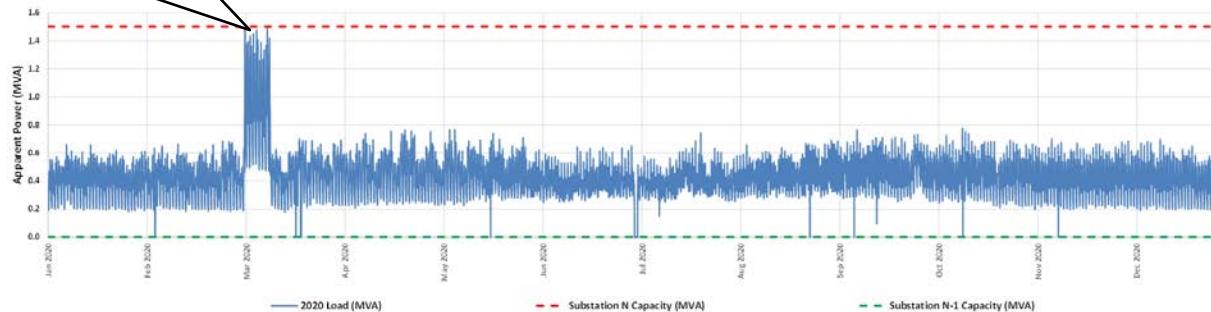


Figure 52 Underwood 33/11kV zone substation: Apparent power (MVA) load characteristics

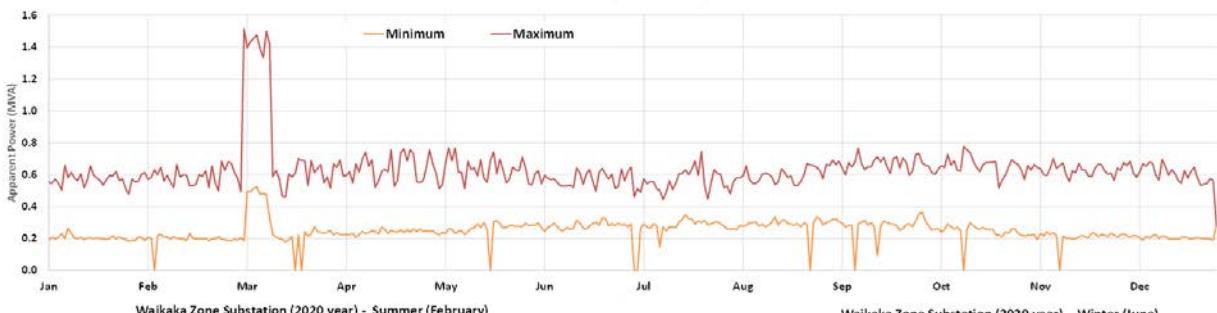
This unusual section of the graph is likely due to back-up of an adjacent substation

Waikaka Zone Substation (2020 year) - Half hourly loading

WAIKAKA MVA

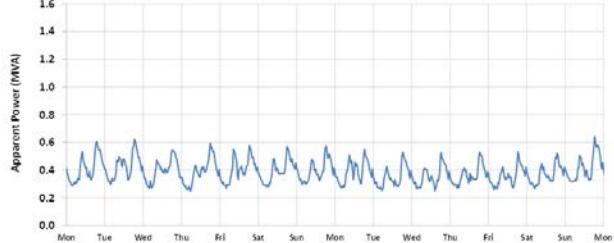
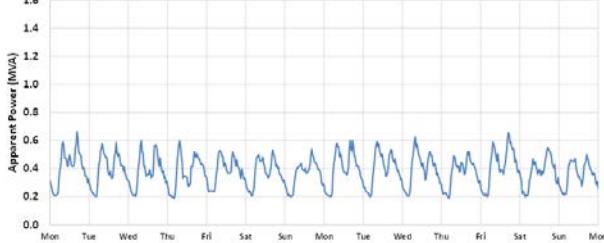


Waikaka Zone Substation (2020 year) - Daily Maximum/Minimum



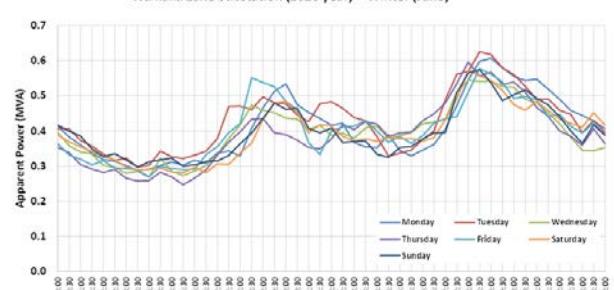
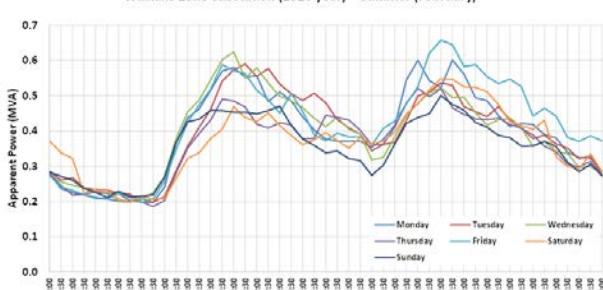
Waikaka Zone Substation (2020 year) - Summer (February)

Waikaka Zone Substation (2020 year) - Winter (June)



Waikaka Zone Substation (2020 year) - Summer (February)

Waikaka Zone Substation (2020 year) - Winter (June)



Waikaka Zone Substation (2020 year) - Load Duration Curve

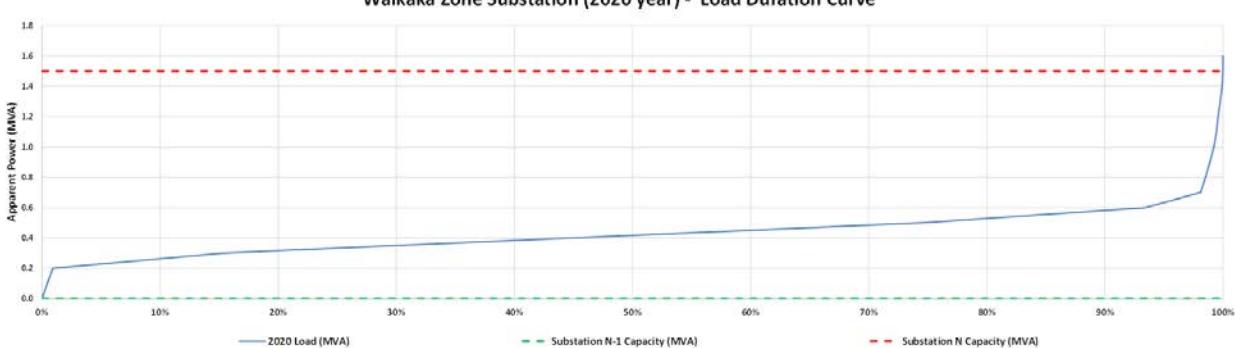


Figure 53 Waikaka 33/11kV zone substation: Apparent power (MVA) load characteristics

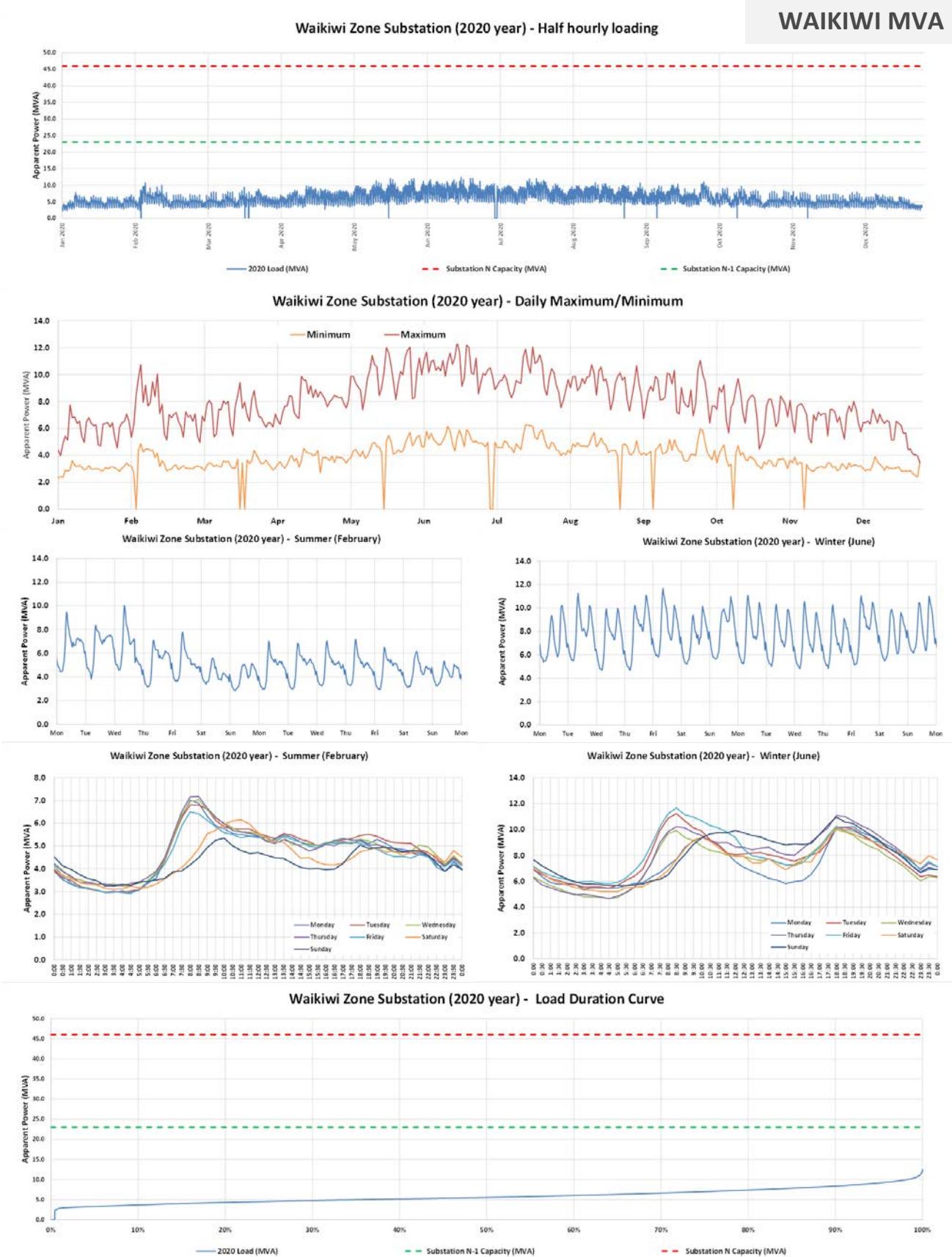


Figure 54 Waikiwi 33/11kV zone substation: Apparent power (MVA) load characteristics

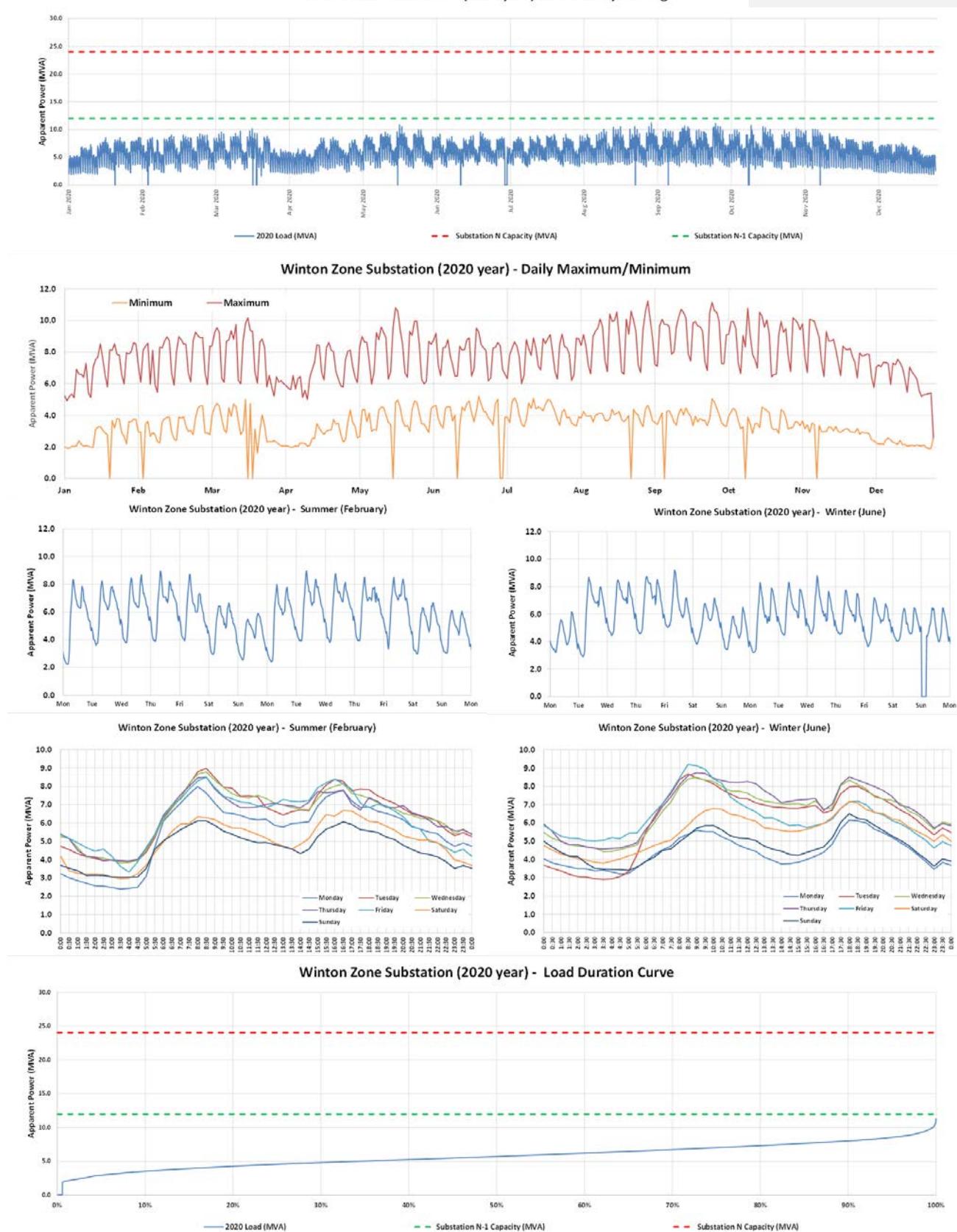
WINTON MVA


Figure 55 Winton 66/11kV zone substation: Apparent power (MVA) load characteristics

3.2 Electricity Invercargill

The characteristics of the zone substation **apparent power loadings** within Electricity Invercargill's network are shown in the following:

- **Figure 56** Spey Street 33/11kV zone substation: Apparent power (MVA) load characteristics
- **Figure 57** Leven Street 33/11kV zone substation: Apparent power (MVA) load characteristics
- **Figure 58** Racecourse Road 33/11kV zone substation: Apparent power (MVA) load characteristics
- **Figure 59** Southern 33/11kV zone substation: Apparent power (MVA) load characteristics

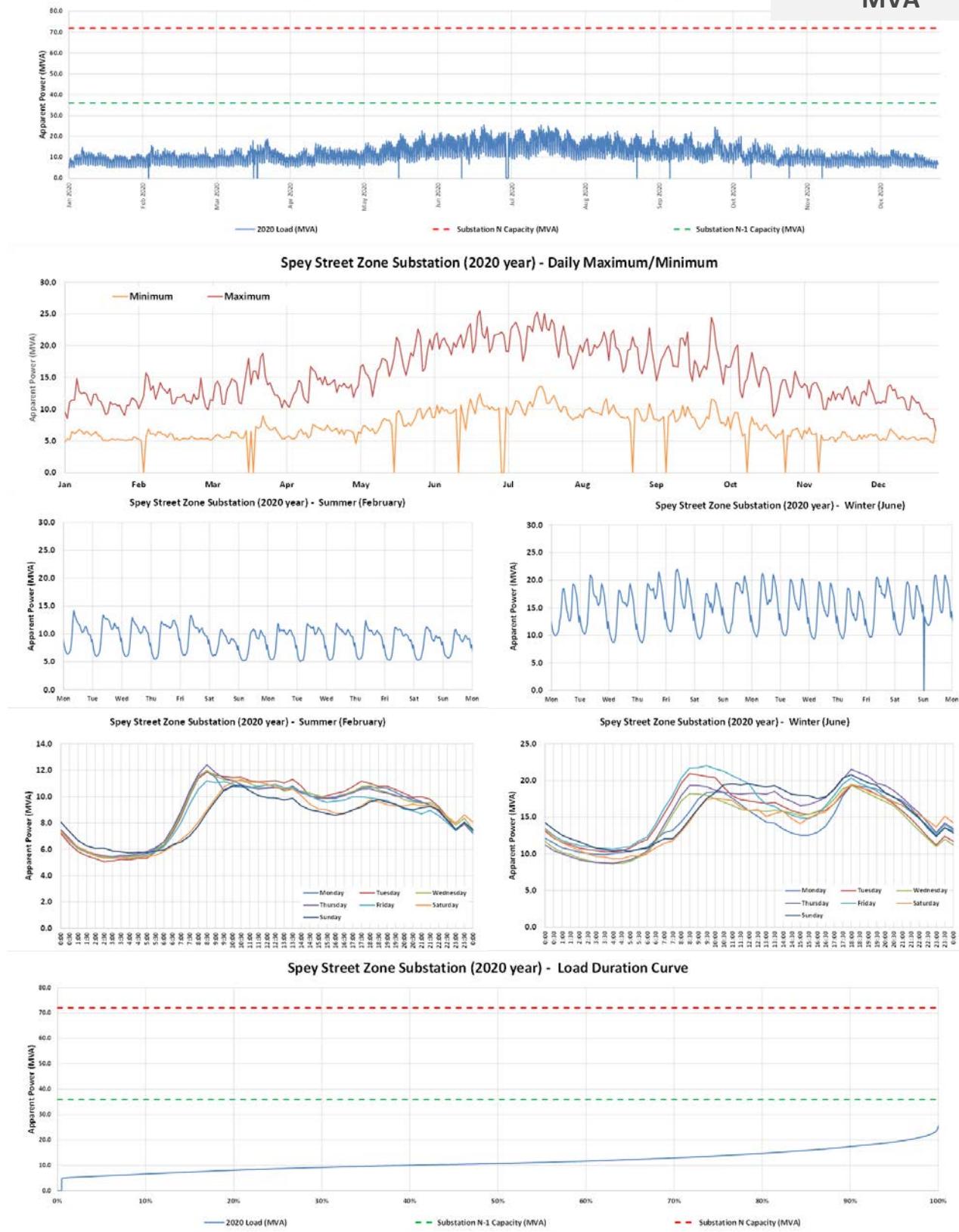
**SPEY STREET
MVA**


Figure 56 Spey Street 33/11kV zone substation: Apparent power (MVA) load characteristics

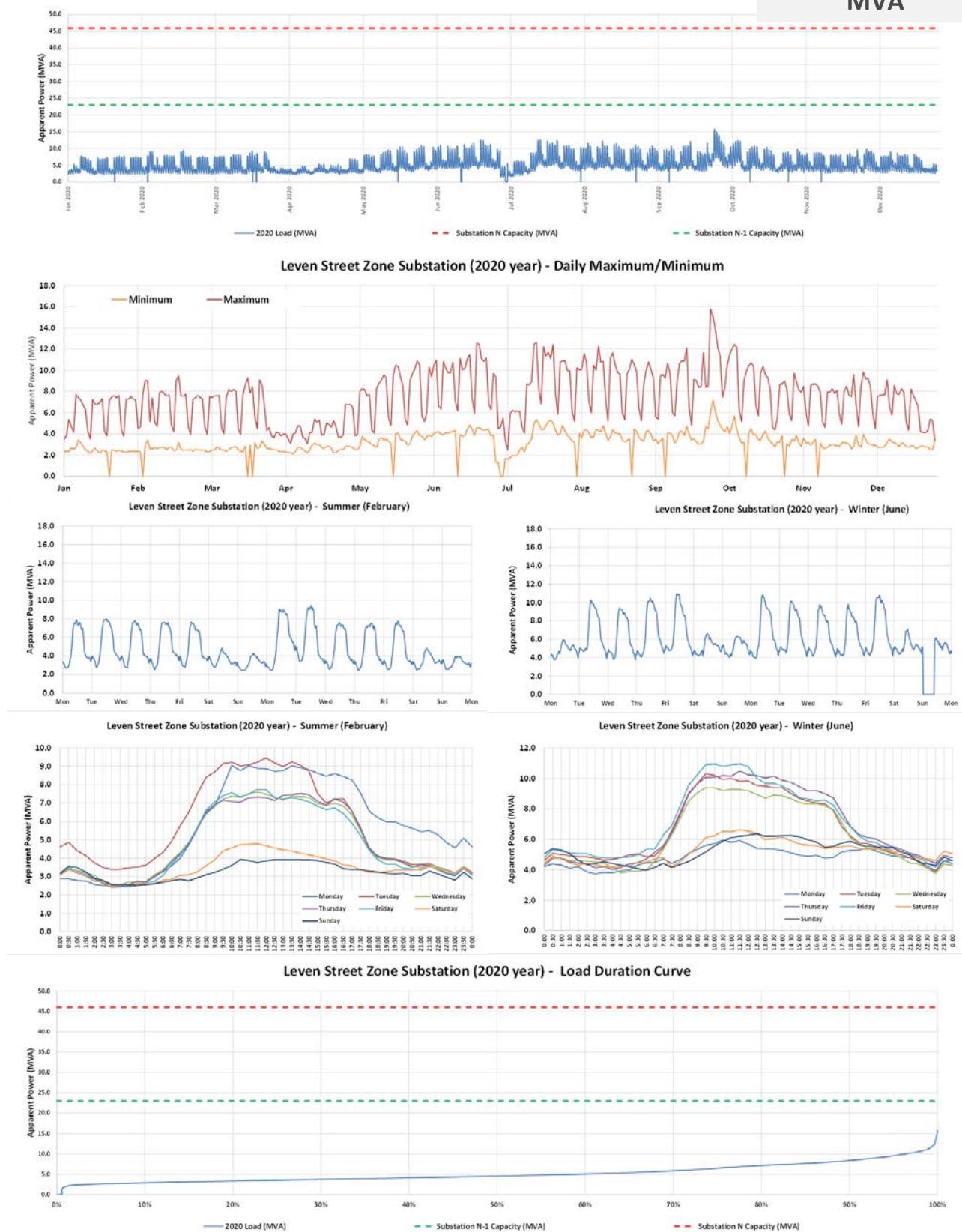
**LEVEN STREET
MVA**


Figure 57 Leven Street 33/11kV zone substation: Apparent power (MVA) load characteristics

RACECOURSE ROAD MVA

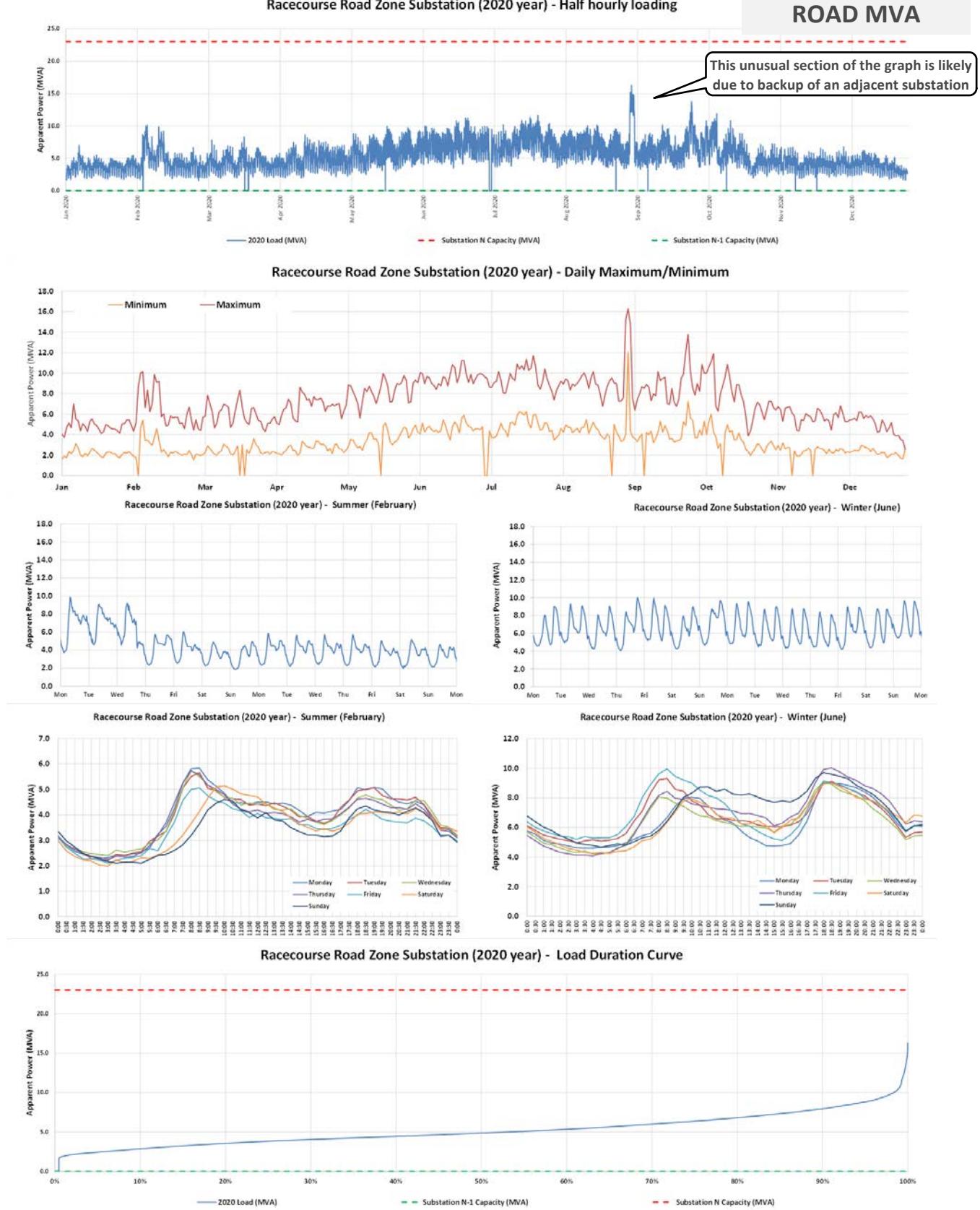


Figure 58 Racecourse Road 33/11kV zone substation: Apparent power (MVA) load characteristics

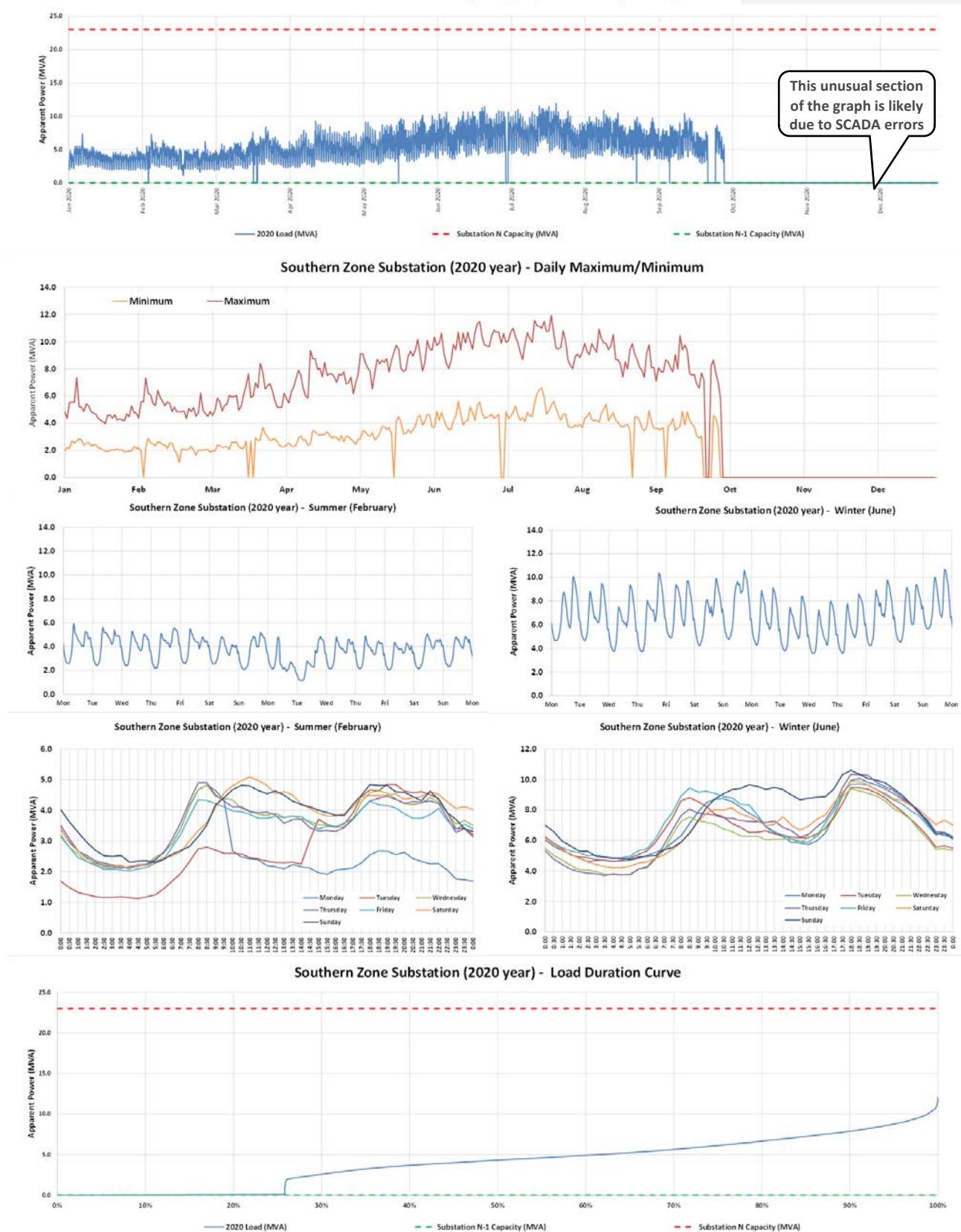
SOUTHERN MVA


Figure 59 Southern 33/11kV zone substation: Apparent power (MVA) load characteristics

3.3 OtagoNet

The characteristics of the zone substation **apparent power loadings** within OtagoNet's network are shown in the following:

- **Figure 60** Charlotte Street (Balclutha) 33/11kV zone substation: Apparent power (MVA) load characteristics
- **Figure 61** Clarks 33/22kV zone substation: Apparent power (MVA) load characteristics
- **Figure 62** Clinton 33/11kV zone substation: Apparent power (MVA) load characteristics
- **Figure 63** Clydevale 33/11kV zone substation: Apparent power (MVA) load characteristics
- **Figure 64** Deepdell 33/11kV zone substation: Apparent power (MVA) load characteristics
- **Figure 65** Elderlee Street (Milton) 33/11kV zone substation: Apparent power (MVA) load characteristics
- **Figure 66** Finegand 33/11kV zone substation: Apparent power (MVA) load characteristics
- **Figure 67** Glenore 33/11kV zone substation: Apparent power (MVA) load characteristics
- **Figure 68** Golden Point 33/11kV zone substation: Apparent power (MVA) load characteristics
- **Figure 69** Greenfield 33/11kV zone substation: Apparent power (MVA) load characteristics
- **Figure 70** Hindon 33/11kV zone substation: Apparent power (MVA) load characteristics
- **Figure 71** Hyde 33/11kV zone substation: Apparent power (MVA) load characteristics
- **Figure 72** Kaitangata 33/11kV zone substation: Apparent power (MVA) load characteristics
- **Figure 73** Lawrence 33/11kV zone substation: Apparent power (MVA) load characteristics
- **Figure 74** Linnburn 33/11kV zone substation: Apparent power (MVA) load characteristics
- **Figure 75** Merton 33/11kV zone substation: Apparent power (MVA) load characteristics
- **Figure 76** Middlemarch 33/11kV zone substation: Apparent power (MVA) load characteristics
- **Figure 77** Milburn 33/11kV zone substation: Apparent power (MVA) load characteristics
- **Figure 78** North Balclutha 33/11kV zone substation: Apparent power (MVA) load characteristics
- **Figure 79** Oturehua 33/11kV zone substation: Apparent power (MVA) load characteristics
- **Figure 80** Owaka 33/11kV zone substation: Apparent power (MVA) load characteristics
- **Figure 81** Paerau 33/11kV zone substation: Apparent power (MVA) load characteristics
- **Figure 82** Paerau Hydro 33/11kV zone substation: Apparent power (MVA) load characteristics
- **Figure 83** Palmerston 33/11kV zone substation: Apparent power (MVA) load characteristics
- **Figure 84** Patearoa 33/11kV zone substation: Apparent power (MVA) load characteristics
- **Figure 85** Port Molyneux 33/11kV zone substation: Apparent power (MVA) load characteristics
- **Figure 86** Pukekawa 33/11kV zone substation: Apparent power (MVA) load characteristics
- **Figure 87** Ranfurly 33/11 33/11kV zone substation: Apparent power (MVA) load characteristics
- **Figure 88** Ranfurly 66/33 33/11kV zone substation: Apparent power (MVA) load characteristics
- **Figure 89** Remarkables 33/11kV zone substation: Apparent power (MVA) load characteristics
- **Figure 90** Stirling 33/11kV zone substation: Apparent power (MVA) load characteristics
- **Figure 91** Waihola 33/11kV zone substation: Apparent power (MVA) load characteristics
- **Figure 92** Waipiata 33/11kV zone substation: Apparent power (MVA) load characteristics
- **Figure 93** Waitati 33/11kV zone substation: Apparent power (MVA) load characteristics
- **Figure 94** Wedderburn 33/11kV zone substation: Apparent power (MVA) load characteristics

CHARLOTTE STREET MVA

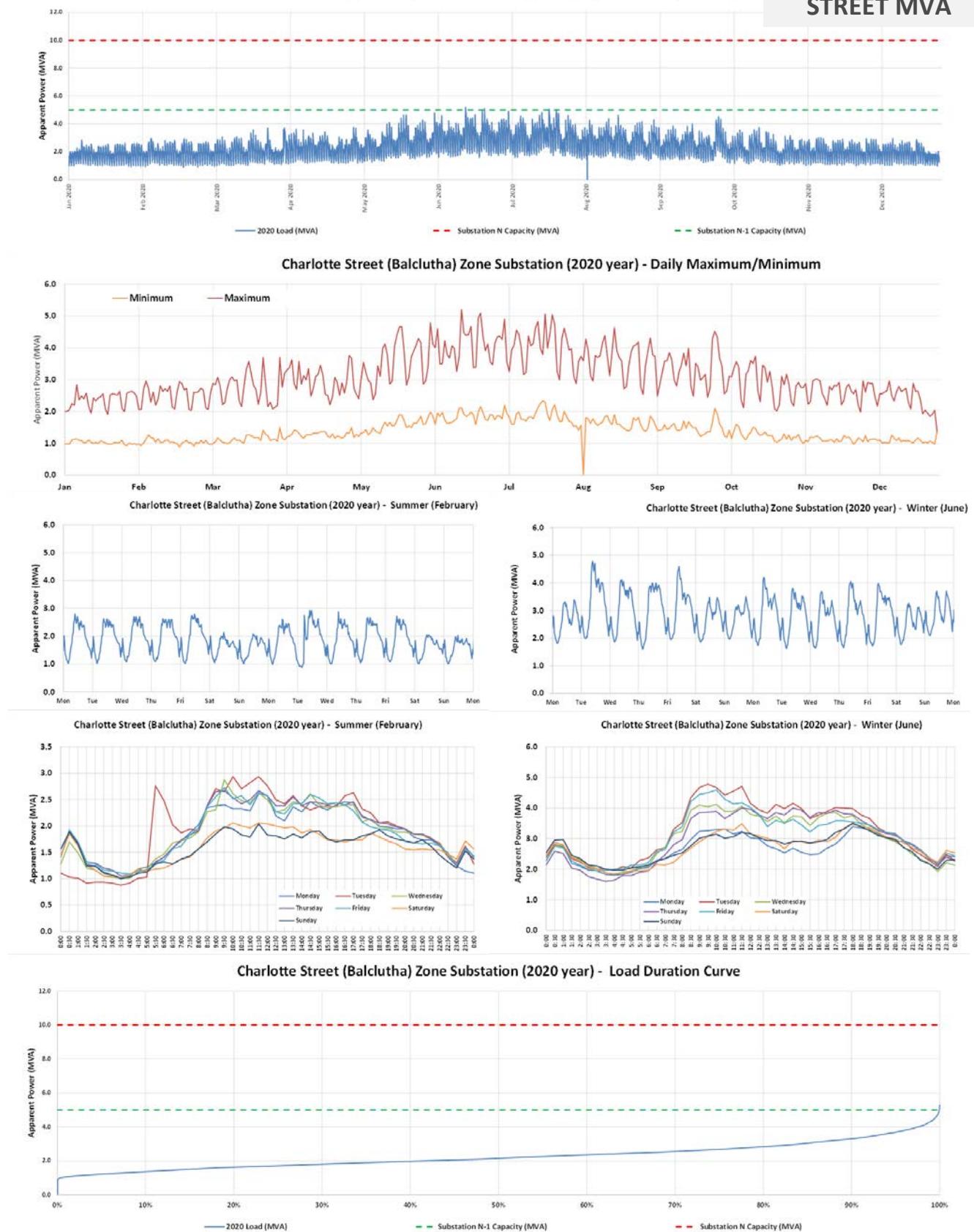


Figure 60 Charlotte Street (Balclutha) 33/11kV zone substation: Apparent power (MVA) load characteristics

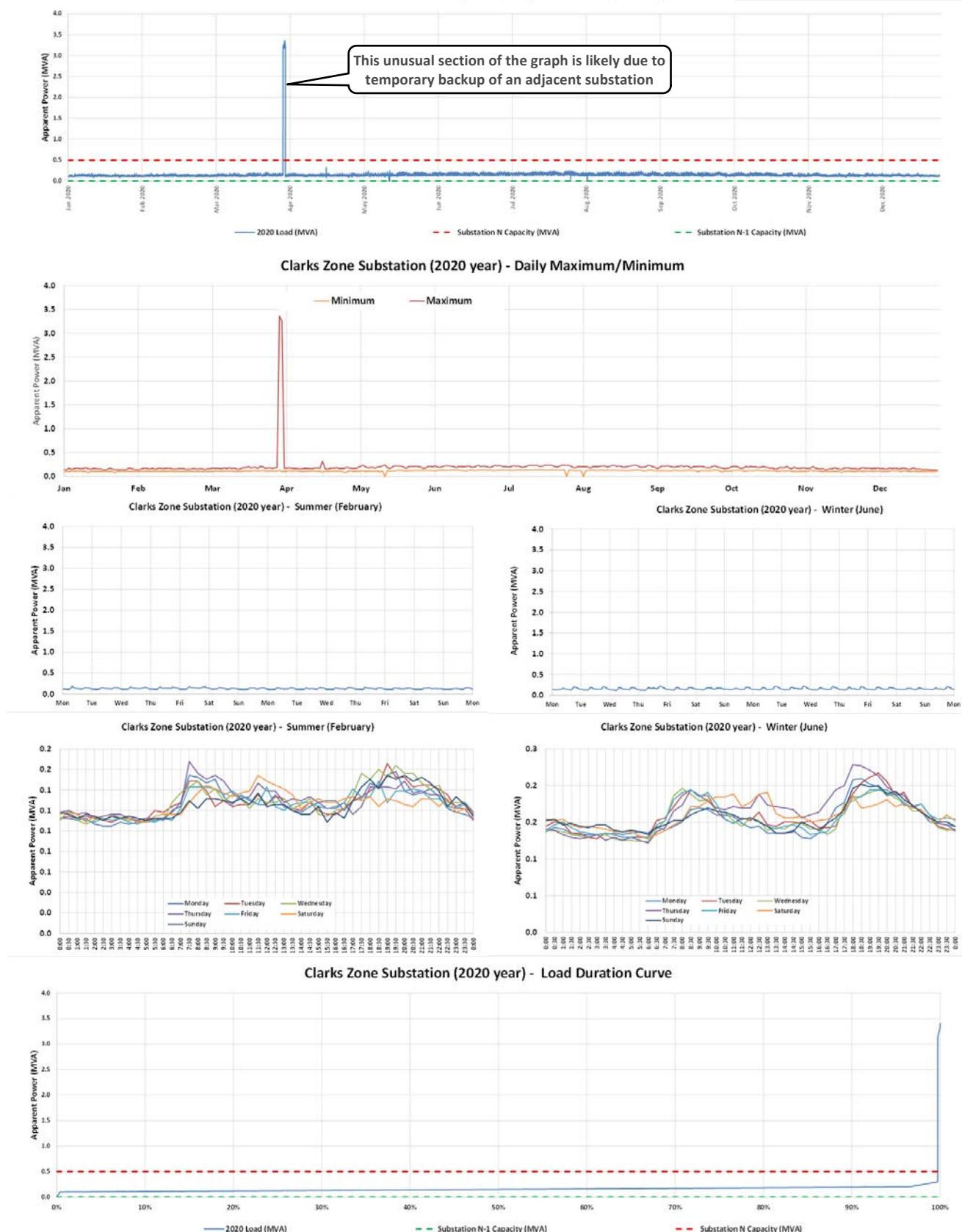
CLARKS MVA


Figure 61 Clarks 33/22kV zone substation: Apparent power (MVA) load characteristics

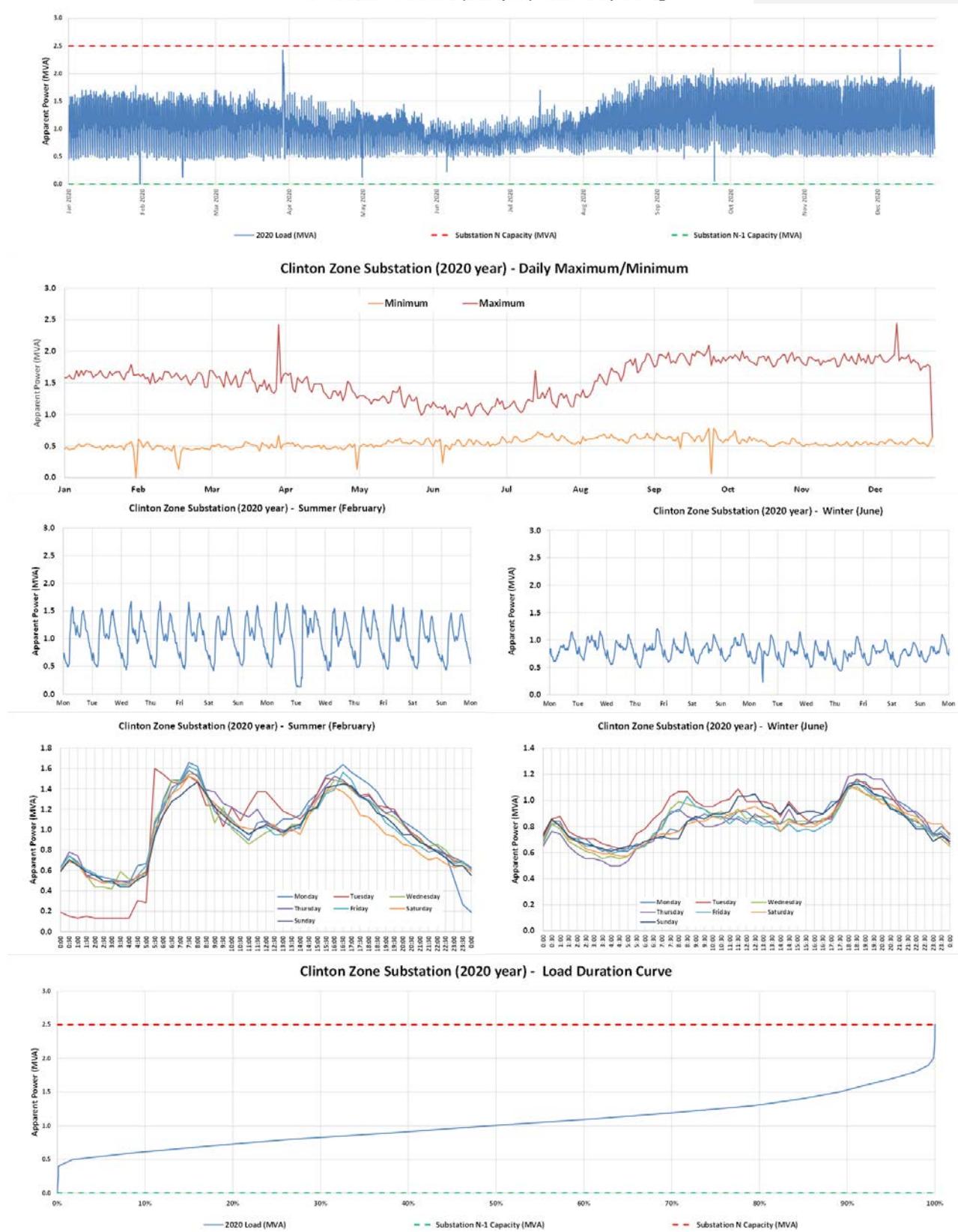
CLINTON MVA


Figure 62 Clinton 33/11kV zone substation: Apparent power (MVA) load characteristics

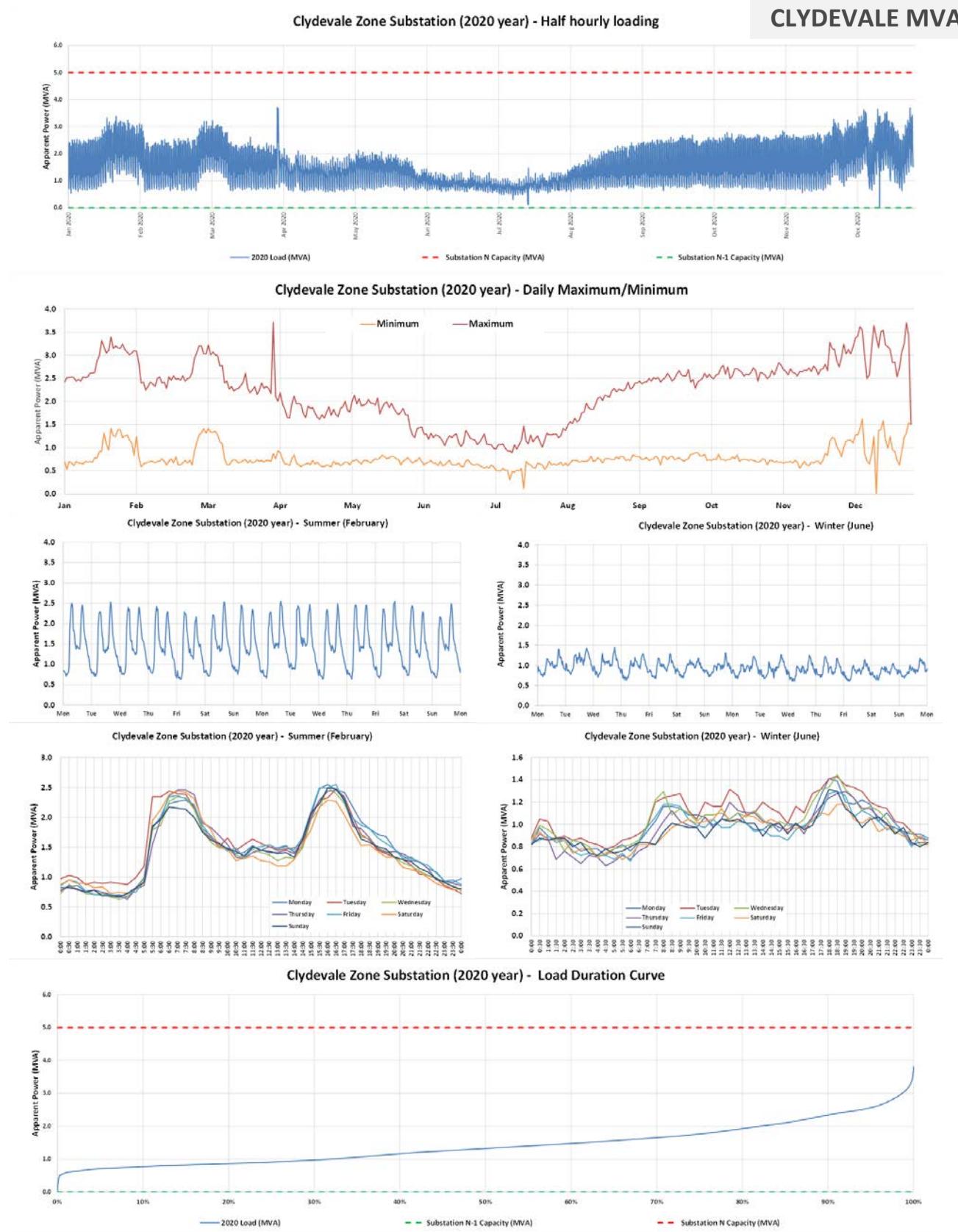


Figure 63 Clydevale 33/11kV zone substation: Apparent power (MVA) load characteristics

DEEPDELL MVA

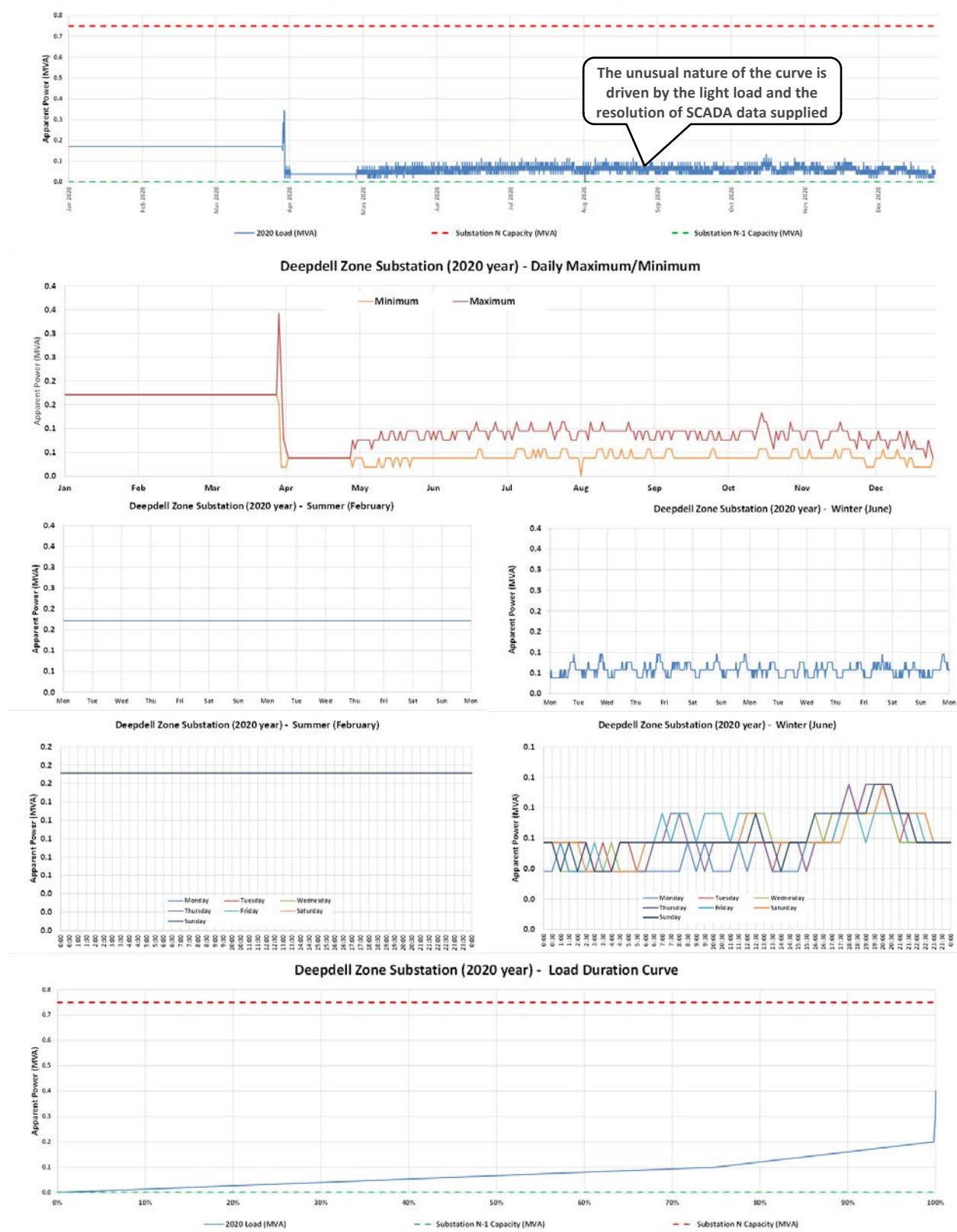


Figure 64 Deepdell 33/11kV zone substation: Apparent power (MVA) load characteristics

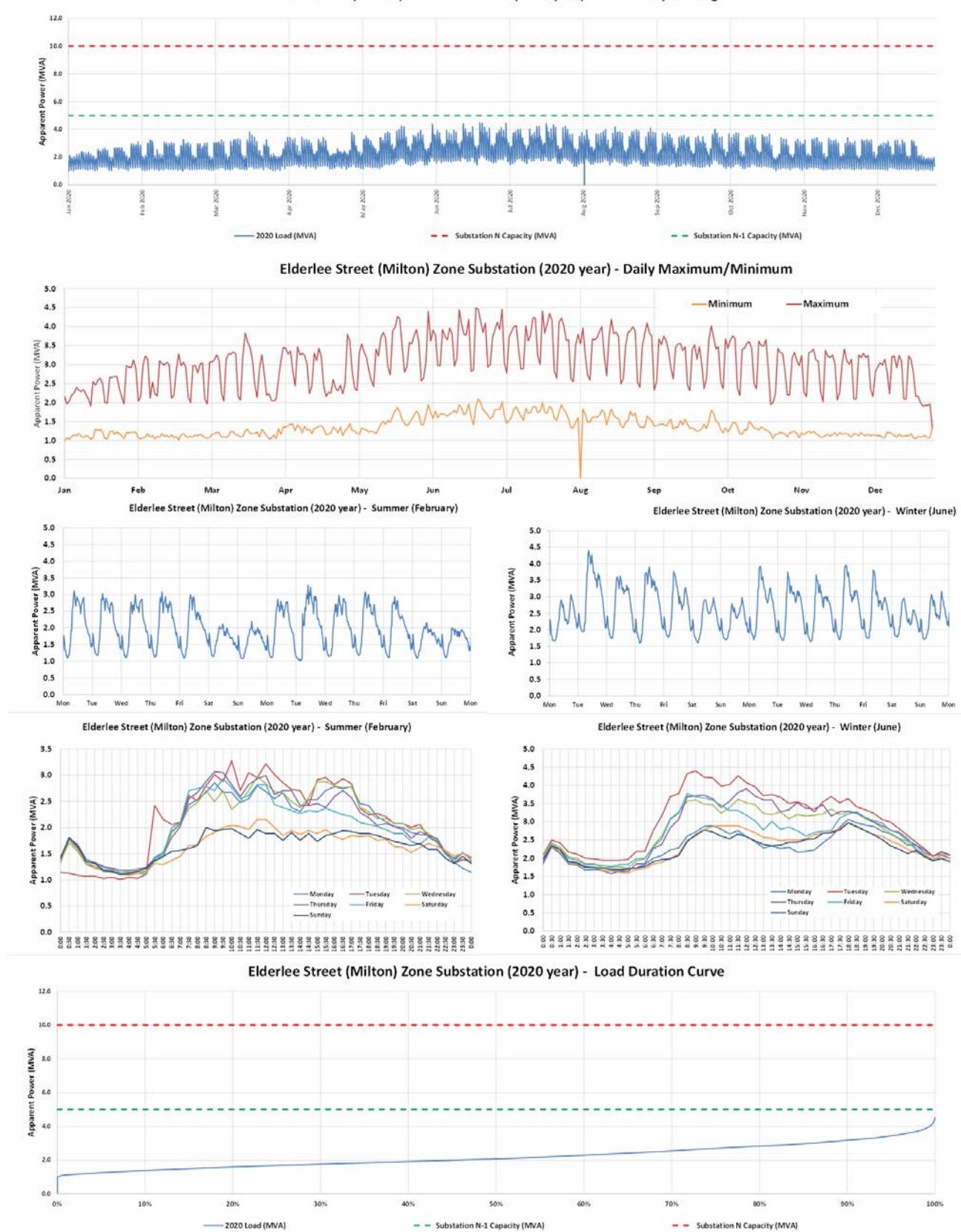
ELDERLEE MVA


Figure 65 Elderlee Street (Milton) 33/11kV zone substation: Apparent power (MVA) load characteristics

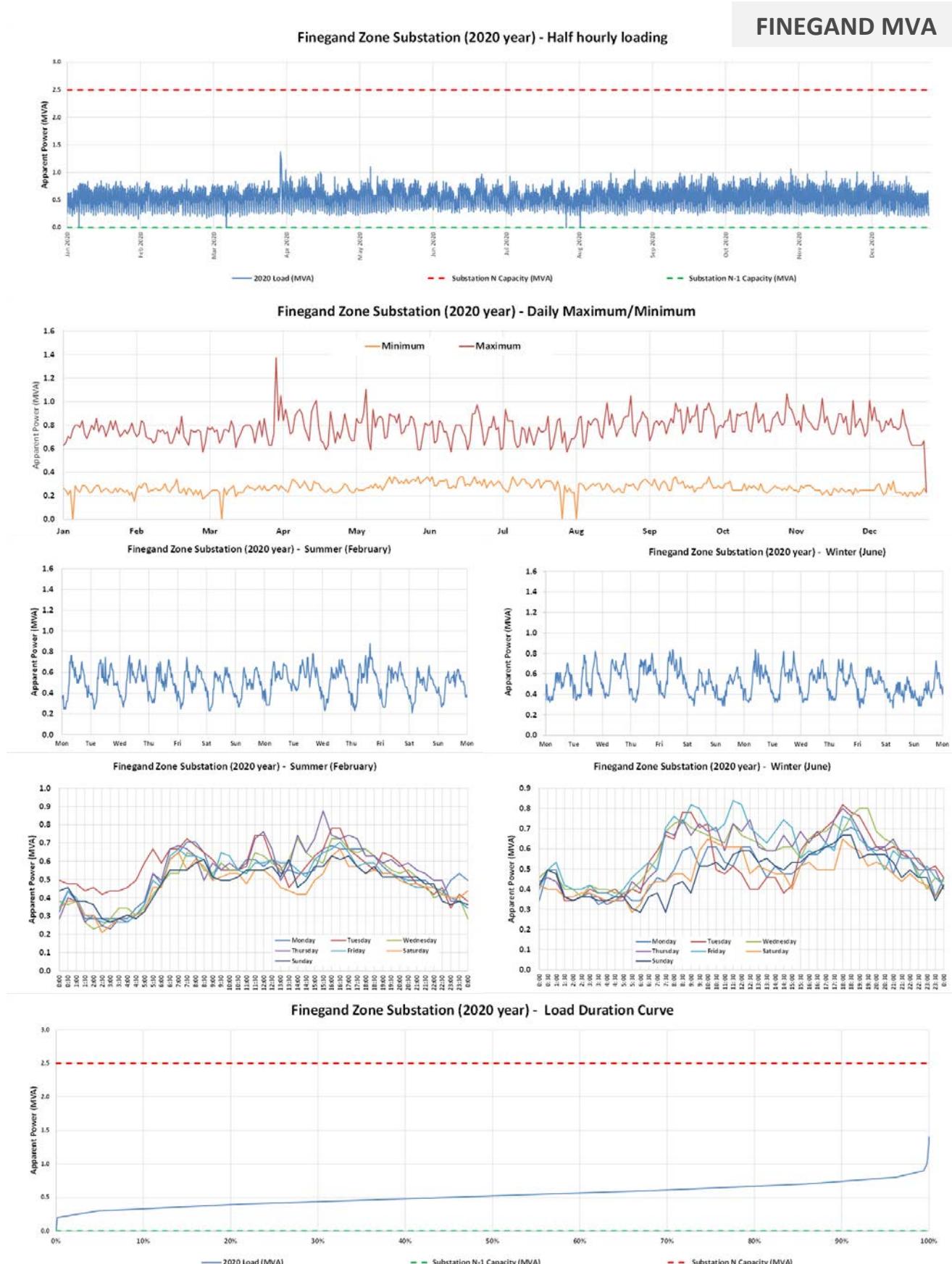


Figure 66 Finegand 33/11kV zone substation: Apparent power (MVA) load characteristics

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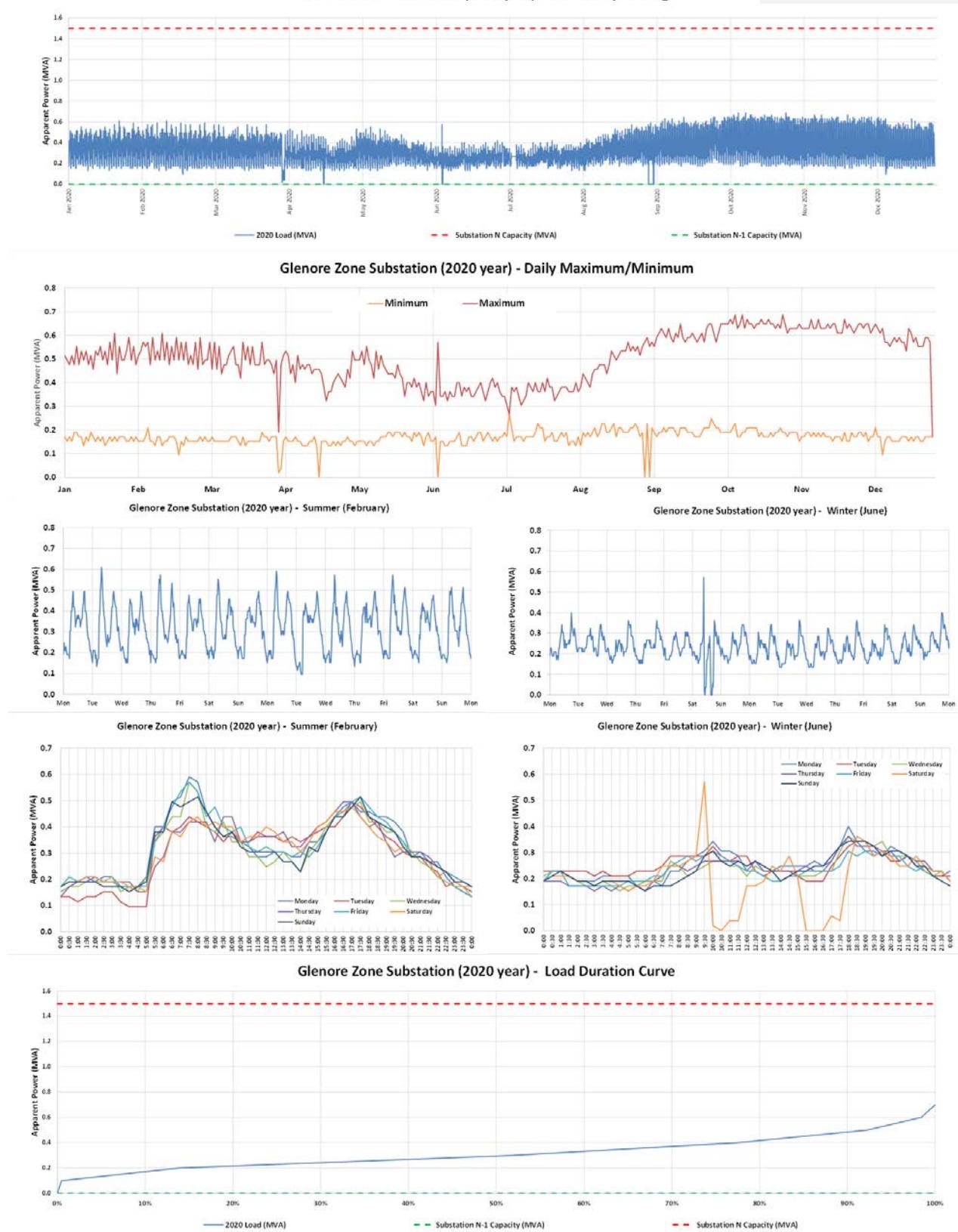
GLENORE MVA


Figure 67 Glenore 33/11kV zone substation: Apparent power (MVA) load characteristics

GOLDEN POINT MVA

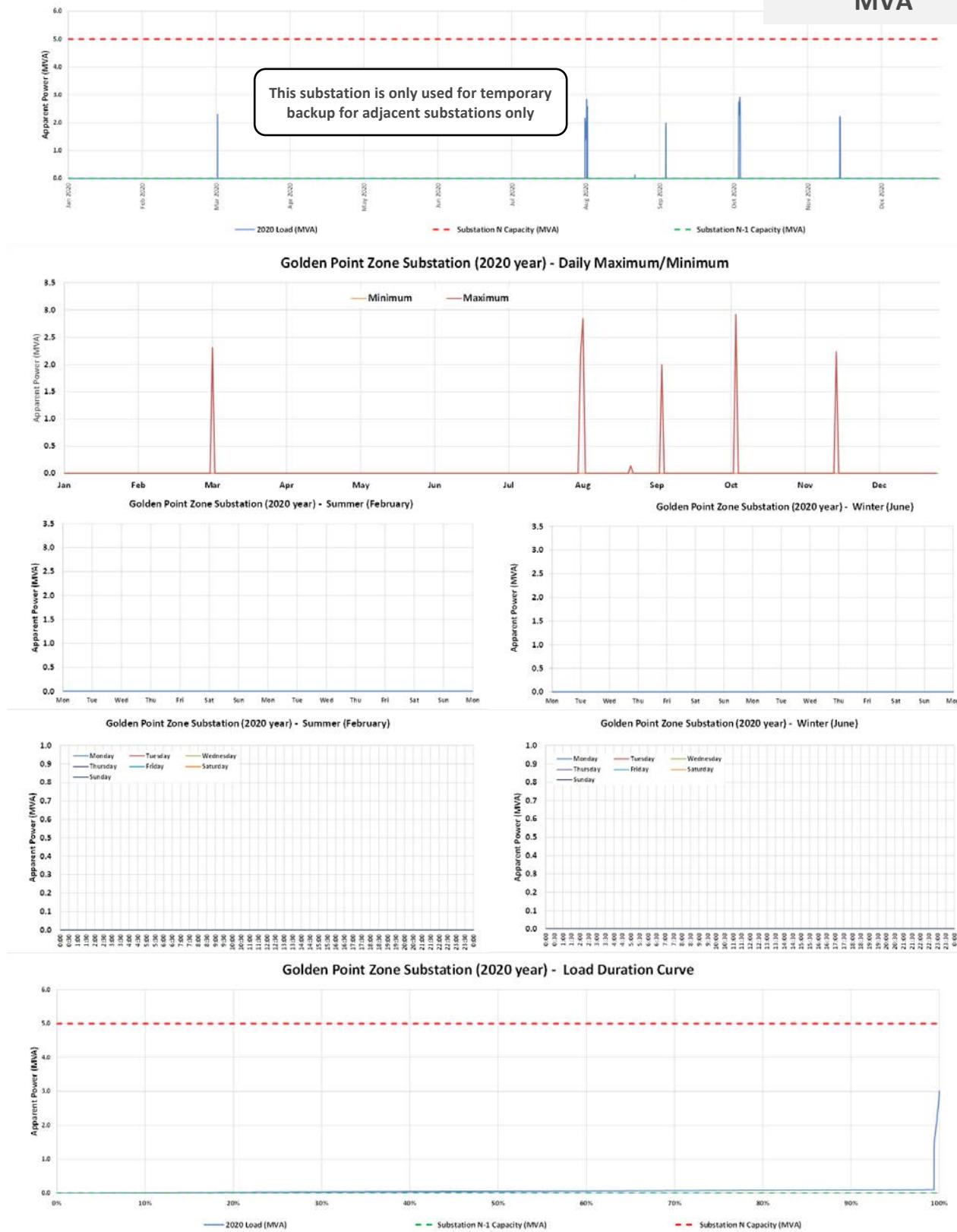


Figure 68 Golden Point 33/11kV zone substation: Apparent power (MVA) load characteristics

GREENFIELD MVA

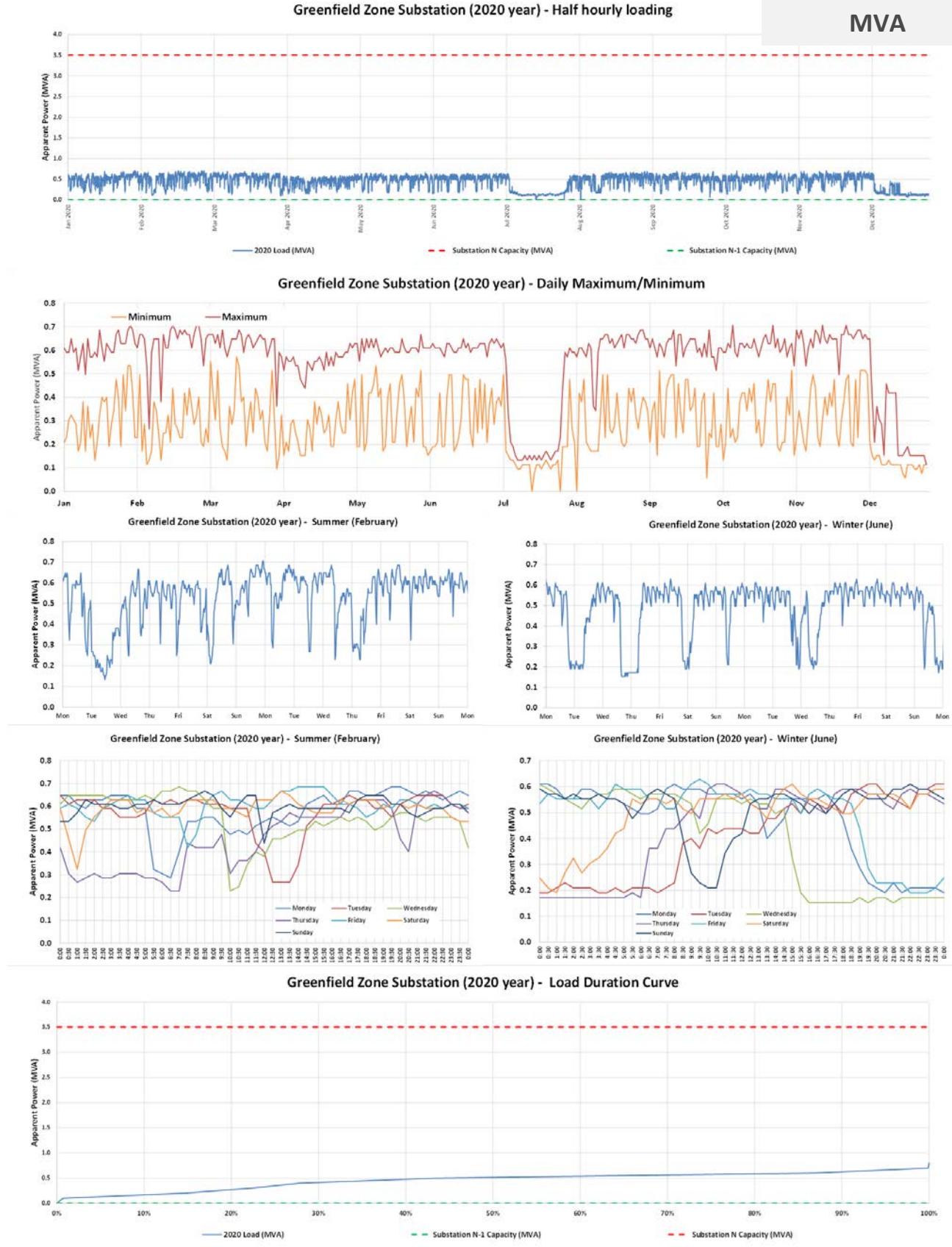


Figure 69 Greenfield 33/11kV zone substation: Apparent power (MVA) load characteristics

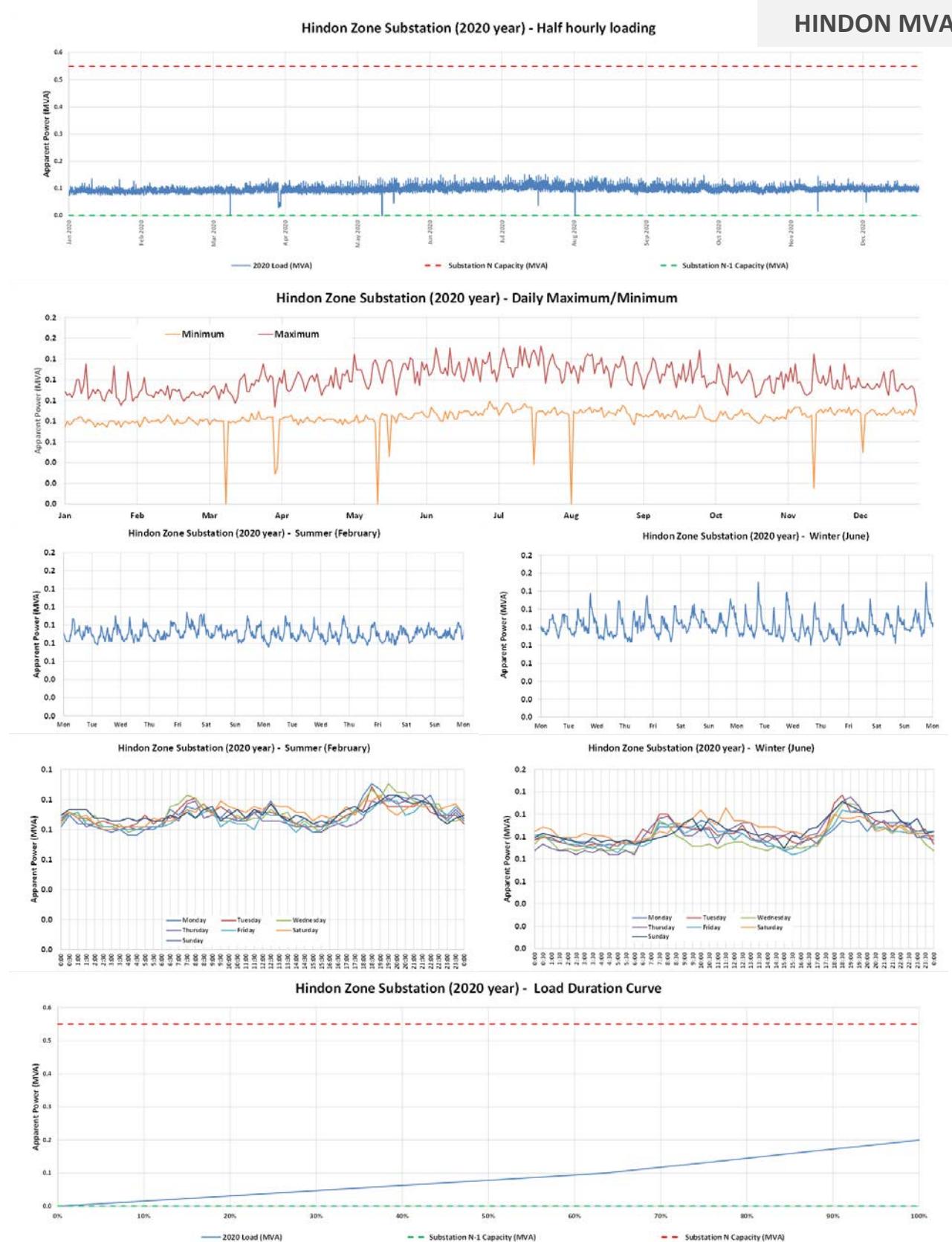


Figure 70 Hindon 33/11kV zone substation: Apparent power (MVA) load characteristics

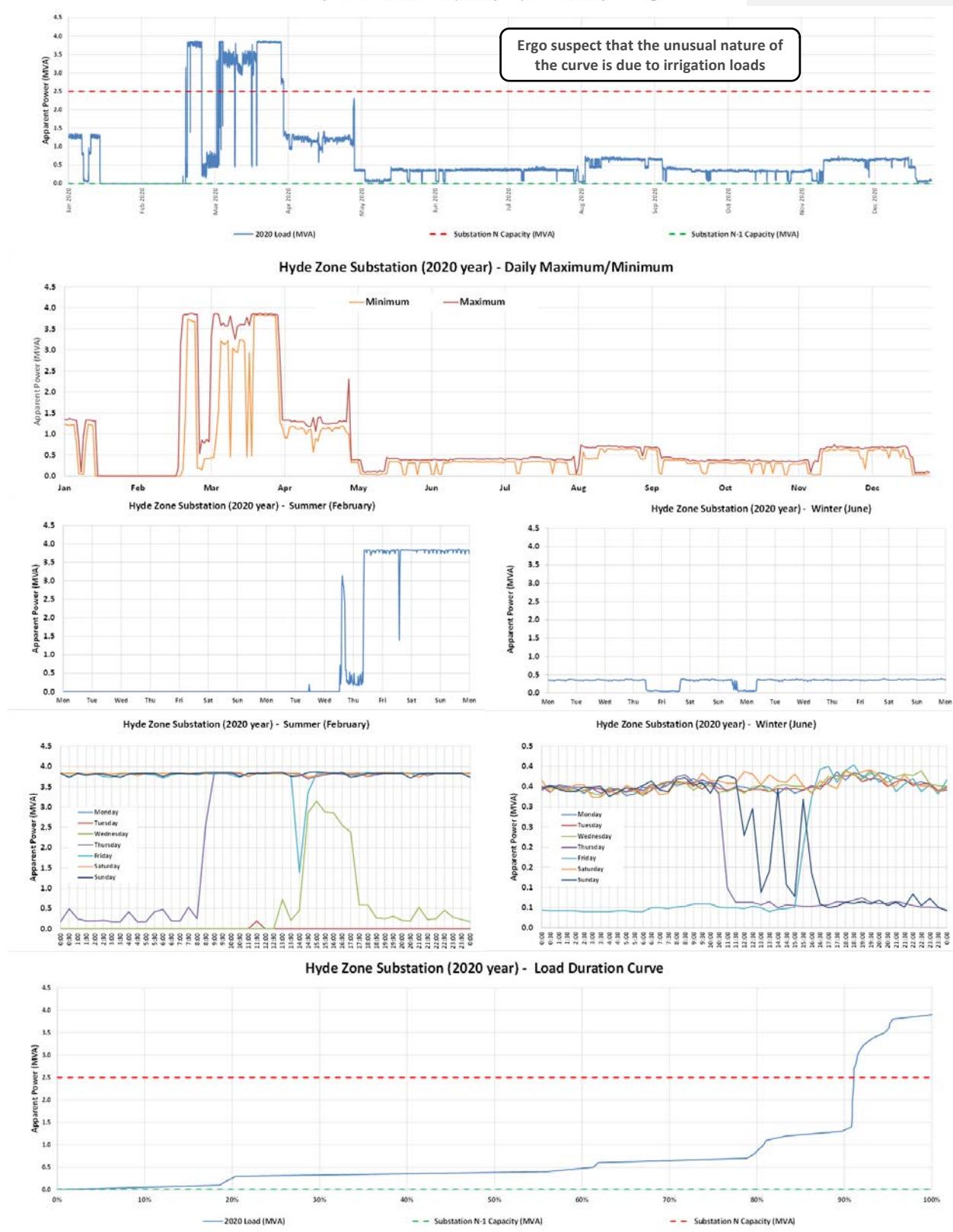
HYDE MVA


Figure 71 Hyde 33/11kV zone substation: Apparent power (MVA) load characteristics

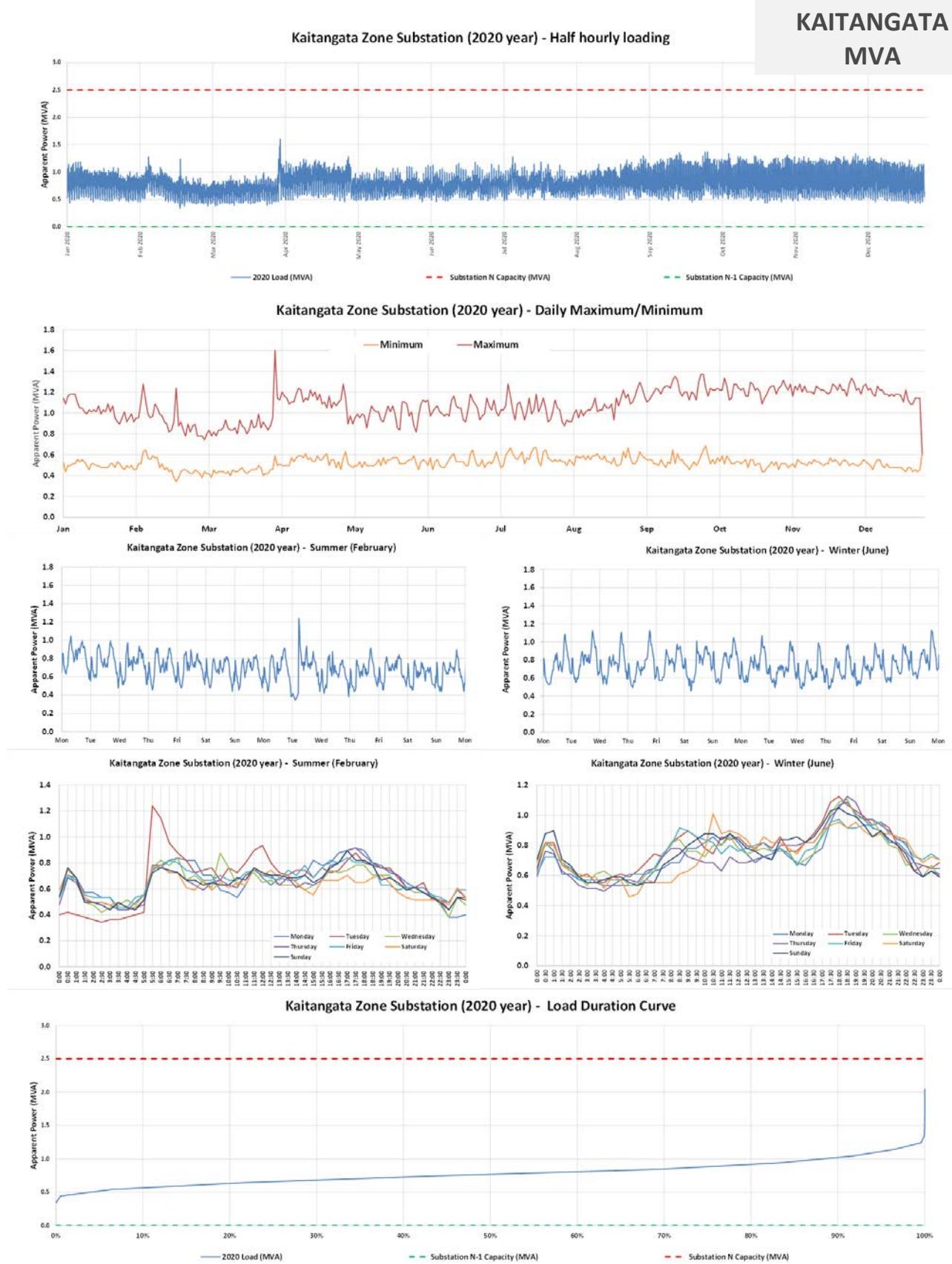


Figure 72 Kaitangata 33/11kV zone substation: Apparent power (MVA) load characteristics

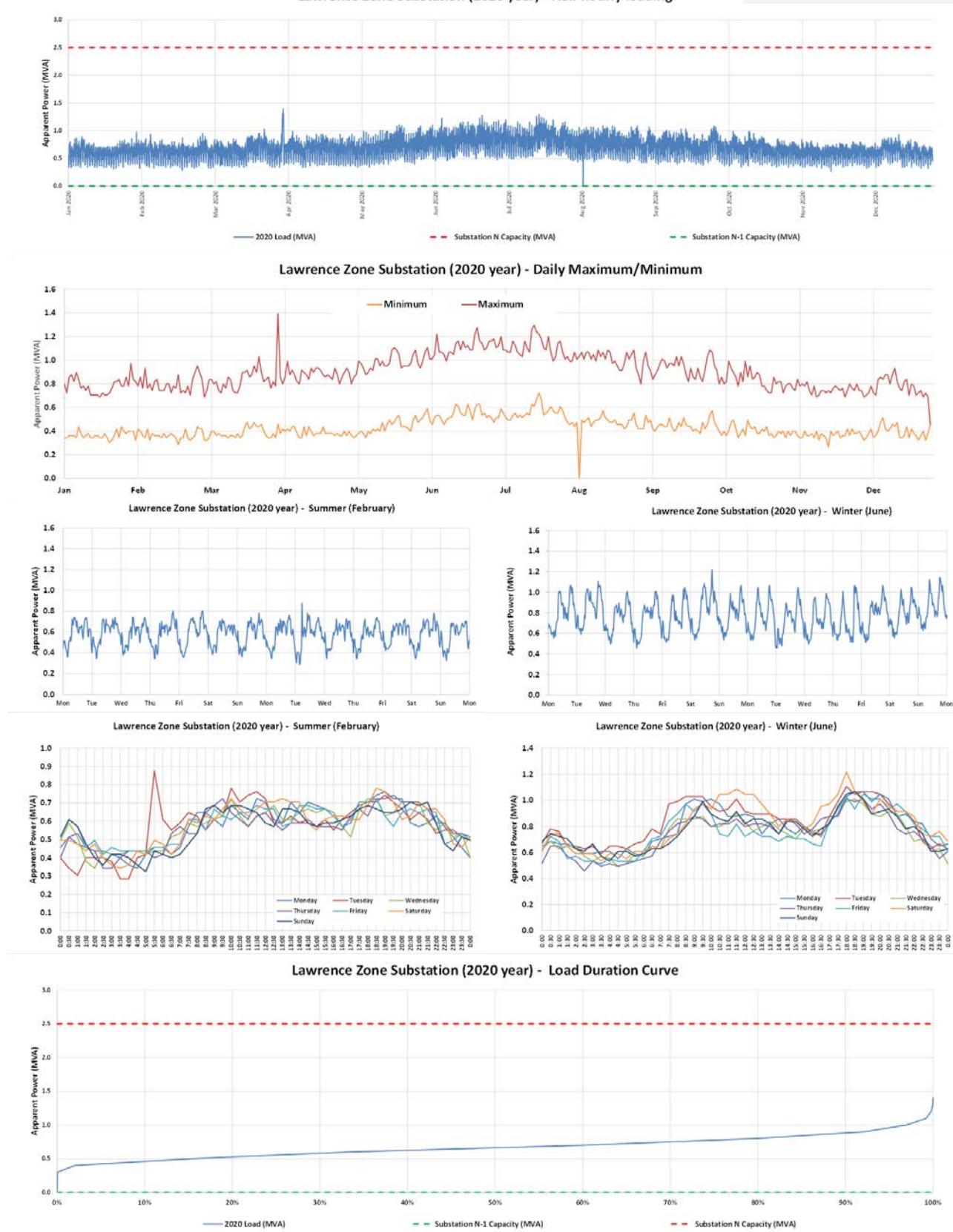
LAWRENCE MVA


Figure 73 Lawrence 33/11kV zone substation: Apparent power (MVA) load characteristics

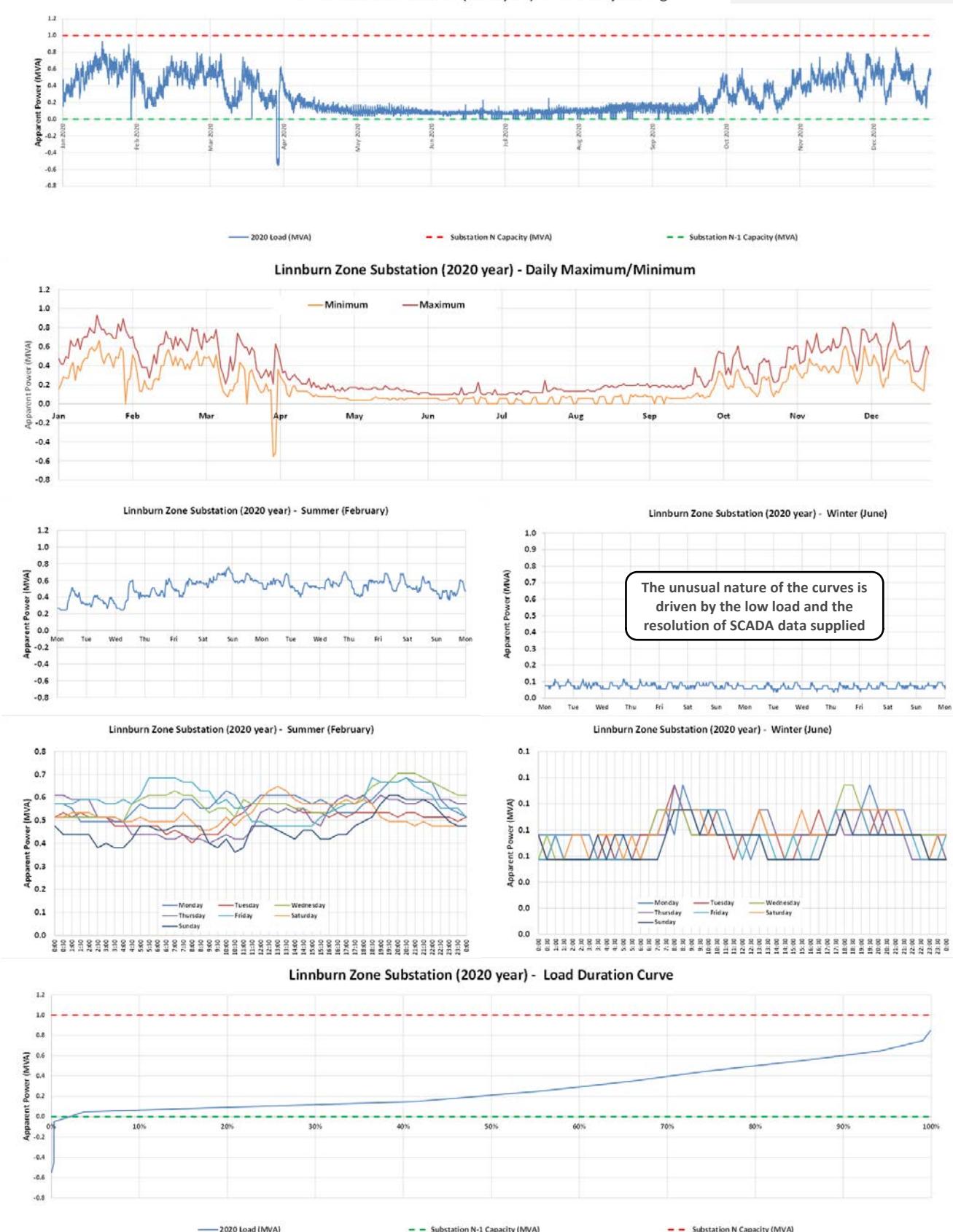
LINNURN MVA


Figure 74 Linnburn 33/11kV zone substation: Apparent power (MVA) load characteristics

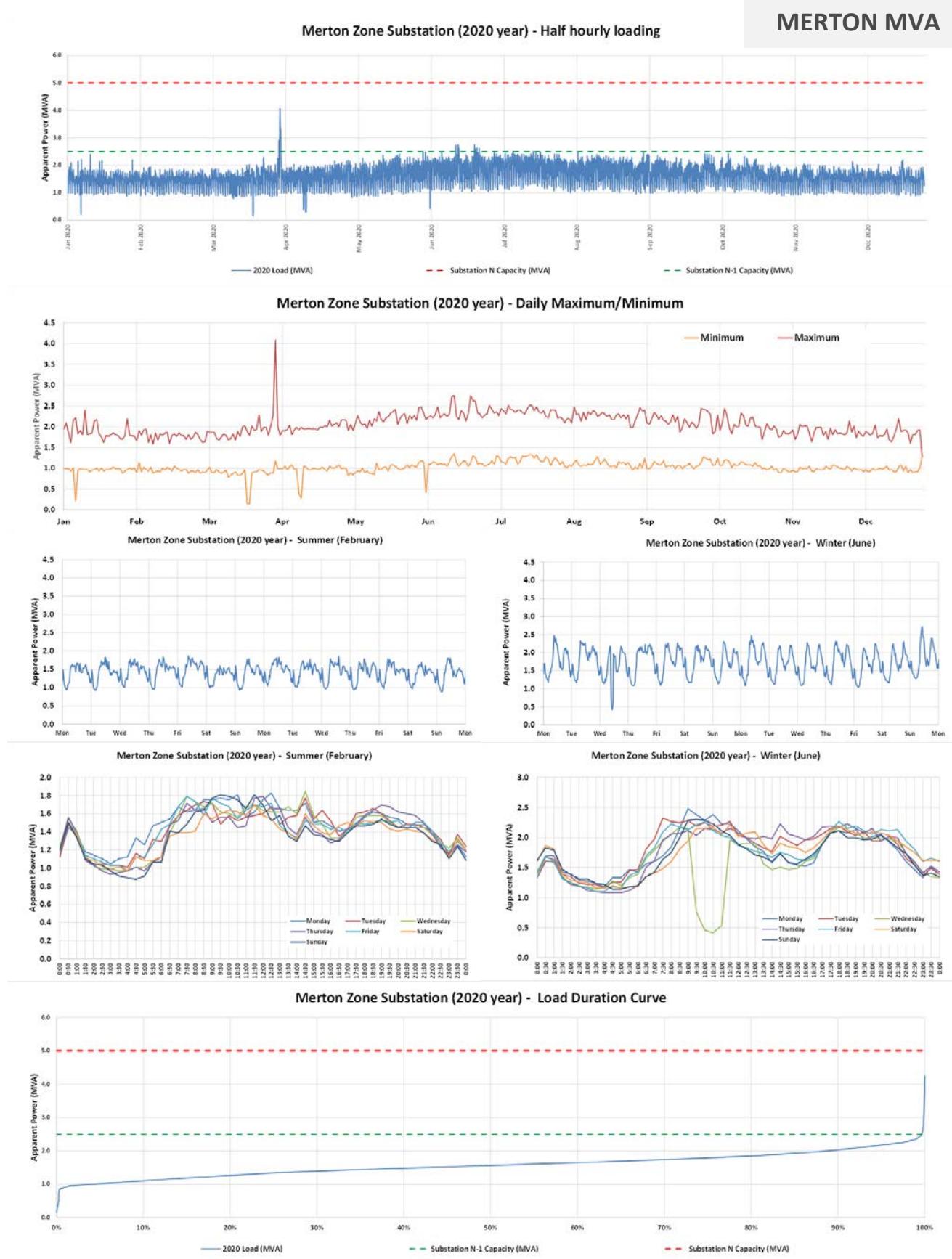


Figure 75 Merton 33/11kV zone substation: Apparent power (MVA) load characteristics

MIDDLEMARCH MVA

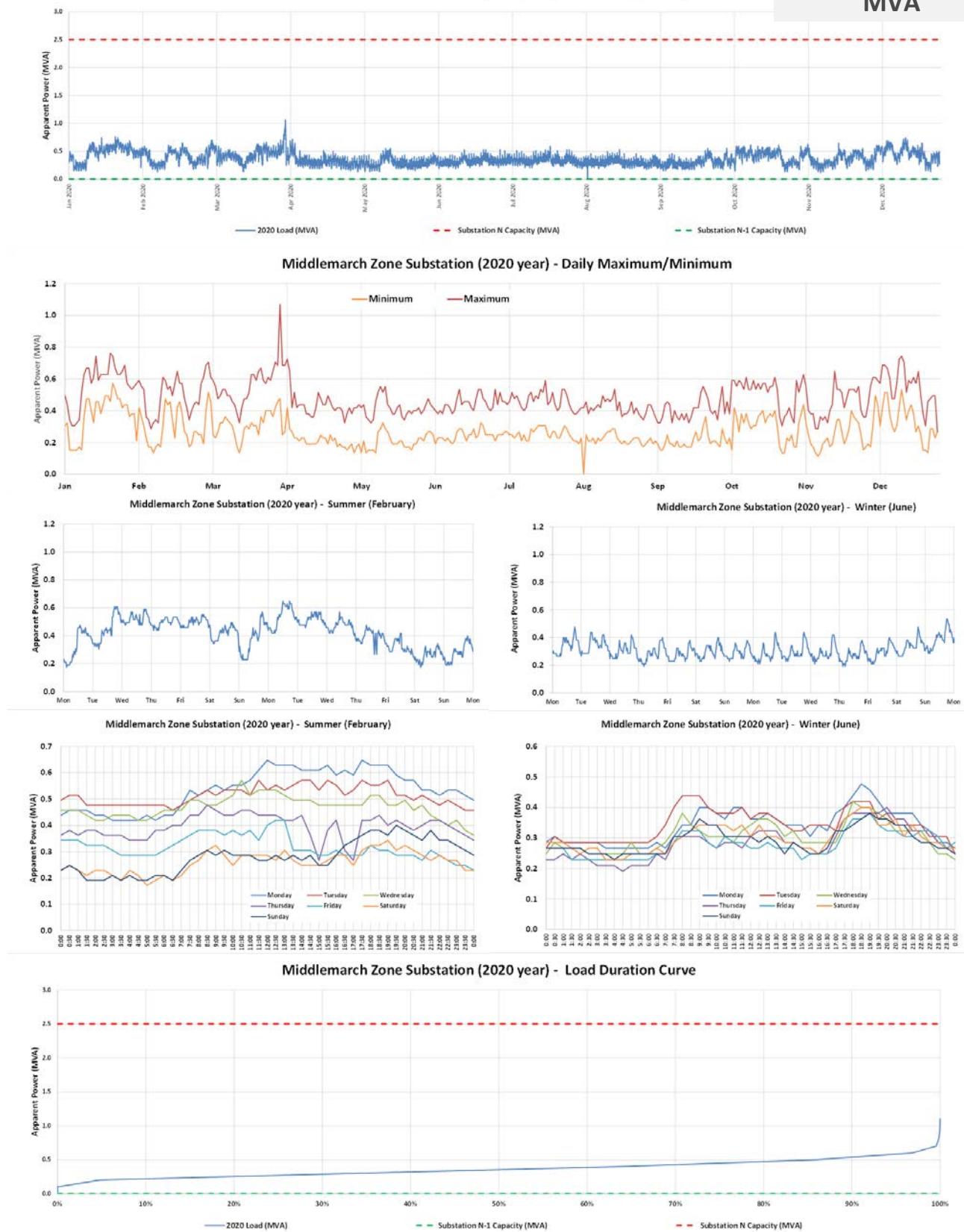


Figure 76 Middlemarch 33/11kV zone substation: Apparent power (MVA) load characteristics

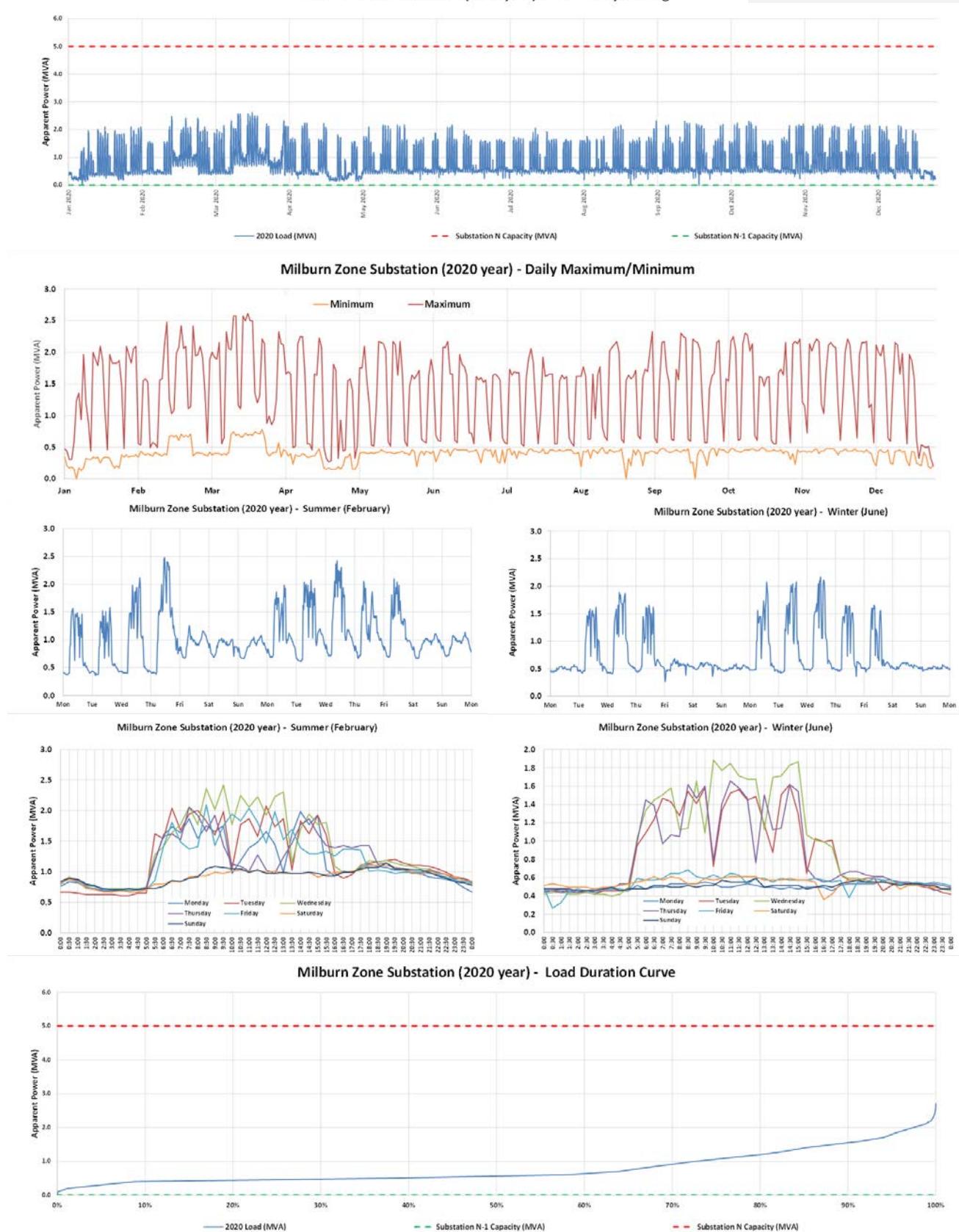
MILBURN MVA


Figure 77 Milburn 33/11kV zone substation: Apparent power (MVA) load characteristics

NORTH BALCLUTHA MVA

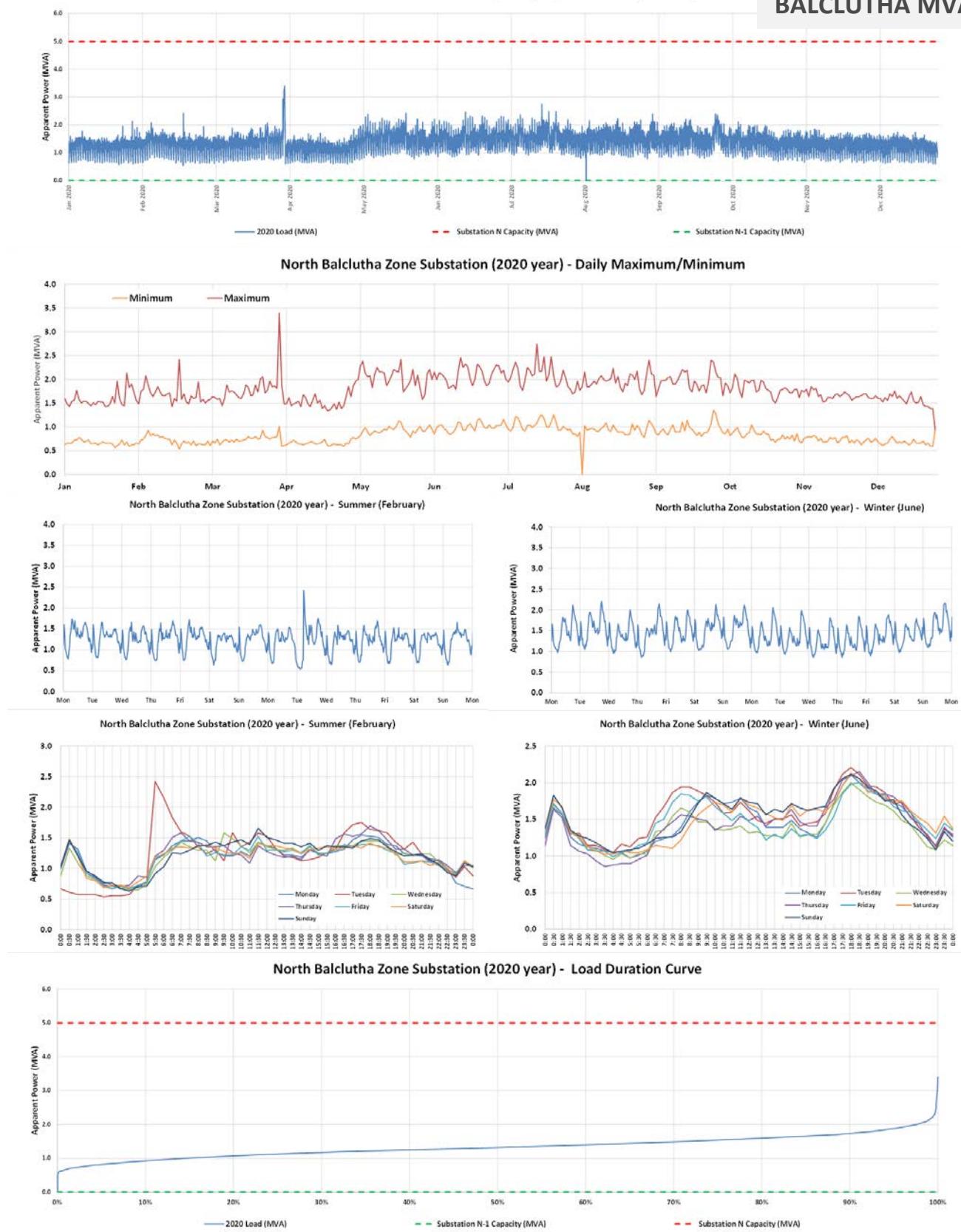


Figure 78 North Balclutha 33/11kV zone substation: Apparent power (MVA) load characteristics

OTUREHUA MVA

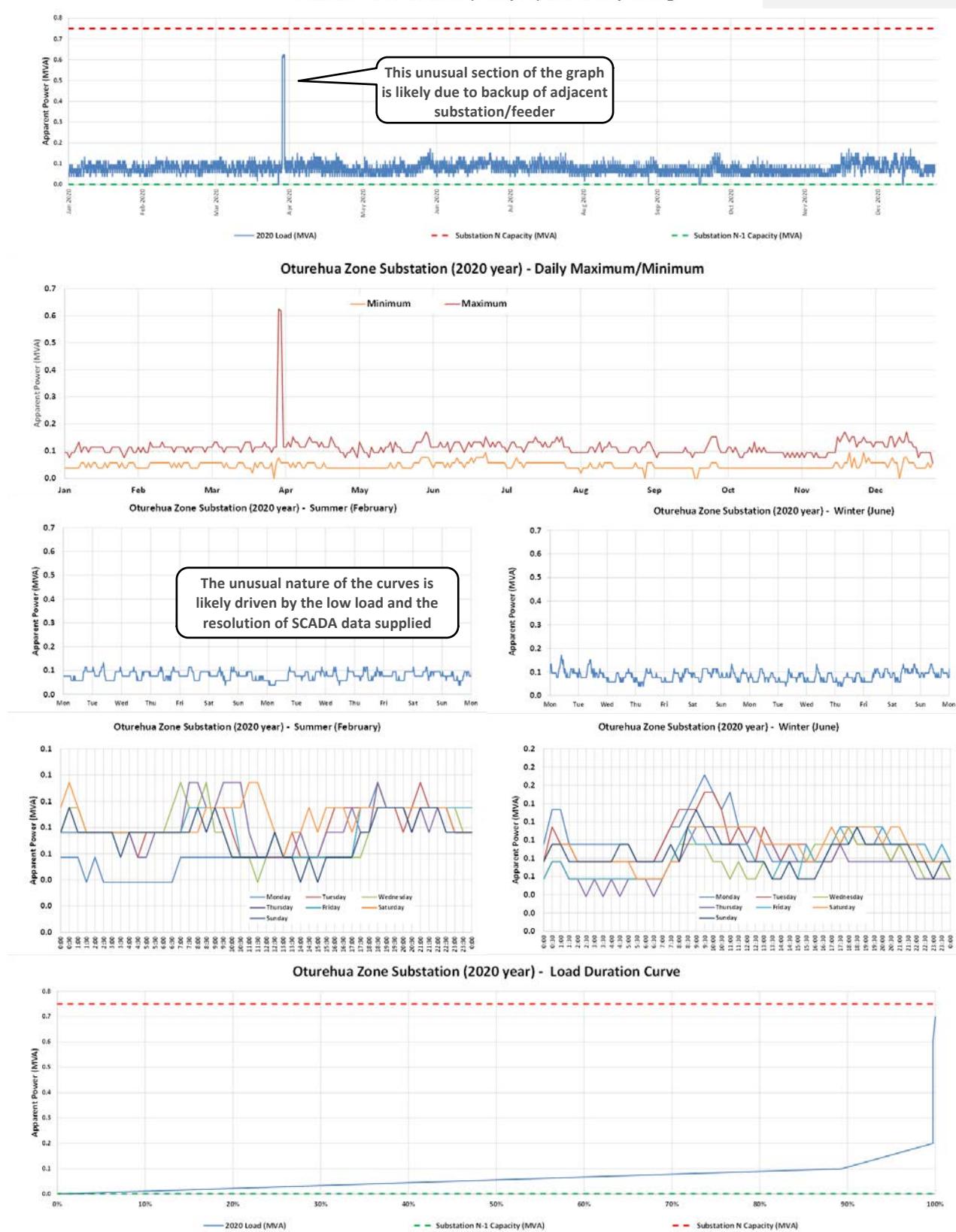
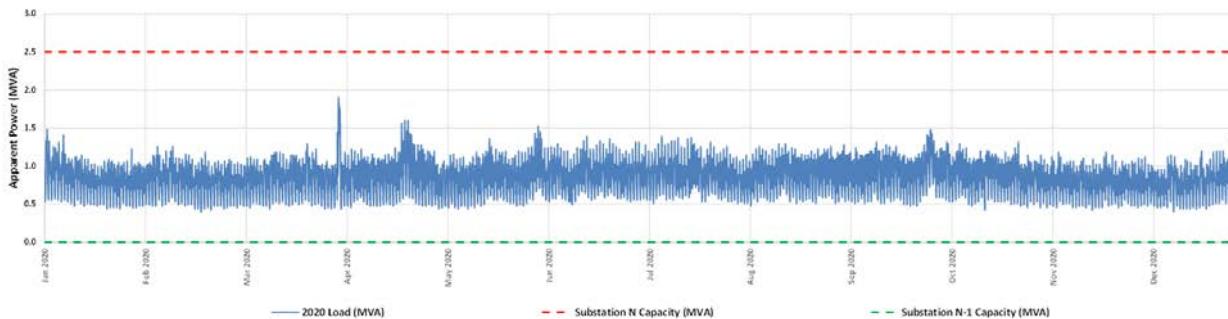


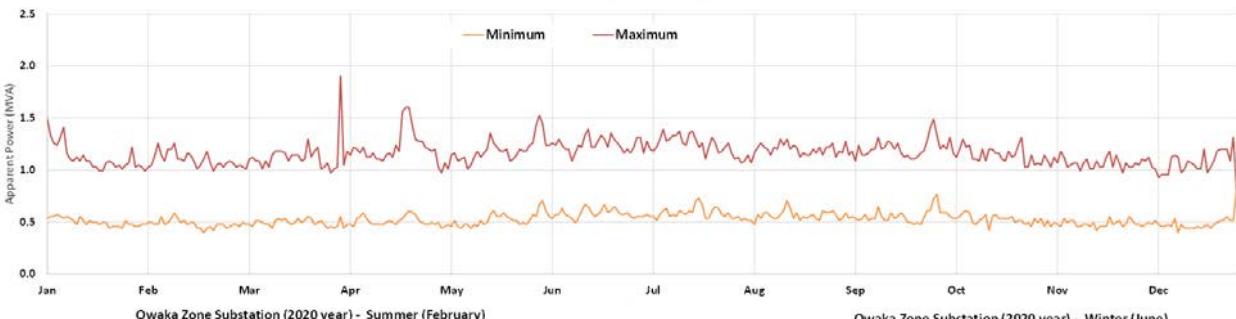
Figure 79 Oturehua 33/11kV zone substation: Apparent power (MVA) load characteristics

OWAKA MVA

Owaka Zone Substation (2020 year) - Half hourly loading

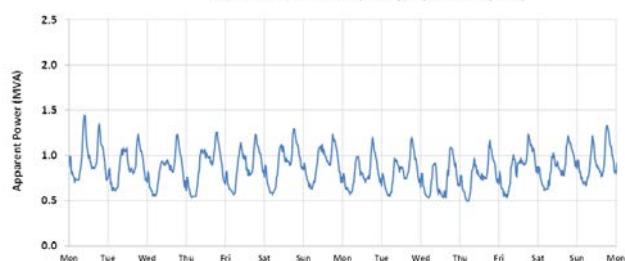
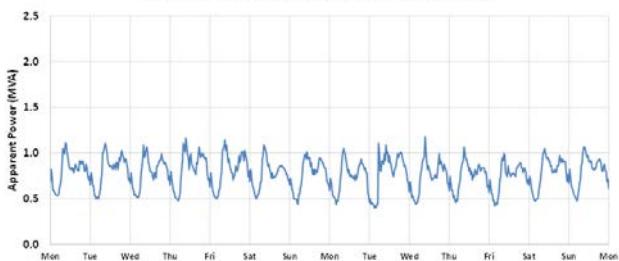


Owaka Zone Substation (2020 year) - Daily Maximum/Minimum



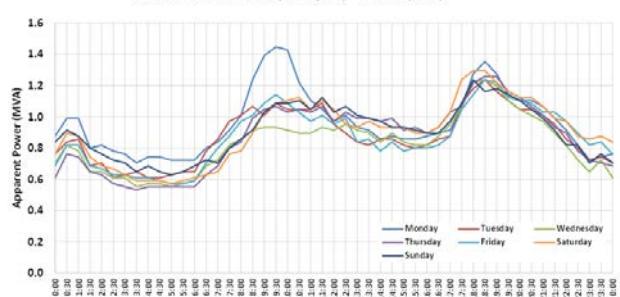
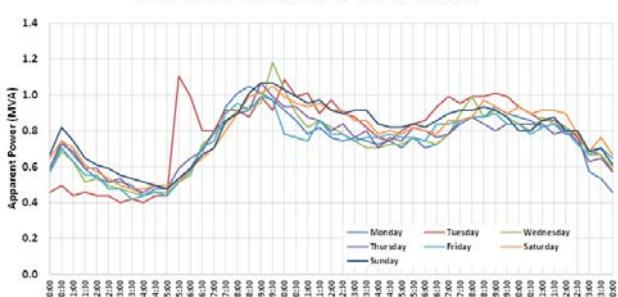
Owaka Zone Substation (2020 year) - Summer (February)

Owaka Zone Substation (2020 year) - Winter (June)



Owaka Zone Substation (2020 year) - Summer (February)

Owaka Zone Substation (2020 year) - Winter (June)



Owaka Zone Substation (2020 year) - Load Duration Curve

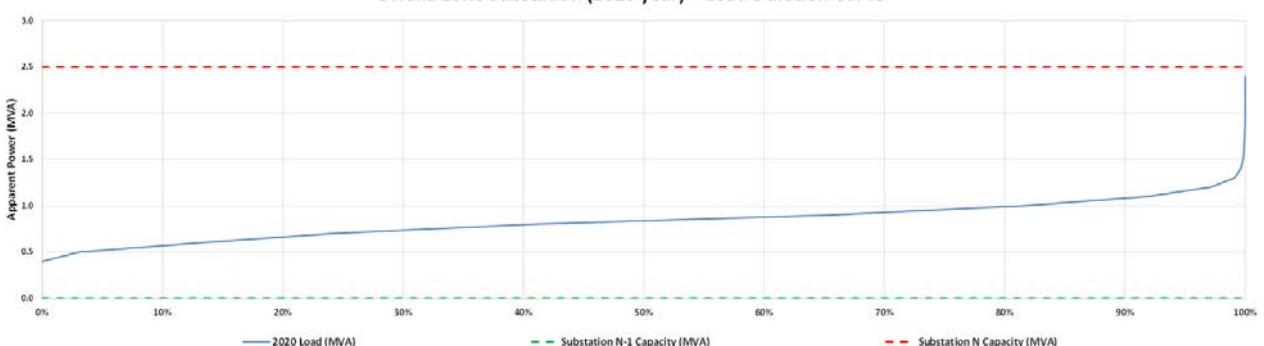


Figure 80 Owaka 33/11kV zone substation: Apparent power (MVA) load characteristics

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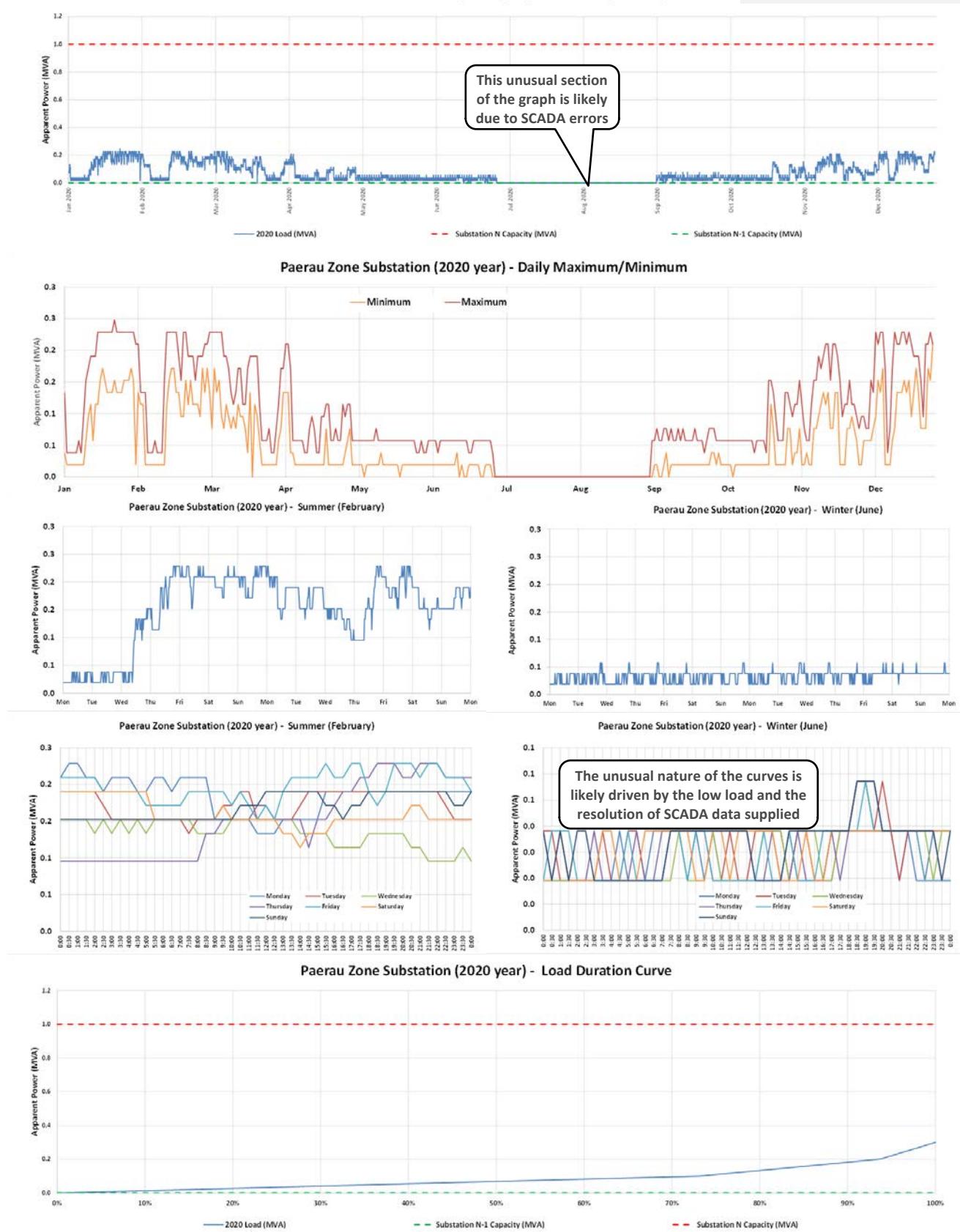
PAERAU MVA


Figure 81 Paerau 33/11kV zone substation: Apparent power (MVA) load characteristics

INFORMATION NOT SUPPLIED

Figure 82 Paerau Hydro 33/11kV zone substation: Apparent power (MVA) load characteristics

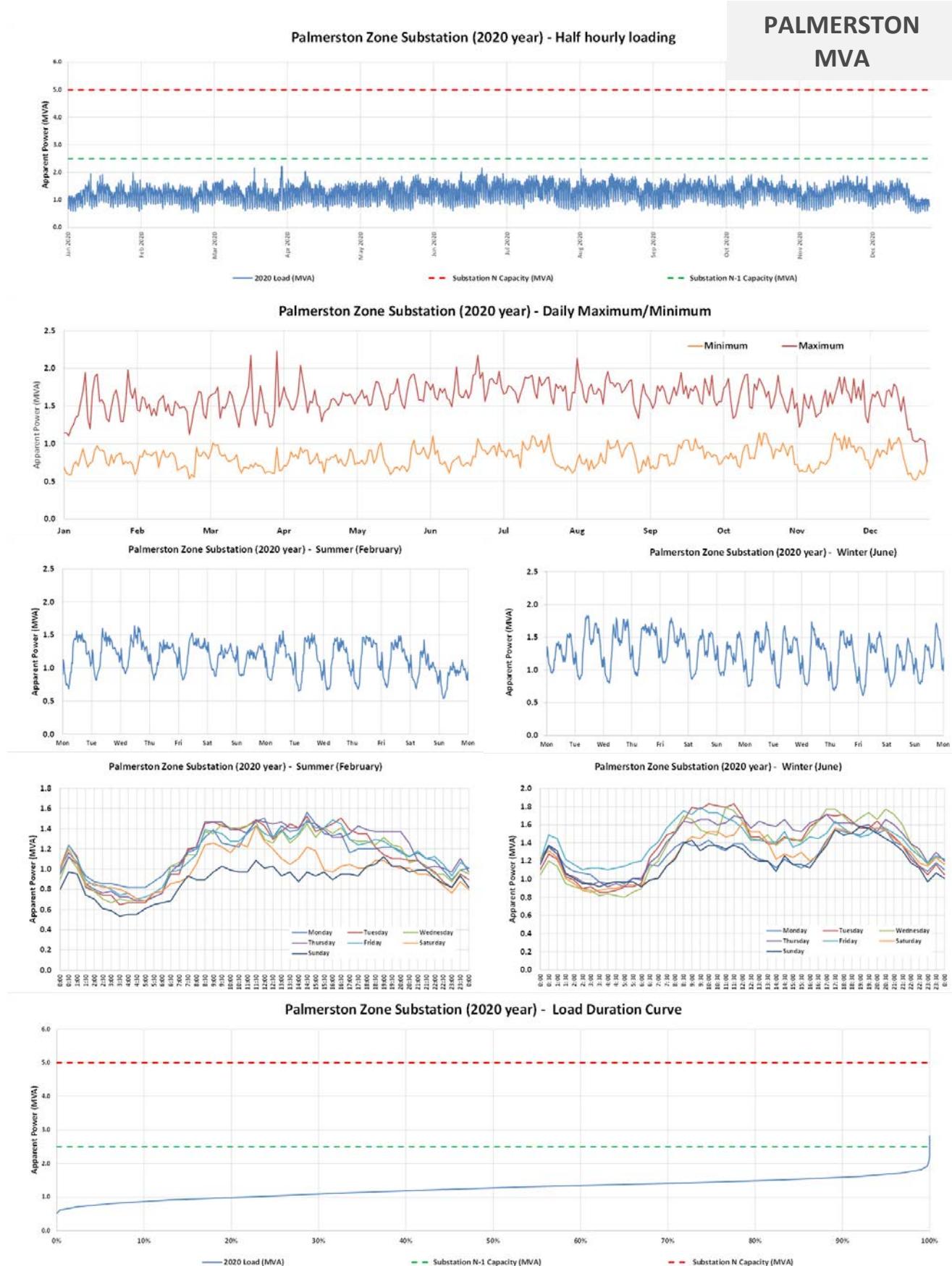


Figure 83 Palmerston 33/11kV zone substation: Apparent power (MVA) load characteristics

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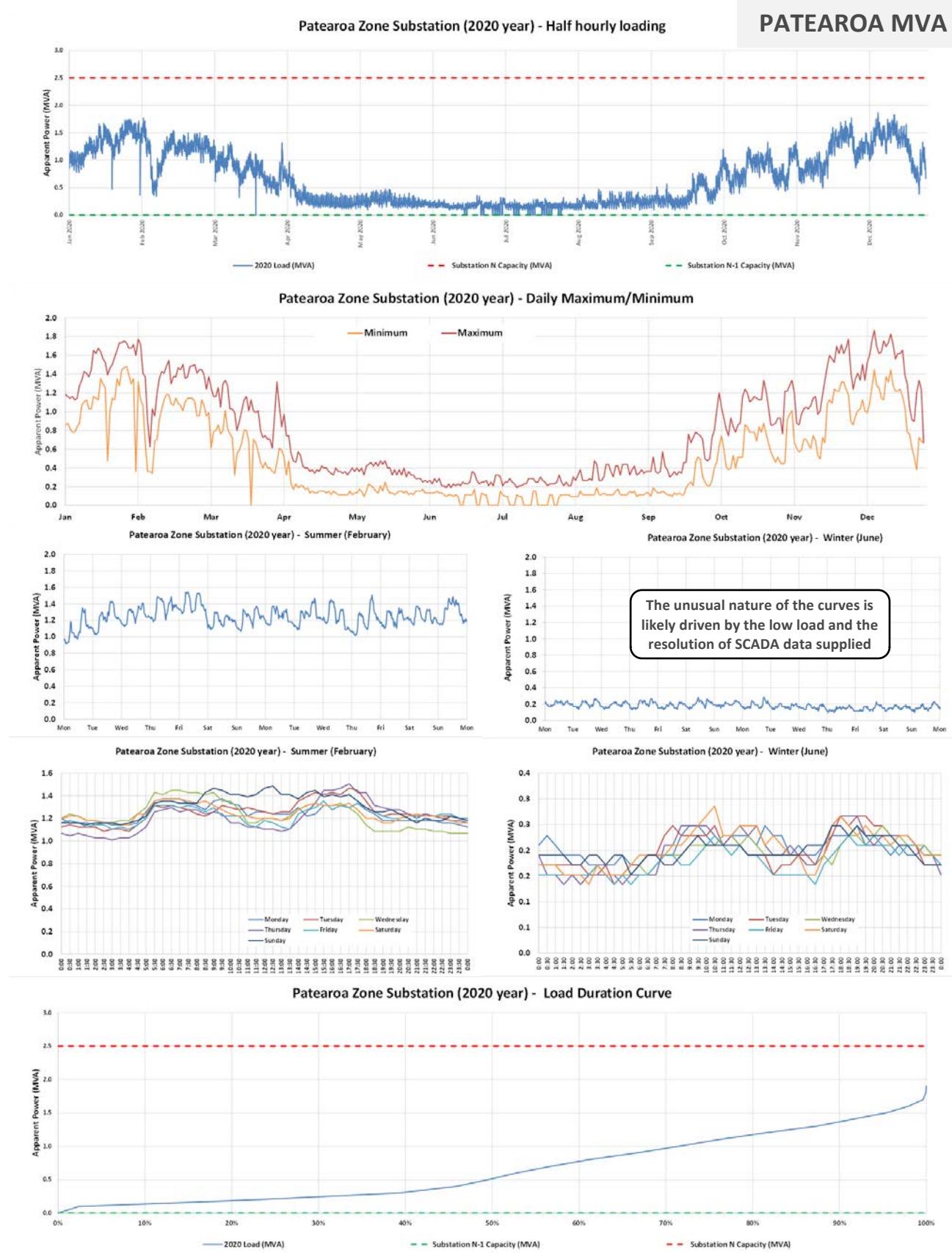


Figure 84 Patearoa 33/11kV zone substation: Apparent power (MVA) load characteristics

PORT MOLYNEUX MVA

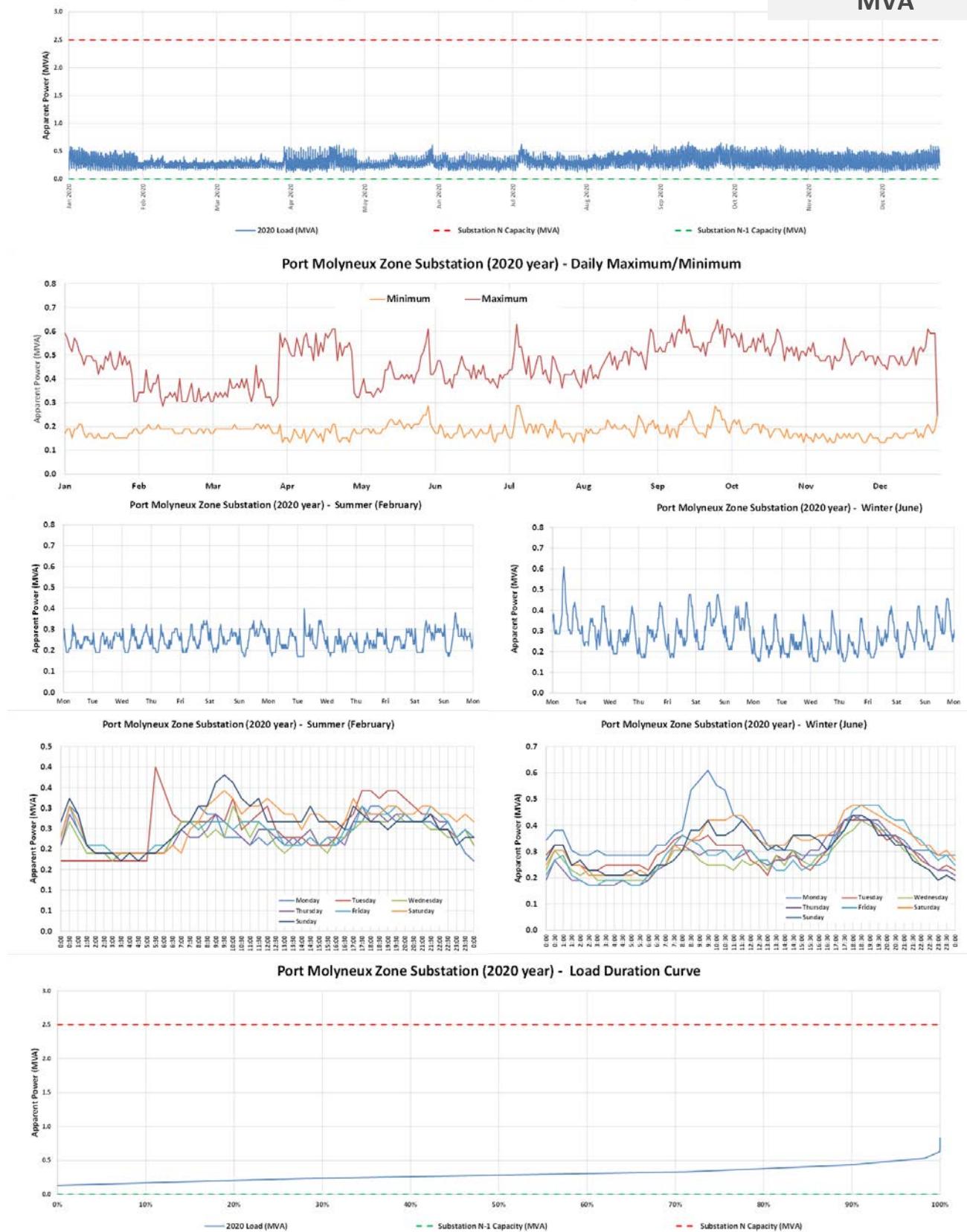


Figure 85 Port Molyneux 33/11kV zone substation: Apparent power (MVA) load characteristics

PUKEKAWA MVA

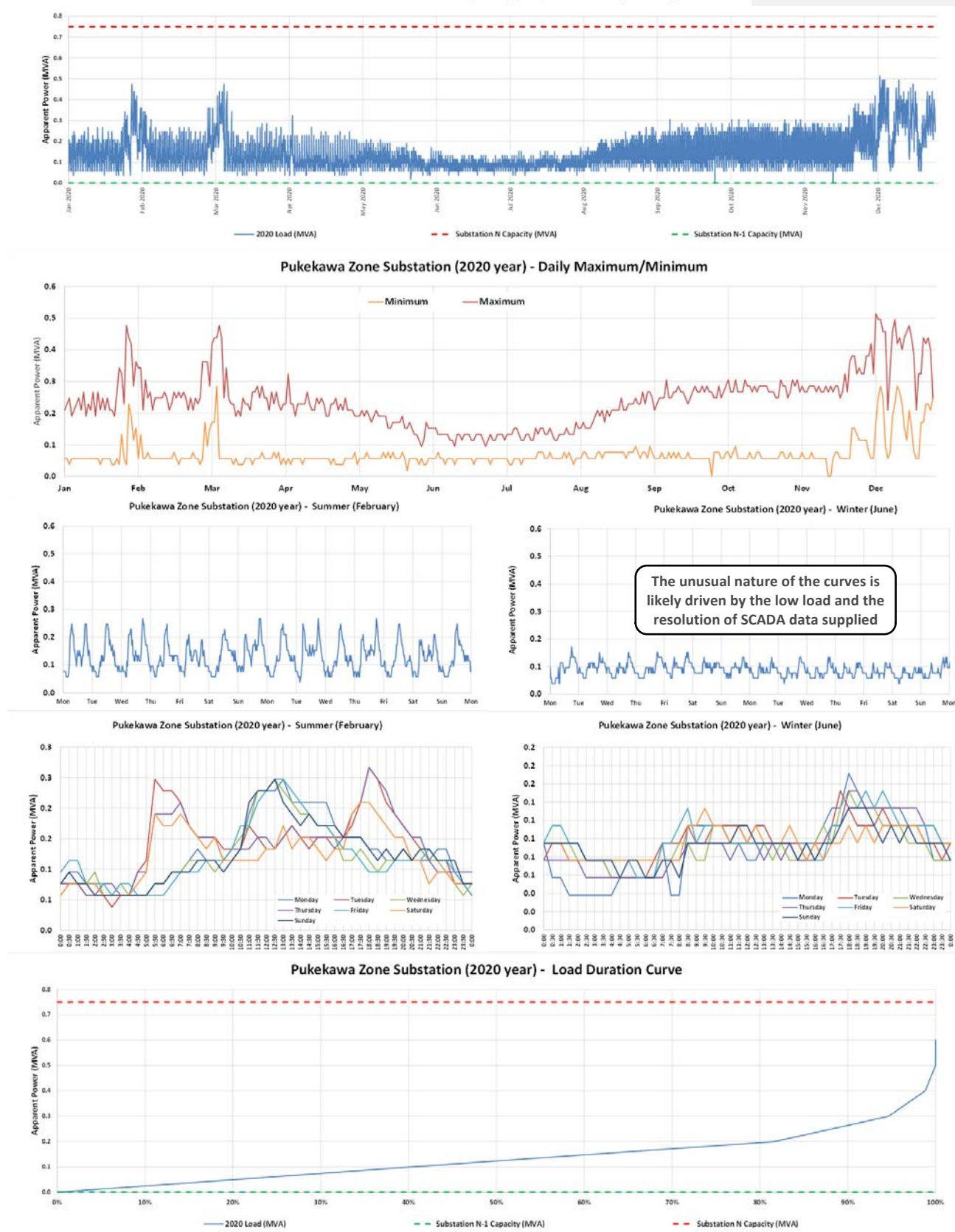


Figure 86 Pukekawa 33/11kV zone substation: Apparent power (MVA) load characteristics

RANFURLY 33/11 MVA

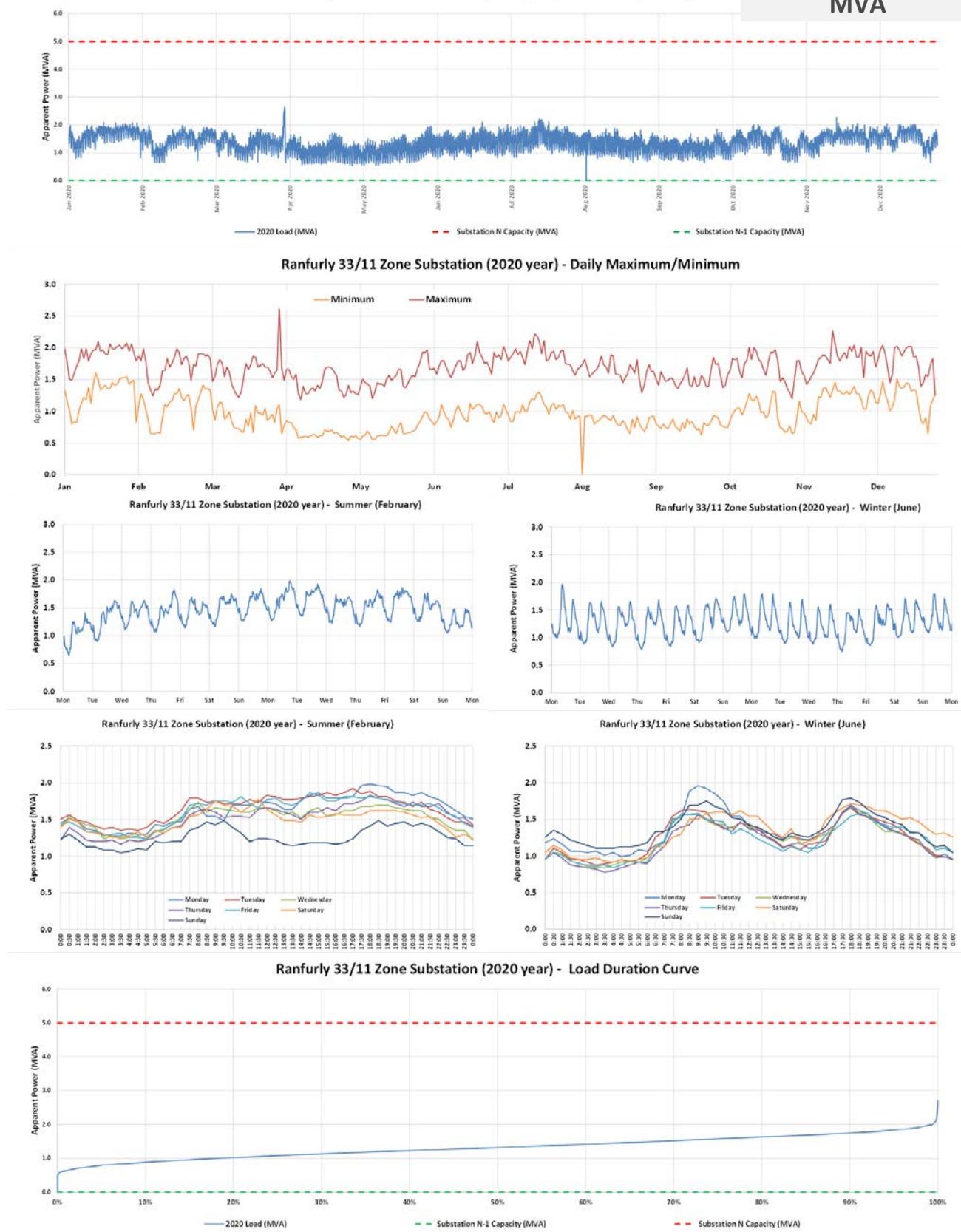


Figure 87 Ranfurly 33/11 33/11kV zone substation: Apparent power (MVA) load characteristics

INFORMATION NOT SUPPLIED

Figure 88 Ranfurly 66/33 33/11kV zone substation: Apparent power (MVA) load characteristics

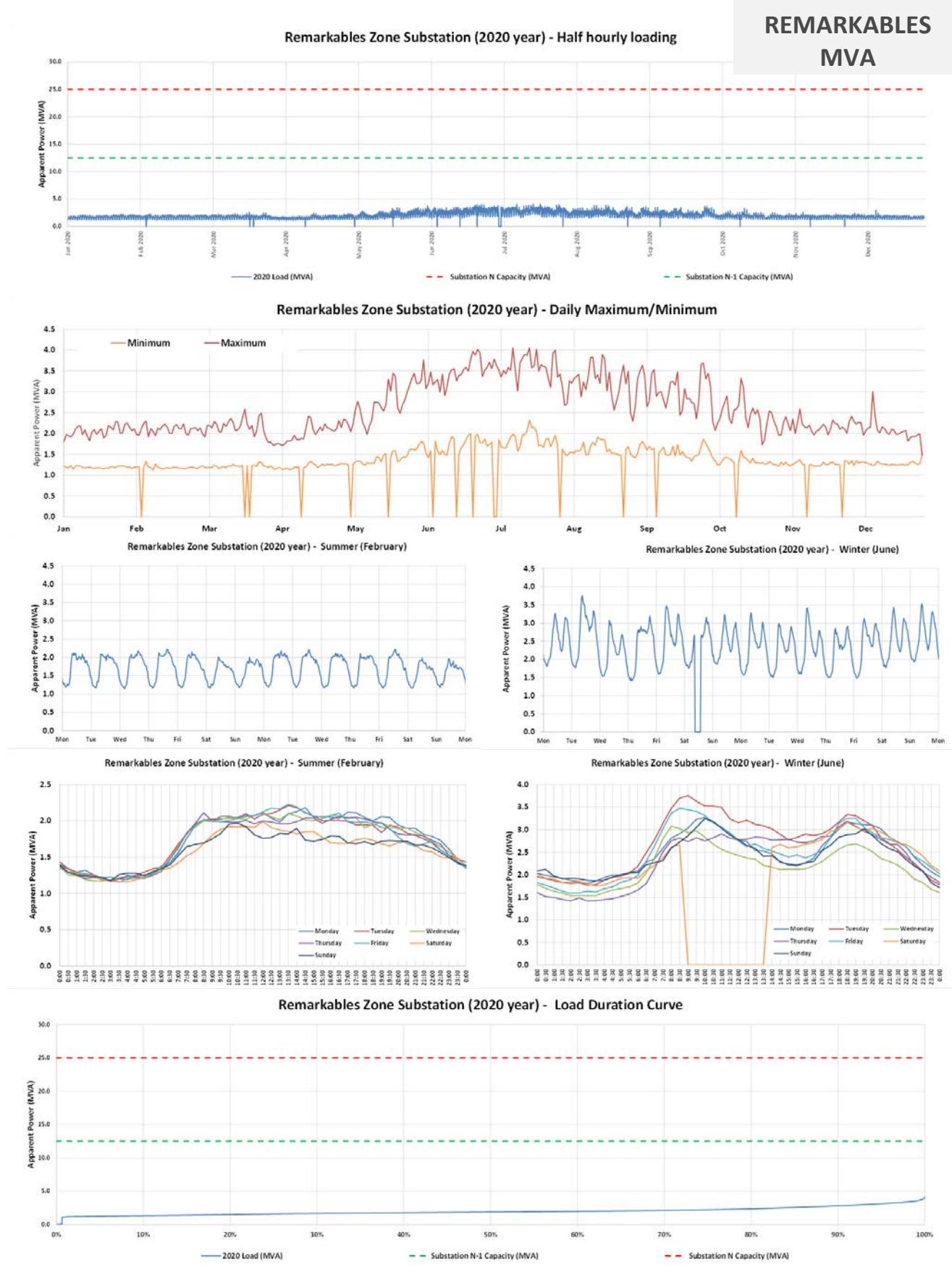


Figure 89 Remarkables 33/11kV zone substation: Apparent power (MVA) load characteristics

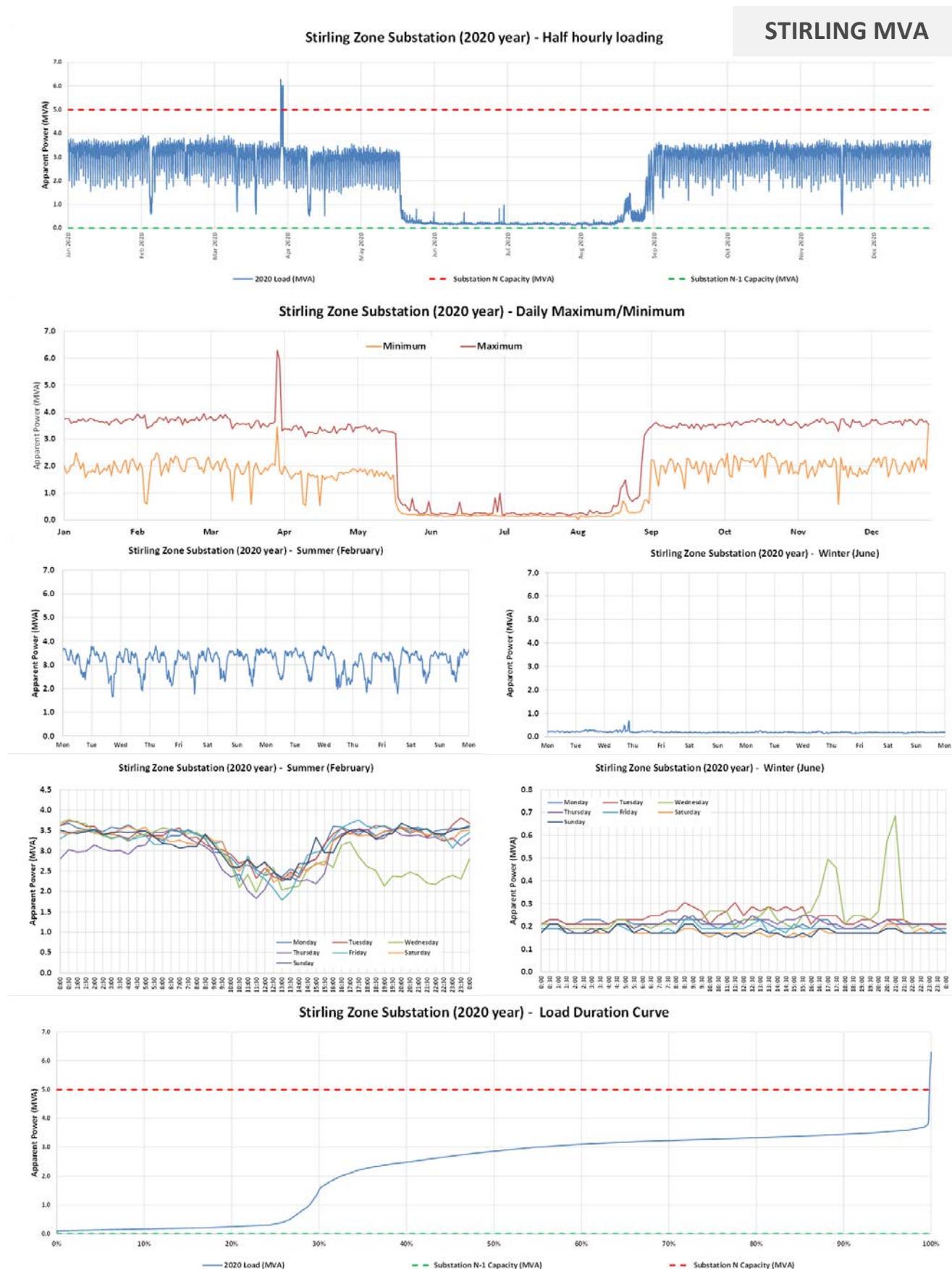


Figure 90 Stirling 33/11kV zone substation: Apparent power (MVA) load characteristics

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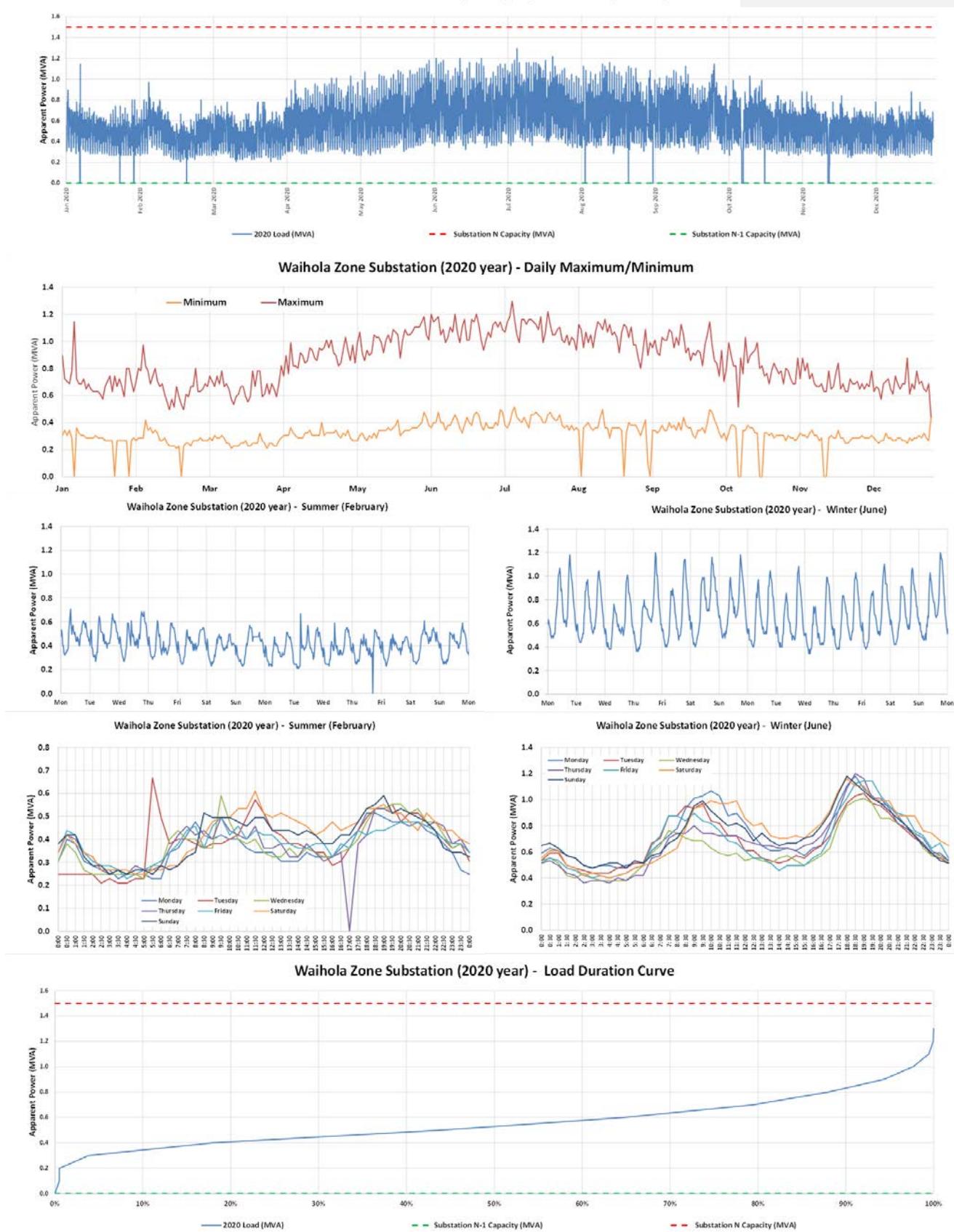
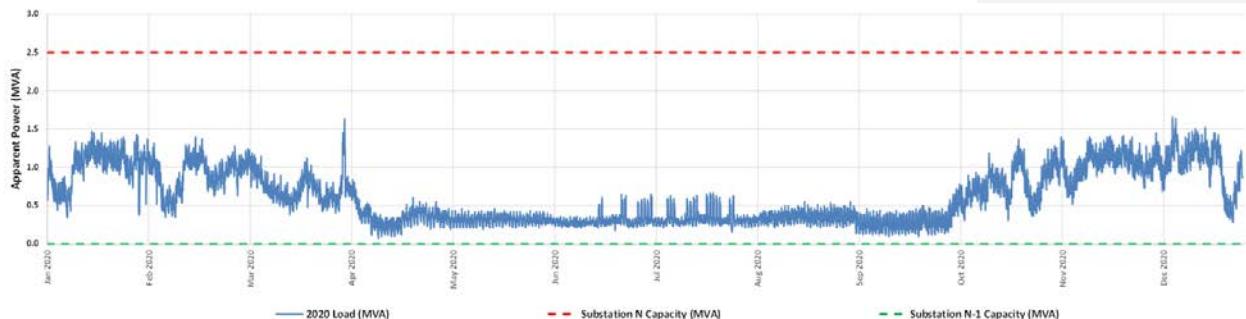
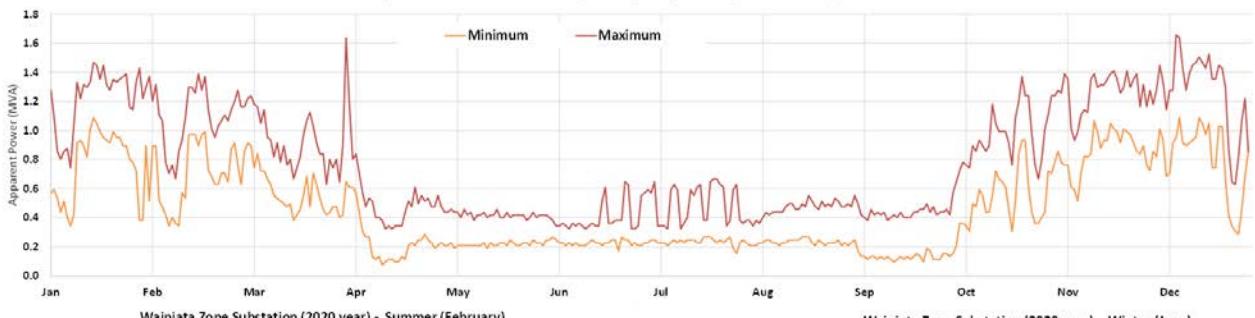
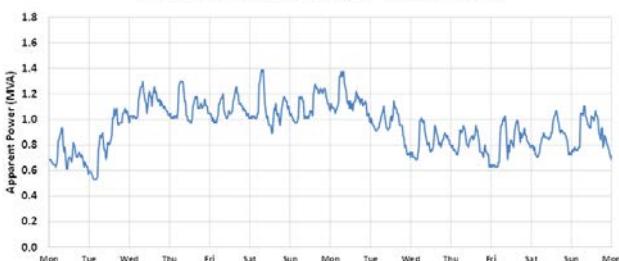
WAIHOLA MVA


Figure 91 Waihola 33/11kV zone substation: Apparent power (MVA) load characteristics

WAIPIATA MVA
Waipiata Zone Substation (2020 year) - Half hourly loading

Waipiata Zone Substation (2020 year) - Daily Maximum/Minimum

Waipiata Zone Substation (2020 year) - Summer (February)

Waipiata Zone Substation (2020 year) - Winter (June)

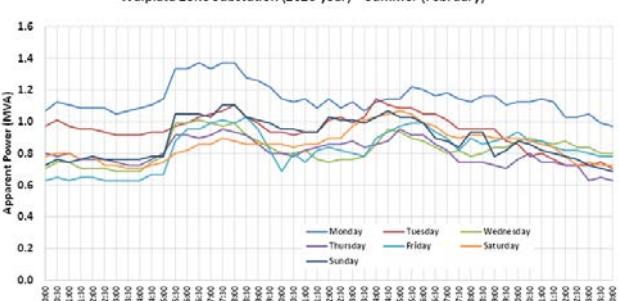
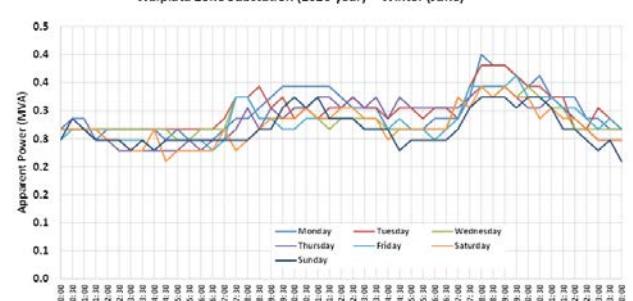
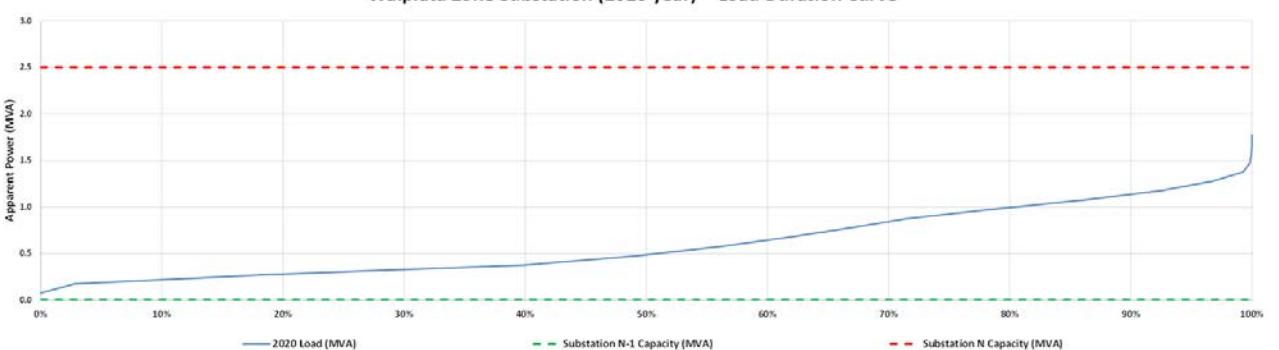
Waipiata Zone Substation (2020 year) - Summer (February)

Waipiata Zone Substation (2020 year) - Winter (June)

Waipiata Zone Substation (2020 year) - Load Duration Curve


Figure 92 Waipiata 33/11kV zone substation: Apparent power (MVA) load characteristics

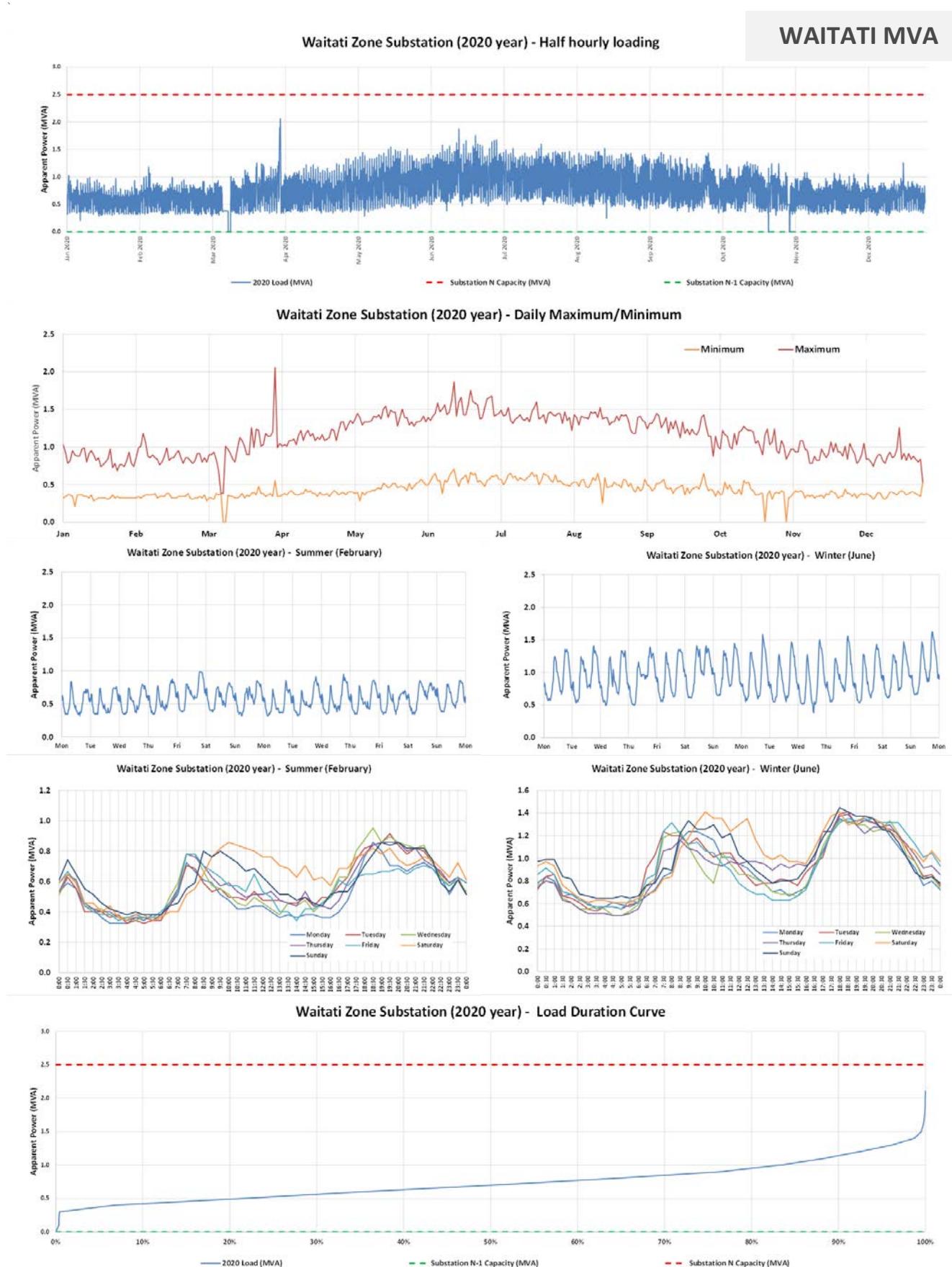


Figure 93 Waitati 33/11kV zone substation: Apparent power (MVA) load characteristics

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WEDDERBURN MVA

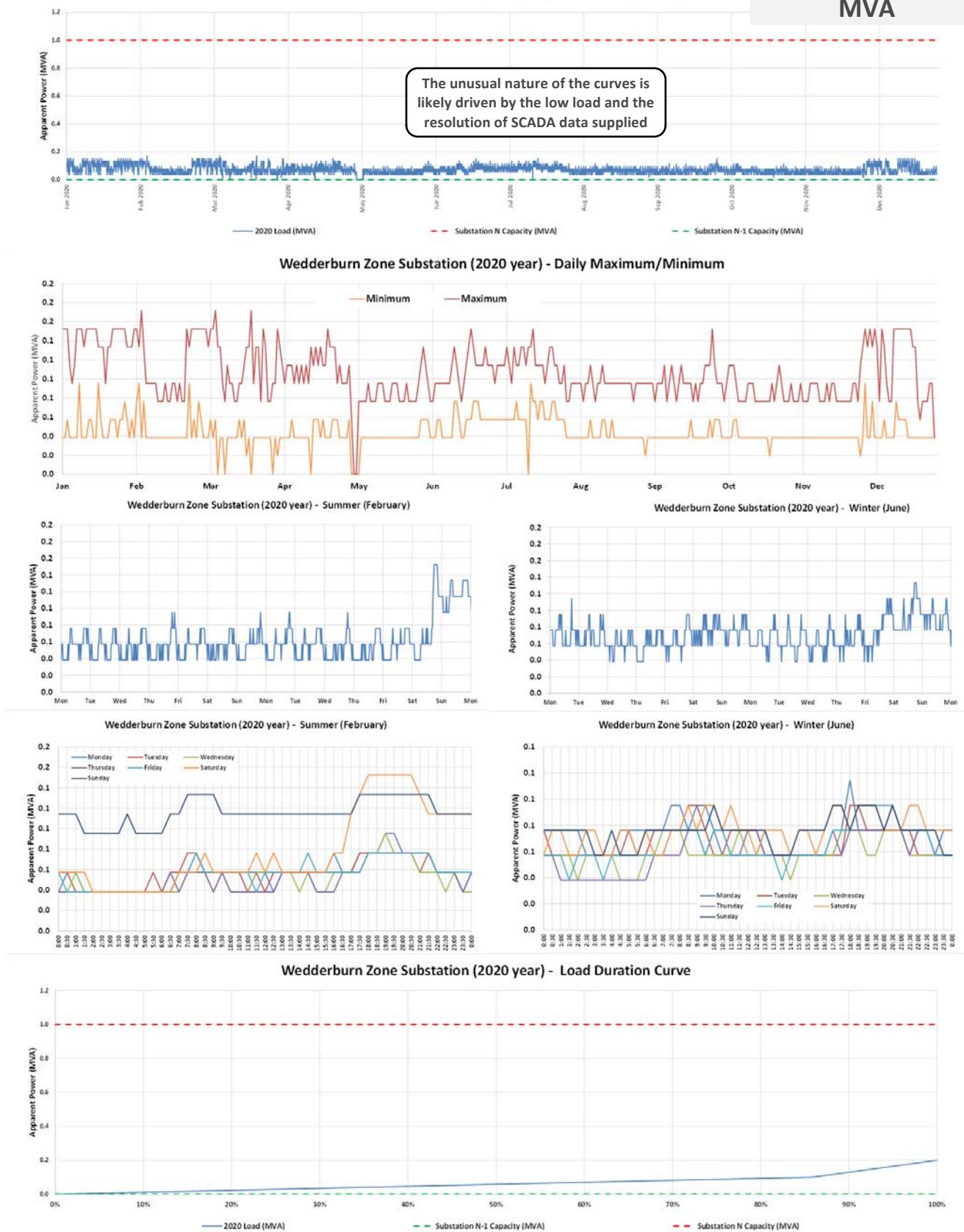


Figure 94 Wedderburn 33/11kV zone substation: Apparent power (MVA) load characteristics