Appendix 6B:

Network Capability Incentive Parameter Action Plan (NCIPAP) 2014-17

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ISSUE/AMENDMENT STATUS

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Table of Contents

1 Introduction 4

2 Assessment of Network Limits 4

3 Proposed Priority Projects 5

3.1 Priority Project 1 – East Rowville-Cranbourne No.1 & No.2 220kV circuit 7

3.2 Priority Project 2 – Rowville - East Rowville No.1 & No.2 220kV circuit & Rowville - Springvale No.2 220kV circuit 7

3.3 Priority Project 3 – Geelong–Moorabool 220kV circuits (No. 1 & No. 2) 7

3.4 Priority Project 4 – Wodonga Terminal Station (WOTS) 8

3.5 Priority Project 5 – Dederang circuits 8

3.6 Priority Project 6 – Templestowe Terminal Station (TSTS) 9

3.7 Priority Project 7 – Thomastown Terminal Station (TTS) 9

3.8 Priority Project 8 – South Morang - Dederang No.1 & No.2 330kV circuits 10

3.9 Priority Project 9 – Horsham Terminal Station (HOTS) 10

3.10 Priority Project 10 – Altona Terminal Station (ATS) 11

3.11 Priority Project 11 – Hazelwood – Loy Yang No.1, No.2 and No.3 500kV circuits 11

3.12 Priority Project 12 – Geelong Terminal Station (GTS) 12

3.13 Priority Project 13 – Ringwood Terminal Station (RWTS) 12

3.14 Priority Project 14 – Moorabool - Mortlake No.2 500kV circuit & Moorabool - Tarrone No.1 500kV circuit 13

3.15 Priority Project 15 – Keilor-Sydenham No.1 500kV circuit & Keilor-South Morang No.1 500kV circuit 13

Attachment 1 – Network Limits (Commercial-In-Confidence)

1 Introduction

The Service Target Performance Incentive Scheme (STPIS) contains a new Network Capability Component which is designed to promote efficient levels of network capability from existing assets when and where most needed to improve customer or wholesale market outcomes.

Under the Network Capability Component SP AusNet is required to submit a Network Capability Incentive Parameter Action Plan (NCIPAP). Clause 5.2(b) of the STPIS Guidelines sets out that the NCIPAP must:

1. Identify for every transmission circuit or injection point on its network, the reason for the limit for each transmission circuit or injection point.
2. Propose the priority projects to be undertaken in the regulatory control period to improve the limit of the transmission circuits and injection points listed above through operational and/or minor capital expenditure projects. This proposal must include:
    a. The total operational and capital cost of each priority project
    b. The proposed value of the priority project improvement target in the limit for each priority project
    c. The current value of the limit for the transmission circuits and/or injection points which the priority project improvement target is seeking to improve, and
    d. The ranking of the priority projects in descending order based on the likely benefit of the priority project on customers or wholesale market outcomes

in which the average total expenditure of the priority projects outlined in each regulatory year must not be greater than 1 per cent of the TNSP's average maximum allowed revenue proposed in its revenue proposal for the regulatory control period.

Due to AEMO's role as the transmission network planner in Victoria, the analysis presented in this document has been prepared jointly with AEMO.

The NCIPAP is structured as follows:

- Section 2 – provides an overview of the assessment of network limits that was undertaken by SP AusNet and AEMO to derive the list of priority projects.
- Section 3 – outlines the proposed priority projects, including a description of the project, the current limit, the improvement target and the estimated project cost.

2 Assessment of Network Limits

SP AusNet and AEMO have undertaken an exercise to identify the reason for the limit for every transmission circuit and injection point on SP AusNet's transmission network. The results of this analysis are attached (Attachment 1 – Network Limits). The limits presented are for system normal conditions. In addition, a RADAR study[1] was carried out by SP AusNet to capture the limiting elements for the transmission lines under outage conditions.

Each limit was then assessed to determine:

- Whether the limit of the transmission circuit or injection point could be increased through operating or minor capital expenditure (where 'minor' is defined as an estimated capital cost of less than $5 million, or the cost threshold for the regulatory investment test for transmission); and
- Whether increasing the limit of the transmission circuit or injection point would either:
    - benefit wholesale market outcomes or
    - increase capability of the transmission system at times when network users place greatest value on the transmission system's reliability.

For the initial assessment presented in this document, AEMO analysed the location of binding constraint equations for 2011 and 2012 to identify which projects would provide these benefits.

[1] This report is available for review at the AER's request.

Where both the above criteria were satisfied, a priority project to address the limit has been included in this NCIPAP. Where multiple small projects have been identified at the same terminal station, they have been aggregated due to the significant efficiencies that would be incurred in undertaking multiple small projects located at the same terminal station simultaneously.

SP AusNet developed cost estimates for these projects, provided below.

3 Proposed Priority Projects

SP AusNet and AEMO have identified 15 priority projects. These are listed in Table 1 and outlined in detail below.

An economic analysis of the benefits of these projects will be provided to the AER by AEMO in the form of a public submission in May 2013. This will enable the prioritisation of the proposed projects, as required under clause 5.2(b)(2)(iv) of the STPIS Guidelines. Therefore, the assigned project number does not reflect the priority ordering of the projects.

The table below presents the estimated cost (capex and opex) of each priority project. The timing of these projects is indicative, based on possible efficiencies where other work is planned to take place at a particular terminal station during the period. However, it is expected that AEMO's benefit analysis could help refine the timing of these projects, as those with greater benefits could be carried out earlier in the regulatory control period to maximise these benefits.

Where a paper uprate has been identified as part of the project identification process, these have been included in the NCIPAP to be addressed during the forthcoming regulatory period. However, no expenditure is proposed for these due to the 'business as usual' nature of these revisions.

Table 1: Proposed Priority Projects ($'000, real 2013-14)

Project Number	Proposed Project Circuit/ Injection Point	Description	2014-15	2015-16	2016-17	Total Expenditure
1	East Rowville-Cranbourne No.1 & No.2 220kV circuits	- Replace protection relays	0	1,033	0	**1,033**
2	Rowville - East Rowville No.1 & No.2 220kV circuits and Rowville - Springvale No.2 220kV circuit	- Replacement of two 220kV isolators - Protection setting changes	0	999	0	**999**
3	Geelong–Moorabool No.1 & No. 2 220 kV circuits	- Replacement of two 220kV isolators.	871	0	0	**871**
4	Wodonga Terminal Station (WOTS)	- Replace 22kV cable connections	778	0	0	**778**
5	Dederang circuits	- Replacement of interplant connections - Protection setting change	486	0	0	**486**
6	Templestowe Terminal Station (TSTS)	- Replace 66kV interplant connections - Review and uprate equipment ratings in RADAR	0	0	377	**377**
7	Thomastown Terminal Station (TTS)	- Replace 66kV interplant connections	177	0	0	**177**

		- Review and uprate equipment ratings in RADAR				
8	South Morang - Dederang No.1 and No.2 330kV circuits	- Develop the SOCS layout to display combined line and series capacitor bank ratings	72	0	0	**72**
9	Horsham Terminal Station (HOTS)	- Protection setting change	0	0	14	**14**
10	Altona Terminal Station (ATS)	- Protection setting change	0	0	14	**14**
11	Hazelwood – Loy Yang No.1, No.2 and No.3 500kV circuits	- Dynamic line model development and implementation	0	0	2	**2**
12	Geelong Terminal Station (GTS)	- Review and uprate equipment ratings in RADAR	0	0	0	**0**
13	Ringwood Terminal Station (RWTS)	- Review and uprate equipment ratings in RADAR	0	0	0	**0**
14	Moorabool - Mortlake No.2 500kV circuit and Moorabool - Tarrone No.1 500kV circuit	- Review and uprate protection settings in TRESIS.	0	0	0	**0**
15	Keilor-Sydenham No.1 500kV circuit and Keilor-South Morang No.1 500kV circuit	- Protection setting change.	0	0	0	**0**
		Total Expenditure	**2,383**	**2,032**	**407**	**4,823**

The expenditure split between capex and opex is shown in the table below, and is identified for each project below. This has been derived consistently with SP AusNet's capitalisation policy.

Table 2: Capital and Operating Expenditure ($m, real 2013-14)

Capex	Opex	Total
4.79	0.03	4.82

The following sections provide further details of each proposed priority project.

3.1 Priority Project 1 – East Rowville-Cranbourne No.1 & No.2 220kV circuit

Transmission Circuit / Injection Point	East Rowville-Cranbourne No.1 and No.2 220kV circuits [Limiting element at East Rowville Terminal Station (ERTS)]
Limit and Reason for the Limit	The East Rowville-Cranbourne No.1 and No.2 220kV circuits are both rated at 827 MVA (continuous) at 35°C. The capacity of these two circuits are limited by secondary protection relays at ERTS with a lower rating of 800 MVA.
Project	Replace protection relays at ERTS
Limit Addressed	Loading constraint of the East Rowville-Cranbourne No.1 and No.2 220kV circuits
Project Description	Protection relays are limiting the capacity of the East Rowville-Cranbourne No.1 and No.2 220kV circuits. Replace protection relays (Relay RXIB) to achieve the required limit, also replace transducers that have a maximum range of 1600A.
Capital Cost	$1,033k
Operating Cost	$0
Priority project improvement target	Remove the protection limitation to enable full use of the rating (827 MVA) of the East Rowville-Cranbourne No.1 and No.2 220kV circuits.
Reasons to undertake the project: The relay protection setting changes to eliminate the protection constraint on the East Rowville-Cranbourne No.1 and No.2 220kV circuits delivers market benefits based on AEMO analysis.	

3.2 Priority Project 2 – Rowville - East Rowville No.1 & No.2 220kV circuit & Rowville - Springvale No.2 220kV circuit

Transmission Circuit / Injection Point	Rowville - East Rowville No.1 & No.2 220kV circuit & Rowville - Springvale No.2 220kV circuit [Limiting element at Rowville Terminal Station (ROTS)]
Limit and Reason for the Limit	These circuits are rated at 800 MVA (continuous) at 35°C and are connected in circuit breaker and a half switch bays at ROTS. The secondary protection relays for the ERTS No.1 and No.2 lines at ROTS have lower rating settings of 686 MVA. The two 220kV isolators in the SVTS No.2 line bay at ROTS have lower ratings of 495MVA compared with the line.
Project	Replace the two 220kV isolators in the SVTS No.2 line bay at ROTS and make protection setting changes for the Rowville - East Rowville No.1 and No.2 220kV circuits at ROTS.
Limit Addressed	Loading constraint of the Rowville - East Rowville No.1 and No.2 220kV circuits and Rowville - Springvale No.2 220kV circuit under single contingency events
Project Description	Replace two 220kV isolators in the SVTS No.2 line bay at ROTS, change the relay settings for the Rowville - East Rowville No.1 and No.2 220kV circuits at ROTS to achieve the required limit and test relays on site.
Capital Cost	$999k
Operating Cost	$0
Priority project improvement target	Full use of line capacity for each line (800MVA).
Reasons to undertake the project: The replacement of the 220kV isolators and the protection setting change delivers market benefits based on AEMO analysis, and will allow full use of the line capacity of the above circuits connected at ROTS during both system normal and contingency conditions.	

3.3 Priority Project 3 – Geelong–Moorabool 220kV circuits (No. 1 & No. 2)

Transmission Circuit / Injection Point	Geelong–Moorabool No.1 and 2 220 kV circuits [Limiting element at Geelong Terminal Station (GTS)]

Limit and Reason for the Limit	The Geelong–Moorabool 220 kV circuits are rated at 827 MVA (continuous rating at 35°C). Both lines are single switched at GTS. The MLTS No.1 220kV line No.2 bus side ROI (remote operated isolator) and the MLTS No.2 220kV line side isolator are rated 800 MVA and 819 MVA respectively. Both these isolators are limiting the line capacity.
Project	Replacement of two 220kV isolators of the MLTS No.1 line and MLTS No.2 line at GTS
Limit Addressed	Loading constraint of the Geelong–Moorabool No.1 and 2 220 kV circuits
Project Description	Replacement of two 220kV isolators of the MLTS No.1 and MLTS No.2 lines at GTS to enable full use of the line capacity.
Capital Cost	$871k
Operating Cost	$0
Priority project improvement target	Full use of line capacity of 827 MVA for the Geelong–Moorabool No.1 and 2 220kV circuits.
Reasons to undertake the project: The line loading constraint has been identified in the Victorian Annual Planning Report 2012 and the upgrade of the 220kV isolators to enable full use of the capacity of both lines delivers market benefits based on AEMO analysis.	

3.4 Priority Project 4 – Wodonga Terminal Station (WOTS)

Transmission Circuit / Injection Point	Wodonga Terminal Station (WOTS)
Limit and Reason for the Limit	The summer cyclic rating of the tertiary winding of the No.1 and No.2 330/66/22 kV transformers at WOTS are both 1154A. The 22kV cables connecting the transformers to the 22kV switchroom has a lower rating of 830A and are limiting the capacity of the transformers.
Project	Replace the 22kV cable connections between the 22 kV switchroom and the No.1 and No.2 transformers at WOTS
Limit Addressed	Loading constraint of the No.1 and No.2 330/66/22 kV transformers at WOTS
Project Description	Replace the 22kV cable connections between the 22 kV switchroom and the No.1 and No.2 transformers at WOTS to match or exceed the cyclic rating of the transformers
Capital Cost	$778k
Operating Cost	$0
Priority project improvement target	Increase the limiting factor of the tertiary winding of the WOTS No.1 and 2 330/66/22 kV transformers to 1154A.
Reasons to undertake the project: The 22kV cable upgrades enable full use of the installed transformer capacity, which delivers market benefits based on AEMO analysis using the Victorian Distribution Businesses Transmission Connection Planning Report (TCPR).	

3.5 Priority Project 5 – Dederang circuits

Transmission Circuit / Injection Point	(1) Dederang-Glenrowan No.3 220kV circuit (2) Dederang-Murray No.1 & No.2 330kV circuit (3) Dederang- Wodonga No.1 330kV circuit [Limiting element at Dederang Terminal Station (DDTS)]
Limit and Reason for the Limit	The Dederang-Glenrowan No.3 220kV circuit is rated at 450 MVA (continuous rating at 35 °C) and is double switched at DDTS. The line is limited by the interplant connections (431 MVA) at DDTS when single switched due to plant outages. The Dederang-Murray No.1 and No.2 330kV circuit are rated at 1043 MVA (continuous rating at 35 °C) and is switched in a circuit breaker and a half switch bay at DDTS. The line is limited by the interplant connections (943 MVA) for a circuit breaker outage at DDTS.

	The Dederang-Wodonga No.1 330kV circuit are rated at 977 MVA (continuous rating at 35 °C) and is switched in a circuit breaker and a half switch bay at DDTS. The line is limited by the interplant connections (943 MVA) for a circuit breaker outage at DDTS. The line capacity is also limited by secondary protection relays with a lower rating of 915 MVA at DDTS.
Project	Replacement of the 330kV and 220 kV interplant connections and protection setting change at DDTS
Limit Addressed	Loading constraint of the above 220kV and 330kV lines under single contingency event
Project Description	Replace the 330kV and 220 kV interplant connections at DDTS to enable full use of the capacity of the 330kV and 220kV lines connected at DDTS. Change the protection settings to achieve required limits and test relays on site.
Capital Cost	$486k
Operating Cost	$0
Priority project improvement target	Full use of line thermal capacity of 450MVA, 1043MVA and 977MVA of the (1) Dederang-Glenrowan No.3 220kV circuit, (2) Dederang-Murray No.1 and No.2 330kV circuit and (3) Dederang- Wodonga No.1 330kV circuit respectively during both normal and contingency conditions.
Reasons to undertake the project: The upgrade of the 330kV and 220kV interplant connections and the protection setting change to enable full use of the capacity of the 330kV and 220kV lines connected at DDTS delivers market benefits based on AEMO analysis.	

3.6 Priority Project 6 – Templestowe Terminal Station (TSTS)

Transmission Circuit / Injection Point	Templestowe Terminal Station (TSTS)
Limit and Reason for the Limit	The summer cyclic rating of the secondary winding of the TSTS B1, B2 and B3 220/66 kV transformer are 1636A, 1528A and 1684A. The B1 and B3 transformer are limited by the 66kV busbars (1585A) and the 66kV interplant connections (1510A). The cost of busbar replacement is significant and outside the scope of the NCIPAP. The B2 transformer is limited by 66kV interplant connections that have incorrect equipment ratings recorded in RADAR (SP AusNet database).
Project	Replace the 66kV interplant connections between the 66kV busbars and the B1 and B3 transformers at TSTS and review and uprate equipment ratings in RADAR
Limit Addressed	Loading constraint of the B1, B2 and B3 220/66 kV transformers at TSTS
Project Description	Replace the limiting 66kV interplant connections between the 66kV busbar and the B1 and B3 transformers at TSTS to match or exceed the B1 and B3 transformer ratings. Review and uprate equipment ratings in RADAR.
Capital Cost	$377k
Operating Cost	$0
Priority project improvement target	Increase the limiting factor of the B1 and B3 220/66 kV transformers branches to the busbar rating of 1585A. Increase the limiting factor of the B2 220/66 kV transformer branch to 1528A.
Reasons to undertake the project: This project increases the B1, B2 and B3 220/66 kV transformation capacity at TSTS, which delivers market benefits based on AEMO analysis using the Victorian Distribution Businesses Transmission Connection Planning Report (TCPR).	

3.7 Priority Project 7 – Thomastown Terminal Station (TTS)

Transmission Circuit / Injection Point	Thomastown Terminal Station (TTS)
Limit and Reason for the Limit	The summer cyclic ratings of the secondary winding of the TTS B1, B2, B3 and B5 220/66 kV transformers are 1758A, 1497A, 1367A and 1505A respectively. The TTS 66 kV busbars are rated 1585A. The cost of busbar

	replacement is significant and outside the scope of the NCIPAP. The B transformer capacity at TTS is also limited by 66kV interplant connection (1460A) and secondary equipment (638A), with some incorrect ratings recorded in RADAR (SP AusNet database).
Project	Replace the 66kV interplant connections between the 66kV busbars and the B1 and B2 transformers at TTS, review and uprate equipment ratings in RADAR
Limit Addressed	Loading constraints of the B1, B2, B3 and B5 220/66 kV transformers at TTS
Project Description	Replace the limiting 66kV interplant connections between the 66kV busbars and the B1 and B2 transformers at TTS to match or exceed the B1 and B2 transformer ratings, review and uprate equipment ratings in RADAR
Capital Cost	$177k
Operating Cost	$0
Priority project improvement target	Increase the limiting factor of the TTS B1, B2, B3 and B5 220/66 kV transformer branches to 1585A (bus rating), 1497A, 1367A and 1505A respectively.
Reasons to undertake the project: This project increases the 220/66 kV transformation capacity at TTS, which delivers market benefits based on AEMO analysis using the Victorian Distribution Businesses Transmission Connection Planning Report (TCPR).	

3.8 Priority Project 8 – South Morang - Dederang No.1 & No.2 330kV circuits

Transmission Circuit / Injection Point	South Morang - Dederang No.1 & No.2 330kV circuits [System Overload Control Schemes (SOCs) layout modification]
Limit and Reason for the Limit	AEMO uses real time rating information from SOCs to operate the transmission system. The presentation of the South Morang series capacitor banks and South Morang to Dederang 330 kV line ratings in SOCS needs some modification to avoid operators interpreting the rating information incorrectly and constraining flows on the 330 kV interconnector between NSW and Victoria.
Project	Develop the SOCS layout to display the combined SMTS-DDTS 330kV line and series capacitor bank ratings
Limit Addressed	Correctly displaying the SMTS-DDTS 330kV line ratings in SOCS will minimise the risk of operators interpreting the rating information incorrectly and constraining flows on the 330 kV interconnector between Victoria and New South Wales.
Project Description	Modify the SOCs interface to display a calculated value for the Continuous, 5 minute and 15 minute ratings being the lower of the line and the capacitor bank ratings for each of Continuous, 5 minute and 15 minute ratings and include a SCADA solution to monitor whether the 330kV series capacitors are in service or bypassed.
Capital Cost	$72k
Operating Cost	$0
Priority project improvement target	Improved presentation of rating information for the SMTS-DDTS 330kV lines and series capacitor banks in SOCS to assist operators and minimise the risk of operators interpreting the rating information incorrectly.
Reasons to undertake the project: Constraints on the DDTS-SMTS 330kV lines could have a significant impact on the market. AEMO requested a modification to the SOCS layout to improve the presentation of the line and capacitor bank ratings as an economic project.	

3.9 Priority Project 9 – Horsham Terminal Station (HOTS)

Transmission Circuit / Injection Point	Horsham Terminal Station (HOTS)

Limit and Reason for the Limit	The summer cyclic rating of the secondary windings of the HOTS B2 and B3 220/66kV transformers are 1047A. The B2 and B3 transformer capacity at HOTS is limited by transformer secondary protection relays with a lower rating of 924 A.
Project	Protection setting change of the Duo-Bias relays at HOTS
Limit Addressed	Loading constraint of the B2 and B3 220/66kV transformers at HOTS
Project Description	High Voltage Overcurrent Settings on the Duo-Bias relays are limiting the transformer capacity. Change the protection settings to achieve required limits and test relays on site.
Capital Cost	$0
Operating Cost	$14k
Priority project improvement target	Increase limiting factor of the secondary winding of the HOTS B2 and B3 220/66kV transformers to 1047A.
Reasons to undertake the project: This project increases the 220/66 kV transformation capacity at HOTS, which delivers market benefits based on AEMO analysis using the Victorian Distribution Businesses Transmission Connection Planning Report (TCPR).	

3.10 Priority Project 10 – Altona Terminal Station (ATS)

Transmission Circuit / Injection Point	Altona Terminal Station (ATS)
Limit and Reason for the Limit	The summer cyclic rating of the secondary winding of the B4 220/66kV transformer at ATS is 1520A. The transformer capacity is limited by the secondary protection relay with a rating of 1000 A.
Project	Protection setting change of the SEL 387-5 protection relay at ATS
Limit Addressed	Loading constraint of the B4 220/66kV transformer at ATS
Project Description	The High Voltage Overcurrent Setting on the SEL 387-5 relay is limiting the transformer capacity. Change the protection setting to achieve required limit and test relay on site.
Capital Cost	$0
Operating Cost	$14k
Priority project improvement target	Increase limiting factor of the secondary winding of the B4 220/66kV transformer at ATS to 1520A.
Reasons to undertake the project: This project increases the 220/66 kV transformation capacity at ATS, which delivers market benefits based on AEMO analysis using the Victorian Distribution Businesses Transmission Connection Planning Report (TCPR).	

3.11 Priority Project 11 – Hazelwood – Loy Yang No.1, No.2 and No.3 500kV circuits

Transmission Circuit / Injection Point	Hazelwood – Loy Yang No.1, No.2 and No.3 500kV circuits [System Overload Control Schemes (SOCs) modification]
Limit and Reason for the Limit	AEMO uses real time rating information from SOCs to operate the transmission system. At present, the Hazelwood – Loy Yang 500kV circuits are rated using static line models in SOCs. AEMO requested a modification in SOCs to allow dynamic rating, which takes into account ambient temperature in real time, of the Hazelwood – Loy Yang 500kV circuits. This will allow the lines to be operated closer to their full capacity while staying within safe operating limits.
Project	Develop a dynamic line model for the Hazelwood – Loy Yang 500kV circuits in SOCs
Limit Addressed	Line static ratings, which do not take into account real time ambient temperature and which could result in network constraints for the Hazelwood to Loy Yang 500kV circuits.

Project Description	Develop a dynamic line model based on real time ambient temperatures for the Hazelwood – Loy Yang 500kV circuits and implement it in SOCs.
Capital Cost	$0
Operating Cost	$2k
Priority project improvement target	Improved rating information based on real time ambient temperatures for the Hazelwood – Loy Yang 500kV circuits, which will allow increased line ratings under favourable environmental conditions.
Reasons to undertake the project: Constraints on the Hazelwood – Loy Yang 500kV circuits could have a significant impact on the market. AEMO requested a modification to SOCs to include a dynamic line model based on actual ambient temperature for the Hazelwood – Loy Yang 500kV circuits.	

3.12 Priority Project 12 – Geelong Terminal Station (GTS)

Transmission Circuit / Injection Point	Geelong Terminal Station (GTS)
Limit and Reason for the Limit	The summer cyclic rating of the secondary winding of the B2 and B4 220/66kV transformers at GTS are 1481A and 1565A respectively. The transformer capacity is limited by the 66kV interplant connections with a lower rating of 1460 A. This is due to incorrect equipment ratings recorded in RADAR (SP AusNet database).
Project	Review and uprate equipment ratings in RADAR
Limit Addressed	Loading constraint of the B2 and B4 220/66kV transformers at GTS
Project Description	Review and uprate equipment ratings in RADAR
Capital Cost	$0
Operating Cost	$0
Priority project improvement target	Increase limiting factor of the secondary winding of the B2 and B4 220/66kV transformer at GTS to 1481A and 1550A respectively. (The B4 transformer is limited by a 66kV interplant connection rated at 1550A that has insufficient benefit to proceed with the replacement of the interplant connection.)
Reasons to undertake the project: The 66kV interplant connections are limiting the 220/66 kV transformation capacity at GTS due to incorrect equipment ratings recorded in RADAR (SP AusNet database). The database will be reviewed and updated by SP AusNet.	

3.13 Priority Project 13 – Ringwood Terminal Station (RWTS)

Transmission Circuit / Injection Point	Ringwood Terminal Station (RWTS)
Limit and Reason for the Limit	The summer cyclic rating of the secondary windings of the RWTS B2 and B3 220/66 kV transformers are rated at 1623A and 1660A respectively. The B2 and B3 transformer capacity is limited by 66kV interplant connections with a lower rating of 1510 A. This is due to incorrect equipment ratings recorded in RADAR (SP AusNet database). The capacity of the transformers is also limited by the 66kV busbars with a rating of 1585A. The cost of busbar replacement is significant and outside the scope of the NCIPAP.
Project	Review and uprate equipment ratings in RADAR
Limit Addressed	Loading constraint of the RWTS 220/66 kV transformers (B2 and B3)
Project Description	Review and uprate the 66kV interplant connection ratings in RADAR.
Capital Cost	$0
Operating Cost	$0

Priority project improvement target	Increase the limiting factor of the RWTS B2 and B3 220/66 kV transformer branches to the busbar rating of 1585A.
Reasons to undertake the project: The 66kV interplant connections are limiting the 220/66 kV transformation capacity at RWTS due to incorrect equipment ratings recorded in RADAR (SP AusNet database). The database will be reviewed and updated by SP AusNet.	

3.14 Priority Project 14 – Moorabool - Mortlake No.2 500kV circuit & Moorabool - Tarrone No.1 500kV circuit

Transmission Circuit / Injection Point	Moorabool - Mortlake No.2 500kV circuit & Moorabool - Tarrone No.1 500kV circuit [Limiting element at Moorabool Terminal Station (MLTS)]
Limit and Reason for the Limit	The Moorabool - Mortlake No.2 500kV circuit and Moorabool - Tarrone No.1 500kV circuit are both rated at 2858 MVA (continuous) at 35 °C. The secondary protection relays for these two lines have a lower rating setting of 2165 MVA at MLTS. The relay settings are incorrectly recorded in SP AusNet's TRESIS database.
Project	Review and uprate protection settings in TRESIS
Limit Addressed	Line loading constraint
Project Description	Review and uprate protection settings in TRESIS sheet Nr. 48038 (X prot-P546), Nr. 48039 (Y prot-L90), Nr. 48689 (X prot-P546) and Nr. 48688 (Y prot-L90)
Capital Cost	$0
Operating Cost	$0
Priority project improvement target	Remove the protection constraints for both the Moorabool - Mortlake No.2 500kV circuit and Moorabool – Tarrone No.1 500kV circuit
Reasons to undertake the project: The secondary equipment is limiting the line capacity due to incorrect protection settings recorded in TRESIS (SP AusNet database). The database will be reviewed and updated by SP AusNet.	

3.15 Priority Project 15 – Keilor-Sydenham No.1 500kV circuit & Keilor-South Morang No.1 500kV circuit

Transmission Circuit / Injection Point	Keilor-Sydenham No.1 500kV circuit and Keilor-South Morang No.1 500kV circuit [Limiting element at Keilor Terminal Station (KTS)]
Limit and Reason for the Limit	The Keilor-Sydenham No.1 500kV circuit and Keilor-South Morang No.1 500kV circuit are both rated at 3204 MVA (continuous) at 35 °C and connected in circuit breaker and a half switch bays at KTS. The line capacity is limited by secondary equipment at KTS with ratings in the range of 873 MVA to 1949 MVA. A project (XC06) was completed to increase the rating of the secondary equipment, however the new ratings have not been updated in RADAR (SP AusNet database).
Project	Review and uprate equipment ratings in RADAR
Limit Addressed	Loading constraint of the Keilor-Sydenham No.1 500kV circuit and Keilor-South Morang No.1 500kV circuit
Project Description	Review and uprate equipment ratings in RADAR
Capital Cost	$0K
Operating Cost	$0K
Priority project improvement target	Remove the protection constraints for the Keilor-Sydenham No.1 500kV circuit and Keilor-South Morang No.1 500kV circuit. This will result in increased ratings of 2078 MVA.
Reasons to undertake the project: The secondary equipment is limiting the line capacity due to	

incorrect ratings recorded in RADAR (SP AusNet database). The database will be reviewed and updated by SP AusNet.

4 Attachment 1 – Network Limits

This attachment is Commercial-In-Confidence.