30 November 2023

Ausgrid's 2024-29 Revised Proposal

Attachment 5.6: New Wallumatta STS Business Case

Empowering communities for a resilient, affordable and net-zero future.

Ausgrid

Contents

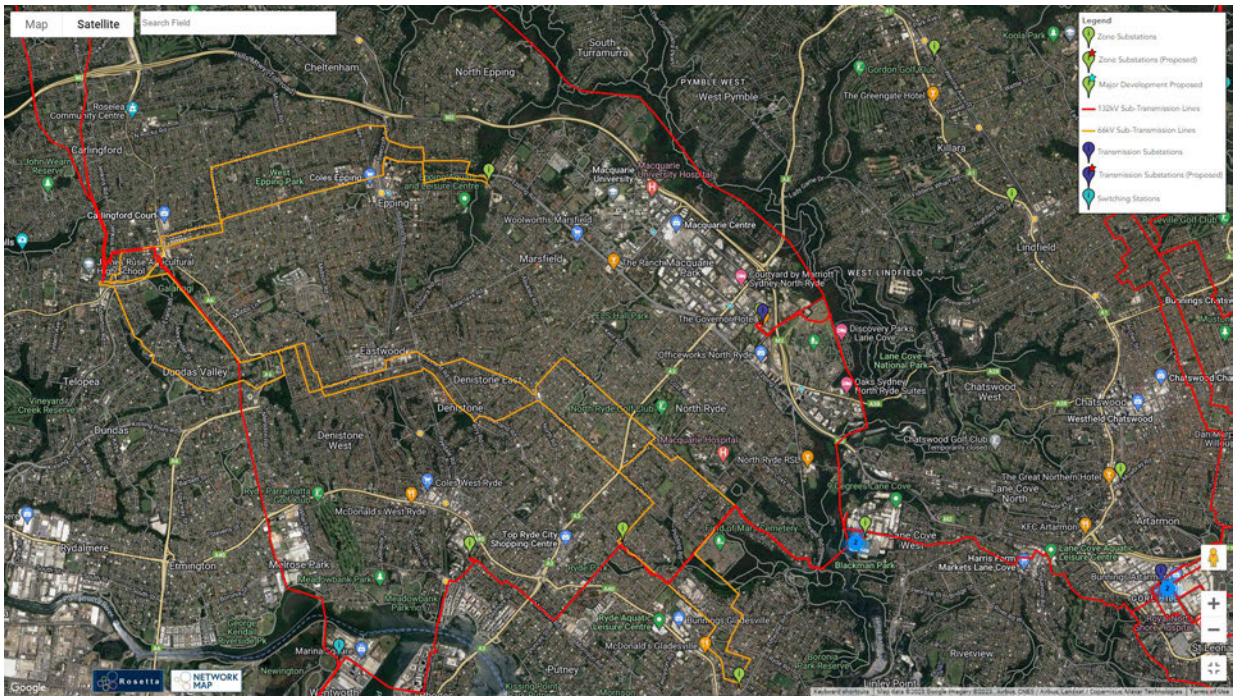
1. Background

The Carlingford network area extends east from Carlingford to Epping and Macquarie Park, and as far south as Hunters Hill and Meadowbank. The area is bounded by the supply boundary with Endeavour Energy to the North-West, by the Lane Cove River Valley to the North, and the Parramatta River and Sydney Harbour to the South and East.

Figure 1. Overview of the Carlingford network area

The area is supplied at 132kV from TransGrid's Sydney North Bulk Supply Point (BSP) and Mason Park Subtransmission Switching Station (STSS), and at 66kV from Endeavour Energy's Carlingford Subtransmission Substation.

Figure 2. Overview of the subtransmission network supplying Carlingford area



The Macquarie Park area, along the northern boundary of the Carlingford area contains load arising from the Macquarie shopping centre, Macquarie University, telecommunication facilities and high density residential developments. A major contribution has come from the development of [redacted].

Figure 3. Location of Macquarie Park load growth area

The installation of major [redacted] customers led Ausgrid to establish a subtransmission substation (STS) in the area, to meet these customers' demands, following the completion of the Regulatory Investment Test for Distribution (RIT-D)[1]. The existing Macquarie 132/33KV STS was commissioned in July 2021 to provide 33kV supply to address the needs of [redacted] three large [redacted] customers:

[redacted]

All these customers have "N-1" supply requirements.

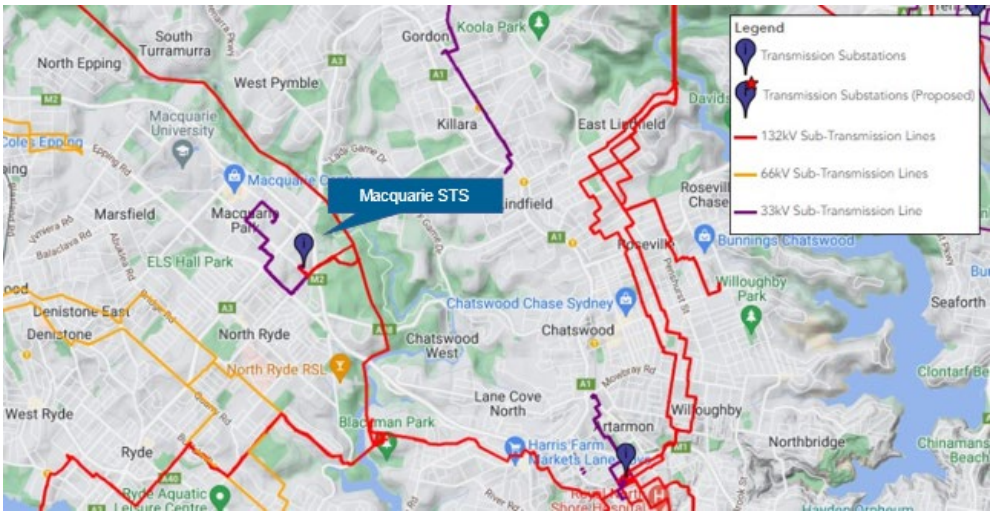
The Macquarie STS has an arrangement of two 120MVA 132/33kV transformers and three sections of 33kV busbar, comprising sixteen gas insulated switchgear circuit breakers. It is supplied via 132kV feeders teed off from feeders 92A and 92B between Sydney North BSP and

[1] Ausgrid, Addressing increased customer demand requirements in the Macquarie Park area, Final Project Assessment Report, 19 October 2018.

Lane Cove STSS. The STS is co-located within the same site as Macquarie 132/11kV Zone Substation (ZS), in Waterloo Rd, Macquarie Park.

The figure below shows where Macquarie STS is located in the wider Carlinford network area.

Figure 4. Location of Macquarie STS within the Carlingford network area



Further connection applications were received from two [redacted] customers, both requesting secured “N-1” supply. [redacted]

These additional loads are most efficiently met by installing a third 120MVA transformer unit at Macquarie STS. A further RIT-D has been completed in relation to this augmentation[2]. An overview of Macquarie STS and the adjacent Macquarie Park ZS is shown in the figure below.

Figure 5. Overview of Macquarie STS and Macquarie Park ZS site

[2] Ausgrid, Addressing increased customer demand requirements in the Macquarie Park area, Final Project Assessment Report, 31 March 2023.

2. Project Need

Commercial developments are expected to continue in the Macquarie Park area, driven by [redacted] Recent announcements by the NSW Government[3] on the expansion into an innovation precinct with new jobs, homes and open space is further driving ongoing growth and development in the area, including:

- 3,060 new homes including affordable housing,
- 1,200,000m^2 of flexible commercial floorspace providing up to 23,000 additional jobs, or
- 5,040 homes through build-to-rent

The capacity of Macquarie STS, including the third transformer unit, is expected to be fully utilised by existing committed customers by the early 2030s. However, the availability of 33kV supply points at Macquarie STS is expected to be fully utilised by existing customers from 2026. Furthermore, there are significant site limitations at the existing Macquarie STS, with no space available to expand the existing 33kV busbar.

Ausgrid has now received formal connection enquiries from the following [redacted] customers requesting secured "N-1" supply:

[redacted]

These customers have indicated a preference for initial supply to be available by FY28/FY29. Each of these requests have been received during 2023, i.e. after the submission of Ausgrid's revenue proposal to the AER, with the latter request being received in October 2023.

[redacted]

[3] See: Macquarie Park | Planning (nsw.gov.au), Proposed Macquarie Park precinct to pave way for thousands of new homes | NSW Government

[redacted] Ausgrid's is expecting formal connection applications will be submitted within the next 12 months. Ausgrid will have an obligation to make an offer of connection to these customers.

It should also be noted that interest has also been received from other [redacted] customers, who have plans to expand their [redacted] footprint in that vicintity and the broader Sydney region. Formal enquiries from these new customers are likely to be received in the near term.

[redacted]

[redacted]

As indicated above, there are no spare 33kV supply points available in the area relating to these connection enquiries. If no action is taken to build a new substation to accommodate these potential new customers, Ausgrid will fail to meet the requirement to connect customers under section 5.2.3(d) of the National Electricity Rules (NER), which include the requirements that a Network Service Provider must:

> *(1) Review and process applications to connect or modify a connection which are submitted to it and must enter into a connection agreement…*
>
> *[…]*

(6) *Permit and participate in commissioning of facilities and equipment which are to be connected to its network in accordance with rule 5.8;*

The recent connection enquiries create an opportunity to provide a scale-efficient and cost-effective investment in shared network assets to benefit multiple customers. This network augmentation will become part of Ausgrid's Regulatory Asset Base, but the costs will be recovered from these customers via cost reflective Individually Calculated Tariffs, and not materially impact network prices for the broader customer base.

Considering the scale of load desired by these customers, 11kV connections would not be cost effective or efficient, as extensive 11kV feeder rearrangement work is required to facilitate load transfers and the existing 11kV network is congested and near full capacity. In addition, there are technical limitations associated with installing multiple 11kV feeders to a single large load customer, such as multiple switching stations, complex protection schemes to manage the operation and separate metering points at 11kV.

A 33kV supply strategy, therefore, presents an opportunity to support all new [redacted] customers efficiently. The proposed 33kv supply strategy would not only meet immediate industry growth needs, but also provide options for potential future expansion capacity, provide greater flexibility to manage evolving loads in the area, and provide enduring capacity for future industry development.

How this investment meets the NEO, and the objectives and criteria within the NER

While this is a contingent project, Ausgrid considers the investment in a new Wallumutta STS will be required to meet the expected demand for standard control services in the Carlingford area, and ensures we will be able to **cost effectively maintain security of supply** over the FY25-29 period and beyond.

Our extensive and ongoing engagement with the relevant customers confirms that **the expected demand forecast is realistic**, while our options analysis and robust basis for cost estimation demonstrate that the proposed investment is both **efficient** and **representative of the costs a prudent operator would require to meet the identified need.**

By maximising the value of shared assets to ensure the connection of new load and meeting growing demand is both timely and cost effective, and making appropriate use of bank guarantees and cost reflective individually calculated tariffs for large connecting customers, we are ensuring that the investment in the new Wallumutta STS **promotes the long term interests of consumers with respect to price, reliability and security of supply.**

What has changed with respect to our Initial Proposal

An augmentation allowance of $0.9 million was included in our initial proposal, which reflected a 10% likelihood that the installation of a 33kV switching station would be required to connect [redacted] customers.

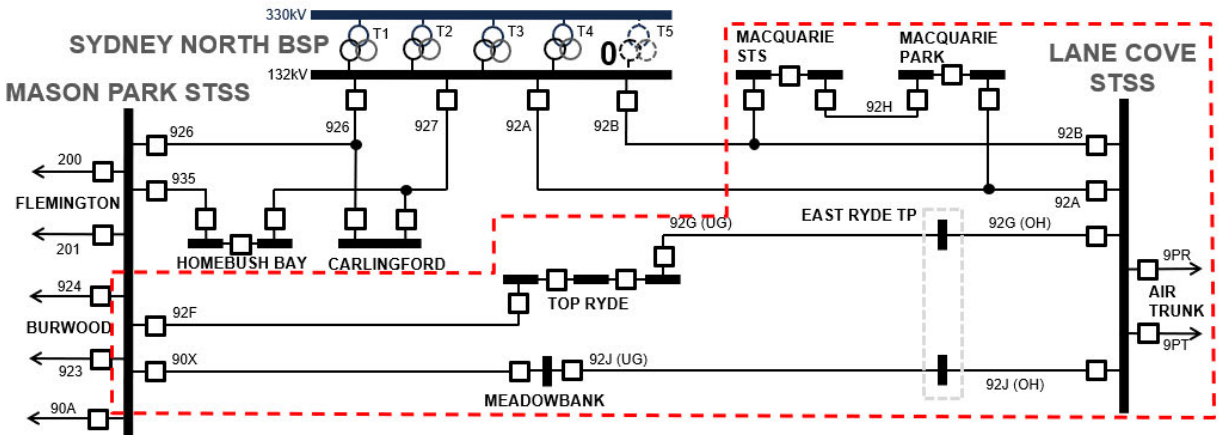
Since the initial proposal was submitted in January 2023, as explained above, formal enquiries have now been submitted [redacted]. These formal enquiries, together with informal enquiries from other customers, has substantially changed the prospects of an augmentation being required to accommodate new connections. Ausgrid's assessment is that augmentation is now certain to be required during the 2024-29 regulatory period.

3. Options analysis

A review of these load requirements concluded that a 33kV connection will continue to be the most efficient way to supply the loads.

A number of network options have been developed, taking into consideration the available capacity of the transmission network, either from the 132kV feeders originated from Sydney North BSP or the 132kV feeders originated from Mason Park STSS. This upstream network is illustrated in the figure below.

Figure 7. Upstream 132kV network with capacity to supply new loads (not all details shown)



No consideration was given to consider supply from the 66kV network given the magnitude of the loads proposed.

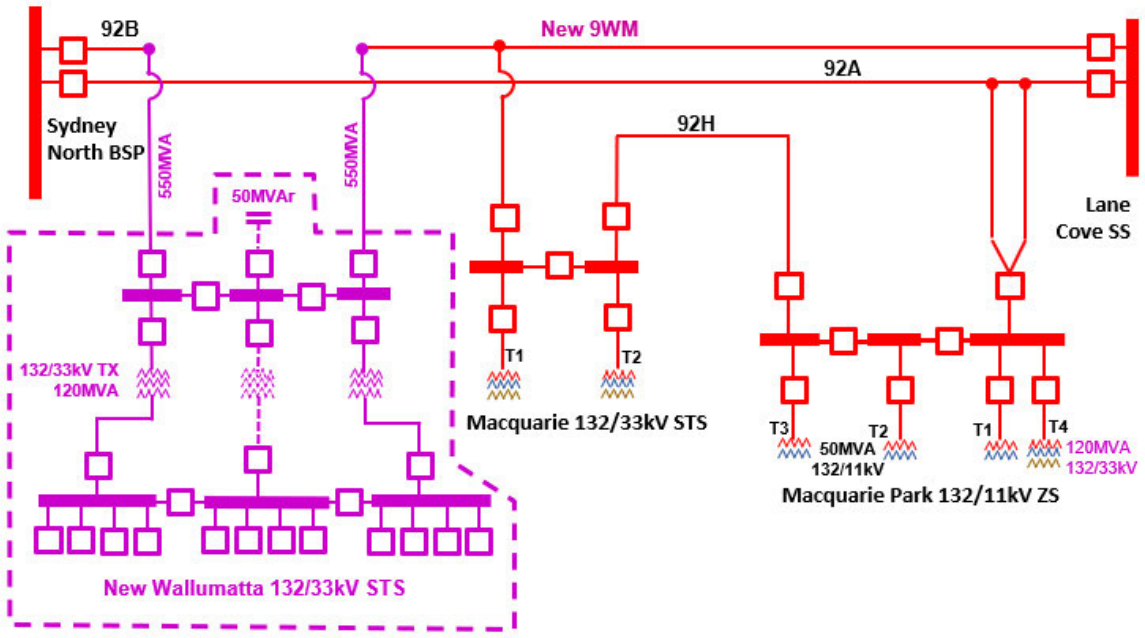
Other options considered but not pursued any further were:

- **New 132/66kV STS**: the substation costs would be relatively similar (i.e. approximately 10% higher than a 132/33kV STS with three 120MVA units) and the 132/66kV transformers will have the same rating, but this option is not preferred by customers. Whilst the customers will get twice the capacity for the same number of 33kV feeders, the customers have made the 33kV supply their preferred choice. Therefore, this option is not viable from the customer's perspective.
- **Direct supply at 132kV to customers**. This would result in unnecessary duplication of network investments. Each customer would have to install switching equipment and substations to reduce voltage to required internal levels, occupying areas in their properties which otherwise could be used for their core business activities. Therefore, this option is not considered commercially viable.
- **Non-network alternatives**. Demand management solutions would not be cost effective due to the magnitude of the load reduction required.

The following four options have been considered to address the project need, noting that costs reported are high level estimates in real FY24 million:

1. **Install a new 132/33kV STS connected by cutting into overhead 132kV feeder 92B Sydney North BSP – Lane Cove STSS.**

Figure 8. Option 1 proposed network arrangement



This option requires installation of new Optical Ground Wire (OPGE) or underground fibre to upgrade communications and ensure adequate control and protection requirements are met.

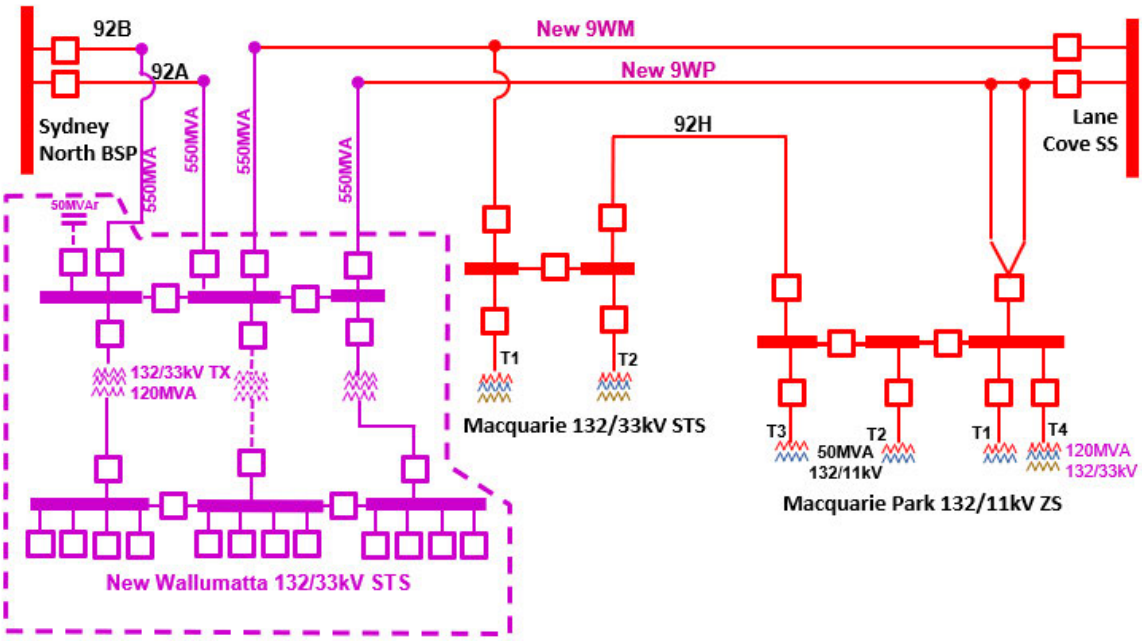
The 550MVA rating capacity determined for 132kV connections to the new STS will require twin 2000mm^2 cables per phase. The cost of these 132kV connections can vary depending on the location of the new STS.

The cost of this option is expected to exceed $140 million, which assumes that a suitable location can be acquired for the new substation in relative proximity to the new loads. Of this cost, it is estimated that the cost of the new substation would be approximately $40 million.

If the location of the new STS is established near the overhead feeder 92B, the required 132kV connections can also be overhead. However, significant 33kV underground connections would be required to reach customer sites, and the location of the new STS may have negative social and visual impact against national parks surroundings.

2. **Install a new 132/33kV STS connected by cutting into overhead 132kV feeders 92A & 92B Sydney North BSP – Lane Cove STSS.**

Figure 9. Option 2 proposed network arrangement



The 550MVA rating capacity determined for 132kV connections to the new STS will require twin 2000mm^2 cables per phase.

Whilst cutting into the two feeders will result in better management of 132kV load flows compared to cutting into one feeder only, such rating capacity cannot be achieved with four feeders in the same route. Therefore, it may require a second location to cut into the tower line and two different feeder routes.

It should be noted that cutting into 92A/92B will also involve some clearing work in national parks, which would impact project delivery timeframe.

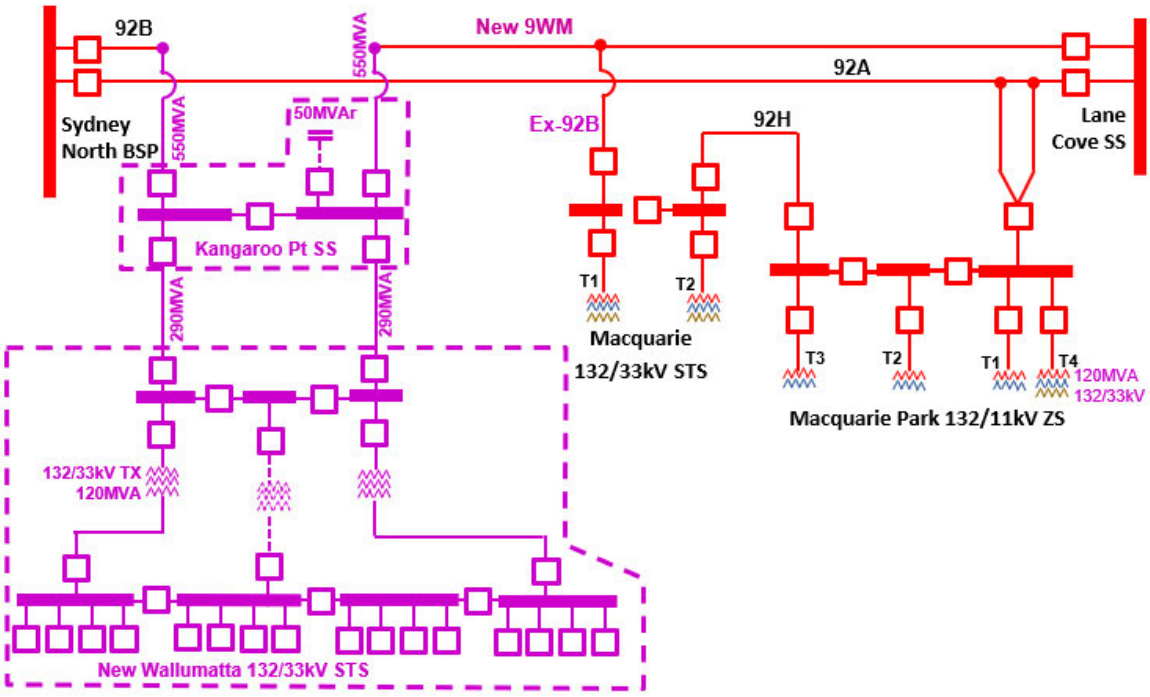
Similar to Option 1, there are communication upgrades required and the cost of these 132kV connections can vary depending on the location of the new STS.

The cost of this option is expected to exceed $200 million, assuming that a suitable location can be acquired for the new substation in relative proximity to the new loads.

If the location of the new STS is established near overhead feeders 92A and 92B, the required 132kV connections can also be overhead, but it will result in an underground/overhead pole farm when cutting the tower lines. In addition, significant 33kV underground connections would be required to reach customer sites, and the location of the new STS may have negative social and visual impact against national parks surroundings.

3. **Install a new 132kV STSS and new 132/33kV STS connected by cutting into overhead feeder 92B Sydney North BSP – Lane Cove STSS.**

Figure 10. Option 3 proposed network arrangement



This option requires the installation of a 132kV switching station, which is likely to be located [redacted].

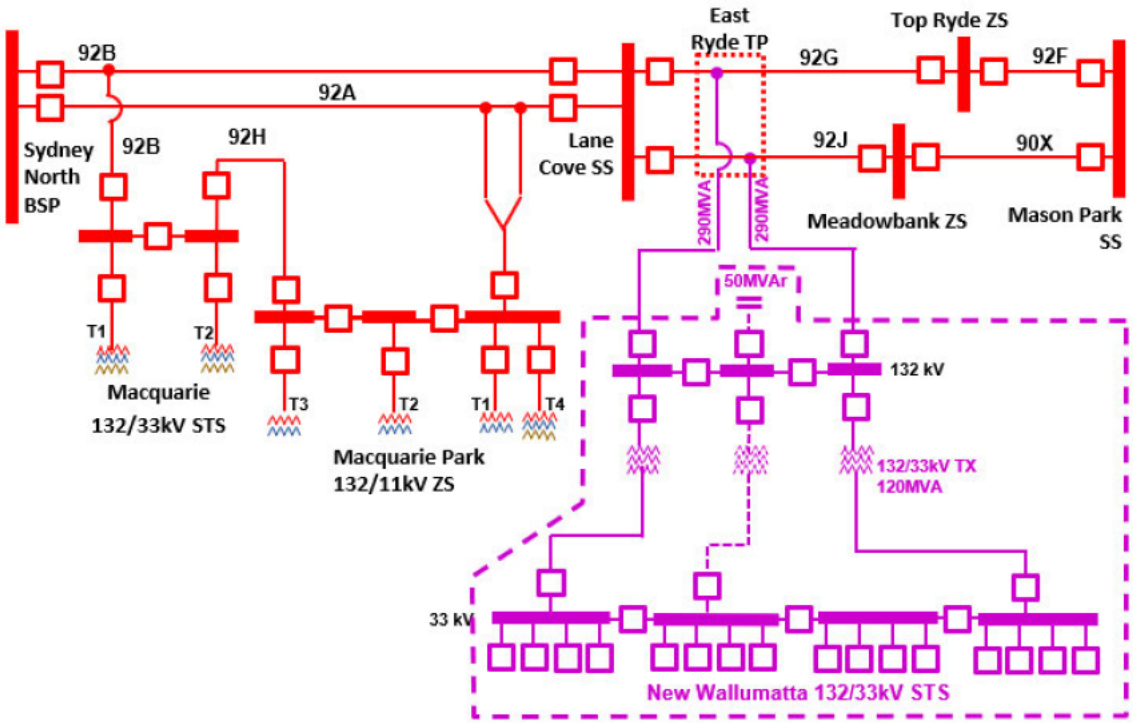
The 290MVA rating capacity required for 132kV connections from the switching station to the new STS means that a shared trench is possible and a single 2000mm^2 cable per phase can be utilised.

However, this option will require acquisition of two land parcels instead of only one, which will result in high risk of delays in project delivery.

The cost of this option is expected to exceed $150 million. Of this, it is estimated that the cost of the new STS would be approximately $44 million.

4. **New STS tee off feeders 92G & 92J East Ryde Transition Point - Lane Cove STSS.**

Figure 11. Option 4 proposed network arrangement



The 290MVA rating capacity required for 132kV connections to the new STS means that a shared trench is possible and a single 2000mm^2 cable per phase can be utilised. In addition, no communication upgrades are required under this option.

This option involves installation of long underground 132kV connections to tee off feeders 92G and 92J and will impact a large number of residents.

The cost of this option is expected to be $128 million. Of this, the cost of the new STS would be approximately $44 million.

A comparison of benefits and risks/drawback of these alternative network options is summarised below.

#	OPTION	BENEFITS	RISKS / DRAWBACKS	CAPEX
1	New STS connected to feeder 92B	• Shared trench of 132kV feeders is feasible.	• Only feasible cut-in point to 92B [redacted].	$140M
2	New STS connected to feeders 92A & 92B	• Better management of load flows compared to connecting one feeder.	• Higher costs due to 4x132kV feeders in two routes. • Cutting into 92A/92B requires clearing of national park areas.	$200M
3	New STS and STS connected to feeder 92B	• Shared trench of 132kV feeders is feasible.	• High risks of delays due to need of two land parcels.	$150M
4	New STS connected to feeders 92G & 92J	• Better management of load flows compared to connecting one feeder.	• Cable route will impact a large number of residents.	$128M

As all options have the same benefits of reducing expected unserved energy, Option 4 is the preferred option as it has the lowest cost and manageable project delivery risks.

4. Scope for the preferred option

The proposed network augmentation includes:

- Acquisition of property at a location in relative proximity to the [redacted] loads;
- Construction of the new Wallumatta STS with an arrangement of three 132/33kV transformers and four busbar sections of 33kV switchgear;
- Installation of 5km, 2x132kV underground transmission cables from East Ryde Transition Point to connect feeders 92G and 92J to the New Wallumatta STS; and
- Installation of ductlines to facilitate 33kV connections into the new Wallumatta STS.

The targeted completion date for this project is FY29. The costs of the preferred option are outlined in the table below.

Table 1. Project Costs - New Wallumatta STS and connections (real $FY24 million)

	FY25	FY26	FY27	FY28	FY29	Post
Preferred Option	**26.0**	**9.2**	**36.0**	**46.3**	**10.3**	**127.9**
Land Acquisition	25.0	-	-	-	-	**25.0**
New STS	0.4	3.9	15.3	19.7	4.4	**43.7**
132kV Feeders	0.6	5.3	20.7	26.6	5.9	**59.1**

5. Commercial arrangements

For the shared assets, Ausgrid is able to charge a cost reflective price through its 'Network Use of System' (NUOS) tariff. The tariff would be set to recover the ongoing cost of each customer's share of the new Wallumatta STS and associated upstream 132kV supply.

Revenue from the customers will be secured via a Guarantee of Minimum Revenue held in the form of a Bank Guarantee to insure against a shortfall due to unexpected customer circumstances. A similar arrangement was implemented for the establishment of the existing Macquarie STS. [redacted].

As revenue is received from each customer, it is planned that the value of their respective bank guarantees would be correspondingly reduced over time. It is expected that the guaranteed revenue would be recovered in 6-9 years, depending on the speed of load take-up by the customers.