Business case: Transformer Workshop

2025-30 Regulatory Proposal
Property Portfolio

Supporting document 5.11.8

January 2024

SA Power Networks

Empowering South Australia

Contents

Glossary

Acronym / term	Definition
AER	Australian Energy Regulator
BAU	Business as Usual
CAB	Community Advisory Board
Capex	Capital expenditure
CBA	Cost Benefit Analysis
CBD	Central Business District
CCP	Consumer Challenge Panel
CER	Consumer Energy Resources
EAM	Engineering & Asset Management
EV	Electric vehicle
FY	Financial Year
Heavy Transformer	Large, very heavy (40-60T), High Voltage, Zone Substation Transformers
ICT	Information and Communication Technology
Light Transformer	Smaller, lighter (1-10T), low voltage, distribution, pole top and padmount Transformers
LV	Low Voltage
MCA	Multi-Criteria Analysis
NPV	Net Present Value
OH&S	Occupational Health and Safety
PV	Present Value
PVC	Polyvinyl Chloride
Repex	Replacement expenditure
RMU	Ring Main Units
RCP	Regulatory Control Period
SPV	Solar photovoltaic
WHS	Workplace Health and Safety

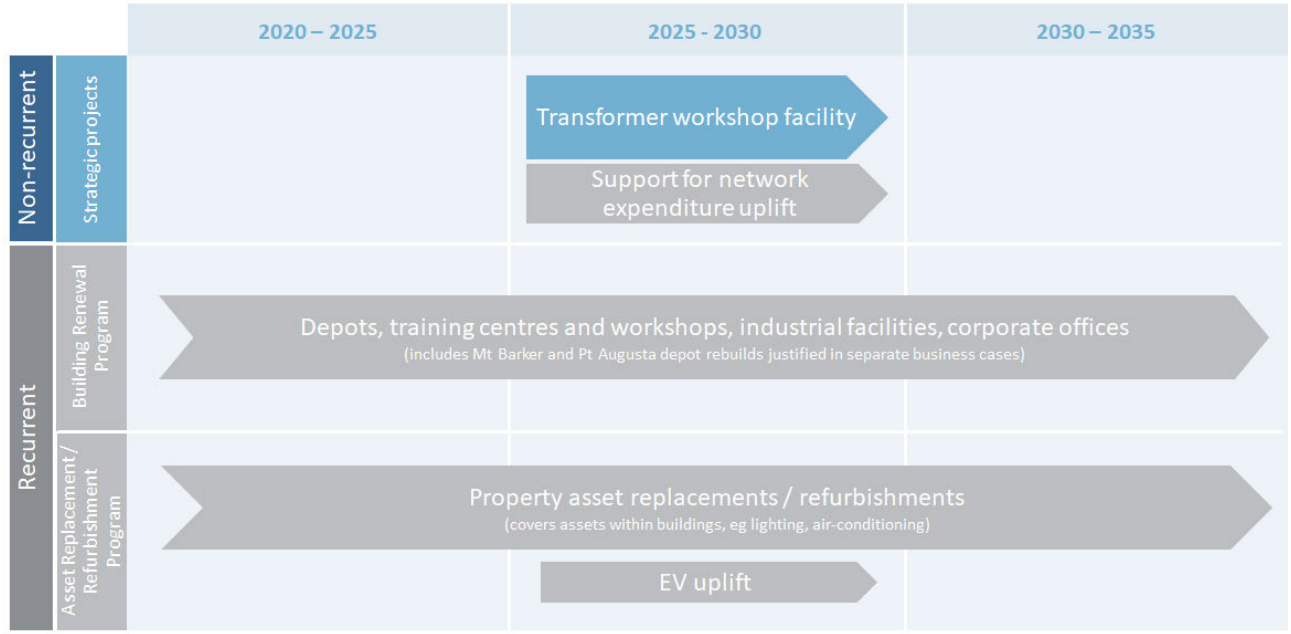
1 About this document

1.1 Purpose

This business case supports SA Power Networks' Regulatory Proposal for the 2025-30 Regulatory Control Period (**RCP**). It describes the drivers for investment in the Transformer Workshop facility, analyses the potential options to address the identified need and sets out the preferred investment option. The options assessment is based on cost benefit analysis (**CBA**) supplemented by multi criteria analysis (**MCA**).

The investment in the Transformer Workshop forms part of our non-recurrent Strategic Projects program (Figure 1).

Figure 1: Property expenditure classification and investment roadmap



1.2 Expenditure category

- Non-network capex: property (non-recurrent)

1.3 Related documents

Table 1: Related documents

Ref	Title	Author	Version / date
	Property Condition Assessment Report 212 Richmond Road, Marleston	KPMG Property & Environmental Services Pty Ltd	14 December 2021
5.11.1	Property Expenditure Forecasting Methodology	SA Power Networks	25 October 2022
5.11.7	Property Recurrent Business Case	SA Power Networks	August 2023

2 Executive summary

The Transformer Workshop was built in the 1950s at Marleston North. This is a key industrial facility, comprising the workshop itself including associated hardstand[1] storage areas and oil reclamation and re-cycling plant (collectively referred to as the Transformer Workshop).

At the Transformer Workshop, our specialist staff assess, test, repair, refurbish, and store zone substation power transformers (heavy), distribution transformers (light), pad-mounted transformers and switching cubicles. The Transformer Workshop allows us to repair and restore transformers and switching cubicles to a 'like new' condition, resulting in the deferral of new purchases and efficient inventory management. Prior to the installation of the new transformers in the network, they are tested and assessed in the Transformer Workshop. The process of reclaiming oil from old transformers is also undertaken at the workshop, and allows us to extend the service life of the oil, deferring the need for new oil. Newly purchased oil is also conditioned through this plant to remove moisture prior to installation on the network.

The Transformer Workshop needs to be **fit-for-purpose, safe, efficient, compliant, and scalable** to provide a range of essential services related to critical network assets, i.e., power transformers and switching cubicles. These assets are critical to safe, efficient, and reliable electricity supply to our customers.

There are three key drivers underpinning the case for investment in the Transformer Workshop:

- condition and lifecycle age: the existing workshop is in very poor condition and past its useful life, and no longer meets environmental compliance, requiring significant capital upgrades and replacements;
- criticality: the workshop is of a very high criticality (site importance rating of max 5)[2] to the ongoing functioning of a reliable network;
- scalability: workshop is capacity constrained and cannot meet the rising demand for its services.

Three options were considered to address the identified need, and compared against the business as usual (BAU) base case. The BAU base case is not an option for investment because it does not address the identified need and is not fit-for-purpose due to the poor condition and age of the building structure. For example, the deterioration of bitumen roads and hard stand areas and functional design result in continued safety risk to staff; the beyond recommended life of equipment results in efficiency losses; and unexpected faults and repairs create operational downtime and supply reliability risks which can impact response times. Lastly, capacity is insufficient to meet future demand for transformer repairs.

Three alternative options were identified as being credible:

1. **option 1: Rebuild at the same site**, requiring demolition and rebuild of the existing workshop on the same site and an interim strategy of replacing (rather than repairing) transformers during the 2-year construction period;
2. **option 2: Build at a new site** that has been acquired by SA Power Networks in Edinburgh North, an outer northern suburb of the Adelaide metropolitan area, allowing continued operation of the current workshop until construction of the new workshop is completed; and
3. **option 3: Phase out Transformer Workshop** (new for old replacement strategy), whereby we no longer operate a Transformer Workshop and broken transformers are replaced with new transformers rather than repaired. There is currently no third-party supplier of repair services for our transformers.

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1 Hardstand is a heavy-duty bitumen or concrete pavement to facilitate heavy vehicle movements and storage of plant and equipment

2 SA Power Networks Property Criticality Assessment Overview – Part 7 p.11

The options were assessed via a CBA, which considered monetised costs and benefits, supplemented by an MCA, which assessed costs and benefits that were challenging to quantify, and a risk assessment. The results of the assessment are presented in Table 2.

The timeframe for assessment used for the CBA was 30 years commencing in July 2025. The costs and benefits presented in Table 2 are incremental to the BAU base case.

Table 2: Summary of the assessment ($m, June 2022 real)[3]

Option	2025-2030 RCP costs		30-year costs		Benefits	NPV[4]	MCA score[5]	Risk rating[6]	Rank
	Capex	Opex	Capex	Opex					
BAU (Base Case)	-	-	-	-	-	-	-	High	Not credible
Option 1: Rebuild at the same site	$60.8m	$1.2m	$60.8m	$1.2m	$194.5m	$42.6m	17/30	Medium	2
Option 2 - Rebuild at the new site	$23.4m	$0.0m	$23.4m	$0.0m	$195.5m	$78.6m	**26/30**	Low	**1**
Option 3 – Phase out Transformer Workshop	$119.9m	$0.0m	$749.0m	$0.0m	$16.9m	-$434.2m	11/30	High	3

We also engaged extensively with stakeholders, customers and community to inform our assessment and seek feedback on the preferred investment option. We adopted a multi-stage engagement program to develop our expenditure forecasts over five iterations over two years with our customers, in a transparent, objective and outcomes-focused manner. We asked customers to help us determine what services and programs we should deliver, and what investments we should make during the 2025-30 RCP.

The recommendation from our customers was that we should invest in addressing the identified needs that are not being met by the current Transformer Workshop, as detailed in this business case. In continuing a BAU approach of operating and maintaining the existing facility, we forecast needing significant ongoing capital upgrades and replacements due to its poor condition. Focused Conversations with our Community Advisory Board (**CAB**) recommended the Transformer Workshop upgrade as a strategic project as it is critical to our operations and not upgrading would have adverse customer impacts and reduced service levels.[7] This recommendation was ultimately supported by the People's Panel in their final deliberation[8].

[3] Totals presented in tables throughout this document may not exactly match the sums of individual figures due to rounding. The costs and benefits are incremental to the BAU base case.

[4] Discounted at 4.05% discount rate over 30 years.

[5] The MCA score indicates the extent of meeting the qualitative criteria for the unquantified costs and benefits set out in Appendix B (the higher the MCA score the better the attainment to the criteria is)

[6] SA Networks Enterprise Risk Management Framework see Appendix D.

[7] Further information on our engagement can be accessed via our TalkingPower website.

Recommendation

The **recommended and preferred option is Option 2: Build at the new site**. Option 2 is preferred to other options considered, on the basis of the incremental Net Present Value (**NPV**) results in the CBA and strengthened further through the risk assessment and the MCA, noting that option 2:

- has the highest NPV of $78.6 million;
- has the lowest residual risk rating; and
- delivers the greatest non-quantified benefits with a rating of 26 out of 30 from the MCA - the most important benefits being health and safety improvements, and positive socio-economic and environmental impacts, including retaining highly skilled employment within South Australia and recycling spare parts.

The profile of spend for Option 2 is presented in Table 3 as incremental to BAU.

Table 3: Option 2 costs and benefits by cost type and RCP, incremental to the BAU base case ($m, June 2022 real, undiscounted)

	2025-26	2026-27	2027-28	2028-29	2029-30	Total 2025 - 30	2030-31	2031-32	2032-33	2033-34	2034-35	Total 2030-35	Total 2025 to 2055
Benefits (Capex)	-$1.1	$0.0	$0.3	$1.0	$2.8	**$3.0**	$5.1	$6.7	$6.8	$6.8	$6.8	**$32.2**	**$186.0**
Benefits (Opex)	$0.0	$0.0	$0.2	$0.2	$0.2	**$0.6**	$0.2	$0.3	$0.3	$0.3	$0.3	**$1.5**	**$9.5**
Costs (Capex)	$4.7	$18.7	$0.0	$0.0	$0.0	**$23.4**	$0.0	$0.0	$0.0	$0.0	$0.0	**$0.0**	**$23.4**
Costs (Opex)	$0.0	$0.0	$0.0	$0.0	$0.0	**$0.0**	$0.0	$0.0	$0.0	$0.0	$0.0	**$0.0**	**$0.0**
Net benefits	**-$5.8**	**-$18.7**	**$0.5**	**$1.2**	**$3.1**	**-$19.8**	**$5.3**	**$6.9**	**$7.1**	**$7.1**	**$7.2**	**$33.6**	**$172.1**

Option 2: Build at a new site is the preferred option to maintain the capabilities and services provided by the Transformer Workshop in alignment with future requirements, and has a cost of $23.4 million capex ($ June 2022) to build a new Transformer Workshop.

3 Background

3.1 Scope

The scope of this business case encompasses the following:

In scope:

- replacement or refurbishment of the existing Transformer Workshop sites depicted in Figure 2; and
- sale or lease of the existing land that is no longer required under each option.

Out of scope:

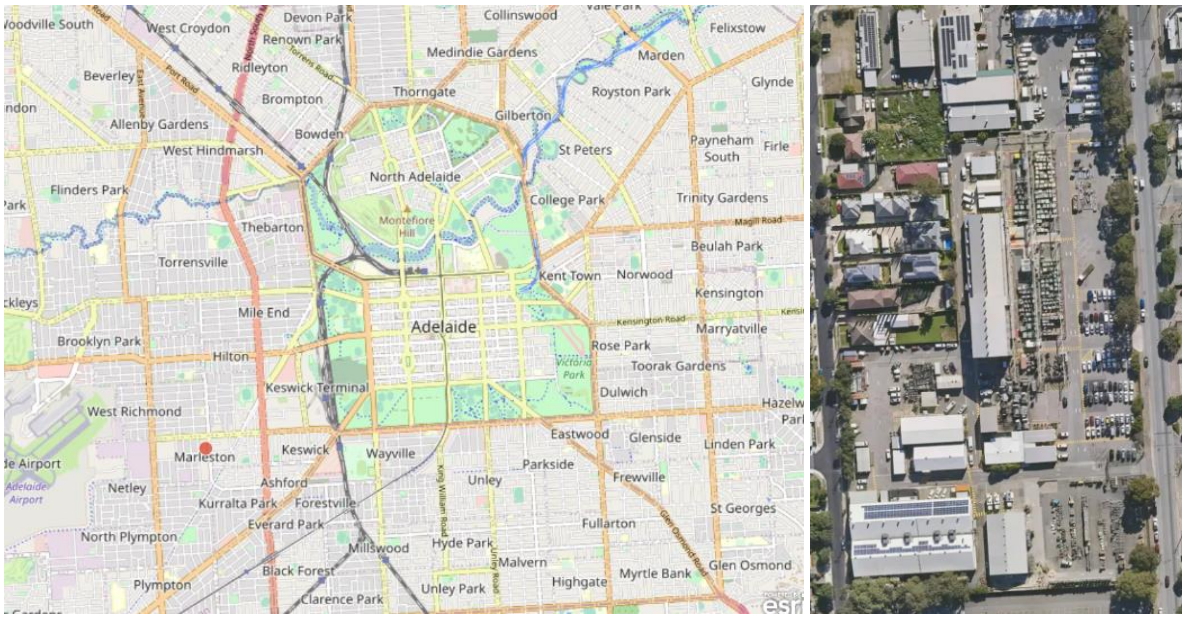
- works to accommodate additional requirements to support our proposed network capital uplift covered in 'document 5.2.5: Resourcing Plan for Delivering the Network Program';
- expenditure for other buildings on the Marleston North site that serve other functions;[9] and
- expenditure uplift for property infrastructure to support electric vehicle (**EV**) charging.

3.2 The Property

3.2.1 Overview of the Transformer Workshop facility

The Transformer Workshop is located at the Marleston North Industrial site (Figure 2), approximately 3.5km to the west of Adelaide's central business district (**CBD**). The Marleston North multi-purpose site is our largest and oldest industrial facility at 35,200m^2 and was constructed in 1952. In addition to the Transformer Workshop, this facility provides a range of support functions such as the management of all our zone substations from construction, maintenance, fault response, network equipment spares storage, high voltage equipment testing, and a recloser workshop.

Figure 2: Map showing proximity of the Marleston North facility to Adelaide CBD and aerial view of the property



[9] These are building numbers listed in the Property Condition Assessment Report as buildings 4,5,6,9,16,17, demountable buildings 1,2,3,8,10,13 and ancillary buildings 4a,7,11.

The Transformer Workshop represents the second-largest building on the Marleston North site. It was built circa 1954 and has been in operation for nearly 70 years, which far exceeded its projected useful lifespan of 40 years. The Transformer Workshop, presented in Figure 3, is comprised of:

- **Transformer Workshop (Building 12)** – a single-story with a mezzanine 1,400m^2 building of steel frame and corrugated iron clad construction. This building is primarily used for condition assessment and repairs/refurbishment of transformers and switching cubicles. It includes a workshop, a 60Tonne and 11Tonne gantry crane and rail system, industrial transformer ovens, lunchroom, offices, toilets, and showers.
- **Transformer Storage** – The pink area North and East of the Transformer Workshop is a 3,300m^2 zone constructed of bitumen hardstand with a series of bund walls, and concrete drains which are used for storage of inventory of spare large transformers and switching cubicles. This zone also has two large gantry cranes that are used to move the large power transformers and pad-mount transformers and is bunded with a small bitumen roll-over bund. The pink area South of the workshop is an area of 2,100 m^2 and is used for substation oil-filled equipment storage.
- **Storage Sheds (Building 14 and 15**) – represent a 35m^2 carport containing oil filtration systems and 450m^2 bunded storage area. This area is primarily used to store bulk reclaimed oil.
- **Oil Plant** – The green area adjacent to the Transformer Workshop building is the oil reclamation plant comprised of tanks, pumps and pipework used for recycling, refining, and storing the oil for re-use in transformers.

Figure 3: Transformer Workshop & Storage Sites

Site	Service
Transformer Workshop (Building 12)	Condition assessment, repair, and refurbishment of the transformers and switchgear cubes
Transformer Storage (12a & 12b)	Open-air storage for the inventory of spare large transformers and switchgear and a special-purpose crane facility that is used to move the transformers
Storage Sheds (Building 14 & 15)	Oil filtration plant
Oil Tanks	Oil filtration systems and oil storage for re-use in transformers

3.3 Our performance to date

The Transformer Workshop performs an essential function to support the delivery of our electricity distribution services. It is critical to maintain a dedicated, in-house facility to ensure the sustainable operation of the network and to meet the increasing demand for transformer refurbishments in a cost-effective manner.

3.3.1 The Functions of the Transformer Workshop

Functions range from assessing, maintaining, repairing, and refurbishing transformers and associated parts and supplies.

Transformer condition assessment, repair, and testing

Transformers are required in the network for electricity to be transferred from one electrical circuit to another, that is, between extra high voltage to high voltage and high voltage to low voltage for supply into and export from the electricity distribution network. Without fully functioning transformers in the distribution network, the electricity supply will be interrupted.

At the Transformer Workshop condition assessment, repairs, and testing are undertaken for light and heavy transformers, switching cubicles, transformer regulators, associated spare parts and equipment as well as oil filtration and recycling.

As of 2022, there were approximately 75,000 pole and kiosk-mounted distribution transformers dispersed throughout our network as well as approximately 600 zone substation (heavy) transformers. The current Transformer Workshop has the capacity to service approximately 250 distribution (light) transformers, 12-18 zone substation (heavy) transformers and 100 switching cubicles per annum.

Transformer storage

Prior to and following repair, transformers are stored in the hardstand area outside the Workshop or dispatched back into the network for re-installation. Management of stored transformer inventory is another important function of the Transformer Workshop as large gantry cranes are required to move heavy items to and from the workshop.

Switching cubicle refurbishment

In addition to transformers, switching cubicles undergo refurbishment at the Transformer Workshop. This is necessary work as switching cubicles are no longer available for purchase as new. The Transformer Workshop is also used to recover essential parts from units that are not suitable for refurbishment. This is particularly important for critical components of the network like Isolation switches that are essential for the efficient, safe, and reliable operation of the electricity distribution network.

New transformer testing

Our in-house capability at the Transformer Workshop is extensive. In addition to refurbishing existing transformers and switching cubicles, the Transformer Workshop also tests newly purchased transformers prior to their installation in the network and conducts preparations such as oil refining for the network deployment.

3.3.2 The importance of the in-house capabilities

There is a preference in the power industry to extend the lifespan of existing transformers by refurbishing transformers compared to purchasing and installing new transformers. The advantages of a dedicated, in-house facility for the repair and refurbishment include the following.

Cost savings from refurbishing compared to buying new transformers

There are clear cost savings by extending transformer lifespans, deferring new purchases and controlling the timing of available refurbished transformers, and switching cubicles. Cost savings are achieved by refurbishing transformers instead of buying new transformers. The cost of new transformers ranges from around $3,000 to over $50,000 depending on the voltage level, phase and size. The weighted average cost per light (low voltage (**LV**) distribution) transformer based on the throughput volume is around $7,500. The weighted average cost of refurbishment is only around $2,800 per transformer. This equates to a saving of over $3000 per transformer ($850,000 per year on average) refurbished compared to buying new.

Efficiency and flexibility in operation

Having in-house capabilities provides operational efficiency and flexibilities by avoiding long lead times for procurement, enabling more complicated procedures to be carried out and transformer testing at the end of the refurbishment process. It also ensures the quality of the works conducted. For example, tests can be carried out on transformers that have been fitted with new windings or had insulation replaced according to our standards. This effectively provides the operator with the same level of assurance of operational condition as for a new transformer. The manufacturer may provide a limited warranty over the work carried out.

Self-reliance and reducing supply chain risks

Another key benefit of retaining the skills and knowledge about working on transformers and switching cubicles in-house is that we can continue to rebuild and maintain these assets when there are emergencies, unexpected breakdowns, and delays to new stock, which are essential to the safe, reliable, and efficient operation of the network infrastructure and the security of the electricity supply. This capability also removes the need to purchase and store a large inventory of network spares to cater for unexpected asset failure events, as the facility can repair and return an asset to the network in days/weeks, compared with long supply chain lead times of 12-18 months or more.

The efficiently functioned in-house capabilities provide us with full control over how the transformers are maintained and stored, and the ability to meet quality standards.

There is an ongoing throughput of old transformers to refurbish. Old power transformers may be replaced, by new units after unplanned, emergency events. The Transformer Workshop will play an increasingly important role in the functioning of the electricity network in the coming years. As demand for electricity connection services continues to rise, we will need to increase reliance on the workshop to keep pace with technological advancements and ensure that our transformer assets are able to meet the demands of a modern distribution network.

3.4 Drivers for change

There are three key drivers underpinning the case for investment in the Transformer Workshop including age and condition, criticality, and scalability.

3.4.1 Asset Condition and Lifecycle age

The Transformer Workshop has been operating for almost 70 years and was constructed using materials and techniques that were appropriate at that time, with a steel frame, concrete floor, and corrugated iron-clad roof and walls. The design and construction of the facility was in compliance with building codes and workplace health and safety (**WHS**) regulations at the time. The Transformer Workshop has reached the end of its useful life. The building contains offices, toilets/showers, a workshop, an internal crane-way, and transformer ovens, but has only undergone piecemeal refurbishments and statutory maintenance and break-fix repairs to date.

The poor condition of the Transformer Workshop is a significant driver of the need for investment. In December 2021, an independent assessment was conducted by KPMG to evaluate the condition of all buildings and associated assets at the Marleston North industrial facility, which includes the Transformer Workshop in Building 12, the oil filtration plant 14 and 15 and storage areas which are all captured under this business case [10]. The Workshop building and its associated storage areas, were found to be in poor to the very poor condition due to significant defects, wear and tear, and non-compliance with Environmental regulations and standard building guidelines[11].

The risk of not addressing the issues highlighted in the property condition report concerning the existing Transformer Workshop is no longer acceptable. Investment is therefore required to provide a fit-for-purpose, safe, and compliant Transformer Workshop building to continue its critical functions and services. The report also noted that the Transformer Workshop are well beyond the end of their useful lives.

The main issues associated with its condition and compliance with current obligations as set out in the KPMG condition report.

Table 4: Summary of issues with the Transformer Workshop (building 12) & the crane operation area

System	Rating	Description
Structure	**Fair/Poor**	The building comprises a structural steel portal frame supporting the structure. Steel truss/rafter system supports the roof structure. The ground floor slab comprises reinforced concrete.
Roof Areas	**Poor**	Building 12's roof is a steep dual pitch roof discharging to perimeter gutters and external downpipes. Downpipes are connected to multiple retrofitted square PVC type oil tank. Roof coverings comprise original corrugated iron sheets. The roof coverings are supported by steel truss and purlins.
Façade	**Poor/Very Poor**	Building 12 façade is predominantly original, full height, corrugated iron sheets. Door and window frames are of metal. Egress doors are of painted timber with additional access is provided in the form of roller shutters and sliding gate. The roller shutter door to the eastern elevation appears to have been recently replaced, the remaining sliding gate and roller shutter doors are dated.
Internal Areas	**Fair**	Building 12 is mainly used as a warehouse with an ancillary single storey office area. The office area includes an open office space, cellular room, toilet, tea prep and shower facilities.
Building 12 Condition Summary	Original corrugated iron sheets have moderate to severe corrosion dotted throughout. The wall cladding has well exceeded its design life. Corrosions are • beyond the surface and material loss is imminent. • Roof sheets are in fair condition and whilst not a priority as the wall cladding, • has exceeded its design life and replacement with a conventional profiled roof cladding is recommended. • Lunchroom, whilst refurbished in the past since construction, no longer presents well. Refurbishment is required to improve the aesthetic appearance and meet modern standards. • Finishing and fixture and fittings to the male and female toilets and showers are original and do not present well. Refurbishment is critically required to improve the aesthetic appearance and meet modern standards.	

[10] For more details, please refer to the Property Condition Assessment Report.

[11] SA Power Network (2022) Industrial facilities Asset Management Plan p29

External Areas	**Poor/Very Poor**	The asphalt is in poor-very poor condition. Issues include undulation, footprint markings where heavy transformer units are stored for a prolonged time, potholes and cracked spoon drains.
Mechanical, Electrical, Fire Protection, & hydraulic services	**Fair/Poor**	The various services are generally installed to a satisfactory commercial standard. From the visual inspection, the services are generally in fair to poor condition dependent on the age of the installations. In general, the various services installed comply with the Regulations and Standards applicable at the time of construction. However, given the age of the asset, it is estimated that various systems wouldn't comply with current standards.

Condition Rating		Condition Explanation
5.0	Excellent	Excellent. No defects
4.0	Good	Good, Minor defects, wear and non-compliance exist. Little to no impact on operation or intended use. 80% to 60% of asset useful life remaining.
3.0	Fair	Fair, Wear and degradation to external surfaces require maintenance, Defects or wear to 5%-20% affected. 60% to 30% of asset useful life remaining. Equipment operating on older technology and less efficient compared to modern equivalent.
2.0	Poor	Poor, Significant defects, wear and non-compliance exist, Rehabilitation of asset required. Component replacement more costly than maintenance. 30% to 20% of asset useful life remaining. Equipment operating on older technology and less efficient compared to modern equivalent.
1.0	Very Poor / Failed	Very Poor, Potential structural, operational problems or not operational.Major defects, wear and non-compliance exist. Extensive defect or wear, 20% to 0% of asset useful life remaining. Cost to maintain is no longer viable. Replacement essential. Equipment outdated or redundant tech technology and less efficient compared to modern equivalent.

Given the lifecycle age of the Transformer Workshop and its recent assessment of its degraded condition, it is expected that these issues will worsen if no proactive intervention continues for any extended period. This will either increase the need for reactive repair, or the current costs and risks will increase.

The poor condition and non-compliances to current WHS and Environmental regulations with the Transformer Workshop result in a range of risks associated with the operation, safety, inefficiencies, and reliability of supply. Table 5 summarises the key risks by category. The risk categories used align with our Risk Management Framework[12] for the management of risk across the business.

Table 5: Key risks

Risk category	Description
Safety risks	Accidents in a building caused by its poor condition and/or building codes and WHS compliance resulting in an injury. The deteriorated condition of hardstand areas and functional design at this site increases the likelihood of a Lost Time Injury (LTI) occurring in the future. (There have been several moderate and minor injuries at the workshop in recent years. This risk is included in the MCA.)

[12] The SA Power Networks Risk Management Framework is designed to outline the risk management activities of SA Power Networks. The risk categories relate to the principles and guidelines described in AS/NZS ISO 31000:2009.

Risk category	Description
Operational risks	An unexpected and rapidly evolving poor condition issue or unexpected major compliance issue occurs that significantly affects the operations in one of the buildings until it is repaired or addressed. This includes unpredictable asset failures rendering plant and equipment unusable for an extended period of time.
Operational inefficiency	Increased costs associated with longer operating times and other constraints (i.e., poorer productivity) due to the existing poor condition of the facilities. For modelling purposes, this predominantly relates to the lifecycle age of air conditioning systems and poor condition, inadequate facilities.
Supply reliability risk	The economic value of the increased fault response and restoration times due to an unexpected and rapidly evolving poor condition issue occurring that significantly affects the operations of the zone substation field crews. Note, this is being considered a high impact low probability (HILP) risk event, whereby the issue at the site affects the response times for a major zone substation outage.

3.4.2 Criticality

In March 2023, we commissioned KPMG to undertake an independent criticality analysis on all our property assets, systems and subsystems to assist us in the prioritisation of buildings and assets, determination of priority ranking for maintenance tasks, scheduling, and forecasting, identification of risk mitigation strategies, and guidance of budget allocation so critical assets are given high priority for upgrades or replacement.[13] See Appendix C for the Criticality Assessment for the top 5 highly critical locations.

The Transformer Workshop provides a range of critical services as outlined in Section 3.3. The Transformer Workshop is identified as the most critical building and asset system in the property portfolio overall and the criticality score is extreme. The facility is a high priority for continued operations, requiring ongoing maintenance to ensure it is in good condition.

The Transformer Workshop contains valuable equipment and other physical assets that need to be protected from theft. The current facility does not have sufficient levels of physical security to prevent theft, occasionally resulting in the loss of equipment.

The transformers undergo a comprehensive refurbishment process, restoring them to a "like new" condition. This process involves dismantling the transformer, inspecting all components, repairing, or replacing any damaged or worn parts, and reassembling the transformer to its original specifications. This process is more affordable than replacement.

The resetting process also involves testing each transformer to ensure that it meets or exceeds all relevant performance standards and is safe to use. This testing includes electrical tests, such as insulation resistance testing and winding resistance testing, as well as functional tests, such as load and temperature tests. Once the transformer has been reset, it should perform as if it were new, with improved efficiency, reliability, and lifespan.

The Transformer Workshop is also used for the refurbishment of switching cubicles. Switching cubicles are no longer available for purchase as new within Australia. They can be replaced with costly ring main units (RMU). The more affordable option is to keep the switchgear operational.

[13] KPMG (2023) Property Criticality Assessment V0.1 – Location, System and Subsystem Rating Tabs

3.4.3 Scalability

While there will be no change in the functions provided by Transformer Workshop, a higher volume of throughput will be required to meet the forecast rising demand for refurbishment into the foreseeable future. This is predominantly due to the aging of transformers, the loading conditions in which transformers and switching cubicles are operated, and the volume of new transformers that will be tested prior to installation. Demand is expected to increase gradually. The current Transformer Workshop's capacity of servicing approximately 250 distribution (light) transformers, 12-18 zone substation (heavy) transformers and 100 switching cubicles per annum is not able to meet the future demand. Investment is therefore required to expand the service capacity of the Transformer Workshop.

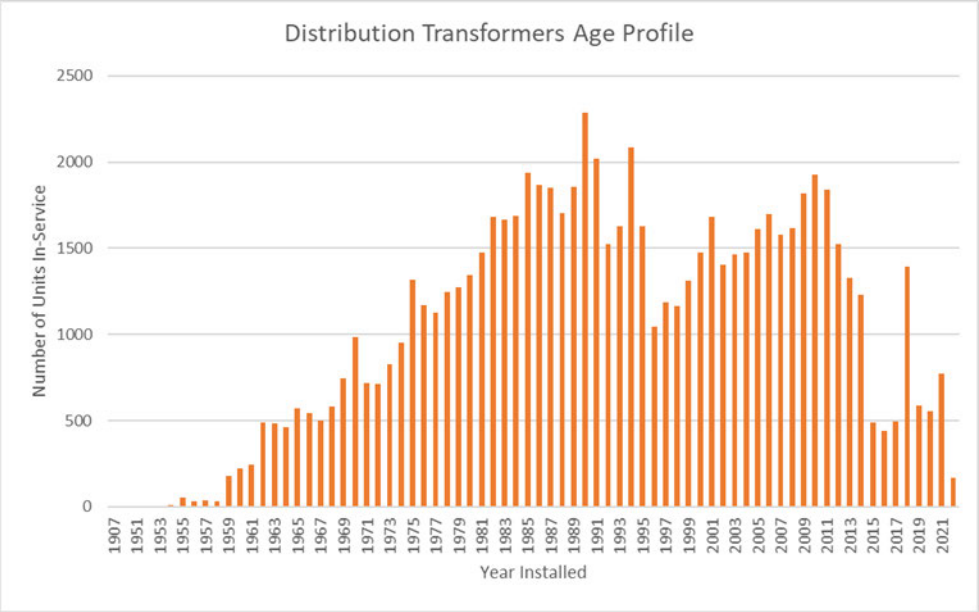
Increasing demand driven by aging assets

The number, age, and condition of transformers in the network drive the forecast volume of transformer repairs at the workshop. Higher volumes of transformers in the network will result in higher volumes of repair and maintenance tasks in the workshop[14]. The demand for refurbishing is expected to increase as the expected volume of faulty transformers increases due to the aging condition of distribution transformers in the network.

By 2035, the forecast volume of light transformer repairs is expected to reach 350 units, resulting in significant savings from repairing light transformers. Repairing heavy transformers and switching cubicles coupled with the process of reclaiming oil contribute to additional demand.

Figure 4 and Figure 5 provide a graphical representation of the age profile of our light distribution transformers[15]. Figure 4 shows that between 1980 to 1990 we installed between 1,500-2,000 transformers every year, and these transformers will be aged between 35 and 50 years in the next RCP. The age profile suggests we will need to refurbish or replace more transformers in the coming decades. This poses a significant workload now and in the long term for the refurbishment of the existing and testing of the new transformers at the transformer workshop. Some transformer types are specific to our distribution network and spare parts are not manufactured in Australia.

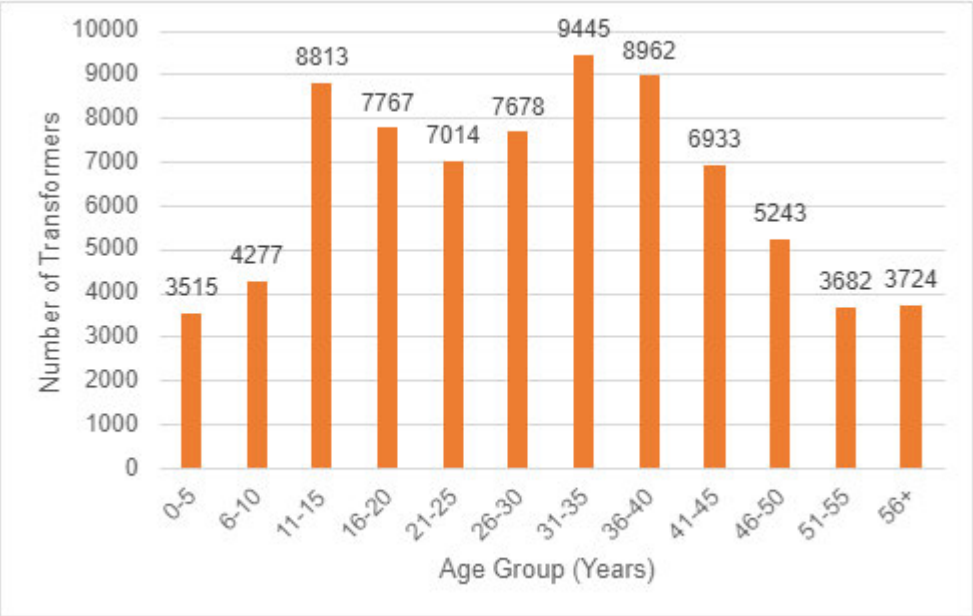
Figure 4: SA Power Networks distribution transformers age profile



[14] SA Power Networks (July 2022) Industrial Facilities Asset Management Plan p. 33-35

[15] Note that the age of a fully refurbished transformer is re-set to zero

Figure 5: Number of distribution transformers per age group[16]



Further demand driven by newly added assets

The demand for transformers in the network is expected to increase due to network element replacements, network augmentation, non-conventional system operations, and climate adaptation. The Transformer Workshop is expected to continue to perform a critical function, providing the capacity to produce components required to support network demand. Further technological advancements from Consumer Energy Resources (**CER**) are expected to increase the demand for electricity connection services, necessitating an upgrade or refurbishment of a larger number of transformers.

The increase in the number of new transformers being installed in the network does not detract from the fact that there are a large number of transformers that have reached the end of their expected life and can be expected to break requiring repair. New transformers add work to the Transformer Workshop because many need to have pressurised gas removed and oil added, or testing conducted, before being installed in the network. In addition, new transformers will age, and many will require repairs in 30 years, within the expected life of the new Transformer workshop.

3.5 Alignment with building industry practice

Following Australian Energy Regulator (**AER**) feedback on our property expenditure in our Regulatory Proposal for the 2020-25 RCP, we worked extensively over the last three years to establish a clear strategic direction and achieve an uplift in building asset lifecycle management maturity.

These practices have been proven to facilitate cost effective and efficient management of long-lived assets such as properties in utilities and other industries. This improvement responds directly to concerns raised by the AER and its Consumer Challenge Panel (**CCP**) in the 2020-25 Distribution Determination.

We engaged KPMG Property and Environmental Services and KPMG Asset Management experts to work with us to develop a structured, data-driven and sustainable framework for property management, aligned with the building and construction industry. KMPG's Engineering & Asset Management (**EAM**) team developed, with SA Power Network's operations team input, a suite of asset management tools, documentation and

[16] Distribution transformers are designed with an expected life span of 30 years. With monitoring, maintenance, and refurbishment in the Transformer Workshop, their life span is extended, and new purchases are differed.

frameworks to baseline, and then advance the existing property portfolio in alignment with industry standards and regulations.[17] In December 2021, KPMG completed a detailed property asset condition assessment of the Marleston North site, which includes the Transformer Workshop. The Condition Report identified issues and provided evidence that this structure is in poor to very poor condition and requires replacement.

The 2023 criticality assessment recommends optimised investment timing to ensure continued and safe delivery of services. As the Transformer Workshop is identified as the most critical building and asset system in the property portfolio overall and the criticality score is extreme, the assessment recommends that the identified issues are addressed early in the 2025-30 RCP.

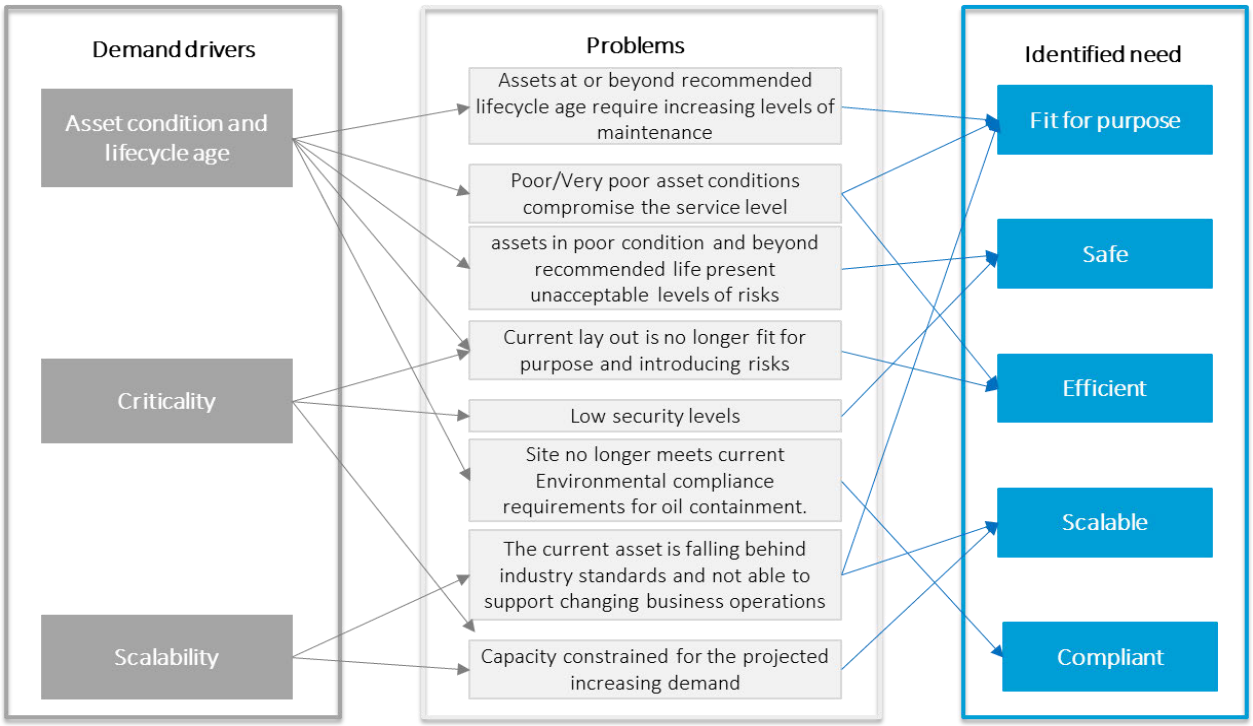
[17] National Construction Code and state-based legislation for WH&S/OH&S as specified in Condition Assessment Reports.

4 The identified need

Ensuring the safe and efficient operation of the Transformer Workshop is essential to meeting our obligations to maintain a reliable electricity supply for electricity customers throughout the State.

To provide a range of essential services related to critical network assets, the Transformer Workshop needs to be **fit-for-purpose**, **safe**, **efficient**, **compliant**, and **scalable**. The Transformer Workshop repairs and maintains power transformers and switching cubicles. These assets are critical to safe, efficient, and reliable electricity supply to our customers. Alignment of the capacity of the workshop with future requirements includes recognition of the aging process of transformers and switching cubicles deployed in the network, coupled with the loading conditions in which they are operated which will trigger more testing and refurbishment work. Additionally, future network expansions will increase the number of new transformers tested in the Workshop before installation. Figure 6 maps out the key demand drivers, current issues and the requirements driving the need for investment.

Figure 6: Identified need logic mapping



To address the key issues underpinned by the demand drivers as shown in section 3.4, the following requirements have been identified:

- **fit-for-purpose**: we need a fit-for-purpose facility to manage expected demand for transformer repairs and refurbishment, to ensure the supply of operational transformers and switching cubicles for high levels of customer reliability and connection outcomes in the supply of electricity. For example, the external Heavy Transformer trolley rails are no longer functional which results in additional cost and delay for hiring a mobile 400 Tonne crane each time when a lift is required. The current facility also does not have sufficient levels of physical security to prevent theft of valuable assets.
- **safe:** the safety of employees and visitors to the Transformer Workshop is crucial. Improved safety upgrades must be installed to mitigate the present safety risks and meet future safety standards;
- **efficient:** upgrading the building's infrastructure, such as electrical, plumbing, and the equipment used, including the site layout for handling transformers and managing oil containment is required to improve efficiency and reduce downtime. For example, due to the site being at full storage capacity transformers are inappropriately stored at various overflow locations across the state. This

is contrary to our preferred approach to centralise storage in a purpose built location designed with current WHS and Environment compliance standards for oil-filled equipment storage;

- **Scalable**: as the demand for transformer repairs and refurbishment grows, the Transformer Workshop needs to be flexible and increase its capacity to accommodate the increased workload; and
- **Compliant:** the Transformer Workshop must comply with current, relevant regulations and building codes, such as those related to fire safety, disability access, structural integrity, and toilet and changing room amenities. In general, the assets and services comply with the Regulations and Standards applicable at the time of construction in the 1950's. However, given the age of the asset, it has been identified that various systems wouldn't comply with current standards.

To address these service requirements, an efficient and prudent investment in the Transformer Workshop must be made as the following risks of not progressing are not acceptable:

- ongoing investment in infrastructure that is not fit for purpose;
- increased likelihood of unexpected maintenance expenditure to address failing assets;
- increased likelihood of asset deterioration causing potential service disruption to our customers; and
- employee well-being, health, and safety and environmental compliance concerns.

Consequently, action needs to be taken to address the identified issues and ensure that the facility continues to serve its intended purpose for the foreseeable future. This will not only improve its efficiency and performance but also enhance its safety and compliance with industry standards.

5 Comparison of options

The options presented in this section are the credible options that were compared to a counterfactual option of BAU base case. The options represent substantially different commercially and technically credible options. Credible options are those that meet the following criteria:

- addresses the identified need
- is commercially prudent expenditure and technically feasible
- can be implemented in sufficient time to meet the identified need.

5.1 The options considered

The assessed options that are relevant and credible to address the identified need are summarised in Table 6. Each option is assessed in the cost benefit analysis and further described in the subsequent chapters of this business case.

Table 6: Summary of options considered

Option	Description
The base case (BAU)	The BAU base case is a continuation of previous management practices (Statutory Maintenance and Break-Fix Repairs and Replacements). It includes undertaking works required to continue operations, incurring reactive and storage costs. The BAU base case is used as the comparison to alternative options. The BAU base case is not considered to be a viable option for investment because it does not address the identified need.
Alternative options considered	
Option 1: Rebuild at the same site	This option is to rebuild a Transformer Workshop on the same location on the Marleston North site where the existing workshop stands. The existing Transformer Workshop would be demolished. Transformer repair and refurbishment work would cease during re-construction. External storage would be leased for inventory. The surrounding infrastructure would remain intact, including connections to utilities, transportation, and other facilities. However, these works would trigger a requirement to address site contamination at high cost. The construction of the project would be initiated in the first half of 2026. The construction of the project would take 18 months which is across 2 regulatory years 2025/26 and 2026/27.
Option 2: Build at a New site	This option is to construct a new Transformer Workshop facility at the Edinburgh North site which is a less central and more industrial location than Marleston North, which would allow for a larger space and a complaint and more efficient surrounding facilities. These works would not trigger a requirement to address site contamination at high cost. The whole site was built on contaminated land, so avoiding any large-scale civil works would not trigger extensive soil remediation. The existing Transformer Workshop would continue to provide repair services during the time of a new workshop construction. The construction of the project would be initiated in the first half of the year 2026. The construction of the project would take 18 month which is across 2 regulatory years 2025/26 and 2026/27.
Option 3: Phase out Transformer Workshop	This option is to purchase new transformers when they malfunction instead of retaining in-house capability for maintenance and repair (new for old replacement strategy). The Transformer Workshop is no longer required to provide repair and maintenance services. The main objective of this option is to test whether replacing the used transformers (instead of repairing and refurbishing) would be a better choice for us in terms of cost-effectiveness, risk management and efficiency.

5.2 Options investigated but deemed non-credible

To ensure all the potential solutions are considered in the development of the business case, the following options were also explored but deemed non-credible. This section outlines the key reasons why these options are not progressed.

5.2.1 Outsource transformer repair and maintenance

This option involved contracting a third party to repair and maintain our transformers. The market for maintenance and repair services of distribution transformers in Australia is limited to only a few service providers located on the Eastern seaboard. The distances required for transportation for repair work are cost prohibitive as there are no service providers in South Australia and our transformers would go into a repair queue with all the other distribution businesses nationally. The service providers in the East Coast do not offer their services for any repairs to units smaller than a zone substation power transformer, as it is not financially viable for them to repair small units. Furthermore, these service providers do not produce or have supplies of spare parts for the transformers we use. Converting our installed transformers is comparable to the cost of replacing with new equipment and then additional costs incurred to reconfigure the network connections.

This option was considered to be non-credible because there is no current supplier in South Australia and even if, in the future, a contract could be agreed upon with a supplier to establish a South Australian workshop suited to our transformers, the business risk to reliability is considered too high as a guaranteed service level of repairs/maintenance of transformers comparable to in-house services levels may not be achievable.

5.2.2 Phased build on Edinburgh North site

This option involves constructing the new Transformer Workshop in two stages at the Edinburgh North site. The initial stage, which makes up around 85% of the overall project cost, comprises the following tasks:

- authorities fees and charges
- professional fees and disbursement
- workshop facility including office
- civil works
- landscaping and drainage
- external services
- cranes and crane rail

The second stage of work, accounting for roughly 15% of the project cost, would entail the following tasks to be carried out during the regulatory period after FY2030:

- office (Standalone Building)
- landscaping (Outside Boundary)

The option of constructing the new Transformer Workshop in two stages was not progressed because:

- the identified need is significant and deferring/staging construction in order to span regulatory periods is not appropriate; and
- additional preliminary costs for site set-up and mobilisation would be incurred under a staged approach, increasing total project costs to the detriment of customers in the long run;

- deferring works increases exposure to construction cost escalation, increasing total project costs to the detriment of customers in the long run; and
- a staged approach creates interface risk between operations and second-stage construction delivery with potential safety and operational efficiency implications

5.2.3 Delay build

This option is to postpone the construction of the transformer workshop until the 2030-2035 RCP and continue with the BAU base case for the 2025-2030 RCP. This option was not progressed because:

- the costs are very high due to the requirement to undertake workshop asset replacement and works under the BAU base case as well as the construction of the new workshop at a later date;
- risks of further cost escalation to the estimated cost of construction for both materials and labour; and
- risks of continuing labour shortages delaying project completion.

5.3 Approach to the options assessment

The direct impacts of the different options for undertaking recurrent replacements and renewals on the benefits and efficiencies (both operational and cost-related) are not readily quantifiable. The current data maturity also makes it difficult to objectively monetise the quantifiable impacts of the options such as the improved operational safety benefits and improved workplace amenity. Where benefits cannot be readily monetised, a cost benefit analysis is not feasible, and only costs that are readily monetised are analysed in the CBA in NPV terms.

To evaluate the credible options listed in Table 6, an assessment that considers both qualitative and quantitative factors is used as to provide a complete understanding of the potential impacts of each option.[18] The analysis brings together the non-monetised or qualitative factors and the results from the CBA to ensure all factors are appropriately considered when selecting a recommended option.

This approach is summarised in Table 7.

Table 7: Summary of the approach used for the evaluation of options

	Evaluation Measure	Description	Assessment Approach
Costs, benefits	Monetary	Impacts that can be reasonably identified and valued in monetary terms. This includes both direct construction costs and indirect costs that can be quantified in monetary terms, in addition to benefits that have a measurable monetary impact as outlined in Table 8.	CBA
	Qualitative	Impacts are known to exist but are not valued in monetary terms due to the absence of market prices.	MCA Risk assessment

[18] As recommended by Infrastructure SA (2022) Impact Analysis Guide: Cost-Benefit Analysis p.5 and "Guidelines for the evaluation of public sector initiatives Part B: Investment Evaluation Process (2014)" p.71.

Costs and benefits are assessed on an incremental basis relative to the BAU base case. The modelling period in the CBA is 30 years for each option.

A summary of the costs and benefits quantified in the CBA is presented in Table 8.

Table 8: Summary of Quantified Benefits and Costs Considered by Option

Benefits	Description	Option 1	Option 2	Option 3
Reclaiming oil	Oil is extracted from transformers during repairs and is filtered for re-use in transformers. This process avoids the cost of purchasing new oil.	Y	Y	NA (No repair)
Opportunity benefit of land	The value of the benefit from using the land at Edinburgh North or Marleston North for alternative purpose than for the Transformer Workshop.	Y	Y	Y
Terminal value – improvements	The value of the newly built structures that remains at the end of the period of analysis of 30 years in the CBA. New buildings are expected to have a life of 40 years. By 2054/55 there will be 28 years of built structures, with 12 years of value remaining.	Y	Y	NA (No capex improvement)
Terminal value – land	The value of land that remains in use. Land value is considered to escalate at 1.5% year on year. For BAU base case the value is based on divestment value for Marleston North.	Y	Y	Y
Avoided maintenance cost	The difference in the costs of undertaking maintenance on a newly built structure compared the BAU base case structures. Considerably less work is required on new structures so the avoided cost is a benefit.	Y	Y	Y
Avoided works cost	Avoided works is the difference in the costs of undertaking works required under the BAU base case relative to the options. Works refers to the list of activities identified during the condition assessment, in order to allow continued function of transformer activities at the site. These works would not be carried out if the structures were expected to be demolished.	Y	Y	Y
Avoided reactive cost	The difference in costs from undertaking reactive actions under the BAU base case relative to the options. Reactive cost refers to cost incurred to respond to breakages or faults on site. It is expected that a newly built workshop will require no reactive costs for seven years after construction.	Y	Y	Y
Avoided workshop asset replacement cost	The difference in costs from undertaking asset replacement activities under the BAU base case relative to the options. Asset replacement activities refers to replacement of items at the transformer workshop that would need to be undertaken to continue operations at the workshop. These works would not be carried out if the structures were expected to be demolished.	Y	Y	Y
Avoided crane hire	The costs associated with crane hire under the base case are not needed under other options	Y	Y	Y

Benefits	Description	Option 1	Option 2	Option 3
Increased Transformer Throughput savings	The avoided cost of purchasing new transformers by repairing old transformers. The increased Transformer Throughput refers to the savings that are obtained from building a workshop that can manage a larger volume of repair work than the BAU base case. This reduces the need to buy as many new transformers when faults arise that cannot be managed by the workshop due to capacity constraints.	Y	Y	NA (no repair)
Costs	**Description**	**Option 1**	**Option 2**	**Option 3**
Transformer replacement cost	The purchase price of new transformers for the forecast volume of repairs that cannot be met by the workshop. If a transformer cannot be repaired, it will incur a cost to purchase a new transformer to replace the faulty transformer.	Y	NA (High capacity meeting the repair demand)	Y
Project Capital Expenditure	Project Capex expenditure is the total construction and commissioning cost for a new Transformer Workshop building, offices and storage.	Y	Y	NA (No capex improvement)
Switching cubicle replacement and repair cost	Switching cubicles are repaired at the Transformer Workshop. If SA Power Network cannot repair a switching cubicle it will be replaced with a ring main unit (RMU) as new switching cubicles are not available for purchase.	Y	NA (High capacity meeting the repair demand)	Y
Storage Cost	Land is required to store transformer inventory during the construction period for Option 1. The storage area must be secure and relatively close so that additional travel costs and handling costs are low.	Y	NA	NA
Relocation cost	Costs incurred to relocate the equipment.	Y	N	NA
Remediation cost	Remediation costs refer to works to remove and dispose of contaminated soil.	Y	NA	NA
Demolition cost	Demolition expenses related to removal of the structures and hardstand. This includes asbestos removal.	Y	NA	NA
Increased transformer inventory cost	The cost of additional transformers multiplied by the average cost of transformers.	NA	NA	Y

The unquantifiable costs and benefits are evaluated via the risk assessment and MCA.

The risk assessment uses our Corporate Risk Framework. Key risks are identified for the BAU base case and each alternative options. Consequences and likelihood of each identified risks are evaluated based on the impact to us and our customers in line with the consequence and likelihood framework as shown in Appendix D.

The MCA uses ratings to evaluate the options. Several cost impacts were removed from the cost analysis and included in the MCA instead, due to a lack of information to support robust cost estimates. These cost impacts relate to improvements in reliability and WHS, as well as electricity efficiency savings.[19] MCA relies on informed judgment to assess the options against the criteria. A consistent rating scale is applied to all MCA criteria. There is no double counting between MCA and CBA because the criteria included in the MCA and the CBA are mutually exclusive.

The MCA criteria used in this business case align with the relevant parts of our Strategic Plan and consider deliverability and social or economic benefits attributable to electricity customers. There are six MCA criteria used in this business case (see Appendix B), with each criterion is rated on a scale from 1 (little to no attainment of the criterion) to 5 (very high attainment of the criterion). The scores against each of the six criteria are then summed up to give the total MCA score. Therefore, the higher the MCA score the better the option is according to the MCA assessment, with the highest possible score being 25/25.

The MCA criteria and rating scale are summarised in Appendix B.

5.4 Analysis summary and recommended option

5.4.1 Options assessment results

A summary of the scores from the assessment aprpoach including the results of the CBA, MCA and risk for each option are listed in Table 9 and presented in Figure 7. Note that the MCA does not change the result obtained under the CBA, where Option 2 has the highest incremental NPV.

Table 9: Summary of the assessment ($m, June 2022 real, 30-year period, 4.05% discount rate)

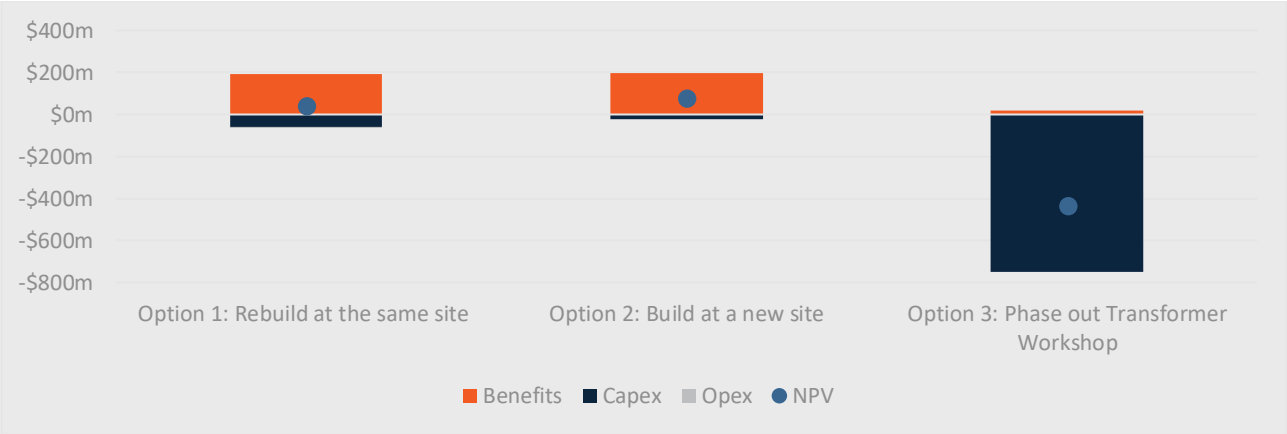
Option	RCP 2025-2030 Costs		30-year costs		30 year benefits	NPV[20]	MCA Score	Risk Level[21]	Rank
	Capex	Opex	Capex	Opex					
BAU (Base Case)	-	-	-	-	-	-	-	High	-
Option 1: Rebuild at the same site	$60.8	$1.2	$60.8	$1.2	$194.5	$42.6	17/30	Medium	2
Option 2 - Rebuild at the new site	$23.4	$0.0	$23.4	$0.0	$195.5	$78.6	**26/30**	**Low**	**1**
Option 3 – Phase out Transformer Workshop	$119.9	$0.0	$749.0	$0.0	$16.9	-$434.2	11/30	High	3

[19] For guidance on inclusion of intangible benefits as supplementary information to quantified analysis see AER (2019) "Non-network ICT Capex Assessment Approach" p.20.

[20] Discounted at 4.05% discount rate over 30 years.

[21] SA Networks Enterprise Risk Management Framework. See Appendix D.

Figure 7: CBA results of credible options ($m, June 2022 real, 30-year period, 4.05% discount rate)



Note: Costs and benefits are undiscounted. NPV is discounted at 4.05%

Table 9 shows the application of our Enterprise Risk Management Framework to assessment of the options. Option 2 is the lowest risk option. The risk assessment is further outlined in Appendix D.

The advantages and disadvantages of each option are summarised in Table 10.

Table 10: Options summary

Credible Option	Description
Option 1: Rebuild at the same site	✓ Transformers and switching cubicles refurbishment are more affordable than replacement. ✓ Lower ongoing maintenance cost of a new facility. ✓ Qualitative benefits from improved safety, network performance, retention of capability and scalable output. × Additional capital cost of purchasing, rather than repairing, transformers during construction. × Lower qualitative benefits from site congestion and impact on the surrounding residential community.
Option 2: Build at a new site	✓ Transformers and switching cubicles refurbishment are more affordable than replacement. ✓ Greatest net benefits emerging from avoiding high maintenance and replacement costs of the existing workshop, balancing out the capital investment costs with the values of the backfill space. ✓ Lower ongoing maintenance cost of a new facility. ✓ Greatest qualitative benefits from improved safety, network performance, retention of capability and scalable output.

Credible Option	Description
Option 3: Phase out Transformer Workshop	× Risk of late delivery of transformers from third-party supplier × Significantly lower net benefits emerging from the cost of new purchases and increased inventory and extra risks associated with replacing used transformers × Significantly lower qualitative benefits from reduced employment opportunities, and loss of control over maintenance schedules.

5.4.2 Recommended option

The **preferred option is Option 2: Build on a new site** as it has the highest NPV result. In addition, this option also has the highest MCA assessment. Under the CBA Option 2 has the highest incremental NPV of $78.6 million. Under the MCA Option 2 has the highest score of 26/30.

In terms of the CBA, Option 2 remains preferred to other options across sensitivity and scenarios tested as reported in Section 5.5. This option provides the greatest long-term benefits by addressing the identified need in the most efficient and prudent way, providing the following

- adequately location allowing faster repair time resulting in improved reliability;
- improved staff skills in servicing equipment resulting in better servicing and fewer repairs;
- improved compliance with current WHS, environmental, building standards, and industrial work standards;
- enabling continuation of capability to repair transformers;
- avoiding maintenance cost of existing aged workshop facility;
- improving operational cost via labour efficiency through skill development and better workshop layout and fixtures; and
- repair of transformers under Option 1 and 2 is far more cost effective than replacing failed transformers with new ones under Option 3.

The undiscounted costs and benefits of Option 2 that will be incurred during the RCP are presented in Table 20 in Section 5.8.

From both an operational and financial perspective, Option 2 is the preferred option and delivers the best outcome for the business and its customers. Additionally, it effectively addresses the safety and compliance issues at the existing Transformer Workshop.

5.5 Sensitivity and scenario analysis

This section presents the sensitivity and scenario analysis results in testing the robustness of the CBA under different key projection inputs and assumptions.

The worst case and best case scenarios were also tested for a combination of key variables to show the possible low and high range of the option performance.

Table 11 below shows the key variables tested and values adopted under each test. The default setting used in this report are the core case scenario.

Table 11: Sensitivity testing parameters

	Core case	Parameter value tested
Construction cost for Option 1 & 2	$23m	+25%, +50%
New oil price	$3.13	+/-25%
Light Transformer Throughput Increase	10	+/-25%
Heavy Transformer Throughput Increase	3	+/-25%
Cost of transformer refurbishment	Heavy: ~$26K to $164 Light: ~$400 to $5k	+/-25%
Discount rate	4.05%	3%, 3.5%, 4.5% and 5%
Worst case	As above	• -25% on new oil price and transformer throughput • +50% construction costs • +25% on cost of transformer refurbishment, • 5% discount rate
Best case scenario	As above	• +25% on new oil price and transformer throughput • Core case construction costs • -25% on cost of transformer refurbishment • 3% discount rate

The sensitivity testing results are presented in Table 12. The outcome suggests Option 2 remains preferred to other options across sensitivity and scenarios tested and NPVs remain positive across all the tests including the worst case scenario.

The sensitivity results suggest that the option's performance is most impacted by an increase in the discount rate. Nevertheless, a 5% discount rate would reduce the NPV by approximately 29% for Option 1 and 22% for Option 2 compared to the central discount rate of 4.05%, Option 1 and Option 2 still return strong positive NPVs. In addition, Option 2 is more stable against uncertainties in discount rate compared to Option 1.

Table 12: Sensitivity testing results ($m, June 2022 real, 30-year period, 4.05% discount rate where discount rate is not stated)

	Option 1 NPV	Option 2 NPV	Option 3 NPV
Core case	$42.6	$78.6	-$434.2
New oil price +25%	$42.6	$78.6	-$434.2
New oil price -25%	$42.6	$78.6	-$434.2
Construction cost +25%	$37.5	$73.5	-$434.2
Construction cost +50%	$32.3	$68.4	-$434.2
Light transformer throughput +25%	$43.3	$79.3	-$434.2
Light transformer throughput -25%	$41.5	$77.5	-$434.1
Heavy transformer throughput +25%	$46.3	$82.8	-$436.6
Heavy transformer throughput -25%	$36.0	$71.5	-$431.0
Cost of transformer refurbishment +25%	$40.3	$76.3	-$434.2
Cost of transformer refurbishment -25%	$44.8	$80.8	-$434.2

	Option 1 NPV	Option 2 NPV	Option 3 NPV
Discount rate at 3%	$59.3	$95.9	-$490.9
Discount rate at 3.5%	$50.9	$87.2	-$462.5
Discount rate at 4.5%	$36.4	$72.2	-$413.0
Discount rate at 5%	$30.2	$65.7	-$391.3
Best case scenario	$66.7	$103.8	-$493.3
Worst case scenario	$10.6	$45.7	-$388.1

5.6 The Base Case: BAU

The base case is represented as a BAU option, reflecting the continued operation of the current Transformer Workshop under existing management practices of break-fix repairs and replacements and statutory maintenance supplemented with the minimum work required to continue operations. The consequence of not proceeding with any investment in Transformer Workshop will result in a range of significant costs and risks associated with the operation, safety, inefficiencies, and reliability of supply as summarised in Section 4 above. The BAU base case is not an option for investment because it does not address the identified need.

5.6.1 Costs and benefits for the BAU Base Case

A significant portion of the cost arise from repairs to the existing Transformer Workshop in its current location (including necessary site works) in order to continue its operation throughout the CBA period. The repairs include the following items:

- re-clad transformer workshop;
- hardstand and heavy transformer end bunding;
- new fit-out to building;
- light transformer end bunding, hardstand replacements;
- electrical upgrades, Transformer Workshop floor;
- car park bitumen, driveway concrete;
- continued hardstand replacements, stormwater drainage upgrades; and
- oil plant shed replacements.

Options are assessed relative to the base case and so the Base Case has been set to an NPV of zero. The costs and benefits are presented below in

Table 13 in absolute terms. The costs of the BAU base case would exceed the benefits by -$153.2 million during the 30-year evaluation period at a discount rate of 4.05% and -$278.5 million undiscounted. Figure 8 shows the absolute costs and benefits profile across years for the evaluation period.

Table 13: Costs and benefits for BAU Base Case ($m, June 2022 real, 30-year period)

Costs/Benefits	Capex/Opex	Present Value (PV) 4.05% discount rate	Undiscounted
Benefits			
Opportunity benefit of sale value of EN	Capex	$3.3	$3.3
Terminal value MN land	Capex	$0.6	$1.8
Reclaiming oil	Opex	$11.5	$19.4
Total Capex	Capex	$3.9	$5.1
Total Opex	Opex	$11.5	$19.4
Sum of Benefits		**$15.4**	**$24.5**
Cost			
Workshop asset replacement cost	Capex	$1.4	$3.2
Maintenance cost	Capex	$0.8	$1.3
Works	Capex	$2.2	$2.2
Reactive cost	Capex	$3.7	$6.8
Transformer replacement cost	Capex	$100.0	$187.7
Switching cubicles repair cost	Capex	$58.6	$98.4
Crane hire cost	Opex	$2.0	$3.4
Total Capex	Capex	$166.7	$299.6
Total Opex	Opex	$2.0	$3.4
Sum of cost		**$168.7**	**$302.9**
Differences in costs and benefits		**-$153.2**	**-$278.5**

Figure 8: Cost and benefits profile for BAU Base Case ($m, June 2022 real, 30-year period, undiscounted)

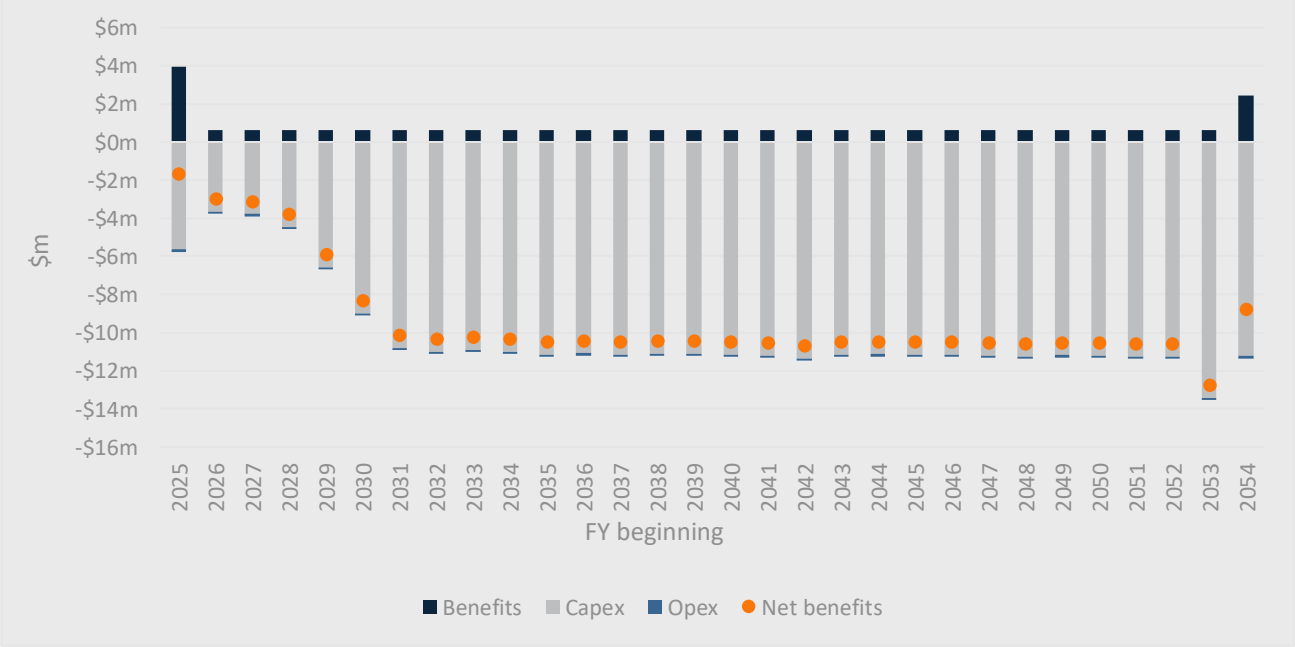


Table 14 presents the base case costs and benefits by cost type and review cycles.

Table 14: BAU Base Case costs and benefits by cost type and Regulatory Control Period ($m, June 2022 real, undiscounted)

	2025-26	2026-27	2027-28	2028-29	2029-30	Total 2025 - 30	2030-31	2031-32	2032-33	2033-34	2034-35	Total 2030-35	Total 2025 to 2055
Benefits (Capex)	$3.3	$0.0	$0.0	$0.0	$0.0	**$3.3**	$0.0	$0.0	$0.0	$0.0	$0.0	**$0.0**	**$5.1**
Benefits (Opex)	$0.6	$0.6	$0.6	$0.6	$0.6	**$3.2**	$0.6	$0.6	$0.6	$0.6	$0.6	**$3.2**	**$19.4**
Costs (Capex)	$5.6	$3.5	$3.7	$4.4	$6.4	**$23.6**	$8.9	$10.7	$10.9	$10.8	$10.9	**$52.2**	**$299.6**
Costs (Opex)	$0.1	$0.1	$0.1	$0.1	$0.1	**$0.6**	$0.1	$0.1	$0.1	$0.1	$0.1	**$0.6**	**$3.4**
Net benefits	**-$1.8**	**-$3.0**	**-$3.1**	**-$3.8**	**-$5.9**	**-$17.7**	**-$8.3**	**-$10.2**	**-$10.3**	**-$10.3**	**-$10.4**	**-$49.5**	**-$278.5**

5.6.2 MCA the BAU Base Case

The results of MCA for Base Case are presented in Table 15 in line with the criteria and rating scale outlined in Appendix B.

Table 15: Results of MCA for Base Case

#	MCA criteria	MCA assessment		Rating
1	Network and Reliability	×	Performance risk from operational downtime due to poor conditions/asset failures.	1
		×	Not supporting the future energy strategy because old equipment, workshop and storage are not purpose-built and not versatile.	
2	Operational Safety	×	Site congestion remains.	1
		×	Safety risks likely to accumulate. Approximately 10 minor injuries occurred between 2019-2022.	
3	Culture and Workforce	×	Staff workplace conditions remain poor.	2
		✓	Retain unique repair capability with SA Power Networks.	
4	Deliverability	✓	Reactive break/fix maintenance is required ongoing and increases over time – within capability.	3
5	Socio-economic and environmental impacts	×	Not scalable to increase production and storage.	2
		×	Negative environmental impact (oil and stormwater related non-compliances).	
		×	No resolution of impact on neighbouring residents (from noise, dust, odours, visual quality, and street congestion).	
		✓	Retain employment within SA.	

#	MCA criteria	MCA assessment		Rating
6	Network assets recycling opportunities	✓	Provides the ability to recover essential parts from units that are not suitable for refurbishment subject to site constraints.	3
Total score				**12/30**

5.7 Option 1: Rebuild at the same site

The scope of this option is to build a new Transformer Workshop located at its current site. The construction of the project will be initiated in the first half of the year 2026. The construction of the project will take 18 months, which is across 2 regulatory year 2025/26 and 2026/27.

This option will require the existing Transformer Workshop to be temporarily closed due to a lack of a suitable temporary workshop solution. Consequently, some repairs will need to be carried out at network sites, which may not be ideal for maintaining the quality and consistency of the work and transformers will need to be replaced with newly purchased transformers during the construction period.

The extended closure of the existing site poses a considerable risk to the reliability of the operations. The longer the workshop remains closed, the higher the risk of significant deterioration in the quality of the work. This deterioration could lead to significant penalties and poor outcomes for customers and damaging the SA Power Networks' reputation.

A high-level pre-concept plan for the new Transformer Workshop includes the list of following items:

- obtaining required approvals from relevant authorities;
- construction of a Transformer Workshop facility including office as a stand-alone building;
- landscaping (inside and outside of boundary) and drainage; and
- cranes and crane rail

The following items have been excluded from the plan:

- removal and disposal of any contaminants like asbestos.
- cut and fill or imported material to adjust levels across the site.
- rise & fall provision.
- rock excavation.
- latent conditions.
- removal/relocation of existing stormwater drainage, if any.
- removal/relocation of existing services to the site, if any.

5.7.1 CBA for Option 1: Rebuild at the same site

The primary opportunities for benefits in this option are avoiding current costs for inspecting and maintaining cranes, site reactive maintenance and mobile crane moves. However, potential operational savings at the existing site given its potential to divest the backfill space cannot be achieved in this option as the existing site will continue to be used. There are additional capital and operational cost required to maintain Transformer Workshop operations during construction – temporary bunded area, mobile cranes, loss of parking, and site congestion.

The incremental NPV results of CBA for Option 1 are presented in the following Table 16 and graphically presented in Figure 9 below. The incremental NPV is $42.6 million at 4.05% discount rate.

Table 16: CBA results for Option 1 ($m, June 2022 real, 30-year period)

Costs/benefits	Capex/Opex	Present Value (PV) 4.05% discount rate	Undiscounted
Incremental Benefits			
Avoided maintenance cost	Capex	$0.3	$0.4
Avoided works	Capex	$2.2	$2.2
Avoided reactive cost	Capex	$2.9	$5.0
Avoided workshop asset replacement cost	Capex	$1.2	$2.8
Increased Transformer Throughput savings	Capex	$89.7	$168.5
Terminal value - building improvements	Capex	$2.2	$7.0
Reclaiming oil	Opex	$2.4	$5.3
Avoided crane hire	Opex	$2.0	$3.3
Total Capex	Capex	$98.5	$185.9
Total Opex	Opex	$4.3	$8.7
Sum of Benefits		**$102.9**	**$194.5**
Incremental Cost			
Project Capex	Capex	$22.7	$23.4
Transformer replacement cost	Capex	$16.6	$17.0
Switching cubicles replacement cost	Capex	$14.4	$14.8
Relocation cost	Capex	$0.4	$0.4
Remediation cost	Capex	$1.9	$1.9
Demolition cost	Capex	$3.3	$3.3
Storage Cost	Opex	$1.1	$1.2
Total Capex	Capex	$59.2	$60.8
Total Opex	Opex	$1.1	$1.2
Sum of cost		**$60.3**	**$61.9**
NPV		**$42.6**	**$132.6**

Figure 9 Cost and benefits profile for Option 1 ($m, June 2022 real, 30-year period, undiscounted)

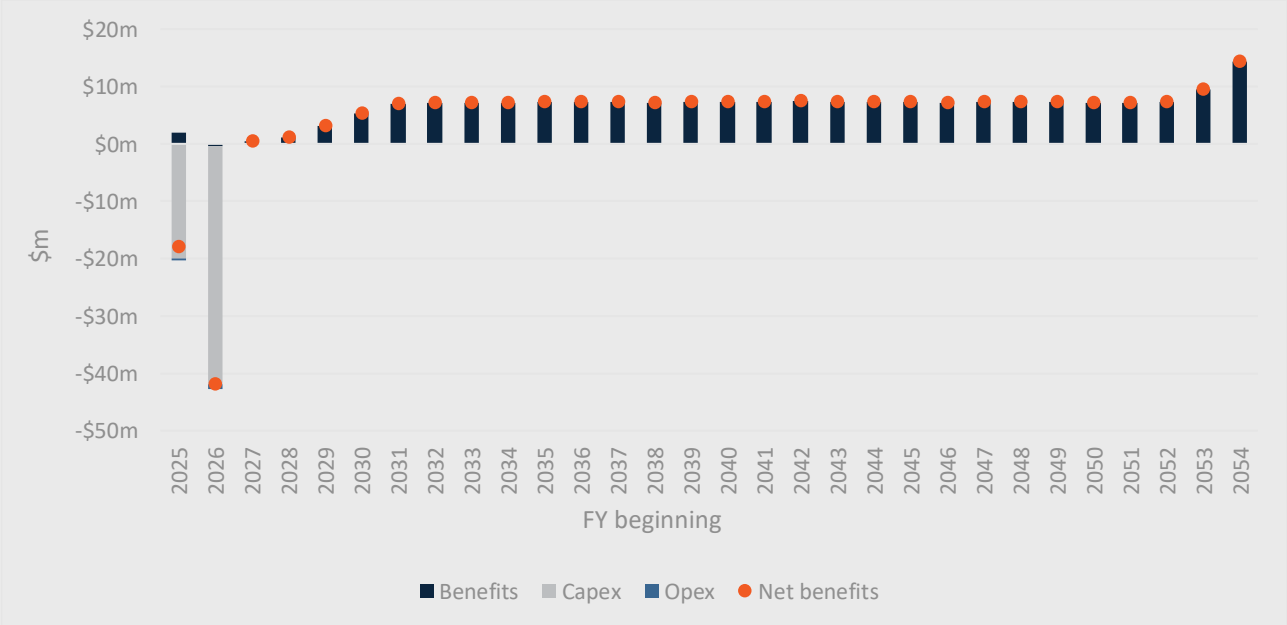


Table 17 presents the Option 1 costs and net benefits by cost type and review cycles.

Table 17: Option 1 costs and benefits by cost type and Regulatory Control Period ($m, June 2022 real, undiscounted)

	2025-26	2026-27	2027-28	2028-29	2029-30	Total 2025 - 30	2030-31	2031-32	2032-33	2033-34	2034-35	Total 2030-35	Total 2025 to 2055
Benefits (Capex)	$2.3	$0.1	$0.3	$1.0	$2.8	**$6.6**	$5.1	$6.7	$6.8	$6.8	$6.8	**$32.2**	**$185.9**
Benefits (Opex)	-$0.3	-$0.5	$0.2	$0.2	$0.2	**-$0.2**	$0.2	$0.3	$0.3	$0.3	$0.3	**$1.5**	**$8.7**
Costs (Capex)	$20.0	$40.8	$0.0	$0.0	$0.0	**$60.8**	$0.0	$0.0	$0.0	$0.0	$0.0	**$0.0**	**$60.8**
Costs (Opex)	$0.4	$0.8	$0.0	$0.0	$0.0	**$1.2**	$0.0	$0.0	$0.0	$0.0	$0.0	**$0.0**	**$1.2**
Net benefits	**-$18.3**	**-$42.0**	**$0.5**	**$1.2**	**$3.1**	**-$55.6**	**$5.3**	**$6.9**	**$7.1**	**$7.1**	**$7.2**	**$33.6**	**$132.6**

5.7.2 MCA for Option 1: Rebuild at the same site

The results of MCA for Option 1 are presented in Table 18 in line with the criteria and rating scale outlined in Appendix B.

Table 18: Results of MCA for Option 1

#	MCA criteria	MCA assessment		Rating
1	Network and Reliability	×	High network performance risk from limited repair jobs during re-construction.	2
		×	Site is not scalable to support an increase in production and storage risking reliability.	
		✓	Supports the future energy strategy because new workshop space is versatile- subject to congestion.	
2	Operational Safety	✓	Safety risks likely to reduce subject to congestion.	3
3	Culture and Workforce	✓	Retain unique repair capability with SA Power Networks.	4
		✓	Improved staff workplace conditions.	
4	Deliverability	✓	Ownership control over approvals processes.	1
		×	Business continuity not possible during re-construction preventing repair activities for 2-3 years.	
		×	Challenges in construction sector labour and material costs and timing.	
5	Socio-economic and environmental impacts	×	No resolution of impact on neighbouring residents (from noise, dust, odours, visual quality, and street congestion).	3
		×	Additional impact on community during re-construction.	
		✓	Retain employment within SA.	
		✓	Sustainability improvements and reduced carbon footprint through Environmentally sensitive and energy efficient design.	
6	Network assets recycling opportunities	✓	Provides the ability to recover essential parts from units that are not suitable for refurbishment.	4
Total score				**17/30**

5.8 Option 2: Build at a new site

The scope of this option is to build a new Transformer Workshop, located at our site in Edinburgh North, an outer northern suburb of the Adelaide metropolitan area, which is approximately 24 km north of the Adelaide city centre. The construction of the project is expected to be initiated in the first half of the year 2026. The construction of the project will take 18 month which is across 2 regulatory year 2025/2026 and 2026/27.

The existing Transformer Workshop will continue to provide the repair and maintenance services during the time of a new workshop construction. Consequently, the current quality and consistency of the work will be maintained.

A high-level pre-concept plan for the new Transformer Workshop includes the list of following items:

- obtaining required approvals from relevant authorities
- construction of a Transformer Workshop facility including office as a stand-alone building
- landscaping (inside and outside of boundary) and drainage
- cranes and crane rail

The following items have been excluded from the plan:

- removal and disposal of any soil contamination.
- cut and fill or imported material to adjust levels across the site.
- rise & fall provision.
- rock excavation.
- latent conditions.
- removal/relocation of existing stormwater drainage, if any.
- removal/relocation of existing services to the site, if any.

5.8.1 CBA for Option 2: Build at a new site

The primary opportunities for benefits in this option, relative to BAU base case, are avoided costs for inspecting and maintaining cranes, site reactive maintenance and mobile crane moves. While maintenance costs will be incurred at the new site, these would be much lower and reactive and replacement costs will not be required for approximately 10 years and then at very low levels. There is also a benefit in the potential to divest or re-purpose the workshop space and manage a higher throughput of repair work. The costs of construction, land purchase of the new site, and demolishing and remediating the old site are offset by the benefits. Option 2 has the highest incremental NPV of all the options at $78.6 million at 4.05% discount rate over the evaluation period. The CBA results of Option 2 are presented in Table 19 and Figure 10.

Table 19: CBA results for Option 2 ($m, June 2022 real, 30-year period, undiscounted)

Costs/benefits	Capex/Opex	Present Value (PV) 4.05% discount rate	Undiscounted
Incremental Benefits			
Avoided maintenance cost	Capex	$0.3	$0.4
Avoided works	Capex	$2.2	$2.2
Avoided reactive cost	Capex	$2.7	$4.8
Avoided workshop asset replacement cost	Capex	$1.2	$2.8
Increased Transformer Throughput savings	Capex	$89.7	$168.5
Reclaimed Oil	Opex	$3.3	$6.3
Terminal value - improvements	Capex	$2.2	$7.0
Terminal value - land	Capex	$1.2	$3.8
Avoided crane hire	Opex	$1.8	$3.1
Opportunity value of EN[22]	Capex	-$3.3	-$3.3
Total Capex	Capex	$96.2	$186.0
Total Opex	Opex	$5.1	$9.5
Sum of Benefits		**$101.3**	**$195.5**
Incremental Costs			
Total Capex	Capex	$22.7	$23.4
Total Opex	Opex	$0.0	$0.0
Sum of Costs		**$22.7**	**$23.4**
NPV		**$78.6**	**$172.1**

Figure 10: Cost and benefits profile for Option 2 ($m, June 2022 real, 30-year period, undiscounted)

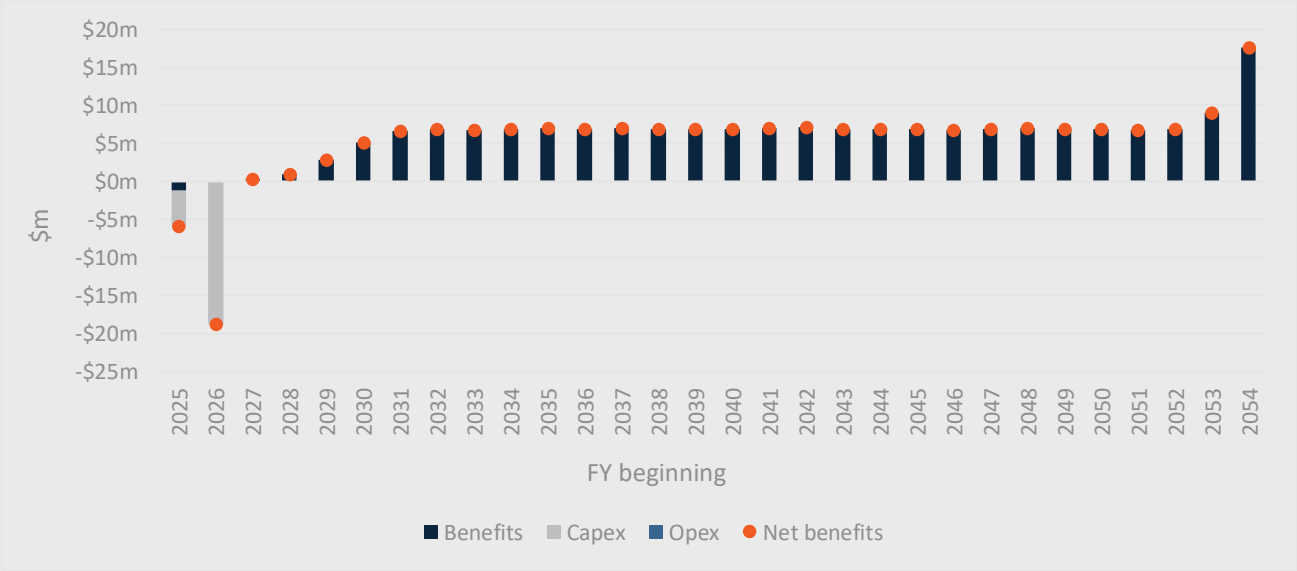


Table 20 presents the Option 2 costs and benefits by cost type and review cycles.

Table 20: Option 2 costs and benefits by cost type and Regulatory Control Period ($m, $ June 2022 real, undiscounted)

	2025-26	2026-27	2027-28	2028-29	2029-30	Total 2025 - 30	2030-31	2031-32	2032-33	2033-34	2034-35	Total 2030-35	Total 2025 to 2055

[22] The loss of the opportunity value of the Edinburgh North land for an alternative use or sale as the land is used for the Transformer Workshop

Benefits (Capex)	-$1.1	$0.0	$0.3	$1.0	$2.8	**$3.0**	$5.1	$6.7	$6.8	$6.8	$6.8	**$32.2**	**$186.0**
Benefits (Opex)	$0.0	$0.0	$0.2	$0.2	$0.2	**$0.6**	$0.2	$0.3	$0.3	$0.3	$0.3	**$1.5**	**$9.5**
Costs (Capex)	$4.7	$18.7	$0.0	$0.0	$0.0	**$23.4**	$0.0	$0.0	$0.0	$0.0	$0.0	**$0.0**	**$23.4**
Costs (Opex)	$0.0	$0.0	$0.0	$0.0	$0.0	**$0.0**	$0.0	$0.0	$0.0	$0.0	$0.0	**$0.0**	**$0.0**
Net benefits	**-$5.8**	**-$18.7**	**$0.5**	**$1.2**	**$3.1**	**-$19.8**	**$5.3**	**$6.9**	**$7.1**	**$7.1**	**$7.2**	**$33.6**	**$172.1**

5.8.2 MCA for Option 2: Build at a new site

The results of MCA for Option 2 are presented in Table 21 in line with the criteria and rating scale outlined in Appendix B.

Table 21: Results of MCA for Option 2

#	MCA criteria	MCA assessment	Rating
1	Network and Reliability	✓ Low network performance risk as there is no service disruption during construction works. ✓ Supports the future energy strategy because new workshop space is versatile.	4
2	Operational Safety	✓ Safety risks likely to reduce.	5
3	Culture and Workforce	✓ Retain unique repair capability with SA Power Networks. ✓ Improved staff workplace conditions.	4
4	Deliverability	✓ Utilisation of already purchased land × Challenges in construction sector related to costs and timing.	3
5	Socio-economic and environmental impacts	✓ Resolves impact on neighbouring residents of current site (from noise, dust, odours, visual quality, and street congestion). ✓ Site is scalable to support an increase in production and storage. ✓ No site congestion. ✓ Retain employment within SA. ✓ Sustainability improvements and reduced carbon footprint through Environmentally sensitive and energy efficient design.	5
6	Network assets recycling opportunities	✓ Provides the ability to recover essential parts from units that are not suitable for refurbishment.	5
Total score			**26/30**

5.9 Option 3: Phase out Transformer Workshop

This option is to purchase new transformers when they malfunction instead of retaining in-house capability for maintenance and repair. Option 3 is shown to be the most expensive option due to the high cost of

transformer replacement. It also provides far inferior qualitative outcomes, and it represents inefficient use of existing transformer resources, due to discarding faulty transformers that would otherwise be repaired.

5.9.1 CBA for Option 3: Phase out Transformer Workshop

The primary opportunities for benefits in this option are from avoiding operational and capital cost of maintaining the existing Transformer Workshop, from the value of the backfill space created by the decommissioning of the existing site and selling the acquired land. The costs arise from transformer replacement and purchasing oil.

This option is shown to be at a much higher order of magnitude of cost representing the highest cost option compared to all other options. The incremental NPV results of CBA for Option 3 are $ -434.2 million presented in Table 22 and graphically presented in Figure 11. This value is not a realistic option but was presented to demonstrate that it is not recommended.

Table 22: CBA results for Option 3 ($m, $June 2022 real, 30-year period)

Costs/benefits	Capex/Opex	Present Value (PV) 4.05% discount rate	Undiscounted
Incremental Benefits			
Avoided workshop asset replacement cost	Capex	$1.4	$3.2
Avoided maintenance cost	Capex	$0.8	$1.3
Avoided works	Capex	$2.2	$2.2
Avoided reactive cost	Capex	$3.7	$6.8
Avoided crane hire cost	Opex	$2.0	$3.4
Total Capex	Capex	$8.0	$13.5
Total Opex	Opex	$2.0	$3.4
Sum of Benefits		**$10.0**	**$16.9**
Incremental Cost			
Transformer replacement cost	Capex	$264.2	$449.7
Switching cubicle replacement cost	Capex	$175.9	$295.1
Increased transformer inventory cost	Capex	$4.2	$4.2
Total Capex	Capex	$444.2	$749.0
Total Opex	Opex	$0.0	$0.0
Sum of cost		**$444.2**	**$749.0**
NPV		**-$434.2**	**-$732.1**

Figure 11: Cost and benefits profile for Option 3 ($m, $ June 2022 real, 30-year period, undiscounted)

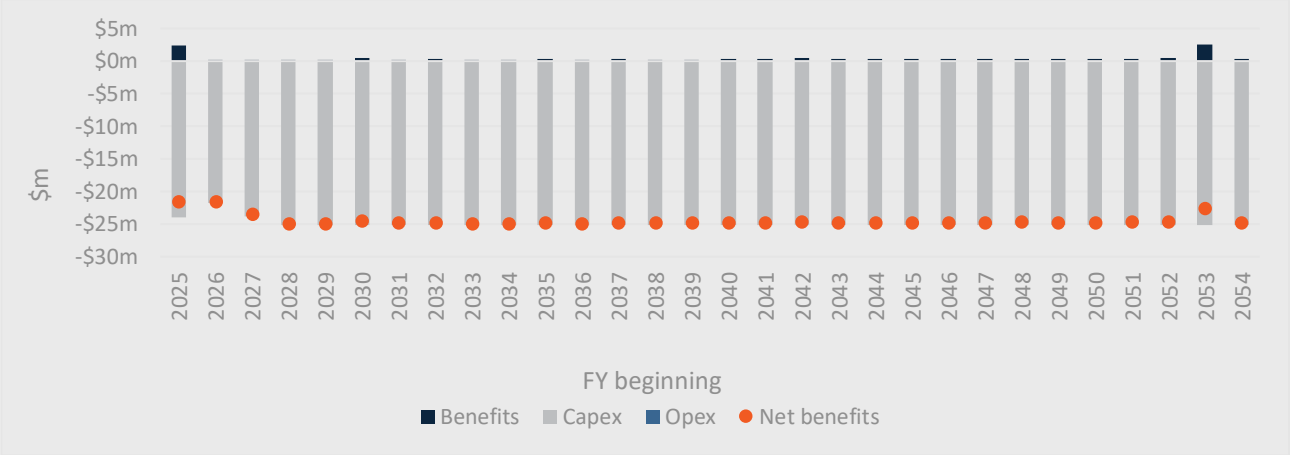


Table 23 presents the Option 3 costs and benefits by cost type and review cycles.

Table 23: Option 3 costs and benefits by cost type and Regulatory Control Period ($m, 2022 real, undiscounted)

	2025-26	2026-27	2027-28	2028-29	2029-30	Total 2025 – 30	2030-31	2031-32	2032-33	2033-34	2034-35	Total 2030-35	Total 2025 to 2055
Benefits (Capex)	$2.4	$0.2	$0.2	$0.2	$0.2	**$3.1**	$0.5	$0.3	$0.4	$0.2	$0.2	**$1.6**	**$13.5**
Benefits (Opex)	$0.1	$0.1	$0.1	$0.1	$0.1	**$0.6**	$0.1	$0.1	$0.1	$0.1	$0.1	**$0.6**	**$3.4**
Costs (Capex)	$24.0	$21.8	$23.8	$25.2	$25.2	**$119.9**	$25.2	$25.2	$25.2	$25.2	$25.2	**$125.8**	**$749.0**
Costs (Opex)	$0.0	$0.0	$0.0	$0.0	$0.0	**$0.0**	$0.0	$0.0	$0.0	$0.0	$0.0	**$0.0**	**$0.0**
Net benefits	**-$21.5**	**-$21.5**	**-$23.5**	**-$24.9**	**-$24.9**	**-$116.2**	**-$24.5**	**-$24.8**	**-$24.7**	**-$24.8**	**-$24.8**	**-$123.7**	**-$732.1**

5.9.2 MCA Option 3: Phase out Transformer Workshop

The results of MCA for Option 3 are presented in Table 24 in line with the criteria and rating scale outlined in Appendix B.

Table 24: Results of MCA for Option 3

#	MCA criteria	MCA assessment		Rating
1	Network and Reliability	×	High network performance risk due to dependence on multiple external providers.	1
		×	Risk of lengthening electricity supply outages.	
2	Operational Safety	✓	Safety risks likely to reduce.	5
3	Culture and Workforce	×	Unique repair capability with SA Power Networks cannot be retained, including on-network site.	1
		×	Redundancy risks.	
4	Deliverability	×	No utilisation of already purchased land.	1
		×	Challenges in loss of control over the timing of transformer delivery, quality control and dependence on multiple external providers	
5	Socio-economic and environmental impacts	✓	Resolves impact on neighbouring residents of current site (from noise, dust, odours, visual quality, and street congestion).	2
		✓	No site congestion.	
		×	Reduces skilled employment within SA.	
		×	Indirect increase in carbon emission.	

#	MCA criteria	MCA assessment		Rating
6	Network assets recycling opportunities	×	Provides the ability to recover essential parts from units that are not suitable for refurbishment.	1
Total score				**11/30**

6 Deliverability of the recommended option

In structuring the identified activities into a sequenced program of work to be undertaken in the 2025-30 RCP, we considered the level and nature of works related to the recommended option that can be delivered, noting the availability of resources and materials. The assessment results for Option 2 demonstrate that it is more efficient to replace the assets that comprise the Transformer Workshop within a short timeframe managed as a single project investment, than to invest in their capital maintenance and replacement under the BAU base case.

We will outsource the delivery of capital and maintenance works on our property assets. Both Capital Construction and Operational Maintenance are undertaken by outsourced service providers. Administration and Project Management functions are undertaken by internal resources.

We have existing building panel arrangements in place with several construction vendors in the market to provide resources or skills as required, noting that specialised electrical skills are not generally required for the majority of property works. Vendor Panels are in place with suppliers for architecture, engineering, trade and building construction works. The appointment of each supplier to the panel is subject to a process of negotiation to ensure the contracted arrangement reflects the efficient cost to procure the resources as and when required. A high-level conceptual workshop and storage facility design has been prepared, shown in Figures 12 and 13 below and an independent quantity surveyor estimate developed.

We have a proven track record of managing the build of new depots to schedule and within budget, with Angaston Depot in the Barossa Valley region as the most recent example of a large industrial development. Following the recommendation of the Asset Condition and Risk sub-committee of our Community Advisory Board (CAB) and Focused Conversations with our stakeholders and customers, consideration will also be given to bundling works by region or project type and builder to achieve economies of scale.

Construction is scheduled to begin towards the end of 2025 and continue into the second half of 2026, taking approximately 12 months. In developing the proposed program of work, we have assessed the optimal timing and resourcing of the Transformer Workshop and in relation to other proposed projects. The total program of expenditure has been considered in terms of the timing and site location of each item. The register of works in each year at each site are then assessed against:

- forecast resource availability; and
- other items of work to be undertaken at similar points in time or at the same site.

Through this assessment, we undertake proactive workforce planning by seeking to identify gaps in resource capacity and opportunities to achieve cost efficiencies in the delivery of multiple items of work.

Figure 12: Concept image for the new Transformer Workshop and Storage Facility – Recommended Option

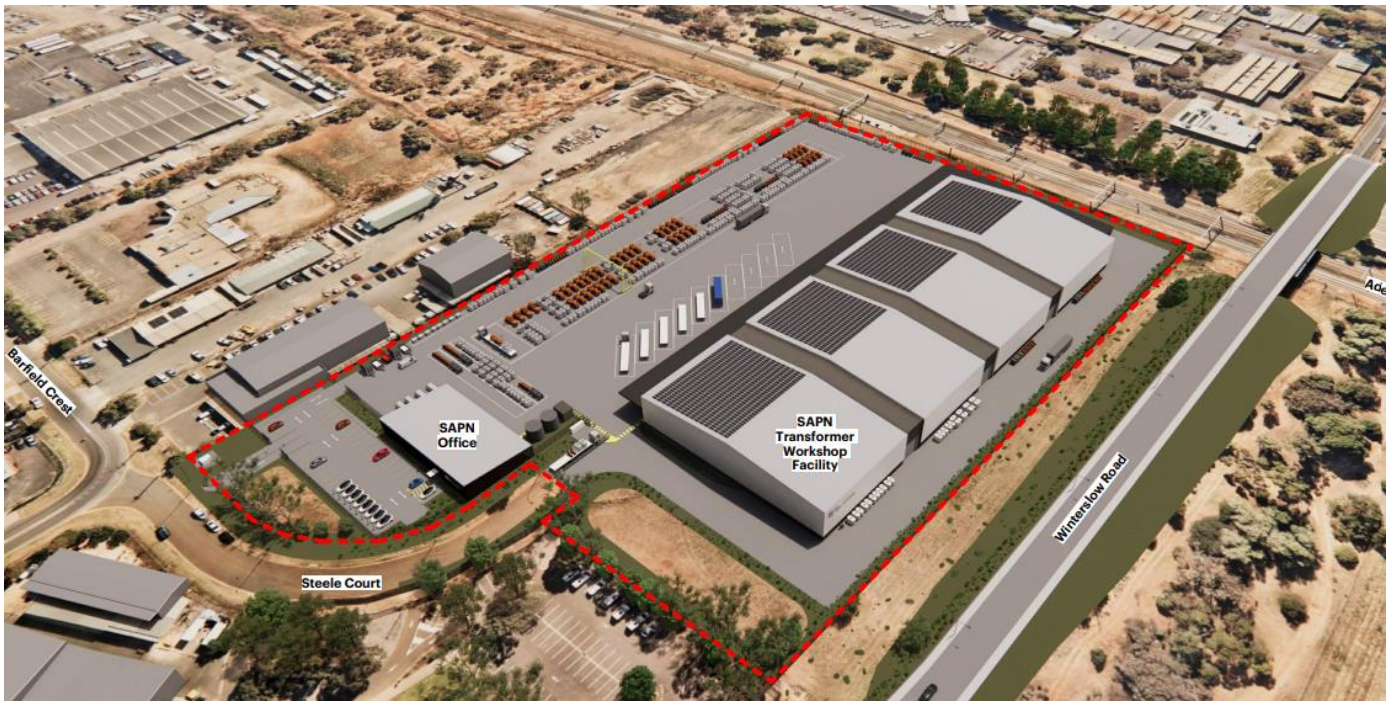
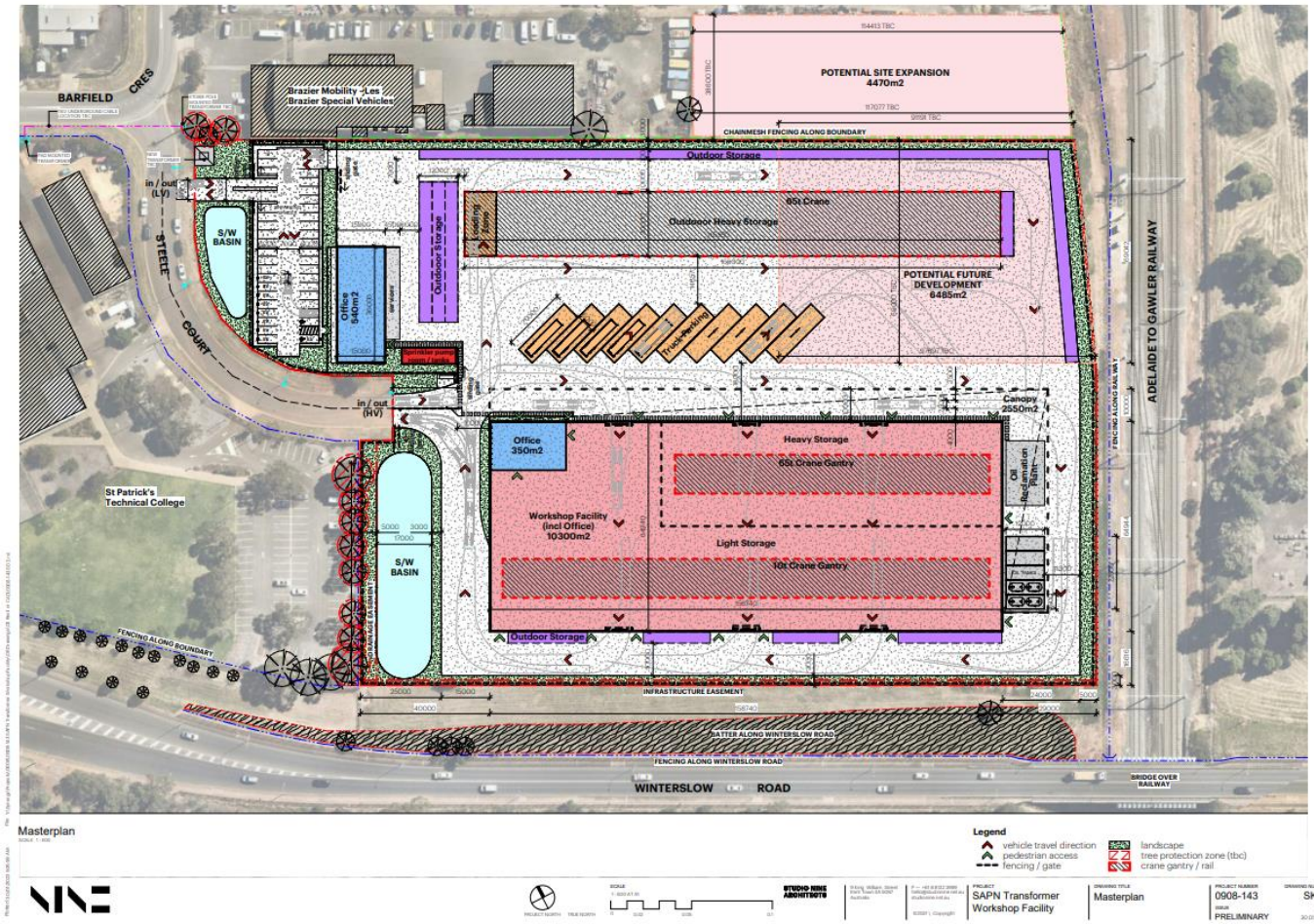


Figure 13: Concept Masterplan for the new Transformer Workshop and Storage Facility – Recommended Option



7 How the recommended option aligns with our engagement

A series of stakeholder engagement sessions were in relation to identified needs and options for the Transformer Workshop facility. Figure 14 below outlines the key stages of our engagement program.

Figure 14: Key stages of engagement

Engagement with customers and community began in 2021 where we sought broad input on key factors that customers value in the delivery of the distribution network services. We presented an overview of the property portfolio including asset management plans and the proposed systematic and proactive approach to building asset lifecycle management to achieve strategic objectives. The options for the Transformer Workshop was presented as a key strategic project in the non-recurrent stream of expenditure for discussion, including general costs and benefits of the project.

This was followed in early 2022 by broad engagement across South Australia with geographically and socially diverse groups of customers, and then six months of Focused Conversations on critical issues with a selection of stakeholders with deep knowledge.

This process culminated in a People's Panel early this year, where advice was sought from a representative group of 51 South Australian customers as to the most appropriate overall balance between price and service in the 2025-30 period, considering all aspects of trade-offs between price and service.

Our total property forecast and the needs it responds to were discussed in detail with customers in our Focused Conversations, and ultimately deliberated on and supported by the People's Panel in their recommendations. The sections below provide further detail of core components of the process where we engaged our customers and the community on the Recurrent expenditure investment decision and options.

Throughout the engagement process, customers recognised the need to respond to the deteriorating condition of our property assets to maintain fit for purpose, safe, suitable and efficient working environments to support our network distribution service provision. At each engagement session, the conclusion was that we should invest in addressing the identified needs that are not being met by the current state of the condition of the transformer workshop.

7.1 Preliminary Customer Engagement

A preliminary customer engagement session was held with customers on 21 September 2022 regarding property and fleet. Options for the property portfolio were presented, including the Transformer Workshop. The options considered for discussion were:

- the BAU base case;
- Option 1: Re-develop in situ;
- Option 2: Build at a new site; and
- Option 3: Delay Build/relocation.

The nature of the costs and benefits were described under each option.

7.2 Focused Conversations

In the second half of 2022 we held over 40 Focused Conversations with 300 stakeholders. The aim of these conversations was to dive deeper into specific priorities and key issues identified in the earlier engagement and narrow options on service and price outcomes. Property was one of 13 topics we discussed in our Focused Conversation. We consulted on renewal and refurbishment of property assets and strategic projects responding to asset age, work volume, and operational efficiencies.

A Property Focused Conversation workshop was held with CAB on 11 November 2022. At the workshop, we presented three scenarios to help frame our engagement. This was to allow stakeholders to explore the trade-offs in the service outcomes posed by the different scenarios on network investments. This approach allowed stakeholders to understand the expenditure requirements and price outcomes needed to maintain or improve customer outcomes and provide transparency on how we align forecast expenditure to customer expectations. The participants considered the three scenarios of expenditure:

1. Scenario 1 – Basic: asset replacement and routine maintenance;
2. Scenario 2 – Maintain;
3. Scenario 3 – New value: the Transformer Workshop, new or expanded depot capacity and SMAS/Transmission Depot.

For the Transformer Workshop, we presented the following options, and discussed the indicative costs and benefits of each option:

- Base case – Business as Usual: All assets at existing transformer workshop site to be replaced, maintained and renewed;
- Option 1 – Re-develop in situ;
- Option 2 – Build at a new site: Construct a modern fit for purpose transformer workshop at a new location; and
- Option 3 – Delay.

The Focused Conversation recommended to the People's Panel that we should invest in the Transformer Workshop upgrade as a strategic project, and that Option 2 should be selected provided it is supported by the CBA, on the basis that:

- we require a fit for purpose facility to manage expected demand;
- the implications of not upgrading the workshop are critical as they will likely affect customer service levels; and

- the need for the upgrade of the transformer workshop to achieve compliance, manage the condition (currently poor) and ensure its criticality to the business was understood by stakeholders.

Focused Conversations recommended expenditure for a new Transformer Workshop in their recommendation to the People's Panel.

7.3 People's Panel

The recommendation in the Final Report – Balancing Service and Price, March 2023[23] was that "SA Power Networks includes in its Regulatory proposal to the AER, the investment in Property in line with the programmatic recommednaitons made by the Focussed Conservation." The report commented that the proposed property expendirture "is important because it is a critical part of SA Power Network's service and maintaining property is essential. It is also important to keep work local because it reduces work time and provides employment. Having purpose-built facilities provides safer workspaces as well."

7.4 Submissions on Draft Proposal

Since conducting the People's Panel, we published a Draft Proposal to play back how we have given effect to customer recommednations and to confirm that those recommendations remain valid given continued cost of living pressuress and to obtain further input to refine our Regulatory Proposal. Submissions received on our Draft Proposal suggest that the recommendations of the People's Panel remain valid with respect to property, this is noting that:

- members of the People's Panel affirmed that their recommendations, including in respect of property expenditure as set out in this business case, remain current;[24]
- some parties such as that from the South Australian Council of Social Services and the Department of Energy and Mining urged further consideration of the overall magnitude of our forecat capital expenditure across in totality;
- no other submission received has raised concerns in relation to property expenditure; and
- a submission received from a sub-group of our CAB which took the lead in engaging on property issues (the Asset Condition and Risk Sub-Committee) endorsed the recommendation on property reflected in this business case, on the basis that it is an appropriate level of risk mitigation that will deliver a fit-for-purpose, safe and compliant property portfolio of assets that meets the needs of SA Power Networks' customers and employees.[25]

7.5 Conclusion of Stakeholder Engagement

Our customers have told us that they expect us to invest to address the current shortfalls of the Transformer Workshop in the most cost-effective manner. The recommended Option 2 of Build a Transformer Workshop at the New site aligns with their views communicated to us.

Key benefits that the new Transformer Workshop will provide to our customers are:

- a fit-for-purpose structure designed to repair, service and store both heavy and light transformers at low cost;
- increased size to meet expected demand for repair work of transformers and switch cubicles;
- maintain customer service levels in respect of reliability;

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23 SA Power Networks People's Panel Final Report – Balancing Service & Price, March 2023.

24 DemocracyCo, *Submission: SA Power Networks Draft Regulatory Proposal 2025-30*, 30 August 2023.

25 AC&RSC, *Submission on behalf of the Asset Condition and Risk Sub-Committee: Draft Regulatory Proposal 2025-30*, 17 August 2023.

- control the supply chain for transformers by fast repair times and optimal storage strategy;
- increased staff safety through the rectification of non-compliances associated with aged property facilities that do not meet current legislative and regulatory requirements;
- support appropriate functioning of assets that are critical to our ongoing business viability since we has many transformers that are bespoke to our network and it is cost-effective to repair them; and
- lower costs from refurbishing transformers at the volume required to meet the forecast level of repairs.

8 Alignment with our vision and strategy

This recommended option aligns with our vision and 30-year Property Strategy. Figure 15 below shows where this case for investment resides within the broader framework of relevant plans and strategies that outline the approach by which we will provide and maintain a fit-for-purpose, safe and compliant portfolio of property assets that effectively and efficiently meets the needs of our people and our customers.

By investing in modern and efficient infrastructure, we can ensure that the Network remains reliable and resilient and can meet the evolving needs of customers. A new Transformer Workshop supports this objective by providing fit-for-purpose, compliant and contemporary facilities for the maintenance and repair of transformers and switching cubicles, which are critical components of the network. With regards to Safety, the Transformer Workshop can provide a safe work environment for the people working within the facility and for its contractors and visitors. The workshop will be designed in compliance with all current, relevant safety and environmental regulations, and building codes ensuring that the facility is fit for purpose and minimises the risk of accidents or incidents.

In addition, the construction of a new Transformer Workshop can help us to meet our Sustainability goals. By incorporating water sensitive and energy-efficient design features and utilising renewable energy sources such as rooftop solar photovoltaic panels, the facility will reduce its environmental impact and support our commitment to reducing our carbon footprint.

Further, the construction of a new Transformer Workshop supports our objective of delivering affordable energy to our customers. By investing in a modern and efficient depot, we can reduce future cost escalations and improve operational efficiency, which contributes towards lower electricity prices for our customers.

Overall, the Transformer Workshop plays a key role in supporting several of the focus areas outlined in our Property Strategy, including Safety, Customer, Network, and Sustainability, while also supporting the goal of providing and maintaining a fit-for-purpose, safe, and compliant portfolio of property assets that effectively and efficiently meets the needs of our people and customers.

Figure 15: Map of property-related documents

Appendix A: Property Condition Assessment Report Marleston

404727 – Condition Report – Marleston – Master Draft 14.12.21

Appendix B: MCA criteria and rating scale

Table 25 outlines the MCA criteria used in the qualitative benefits and costs assessment. These criteria were discussed with stakeholders during the stakeholder engagement process.

Table 25: MCA criteria

#	MCA criteria	Description
1	Network and Reliability	The option is likely to support strategic focus areas: "Providing the foundation for the new energy future" and "Achieving operational excellence and delivering on our priorities" (Strategic Plan 2022-2026). The option indirectly supports reliability and security of supply consistent with the NER expenditure objectives.
2	Operational Safety	The option is likely to support strategic focus areas of Safety "Ensuring the safety of our people and community, every day" (Strategic Plan 2022-2026) and safety of supply of electricity from the NER expenditure objectives.
3	Culture and Workforce	Support the critical enabler of "An engaged, aligned and high performing workforce" (Strategic Plan 2022-2026).
4	Deliverability	The option is capable of being delivered in practical terms of the market capacity to supply materials and skilled construction workers.
5	Socio-economic and environmental impacts	The option will deliver positive broad socio-economic and environmental benefits including broader employment, local community, land use and environmental benefits.
6	Network assets recycling opportunities	The option provides the ability to recover essential parts from units that are not suitable for refurbishment. This is particularly important for critical components of the network like ABB Isolators that are essential for the efficient, safe, and reliable operation of the SA electricity distribution network.

Table 26 outlines the MCA rating scale against each of the criterion.

Table 26: MCA rating scale

#	MCA rating scale
1	Little to no attainment of the criterion
2	Low attainment of the criterion
3	Moderate attainment of the criterion
4	High attainment of the criterion
5	Very high attainment of the criterion

Appendix C: Criticality Assessment

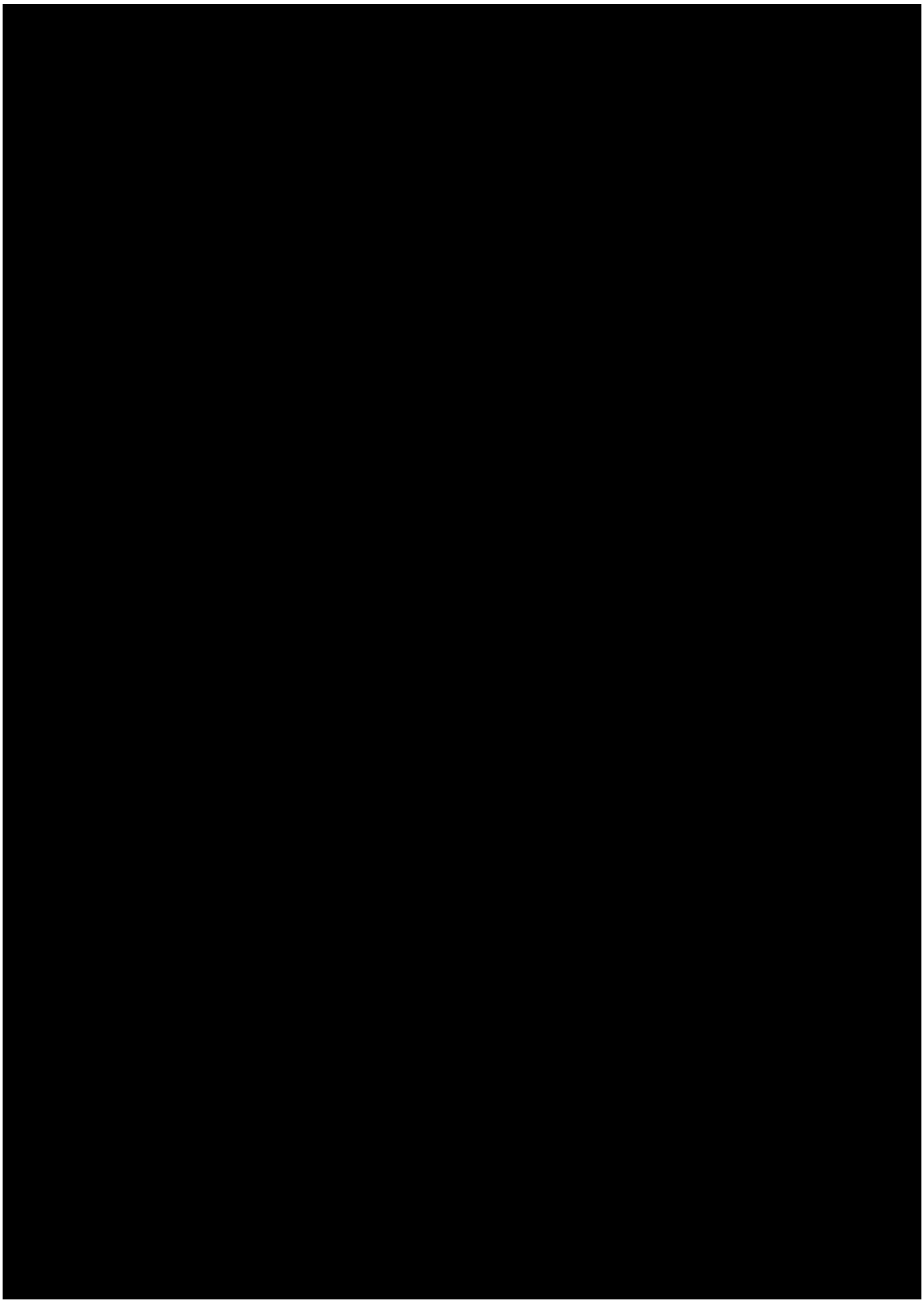
Criticality – top sites

Site ID	Site Address	Location/ Building	Consequence rating	Likelihood rating	Criticality rating
AGL500	500 Grand Junction Rd, Angle Park	Building 8	4.70	3.80	16.72
AGL500	500 Grand Junction Rd, Angle Park	Building 9	4.70	3.80	16.72
MRL212	212 Richmond Rd, Marleston	Building 12	4.70	3.80	16.72
STM33A	33 Ayliffes Road, St Marys	Building 4	4.20	3.80	16.72
STM33A	33 Ayliffes Road, St Marys	Building 6	4.20	3.80	16.72
KES1AN	1 Anzac Highway, Keswick	Building 1	4.88	3.20	15.20
AGL500	500 Grand Junction Rd, Angle Park	Building 12	4.70	3.20	14.08
AGL622	622 South Road Angle Park	Building 1	3.70	3.20	14.08

Appendix D: Risk Assessment

Risk assessment outcome for all options

ID	Risk scenario	Consequence description	Consequence category	Current risk – BAU			Residual risk – Option1			Residual risk – Option 2			Residual risk – Option 3		
				Consequence	Likelihood	Risk Level	Consequence	Likelihood	Risk Level	Consequence	Likelihood	Risk Level	Consequence	Likelihood	Risk Level
1	Inability to reuse and replace SA Power Networks specific transformers	Significant capital expenditure required to procure new transformers for the network	**Performance & Growth**	2	2	Low	3	4	High	3	2	Low	5	4	Extreme
			Network	2	2	Low	3	3	Medium	2	2	Low	4	4	High
2	Procurement and supply chain risk for new transformers	Delays in procurement of critical assets for the network with potential impact on reliability of supply	**Network**	1	1	Negligible	2	3	Low	2	2	Low	4	3	High
		Potential disruption of supply to customer or poor level of service	**Customers**	2	2	Low	2	3	Low	2	2	Low	4	3	High
3	Ageing building infrastructure	Potential safety impacts due to asset failure and lack of fit for purpose facility	**Safety**	4	3	High	3	2	Low	3	2	Low	1	2	Negligible
		Lack of a safe and compliance environment for workforce	**Culture & workforce**	3	4	High	2	3	Low	2	2	Low	1	2	Negligible
4	Non-compliance of environmental regulations and standards	Unable to achieve SA Power Networks sustainability targets	**Sustainability**	3	3	Medium	3	4	High	3	2	Low	2	2	Low
		Potential impact resulting in environmental harm and penalties	**Performance & Growth**	3	3	Medium	4	4	High	3	2	Low	2	2	Low
			Overall Risk Level			High			Medium			Low			High



Appendix F: SAPN Property Criticality Assessment Overview

SAPN Property Criticality Assessment Overview