Attachment 20.46

SA Power Networks: Undergrounding for Road Safety Business Case

October 2014

Business Case

Undergrounding for road safety

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SA Power Networks

www.sapowernetworks.com.au

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1. Executive Summary

1.1 Requirement for the Project

Across metropolitan and regional South Australia, SA Power Networks' assets line thousands of km of roads, many of which have high traffic flows. The potential for vehicles to collide with infrastructure is greater at intersections and sections of road subject to high traffic volumes.

During SA Power Networks' Customer Engagement Program a specific collaborative workshop was held on undergrounding as customers had previously (in earlier stages of the program) raised significant concerns regarding road safety risks associated with SA Power Networks' Stobie poles. Recognising the prohibitive costs of widespread undergrounding, participants indicated a preference for reducing community safety hazards by a targeted approach to undergrounding power lines and poles at high risk locations as expressed in stakeholder-derived principles that were agreed at the collaborative workshop.

SA Power Networks' Customer Engagement Program was then extended to develop project options based on the stakeholder-derived principles, followed by testing price sensitivity via Willingness to Pay research (using discrete choice modelling techniques) on the various options for targeted approaches to undergrounding power lines for road safety purposes.

The Willingness to Pay research identified that the majority (56%) of those surveyed were willing to pay up to $9.40 annually for a targeted program of undergrounding power lines to address up to thirty traffic blackspots (approximately 15 intersections and 15km of road), thereby reducing the potential for vehicle collisions with Stobie poles. At an estimated annual cost of $6.20, there was 74% support for at least twenty blackspots.

This proposed program is in response to customer feedback indicating a preference for undergrounding of SA Power Networks' overhead powerlines in locations with evidence of a high number of traffic incidents involving Stobie poles. In the interest of minimising pricing impacts on customers, SA Power Networks is proposing to adopt the lower cost program consisting of 20 blackspots. SA Power Networks considers this response to the customer preferences revealed by our Customer Engagement Program to be a prudent and balanced program.

1.2 Business Options Considered

SA Power Networks considered a range of safety improvement options. Through collaborative discussions with customers and community Subject Matter Experts at the workshops, it was agreed that SA Power Networks should maintain its current Power Line Environment Committee (**PLEC**) program in its present form, but develop a separate additional undergrounding program in line with the following principles:

- taking a long term view to undergrounding the network;
- placing priority on targeted undergrounding for community safety in high bushfire areas (refer to the Bushfire mitigation business case, Attachment 20.45); and
- placing priority on targeted undergrounding for community safety at identified dangerous road sections and intersections.

Subsequent Willingness to Pay choice modelling research provided SA Power Networks with clear evidence that customers are willing to contribute additional funds through their annual electricity account when road safety can be improved in the manner represented by the proposed program.

1.3 Recommended Option

SA Power Networks is proposing a program in the 2015-20 Regulatory Control Period (**RCP**) to underground targeted overhead power line assets in 20 high risk traffic accident areas (approximately 10 intersections and 10km of power lines along roadways), over a five year period at a program cost of around $77.4m.

2. Reasons

2.1 Objectives

The objectives of this business case are as follows:

- targeted undergrounding of SA Power Networks' overhead power lines at identified intersections and road sections where high risk has been evidenced by past vehicle incidents involving Stobie poles.

2.2 Background

The AER must have regard to, among other things, the extent to which the Proposal includes expenditure to address the concerns of electricity customers as identified through engagement with electricity consumers (sections 6.5.7(e)(5A) and 6.5.6(e)(5A) of the NER).

SA Power Networks' customers have expressed that they have a high level of concern regarding community safety and want SA Power Networks to undertake strategic investment that focuses on public safety, (refer to Section 2.3)[1].

Through the Customer Engagement Program, SA Power Networks' customers identified community safety concerning bushfires and road safety as priority areas for the undergrounding overhead power lines. In a separate targeted workshop, customers and community Subject Matter Experts (**SMEs**) recognised that while broad scale undergrounding of the electricity network is cost prohibitive, selective undergrounding in priority areas is a more prudent approach to address customers' concerns and preferences.

The workgroup concluded that SA Power Networks should develop an Undergrounding plan that maintains the PLEC program in its present form, and develop a separate additional undergrounding program in line with the following principles:

- taking a long term view to undergrounding the network;
- placing priority on targeted undergrounding for community safety in high bushfire areas (refer to the Bushfire mitigation business case, Proposal Attachment 20.45); and
- placing priority on targeted undergrounding for community safety at identified high risk intersections and road sections.

Subsequent Willingness to Pay choice modelling research provided SA Power Networks with clear evidence that customers are willing to contribute additional funds through their annual electricity account when road safety can be improved In the manner represented by the proposed program.

In response, SA Power Networks is proposing a targeted approach to undergrounding power lines at locations that have repeatedly been impacted. The proposed forecast expenditure for this program is $77.4 million. This expenditure is supported by detailed discrete choice modelling Willingness to Pay research (refer to Section 2.3).

To ensure prudency of the program, a working group consisting of SA Power Networks, Motor Accident Commission (**MAC**) and Department of Planning, Transport and Infrastructure SA (**DPTI**) personnel has been formed. A letter of agreement has been developed (refer to Attachment A) to select suitable remediation locations on an annual basis. An initial assessment has identified two locations for remediation (refer to Attachment B), with a further eighteen locations to be identified and remediated over the 2015-20 RCP.

[1] Deloitte, SA Power Networks Stage 1 Online Consumer Survey report

SA Power Networks' proposed level of expenditure ($77.4 million) is $30.3 million below the cost of a more extensive program that was also supported by a majority of customers. SA Power Networks has adopted the more limited program after giving consideration to the overall capital expenditure program quantum and the related impact on customers' bills.

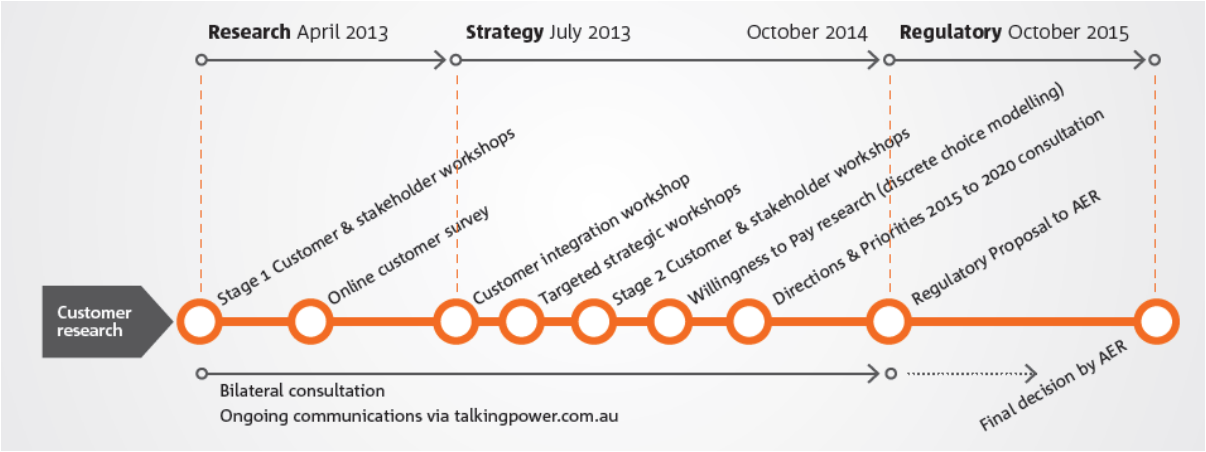
SA Power Networks' network spans across South Australia and consists of over 88,000km of power lines, of which approximately 18%, or 16,000km, is underground. To underground all power lines is cost prohibitive, therefore undergrounding existing assets is generally considered on a case by case basis. All power lines in new subdivisions are required to be placed underground. Additionally, SA Power Networks undergrounds power lines through the Government-Legislated PLEC program. The PLEC program is a scheme for limited undergrounding of power lines to improve the aesthetics of the local area for the benefit of the general community, having regard to road safety and the provision of electrical safety. The total annual PLEC spend is capped at around $9m, of which SA Power Networks funds approximately two-thirds of each project. PLEC locations are proposed by local councils subject to their ability to part-fund projects. SA Power Networks also undergrounds power lines through negotiated services for those customers who request and are willing to fund power lines to be placed underground for re-development purposes.

According to the Urban Roadside Hazards report, produced by the Infrastructure Task Force of the Road Safety Advisory Council in South Australia, Stobie poles accounted for 18% of struck objects in serious crashes in metropolitan Adelaide (based on vehicle crash data reported to Police in SA, 2004 to 2008).

2.3 SA Power Networks' Customer Engagement Program

The implementation of SA Power Networks' Customer Engagement Program (**CEP**) commenced in late 2012. The CEP was designed to engage with our customers and stakeholders in order to understand their current and future needs, concerns and preferences (see Figure 1).

Figure 1: SA Power Networks' Customer Engagement Program



Source: SA Power Networks 2014

The CEP design spans three distinct stages – Research, Strategy and Regulatory.

The 'Research' stage is designed to focus on exploring and 'listening' to customer expectations and concerns in workshops and through an online survey in order to facilitate inputs for the development of the services and investments required for 2015-2020.

The second stage focuses on 'Strategy' and endeavours to progress and integrate customer expectations and concerns identified in stage one into planning for the 2015-20 RCP.

The third and final stage of our CEP focuses on the 'Regulatory' determination process and AER engagement.

2.3.1 Stage one CEP workshops and online survey

Stage one of SA Power Networks' CEP consisted of customer workshops in April 2013 and an online customer survey in May-June 2013.

Workshop participants indicated that SA Power Networks should underground network assets in the following manner:

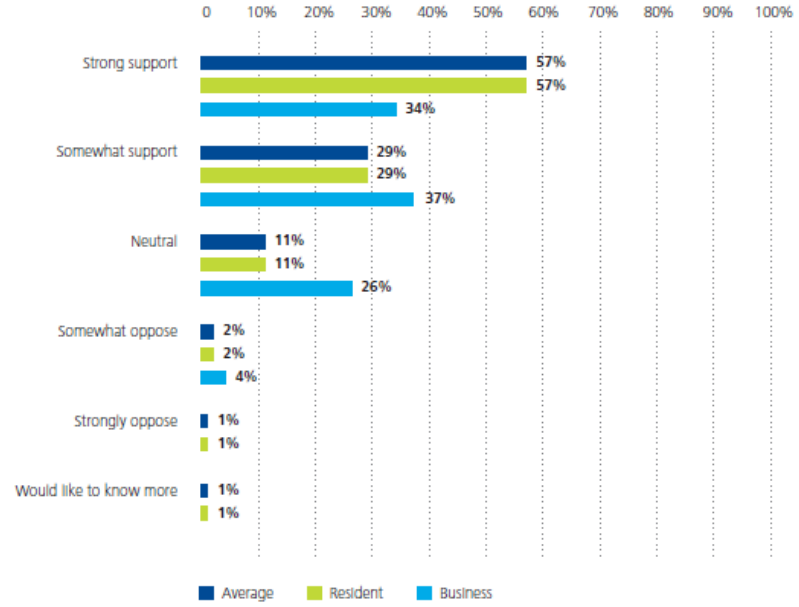
- on a gradual basis and within budget;
- using a rating system to determine priority areas; and
- in consultation with the community[2].

Customers also expressed concern regarding the cost of widespread undergrounding programs, however they were of the view that a strategic and gradual approach to undergrounding would be the most appropriate solution.

[2] Deloitte, Stage 1 Stakeholder and Consumer Workshop report

In the online survey customers indicated widespread support (86%) for undergrounding the network (Figure 2).

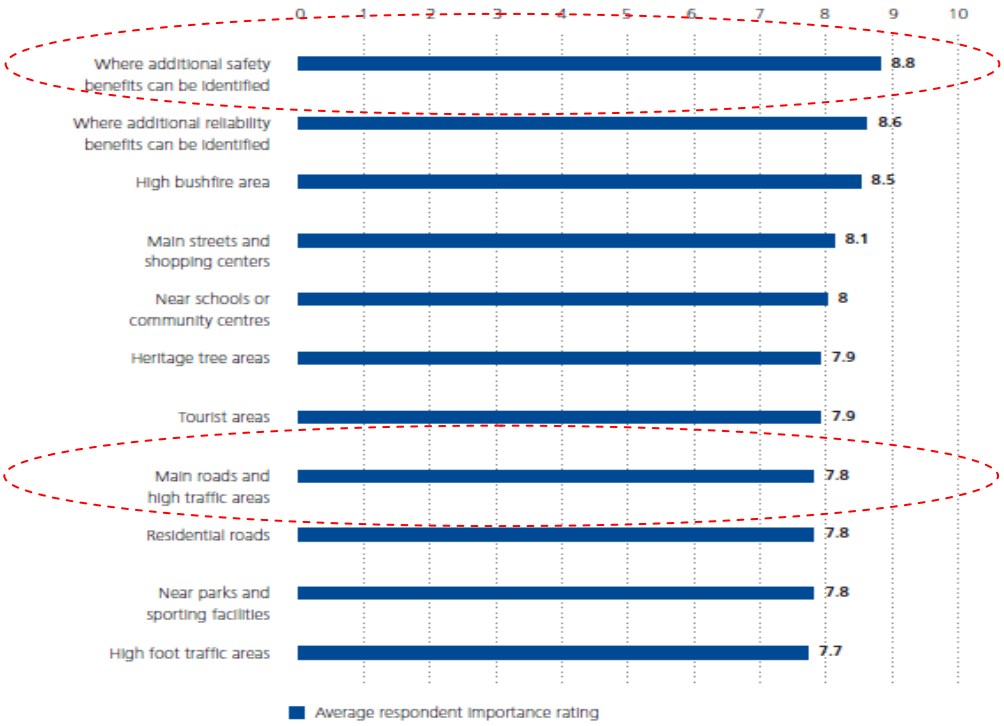
Figure 2: Online customer survey – support for undergrounding the electricity network



Source: Deloitte, SA Power Networks Stage 1 Online Consumer Survey report

In the online customer survey, customers also identified the following priority areas that they would like to see SA Power Networks focus on, when considering undergrounding of power lines (Figure 3):

Figure 3: Average respondent undergrounding priority areas



Source: Deloitte, SA Power Networks Stage 1 Online Consumer Survey report

2.3.2 Targeted workshop on undergrounding power lines

During SA Power Networks initial consideration of the outcomes from the customer engagement workshops and online survey, two areas of concern to consumers emerged where we considered there would be benefit from further focus on potential approaches to delivering on customer expectations. Accordingly two targeted strategic workshops on undergrounding power lines and vegetation management were held on 1 October 2013.

Using Second Road who are expert facilitators skilled at promoting 'design thinking', we decided to bring together stakeholders, subject experts and company staff to collaborate and review issues with the aim to agree on balanced options, concepts and principles with appropriate criteria that meet the needs of the community.

Workshop participants explored perceptions of the present situation, evaluated possible alternatives with the required commitments (including the consequences) of implementation in order to develop a future vision. With a community view of the future the participants collaborated to review issues and agree on balanced options and appropriate criteria that meet the needs of the community. A mind-map of some of the many options explored in the undergrounding workshop is shown below (Figure 4).

Figure 4: Mind-map from the Targeted workshop on undergrounding power lines

2.3.2.1 Stakeholder-derived principles for Undergrounding

Participants held a common view that more could be done in these areas with a greater emphasis on longer term solutions, managing community safety risks and enhancing stakeholder participation in these activities. The undergrounding workshop participants developed the following plan.

The workgroup concluded that SA Power Networks should develop an Undergrounding plan that facilitates the following:

- Maintains the PLEC program, and
- Place more emphasis on:
    - the long term and balances the benefits with the costs
    - places some priority on undergrounding when replacing assets
    - undergrounding high risk power lines or assets in high bushfire zones
    - undergrounding high risk power lines or assets for improved road safety
    - partnering and consultation with communities and groups.

Figure 5: Stage two targeted strategic workshop


2.3.2.2 Stakeholder-derived priorities for road safety

Specifically with regard to **road safety,** workshop participants also identified the following priority ratings:

High priority:

- Focus on areas that have existing SA State Government "Black Spot" funding, and specifically on areas that have Stobie poles close to the road or corners. Prioritisation decisions should be based on data available through the DPTI and insurance companies.
- It should also be linked to high traffic areas, specifically in metropolitan areas and where cars share road space with trucks.

Medium priority:

- Focus on areas with no known fatalities but which have high traffic or high populations and poles in close proximity to the roads or corners.

Low priority:

- The group felt that there was no such thing as a low priority road safety area.

Workshop participants also assisted in identifying the criteria to apply to decision making and prioritisation for **road safety undergrounding initiatives**. Using a decision tree, the group created a prioritisation map, as follows:

1. Existing "Black Spot" areas, with high fatalities;
2. Non-"Black Spot" areas with high speed areas with high populations; and
3. Non-"Black Spot" areas where there are poles in areas that could result in low speed accidents.

2.3.2.3 Workshop customer feedback

The following is a selection of verbatim feedback from electricity customers on undergrouding power lines in South Australia.

- "Great conversation, ideas, team work, loved learning what I did about SAPN + forward strategy planning. Thanks for having me involved." – Resident, Regional
- "Learnt a lot more. Nice feeling to know my ideas are of use and benefit and are wanted." – Resident, Regional
- "Opportunity to learn and influence policy making." – Anonymous
- "Greater understanding of the issues particularly the mix of competing demands." – Anonymous
- "Ability to participate and hear various other stakeholders views on the matters presented." – Government
- "Greater understanding of issues from the range of stakeholders." – Government
- "Positive approach by all contributors, including team leaders, lisa and participants from regions." – Business, Regional
- "Gives me good overview of the involvement of SA Power Network in the community enhancing its safety." – Resident, Metro
- "As this was my first workshop I have learnt a lot about the complexity of what I believe to be a simple decision." – Business, Regional

2.3.3 Stage two CEP workshops

The stakeholder-derived principles and ideas on undergrounding power lines were tested further in eight Stage two stakeholder workshops held around the State from 23 October to 6 November 2013[3]. Participants confirmed in these workshops that SA Power Networks is listening to, and acting upon, the insights gathered from its electricity customers.

2.3.4 Undergrounding power lines internal working group

In response to the outcomes of the undergrounding workshop, SA Power Networks considered the development of an undergrounding program that placed emphasis on:

- a long term view that balances costs and benefits;
- undergrounding when replacing assets;
- **undergrounding high risk powerlines and/or assets to improve road safety; and**
- partnering and consulting with community and neighbourhood groups.

The stakeholder-derived principles and the priorities developed in the targeted workshops were then further developed into concept options, with accompanying cost estimates, by staff teams using the business' detailed knowledge and information sources.

These concept options and costings would form a suitable basis for the next phase of research – discrete choice modelling in Willingness to Pay (**WTP**) survey to assess the extent that customers were prepared to pay for the options.

2.3.5 Willingness to Pay Survey

WTP research is used to mimic the choices customers would make if the services were being provided in a competitive marketplace. WTP allows consideration of appropriate service levels and network improvements, based upon the service improvements customers are willing to pay for.

[3] Deloitte, SA Power Networks Stage 2 Stakeholder and Consumer Workshop report

In the SA Power Networks WTP survey, respondents were given the opportunity to maintain the current network and service level, or they could choose to pay more for an improved level of service, framed around various scenarios, including high priority road safety accident areas.

The service improvements tested in the research comprised combinations of vegetation management activities (tree trimming cycles, tree removal and replacement) and undergrounding assets.

The levels tested regarding undergrounding of power lines to address known traffic "Black Spots" or high priority road safety accident areas, are listed below:

Table 1: Attributes and levels tested to address traffic blackspots in WTP survey

Attribute	Level
Undergrounding of Powerlines to address traffic blackspots	• Current service offering • 10 Traffic Blackspots. Approximately 5 intersections and 5km of road. • 20 Traffic Blackspots. Approximately 10 intersections and 10km of road. • 30 Traffic Blackspots. Approximately 15 intersections and 15km of road

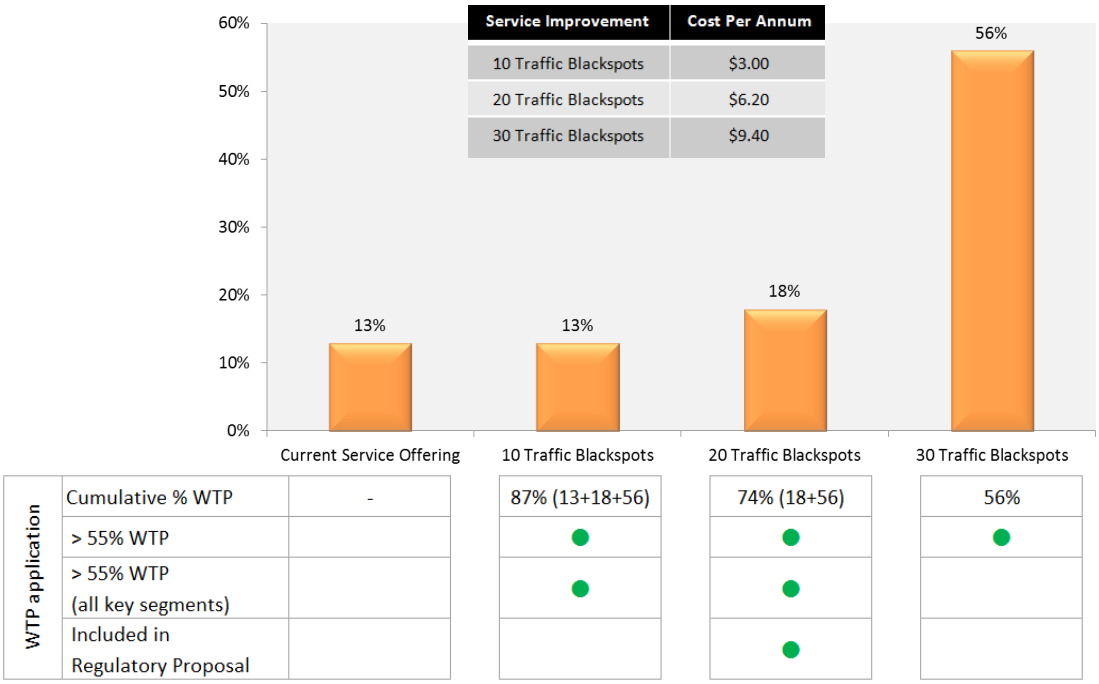
Source: The NTF Group, SA Power Networks Targeted Willingness to Pay Research – research findings

2.3.5.1 WTP research findings

In WTP research there are no accepted deterministic rules governing the level of WTP support that mean a given proposal has community endorsement. Service improvements receiving greater than 50% willingness to pay represent majority customer support. To use an analogy from Federal elections, a political party garnering a 55% majority (in two-party-preferred terms) is deemed to have attracted a significant majority of community support. On that basis, SA Power Networks has adopted a WTP hurdle for improvement proposals of 55% of the community or more being willing to fund the proposal. This hurdle was considered robust if the 55% threshold was achieved amongst all key community segments (ie mainstream, solar PV and hardship customers).

Figure 6 shows the level of community Willingness to Pay to address traffic blackspots. The majority (56%) of those surveyed were willing to pay up to an additional $9.40 annually for a targeted program of undergrounding power lines to address thirty traffic blackspots (comprised of approximately 15 intersections and 15km of road), thereby reducing the potential for vehicle collisions with Stobie poles. The 55% threshold was also achieved amongst all key community segments (ie mainstream, solar PV and hardship customers).There was 74% support for at least twenty blackspots at an estimated annual cost of $6.20. Twenty blackspots was viewed as a prudent and balanced investment level for this improvement option, considering the high level of community support.

Figure 6 Willingness to Pay by specific improvement tested – traffic blackspots



Source: The NTF Group, SA Power Networks Targeted Willingness to Pay Research — Research Findings.

2.3.5.2 WTP survey customer feedback

The following is a selection of verbatim feedback from electricity customers in the WTP survey:

- "I'd like to see a concerted effort to put power lines underground overtime to eliminate the risk of serious collision from motorists and remove what is an eye-sore on the streetscape. Starting in bush-fire areas and main intersections makes sense to me."
- "I would prefer to have more undergrounding happen in high risk areas. It would be preferable when replacing overhead lines if they could be undergrounded at that time. In our area we have been having replacements (with weekly days of power outage) seems to be double handling. We also have lines which are too close to the road edges now and it seems ridiculous to replace poles into the same dangerous sites."
- "I think it is imperative for the government to allocate more spending on infrastructure & I find it remarkable that in this day & age we still have so much above ground. As a customer & a pensioner, I would be prepared to sacrifice a few cups of coffee each quarter to contribute to the improvement of our safety & efficiency."

2.3.6 Targeted workshop outcomes forum

At the Targeted Strategic Workshop on 1 October 2013 we advised all participants that we would be in a position to provide an update on our progress in the areas of vegetation management and undergrounding in early 2014. A follow up outcomes forum for all participants was held on 19 March 2014.

We consolidated the briefing on vegetation management and undergrounding into one session as there was a degree of overlap between topics (undergrounding is one option for resolving ongoing vegetation management) and to provide the opportunity to all participants to review the strategies developed and the process of reviewing the outcomes of both projects.

The feedback from the group was positive, many were pleased to see their contribution had been taken seriously and subsequent detailed work had been undertaken on cost impacts of the options that had been explored based on the principles they had developed in the earlier workshops.

2.3.7 Directions and Priorities consultation

Based on the findings of the WTP research, modest customer-supported programs that are derived from stakeholder and CEP insights were incorporated in our 'Directions and Priorities 2015 to 2020' consultation process.

Specific feedback from Directions and Priorities submissions around undergrounding for traffic blackspots has led us to expand our commitment and engage further with industry partners such as the Motor Accident Commission (**MAC**) and the Department of Planning, Transport and Infrastructure (**DPTI**).

2.3.8 Proposal for undergrounding power lines to address traffic blackspots

Consequently, SA Power Networks is proposing a program to underground existing SA Power Networks assets in approximately 20 high priority road safety accident areas, consisting of power lines around 10 intersections, and 10km of powerlines along roadways. Running over 5 years, the program will deliver a safer road network by reducing the likelihood of serious or fatal vehicle accidents involving Stobie poles. The total program cost for the 5 year period is estimated to cost $77.4m.

2.4 Risk Management Framework

The SA Power Networks corporate Risk Management Framework was used to undertake an inherent risk assessment for the purpose of this business case. In terms of assessing the risks to public safety of existing SA Power Networks Stobie poles along roadways contributing to some increased level of physical harm as a consequence of a motor vehicle accident, the following risk factors are highlighted as being representative of the inherent risk rating.

Table 1 Qualitative Measures of Likelihood

Rating	Description	Description	Probability	Typical Frequency
5	Almost certain	Is expected to occur	96-100%	At least one event per year
4	Likely	Will probably occur	81-95%	One event per year on average
3	Possible	May occur	21-80%	One event per 2-10 years
2	Unlikely	Not likely to occur	6-20%	One event per 11-50 years
1	Rare	Most unlikely to occur	0-5%	One event per 51-100 years

Table 2 Qualitative Measures of Consequence

Level	Minimal 1	Minor 2	Moderate 3	Major 4	Catastrophic 5
Financial	Less than $100 000	$100 000 or more, but less than $1 m	$1 m or more, but less than $10 m	$10 m or more, but less than $100 m	$100 m or more
Safety	• Incident but no injury.	• Medical treatment only.	• Lost time injury.	• Death or permanent disability.	• Multiple fatalities.
Environment	• Brief spill incident. • No environmental damage.	• Minor spill incident. • Pollution on site. • No environmental damage.	• Escape of pollutant causing environmental damage.	• Significant pollution on and off site <$0.5 m.	• Long term environmental damage.

Table 3 Qualitative Risk Analysis Matrix (Level of Risk)

Probability	Consequences				
	Minimal 1	Minor 2	Moderate 3	Major 4	Catastrophic 5
5 Almost Certain	Medium	High	High	Extreme	Extreme
4 Likely	Low	Medium	High	High	Extreme
3 Possible	Low	Low	Medium	High	High
2 Unlikely	Negligible	Low	Low	Medium	High
1 Rare	Negligible	Negligible	Low	Low	Medium

Table 4 Risk Management – Response Level Required

Risk Level	Responsible Person	Action
Extreme	General Manager	Manage via a detailed control plan.
High	General Manager	Allocate responsibility to appropriate manager.
Medium	Manager	Manage by specific monitoring and response procedures.
Low	Manager	Manage by routine procedures.
Negligible	Manager	Monitor.

Table 5 Risk Treatment – SA Power Networks Examples

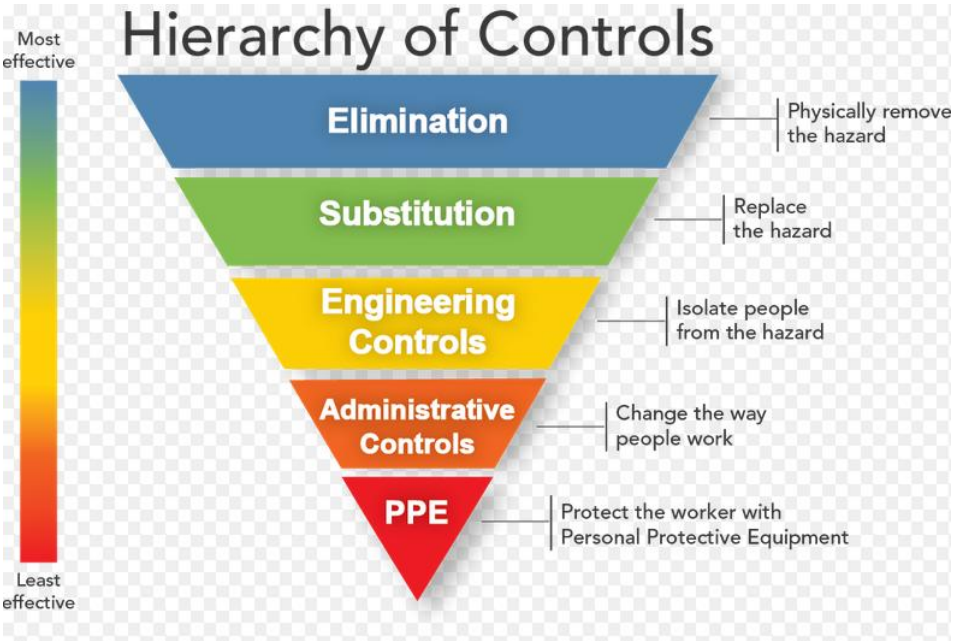
ACTIONS TO REDUCE OR CONTROL "PROBABILITY"	PROCEDURES TO REDUCE OR CONTROL "CONSEQUENCES"
Audit and compliance programmes	Minimisation of exposure to risk
Formal review of requirements, specifications, design, engineering, maintenance and operations	Separation or relocation of an activity
Inspections and process controls	Disaster recovery plans
Project management	Contingency planning
	Education and or public relations programmes

In accordance with the level of response required by the inherent safety risk presented by SA Power Networks' assets along roadways, responsibility for improvement is allocated to an appropriate manager within the SA Power Networks Asset Management business unit.

As noted earlier, SA Power Networks undertakes limited undergrounding of power lines via the PLEC program, along with specific customer funded undergrounding, that will gradually reduce the risk to occupants of motor vehicles. However, the residual risk is likely to remain in the Medium to High range based on the very small amount of undergrounding in hazardous road areas under this limited 'business as usual' approach.

According to best practice thinking on risk management, the adoption of the hierarchy of controls is an appropriate option for SA Power Networks to follow. The hazard control hierarchy consists of a graded list of hazard controls ranking from most effective to least effective, and is often shown in illustrative form as a triangle, refer to Figure 7.

Figure 7 Hierarchy of controls



In order of decreasing effectiveness, the controls include Elimination, Substitution, Engineering, Administrative, and Personal Protective Equipment. This hazard control hierarchy is useful to help guide SA Power Networks towards the most effective options to reduce the likelihood of SA Power Networks contributing to road accidents.

For instance, it is unlikely that SA Power Networks will "eliminate" all traffic accident impacts by removing its overhead electrical network from areas adjacent roadways. However, it is realistic to "substitute" one type of network (Overhead lines) for another less hazardous (from a traffic accident perspective) type of network (Underground). It is for this reason that targeted undergrounding of high risk power lines, and removal of Stobie poles along roadways and at intersections is a reasonable form of hazard reduction.

2.5 Relationship to Business Strategies and Programs

The project contributes to achievement of strategic objectives as described below.

Table 6 Contribution to corporate strategic objectives

Corporate Strategic Objective	Contribution
Delivering on the needs of our shareholders, by achieving our target returns, maintaining the business' risk profile, and protecting the long term value of the business	Maintaining or slightly reducing the risk profile of SA Power Networks by reducing the number of vehicle accidents involving Stobie poles.
Providing customers with safe, reliable, value for money electricity distribution services, and information that meets their needs	As evidenced by Customer Engagement Program and Willingness t Pay outcomes, addressing the concerns of customers by maintaining or improving the safety level of the network in relation to the community by reducing the number of vehicle accidents involving Stobie poles.

Table 7 Contribution to corporate core areas of focus

Corporate Core Areas of Focus	Contribution
Energised and responsive customer service	Responsive to results of Willingness to Pay survey and Customer Engagement Program.

2.6 Relationship to National Electricity Rules Expenditure Objectives

Table 8 Contribution to the National Electricity Rules expenditure objectives

National Expenditure Objectives	Contribution
Maintain the quality, reliability and security of supply of services provided by SA Power Networks	Maintaining or slightly improving network reliability by reducing the number of vehicle accidents involving Stobie poles, and hence reducing potential outages.

2.7 Meeting the National Electricity Rules Expenditure Criteria

Table 9 Activities to Meet the National Electricity Rules expenditure objectives

National Expenditure Criteria	Activity
Efficient cost of achieving the objective(s)	Enhance undergrounding program as strongly supported by customer engagement, and at a prudent pace.
Cost of a prudent operator	Efficient costs by benchmarking and contracting as required.
Realistic expectation of forecast and cost impact	Internal SA Power Networks cost estimates used for program forecasts.

3. Scope

SA Power Networks is proposing a program in the 2015-20 RCP to underground overhead power lines at approximately 20 high priority road safety accident areas, consisting of 10 intersections, and 10km of power lines along high risk roadways. Running over 5 years, the program will deliver a safer road network by reducing the likelihood of severe to fatal accidents that result from vehicles colliding with Stobie poles, in identified high risk locations. The total program cost across the 5 years is estimated to cost $77.4m.

3.1.1 Costing assumptions:

SA Power Networks convened an internal working group that reviewed the requirements to underground power lines in high priority intersections and roads, and for the purpose of the Willingness to Pay research, generic estimates were developed.

When implementing the road safety program, estimates will vary depending on the complexity and voltage levels of powerlines within the intersection or road section. For example, two initial remediation locations have been selected as follows:

- Hackney Road / Robe Terrace intersection; and
- Hancock Road / Milne Road intersection.

Concept designs were developed (refer to Appendix B), and budget estimates developed, refer Table 10. These intersections involve a high degree of complexity and therefore the costs are on the upper end of the scale.

Table 10 Proposed Year 1 intersection remediation

Location	$ M
Hackney Road / Robe Terrace intersection	4.9
Hancock Road / Milne Road intersection	2.9

4. Business Options

4.1 Option 1 – Maintain the Existing Programs

The "Maintain" option for this business case represents a status-quo continuation of the existing PLEC program that primarily addresses aesthetics with some minor regard to road safety.

4.1.1 Option 1 Expected Benefits

Customers would not be required to fund an additional undergrounding program to address road safety.

4.1.2 Option 1 Business Risks

The risks of not proceeding with this project are outlined in the risk management section of this business case – Section 2.4.

4.2 Option 2 – Implement the road safety undergrounding program

This option implements the proposed road safety undergrounding program in its entirety (20 blackspots) over the 2015-20 RCP, at a lower rate than that supported by the Willingness to Pay research (30 blackspots), to take into consideration pricing impacts on customers.

4.2.1 Option 2 Expected Benefits

The benefits of implementing the undergrounding for road safety program of work are difficult to express in monetary terms, as it is difficult to quantify precisely the level of road safety risk reduction available by implementing the program over the do nothing option.

The qualitative benefits accruing from the implementation of this program include:

- implementing the road safety undergrounding program as proposed, the exposure of existing overhead lines around high risk intersections and road sections will reduce the likelihood of serious accidents occurring as a result of vehicles impacting with Stobie poles; and
- SA Power Networks will be taking into consideration customer preferences identified via the Customer Engagement Program and Willingness to Pay research.

4.2.2 Option 2 Major Business Risks

The risks around managing SA Power Networks' assets and road safety are discussed in the risk management section of this business case – Section 2.4.

5. Investment Appraisal

The *"maintain"* option will not achieve the aims of reducing community safety risk by:

- targeted undergrounding of SA Power Networks overhead network assets at identified high risk intersections and road sections where incidents have involved Stobie poles.

The "maintain" options does not align with customer preferences for undergrounding as identified through the Customer Engagement Program and the Willingness to Pay research.

For these reasons the maintain option is not recommended.

6. Recommendation

It is recommended SA Power Networks undertake a program to underground targeted high risk overhead power line assets in 20 high priority traffic accident areas (10 intersections and 10km of power lines along roadways) over a five year period at a program cost of around $77.4m.

7. References

- Deloitte, SA Power Networks Stage 1 Stakeholder & Consumer Workshop Report (Attachment 6.3).
- Deloitte, SA Power Networks Stage 1 Online Consumer Survey Report (Attachment 6.5).
- Deloitte, SA Power Networks Stage 2 Stakeholder & Consumer Workshop Report (Attachment 6.7).
- The NTF Group, SA Power Networks Targeted Willingness to Pay Research -Research Findings (Attachment 6.8).
- SA Power Networks Directions and Priorities 2015 to 2020 consultation document (Attachment 6.10).
- SA Power Networks Customer Engagement Program Summary (Attachment 16.6).

Appendix A – Working group letters of agreement

29 October 2014

Mr Michael Deegan
Chief Executive
Department of Transport, Planning and Infrastructure
GPO Box 1533
Adelaide SA 5001

Dear Mr Deegan

Road Safety - Removal and /or Relocation of SA Power Networks power lines

I write to inform you of a level of proposed expenditure aimed at contributing towards improved road safety for the South Australian community and to seek your agreement to establish collaborative arrangements to target the most appropriate locations for such investment subject to the level of funding being approved by the Australian Energy Regulator (AER).

Background

SA Power Networks is the electricity distribution business who is economically regulated by the national regulator, the AER. Every five years the AER reviews our proposed capital and operating expenditure plans for the next five years and makes a determination on the level of revenue we can earn to fund these activities.

As part of developing our regulatory proposal for the five years commencing 1 July 2015, SA Power Networks has undertaken an extensive customer engagement program titled "Talking Power". A clear signal through this program has been the strong opinion and support for attention to be given to community safety both in regards to bushfire and road safety risks.

In response to these customer insights SA Power Networks undertook further work to assess the extent of the support for the removal (undergrounding) or relocation of our electricity infrastructure near traffic black spots. This work involved collaborative workshops and willingness to pay research. An extract of that research is attached for your information.

Discussion

Preliminary discussions have taken place with Michael Cornish from the Motor Accident Commission (MAC) and Julie Holmes from Department of Planning Transport and Infrastructure (DPTI). These discussions outlined the extent of our customer engagement and the potential level of funding that would be requested from the AER.

www.sapowernetworks.com.au

We have now finalised our regulatory proposal which we are required to lodge with the AER this Friday 31 October 2014. Whilst initial discussion with Michael and Julie indicated a potential funding request of around $100 million we have taken on board responses to our directions and priorities consultation document and are now seeking a reduced amount of $78 million. We have sought to balance the level of capital investment with the price impact on South Australian electricity customers.

The aim of the proposed investment project is to achieve the highest available community safety benefit by undergrounding or relocating SA Power Networks' infrastructure to reduce the risk of vehicle collision or impact by road users.

SA Power Networks is keen to collaboratively work together with DPTI and MAC to identify potential locations where undergrounding or relocation would bring about community safety benefits. It is expected that this will be accomplished by sharing knowledge and data relating to traffic incidents involving SA Power Networks' infrastructure.

The amount of work able to be undertaken will be dependant on the level of funding secured as part of the SA Power Networks 2015-2020 regulatory reset determination. It is proposed that the following principles will apply to work to be undertaken under such funding:

- Overall community benefit from investment is determined in terms of safety/health benefits for the community and the associated economic costs;
- Locations which are part of any major road or other infrastructure projects are excluded as asset relocation should be funded as normal part of works; and
- The final decision on which locations to undertake work on will remain the responsibility of SA Power Networks.

In this regard I can advise that data sharing between our respective organisations would be on a confidential basis for the sole use of determining areas to underground or relocate or for supporting the SA Power Networks funding request to the AER.

We are keen to establish a working group between the three organisations so that these matters can be further progressed and would welcome your feedback on appropriate arrangements that can be established to achieve the aims of this program. Please contact Sean Kelly (8404 5842) if you have any questions.

Yours sincerely

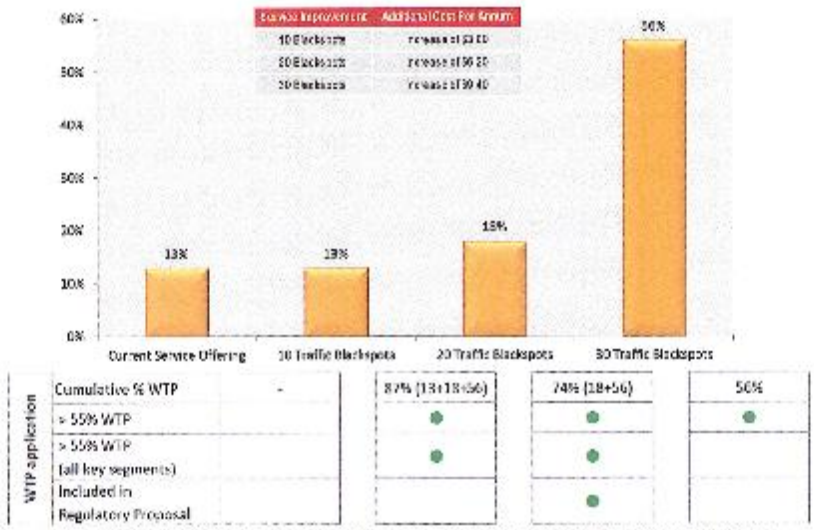
Sean Kelly
General Manager Corporate Strategy

Attachment A: Willingness to Pay by specific improvement tested – traffic black spots
CC: Ms Julie Holmes, General Manager, Safety and Policy Programs, Department of Planning, Transport and Infrastructure

www.sapowernetworks.com.au

Attachment A

Willingness to Pay by specific improvement tested – traffic black spots



Source: The NTF Group, SA Power Networks Targeted Willingness to Pay Research — Research Findings.

The diagram above shows the level of community Willingness to Pay to address traffic black spots in SA Power Networks research. The majority (56%) of those surveyed were willing to pay up to an additional $9.40 annually for a targeted program of undergrounding power lines to address thirty traffic black spots (comprised of approximately 15 intersections and 15km of road), thereby reducing the potential for vehicle collisions with Stobie poles. The 55% threshold was also achieved amongst all key community segments (ie mainstream, solar PV and hardship customers).There was 74% support for at least twenty black spots at an estimated annual cost of $6.20. Twenty black spots was viewed as a prudent and balanced investment level for this improvement option, considering the high level of community support.

29 October 2014

Mr Michael Cornish
General Manager Road Safety and Strategic Communication
Motor Accident Commission
GPO Box 2438
Adelaide SA 5001

Dear Michael

Road Safety - Removal and /or Relocation of SA Power Networks power lines

With regards to our previous meeting, I write to inform you of a level of proposed expenditure aimed at contributing towards improved road safety for the South Australian community and to seek your agreement to establish collaborative arrangements to target the most appropriate locations for such investment subject to the level of funding being approved by the Australian Energy Regulator (AER).

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Yours sincerely

Sean Kelly
General Manager Corporate Strategy
Attachment A: Willingness to Pay by specific improvement zones – traffic black spots

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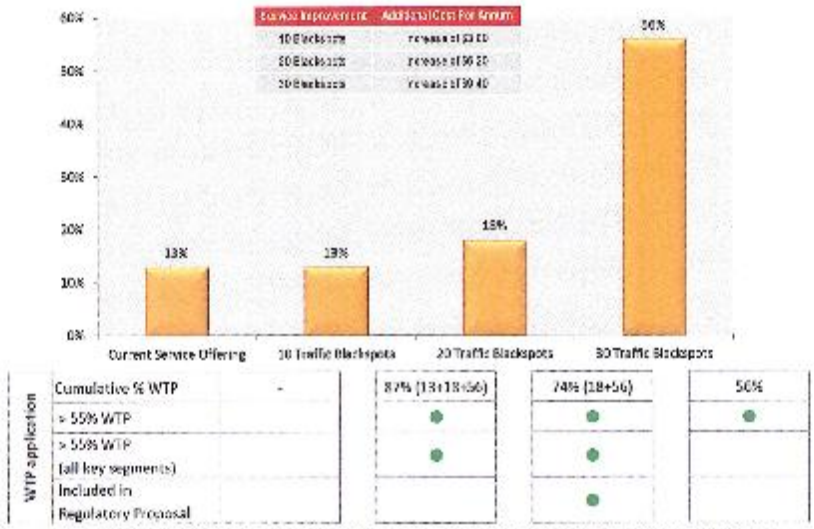
Attachment A

Willlingness to Pay by specific improvement tested – traffic black spots



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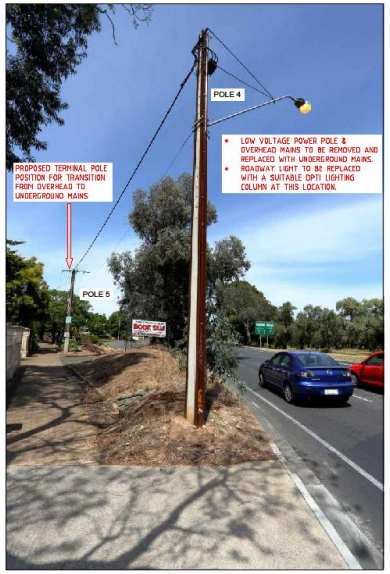
Appendix B – Concept designs

HUNDRED OF YATALA
IN THE AREA NAMED
GILBERTON
TOWN OF NORTH ADELAIDE

LEGEND
- EXISTING 66,000-VOLT OVERHEAD POWER LINE
- EXISTING 66,000-VOLT OVERHEAD POWER LINE TO BE REMOVED
- EXISTING 11,000-VOLT OVERHEAD POWER LINE
- EXISTING LOW VOLTAGE (400 VOLTS) OVERHEAD POWER LINE
- EXISTING LOW VOLTAGE (400 VOLTS) OVERHEAD POWER LINE TO BE REMOVED
- EXISTING STOBIE POLE
- EXISTING STOBIE POLE TO BE REMOVED
- PROPOSED STOBIE POLE
- EXISTING GROUND LEVEL TRANSFORMER
- EXISTING HIGH VOLTAGE UNDERGROUND CABLE
- EXISTING LOW VOLTAGE UNDERGROUND CABLE
- PROPOSED LOW VOLTAGE UNDERGROUND CABLE
- PROPOSED 66,000-VOLT UNDERGROUND CABLE
- EXISTING STOBIE POLE MOUNTED LIGHT
- PROPOSED DPTI LIGHT COLUMN

POLE 3

POLE 2



POLES 4 & 5


POLE 2 FROM ISLAND

POLE 1

SCALE 0 10 20 30 40 50 METRES 100

ZONE:MGA-54-GDA94
MAP REF-6628-42-C
GRID REF: 282115 E 6135675 N
28115m E 6135607 N
NBFRA NON BUSHFIRE RISK AREA
FEEDER NO:
FEEDER NAME:
SUBSTATION NO:
SUBSTATION NAME:
ASSET OWNER:
PROJECT DEFINITION | NOTIFICATION TYPE | PROJECT TYPE

PRELIMINARY

REV	DETAILS OF REVISION	RVD	CKD	APD	DATE

DRAWN	MATTI SYRJANEN	21-10-14
DESIGNED	GEOFF GRAY	21-10-14
CHECKED	STEVE BUCK	21-10-14
PROJECT MANAGER	DANNI KURBATFINSKI	

Head Office
1 Anzac Highway
Keswick South Australia 5035

Postal address:
GPO Box 77
Adelaide South Australia 5001

Corporate switchboard
08 8404 5867
08:00am – 5:00pm
Monday to Friday

SA Power Networks
www.sapowernetworks.com.au

TRAFFIC UNDERGROUND SITE
HACKNEY ROAD/ROBE TERRACE
GILBERTON

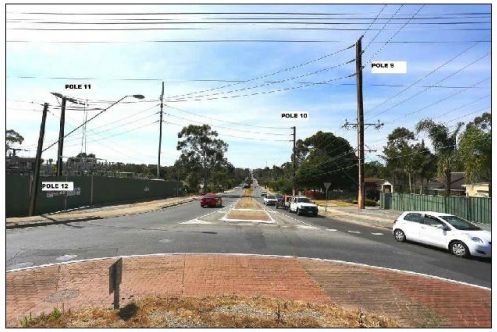
SCALE 1:1000 | A1 | MAC-01 | SHEET 1 OF 1 | REV

\\NAS-01\INPROG\ CURRENT YEAR\PENDING QUOTES\4700 ROBE TERRACE AND WALKERVILLE TERRACE WALKERVILLE PARK UG\AUTOCAD\DPD4700 MAC.DWG

HUNDRED OF YATALA
IN THE AREA NAMED
TEA TREE GULLY
CITY OF TREE TEA GULLY

LEGEND

- EXISTING 66,000-VOLT OVERHEAD POWER LINE
- EXISTING 66,000-VOLT OVERHEAD POWER LINE TO BE REMOVED
- EXISTING 11,000-VOLT OVERHEAD POWER LINE
- EXISTING 11kV OVERHEAD MAINS TO BE REMOVED
- EXISTING LOW VOLTAGE 1400 VOLTS) OVERHEAD POWER LINE
- EXISTING LOW VOLTAGE 1400 VOLTS) OVERHEAD POWER LINE TO BE REMOVED
- EXISTING STONE POLE
- EXISTING STONE POLE TO BE REMOVED
- PROPOSED STONE POLE
- EXISTING HIGH VOLTAGE UNDERGROUND CABLE
- EXISTING DPTI POLE MOUNTED PUBLIC LIGHT TO REMAIN
- EXISTING DPTI POLE MOUNTED PUBLIC LIGHT TO BE REMOVED



POLES 9, 10, 11 & 12

- POLES 9, 11, 12 & ASSOCIATED OVERHEAD MAINS IN HANCOCK ROAD TO BE REMOVED.
- OVERHEAD MAINS IN HANCOCK ROAD TO BE REMOVED TO POLE 10.

POLE 2

- POLE (MILNE ROAD/ARGYLE CRESCENT) TO REMAIN.
- THE ASSOCIATED OVERHEAD MAINS IN MILNE ROAD TO BE REMOVED.

POLES 11, 12 & 13

- POLES 11, 12, 13 & ASSOCIATED OVERHEAD MAINS IN HANCOCK ROAD & MILNE ROAD TO BE REMOVED.

POLES 3 & 13

- POLES & ASSOCIATED OVERHEAD MAINS IN MILNE ROAD TO BE REMOVED.

POLES 4 & 5

- POLE 4 & ASSOCIATED OVERHEAD MAINS TO BE RELOCATED 10m SOUTH.
- ALL MAINS NORTH OF POLE 5 TO BE REMOVED TO POLE 10.

POLES 6, 7, 8 & 9

- POLES 6, 7, 8 & ASSOCIATED OVERHEAD MAINS IN HANCOCK ROAD & MILNE ROAD TO BE REMOVED.
- OVERHEAD MAINS IN MILNE ROAD TO BE REMOVED TO POLE 8

SCALE 0 5 10 15 20 25 50 METRES

ZONE/MGA-54-GDA94
MAP REF-6628-33-h
GRID REF: 282115 E 6135675 N
282114 E 6135007 N

NBFRA NON BUSHFIRE RISK AREA
FEEDER NO:
FEEDER NAME:
SUBSTATION NO:
SUBSTATION NAME:
ASSET OWNER:

PROJECT DEFINITION	NOTIFICATION TYPE	PROJECT TYPE
PRELIMINARY		

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PROJECT MANAGER	DANNI KURBATFINSKI	

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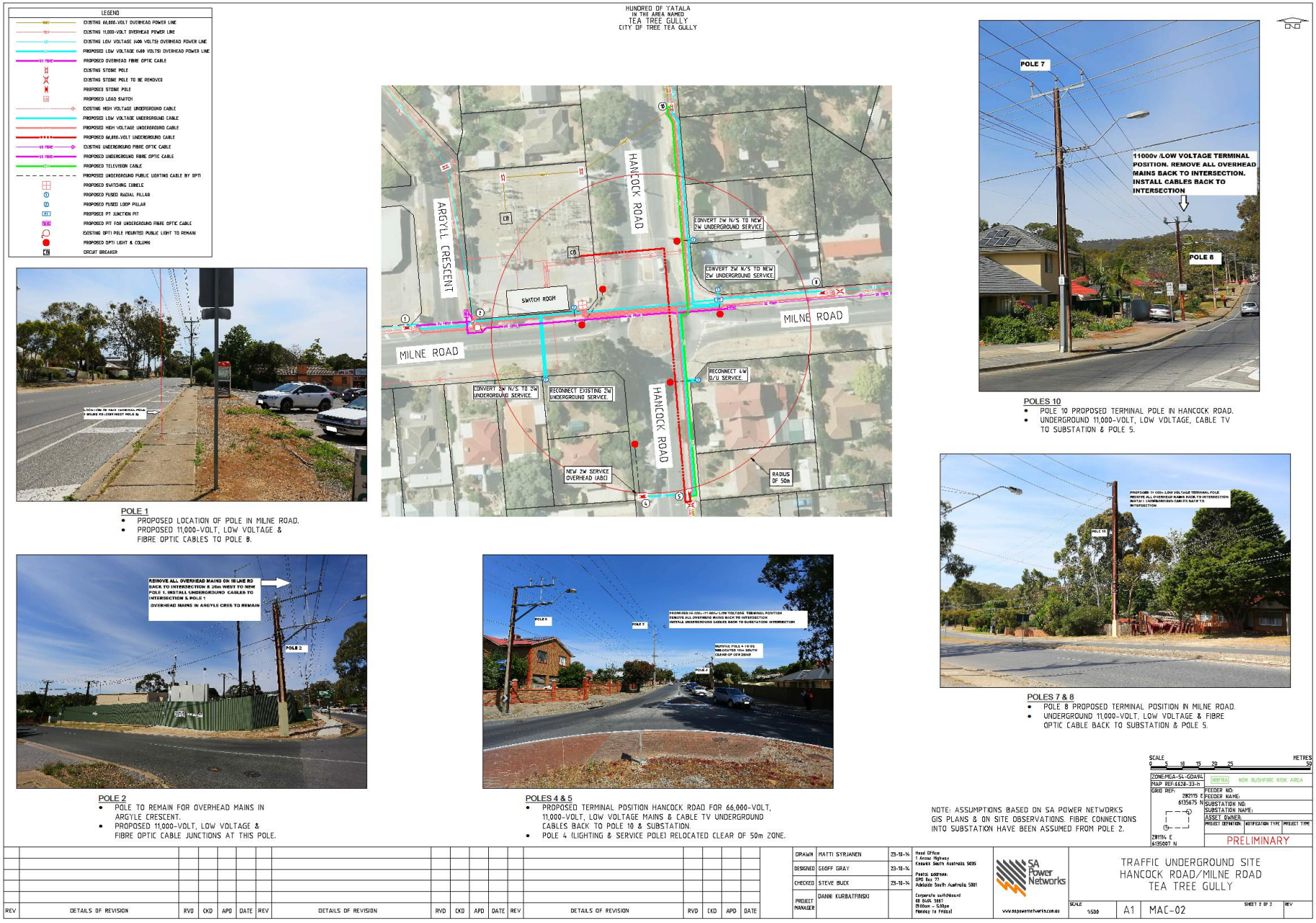
TRAFFIC UNDERGROUND SITE
HANCOCK ROAD/MILNE ROAD
TEA TREE GULLY

SCALE 1:500 | A1 | MAC-02 | SHEET 1 OF 2 | REV

\\NAS-01\INPROG\ CURRENT YEAR\PENDING QUOTES\4499 MILNE ROAD AND HANCOCK ROAD TEA TREE GULLY UG\AUTOCAD\DP04699 MAC.DWG


LEGEND
EXISTING 66,000-VOLT OVERHEAD POWER LINE
EXISTING 11,000-VOLT OVERHEAD POWER LINE
EXISTING LOW VOLTAGE (400 VOLTS) OVERHEAD POWER LINE
PROPOSED LOW VOLTAGE (400 VOLTS) OVERHEAD POWER LINE
PROPOSED OVERHEAD FIBRE OPTIC CABLE
EXISTING STONE POLE
EXISTING STONE POLE TO BE REMOVED
PROPOSED STONE POLE
PROPOSED LOAD SWITCH
EXISTING HIGH VOLTAGE UNDERGROUND CABLE
PROPOSED LOW VOLTAGE UNDERGROUND CABLE
PROPOSED HIGH VOLTAGE UNDERGROUND CABLE
PROPOSED 66,000-VOLT UNDERGROUND CABLE
EXISTING UNDERGROUND FIBRE OPTIC CABLE
PROPOSED UNDERGROUND RIBBE OPTIC CABLE
PROPOSED TELEVISION CABLE
PROPOSED UNDERGROUND PUBLIC LIGHTING CABLE BY DPTI
PROPOSED SWITCHING CUBICLE
PROPOSED FUSED RADIAL PILLAR
PROPOSED FUSED LOOP PILLAR
PROPOSED PJ JUNCTION PIT
PROPOSED PIT FOR UNDERGROUND FIBRE OPTIC CABLE
EXISTING DPTI POLE MOUNTED PUBLIC LIGHT TO REMAIN
PROPOSED DPTI LIGHT & COLUMN
CIRCUIT BREAKER
HUNDRED OF YATALA
IN THE AREA NAMED
TEA TREE GULLY
CITY OF TREE TEA GULLY
ARGYLL CRESCENT
HANCOCK ROAD
MILNE ROAD
MILNE ROAD
HANCOCK ROAD
SWITCH ROOM
CONVERT 2W N/S TO NEW 2W UNDERGROUND SERVICE.
CONVERT 2W N/S TO NEW 2W UNDERGROUND SERVICE.
RECONNECT 4W U/G SERVICE.
CONVERT 2W N/S TO 2W UNDERGROUND SERVICE.
RECONNECT EXISTING 2W UNDERGROUND SERVICE.
NEW 2W SERVICE OVERHEAD (ABC)
RADIUS OF 50m
POLE 7
11000v /LOW VOLTAGE TERMINAL POSITION. REMOVE ALL OVERHEAD MAINS BACK TO INTERSECTION. INSTALL CABLES BACK TO INTERSECTION
POLE 8
POLES 10
POLE 10 PROPOSED TERMINAL POLE IN HANCOCK ROAD.
UNDERGROUND 11,000-VOLT, LOW VOLTAGE, CABLE TV TO SUBSTATION & POLE 5.
POLE 1
PROPOSED LOCATION OF POLE IN MILNE ROAD.
PROPOSED 11,000-VOLT, LOW VOLTAGE & FIBRE OPTIC CABLES TO POLE 8.
REMOVE ALL OVERHEAD MAINS ON MILNE RD BACK TO INTERSECTION & 20m WEST TO NEW POLE 1. INSTALL UNDERGROUND CABLES TO INTERSECTION & POLE 1
OVERHEAD MAINS IN ARGYLE CRES TO REMAIN
POLE 2
POLE 2
POLE TO REMAIN FOR OVERHEAD MAINS IN ARGYLE CRESCENT.
PROPOSED 11,000-VOLT, LOW VOLTAGE & FIBRE OPTIC CABLE JUNCTIONS AT THIS POLE.
POLES 4 & 5
PROPOSED TERMINAL POSITION HANCOCK ROAD FOR 66,000-VOLT, 11,000-VOLT, LOW VOLTAGE MAINS & CABLE TV UNDERGROUND CABLES BACK TO POLE 10 & SUBSTATION.
POLE 4 (LIGHTING & SERVICE POLE) RELOCATED CLEAR OF 50m ZONE.
POLE 7 & 8
POLE 8 PROPOSED TERMINAL POSITION IN MILNE ROAD.
UNDERGROUND 11,000-VOLT, LOW VOLTAGE & FIBRE OPTIC CABLE BACK TO SUBSTATION & POLE 5.
NOTE: ASSUMPTIONS BASED ON SA POWER NETWORKS GIS PLANS & ON SITE OBSERVATIONS. FIBRE CONNECTIONS INTO SUBSTATION HAVE BEEN ASSUMED FROM POLE 2.
SCALE METRES
ZONE/MGA-54-GDA94
MAP REF-6628-33-5
GRID REF: 282115 E 6135675 N
28115m E 6135007 N
NBFRA NON BUSHFIRE RISK AREA
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SCALE 1:500
A1
MAC-02
SHEET 2 OF 2
REV
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