

Access road refurbishment

Regulatory Business Case (RBC) 2024-29

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1. Summary

This business case has been prepared to support the 2024-29 Regulatory Proposal. The business case demonstrates that Power and Water has undertaken appropriate analysis of the need for the expenditure and identified credible options that will resolve the need and ensure that Power and Water continues to meet the National Electricity Objectives and maintain the quality, reliability, and security of supply of standard control services and maintain the safety of the distribution system.

The proposed investment identified in this business case will undergo further assessment and scrutiny through Power and Water's normal governance processes prior to implementation and delivery.

This business case addresses the condition and resulting high safety risks of access roads to assets located in remote locations.

1.1 Business need

Power and Water has a significant number of assets – particularly transmission lines and communications huts – located in remote locations that are affected by the severe weather experienced by the Northern Territory. To access these assets, Power and Water requires reliable and safe access roads that are appropriate for heavy machinery where overhead lines need to be accessed, or accessible by 4x4 for communications assets.

Accessibility during both the wet and dry seasons is required, with a high priority in ensuring the access roads are safe for our field crews and can be maintenance free for a reasonable amount of time.

Power and Water has identified 24 access roads for overhead assets and a further 4 access roads for communications huts that are in poor condition and are no longer able to provide safe and reliable access of the required equipment throughout the year.

1.2 Options analysis

The options considered to resolve this need are shown in Table 1.

Table 1 Summary of credible options

Option	Option name	Description	Recommended
1	Do nothing	Allow the roads to deteriorate and do not undertake any maintenance or repair	No
2	Repair to a five year design life	Repair the roads based on a five year design life.	Yes
3	Repair to a 20 year design life	Repair the roads based on a 20 year design life.	No

A cost benefit analysis was completed for each of the options where the risk reduction, compared to Option 1, was used as the benefit achieved by the option.

1.3 Recommendation

The recommended option is Option 2 – Repair to a 5 year design standard at an estimated cost of \$1.3 million (real 2021/22) during the 2024-29 regulatory period as the most prudent and cost effective to meet the identified needs.

Table 2 shows a summary of the expenditure requirements for the 2024-29 regulatory period.

Table 2 Annual capital and operational expenditure (\$'000, real 2021/22)

Item	FY25	FY26	FY27	FY28	FY29	Total
Capex	185	418	240	180	250	1,273
Opex	-	-	-	-	-	-
Total	185	418	240	180	250	1,273

2. Identified need

This section provides the background and context to this business case, identifies the issues that are posing increasing risks of access roads to Power and Water, describes the current mitigation program and provides a risk assessment of the inherent risk if no investment is undertaken.

2.1 Asset profile

Power and Water owns transmission and distribution assets in three areas of the Northern Territory: the Darwin Katherine System; Alice Springs and Tennant Creek. While a large portion of the network is located in and around Darwin, a significant number of assets – particularly transmission lines and communications huts – are located in remote locations that are affected by the severe weather experienced by the Northern Territory.

To access these assets, Power and Water requires reliable and safe access roads that are appropriate for heavy machinery where overhead lines need to be accessed, or accessible by 4x4 for communications assets.

Accessibility during both the wet and dry seasons is required, with a high priority in ensuring the roads are safe for our field crews.

2.2 Historical and current mitigation programs

Access track rehabilitation works are required for the following reasons.

- To enable PWC line crews 4WD access to the towers for inspections and fault repairs. Access during both wet and dry seasons is required.
- To enable drilling rig access to the towers so that new copper earthing can be installed in vertical drill holes.

Access track refurbishments undertaken in 2020/21 are shown in the table below.

Table 3 Recent access track refurbishment expenditure (\$'000, real FY22)

Location	Total cost
Fountain Head communications site access track	37.9
Robin Falls communications site access track	223.2
O'Shea communications site access track	31.6
Total	292.8

Assuming the expenditure incurred during 2020/21 was indicative of an average year, the 5-year expenditure would be approximately \$1.5 million (real 2021/22).

2.3 Asset condition issues and risks

The natural environment has a direct impact on the condition and degradation of the access roads over time:

- **Road condition:** As a result of the rain and monsoons from October to March and dry weather from April to August, access tracks and roads require a higher level of maintenance or refurbishment to maintain accessibility.
- **Accessibility of heavy equipment:** The roads are required to enable access of field crews and heavy machinery that is required to work on major assets such as transmission towers and communications towers. In particular:
 - To enable PWC line crews 4WD access to the towers for inspections and fault repairs. Access during both wet and dry seasons is required.
 - To enable drilling rig access to the towers so that new copper earthing can be installed in vertical drill holes.
- **Safety of personnel:** Maintaining the road is required to ensure the safety of field crew. With remote assets, there are long distances to travel if there is an accident
- **Reliability of the network:** access to assets during all weather conditions is required in order to restore supply if there is an outage.

The access tracks in poor condition were identified by Power and Water's vegetation contractor and line crews who travel these tracks during the course of their normal maintenance work, and the scope of work for remediation was determined by an experienced road building contractor, who has worked in the area between Darwin and Katherine for over 40 years. The staff from these businesses are familiar with the location and condition of these tracks based on their inspections and maintenance works. The inspection information was then combined with desktop study of the terrain.

The process involved a number of workshops with the vegetation contractor, line crew staff and roads contractor to assess the condition of all tracks, identify those requiring remediation and determine the scope of the remediation.

Following the inspection and desktop review, Power and Water has identified:

- 24 access roads / sections in the Darwin Katherine area that service overhead network assets in poor condition. These are required to enable access of heavy machinery.
- An additional 4 access roads / sections that service communications huts in poor condition. These are required to enable access by field crew in 4x4 type vehicles.

This business case assesses options to address these issues and ensure adequate access to Power and Water's asset is provided.

2.4 Risk assessment

Power and Water has developed the Risk Quantification Procedure to enable consistent quantification of risk from their assets into dollar terms. The procedure is applicable to most assets where there is a direct link between an asset failure and the impact of that failure on the defined consequence categories. Sufficient network data also needs to be available to derive the required inputs.

Access roads are difficult to analyse using the risk quantification procedure as our system to not have sufficient data to create a forecast of the probability of an incident occurring and alternative data sets, such

as road statistics available on the Road Safety NT website, are not aligned to the category of vehicles and type of driving required of Power and Water staff.

However, we recognise that as the road condition deteriorates, access becomes more difficult and there are several impacts that must be considered:

- **Health and safety:** the likelihood of driver error or an obstacle on the road resulting in an accident will increase as condition decreases. We therefore consider that road condition is strongly related to the health and safety of our field crew. This is compounded by the remoteness of the locations which could delay help from arriving for several hours should an incident occur.
- **Network reliability and security:** inadequate access to our assets, including 4x4 vehicles and heavy vehicles for major works, will impact our ability to undertake proactive works to ensure the reliability of electricity supply or reactive works to restore supply following an outage. Delays in reacting to an outage will contribute to our network performance as measured by SAIDI and potentially contribute to exceeding the performance targets set by the Utilities Commission of the Northern Territory.

The key risks described above result in a Medium risk rating with a target risk rating of Low. The qualitative risk assessment of the inherent risk and targeted risk is shown in Figure 1 using the matrix approach set out in the Enterprise Risk Management Standard.

	Insignificant	Minor	Moderate	Major	Severe
Almost certain	Medium	High	Very High	Extreme	Extreme
Likely	Low	Medium	High	Very High	Extreme
Possible	Low	Low	Medium	High	Very High
Unlikely	Low	Low	Medium	High	High
Rare	Low	Low	Low	Medium	Medium

Figure 1 Qualitative risk assessment

While only assessed qualitatively, we consider that the risk presented to the health and safety of our staff and network security by access roads being in poor condition is disproportioned to the cost to rectify the issues, as discussed in section 3 below.

2.5 Summary

Accessibility during both the wet and dry seasons is required to our network assets, with a high priority in ensuring the access roads are safe for our field crews and can be maintenance free for a reasonable amount of time. We consider that access roads in poor condition pose an untenable risk to our field crews and network security.

Power and Water has identified 24 access roads for overhead assets and a further 4 access roads for communications huts that are in poor condition and are no longer able to provide safe and reliable access of the required equipment throughout the year.

3. Options analysis

This section describes the various options that were analysed to address the increasing risk to identify the recommended option. The options are analysed based on ability to address the identified needs, prudence and efficiency, commercial and technical feasibility, deliverability, benefits and an optimal balance between long term asset risk and short-term asset performance.

3.1 Comparison of credible options

Credible options are identified by the AER as options that address the identified need, are technically feasible and can be implemented within the required timeframe. The following options have been identified:

- Option 1 – Do nothing. This option will not address the road condition.
- Option 2 – Repair and refurbish the access tracks to a standard that will last 5 years prior to requiring refurbishment again.
- Option 3 – Repair and refurbish the access tracks to a higher standard that will last 20 years prior to requiring refurbishment again.

Table 4 provides a high-level comparison of the three identified credible options. A detailed discussion of each option is provided in the following sections.

Table 4 Summary of options analysis outcomes

Assessment metrics	Option 1	Option 2	Option 3
NPC (\$'000, real FY22)	N/A	4,116	4,790
BCR	N/A	N/A	N/A
Capex (\$'000, real FY22)	N/A	1,273	5,217
Meets customer expectations	○	●	●
Aligns with Asset Objectives	○	●	●
Technical Viability	○	●	●
Deliverability	●	●	●
Preferred	✗	✓	✗



Fully addressed the issue



Adequately addressed the issue



Partially addressed the issue



Did not address the issue

3.1.1 Option 1 – Do nothing

This option proposes to not undertake any works to repair or refurbish the access roads.

This will result in the current poor condition of the access roads declining further, to the point that it limits and ultimately prevents accessibility to address faults and asset failures, undertake maintenance. This will pose an increasing safety risk to field crews in the event emergency access is attempted.

This option does not align with the asset objectives or customer expectations for Power and Water's management of the network to ensure reliability. Hence, this option is not recommended.

3.1.2 Option 2 – Repair to 5 year design standard

This option proposes to refurbish the access tracks to a standard that will have a serviceable life of 5 years prior to requiring refurbishment again at an estimated cost of \$1.3 million (real, 2021/22).

This option will provide:

- Access to Power and Water's assets for field crew and the required equipment.
- Safety for field crew when travelling to the remote locations.
- Enable Power and Water to provide reliable service to their customers.

The breakdown of the estimated cost of this option is shown in Table 5.

Table 5 Cost estimate for Option 2

Access track location		Design life (years)
Batchelor to Adelaide River	■	5
Adelaide River to Pine Creek	■	5
Pine Creek to Katherine	■	5
Leanyer Swamp	■	5
Access track for Lake Bennett Comms Site	■	5
Access track for Hughes Comms Site	■	5
Access track for Pine Creek Mesa Comms Site	■	5
Access track for Mount Bundy Comms Site	■	5
Total	■	

The Net Present Cost (NPC) of this option is \$4.1 million (real 2021/22). The analysis was completed over a 20 year horizon to be equivalent to the design life of Option 3. Option 2 incurred a slightly lower NPC over the assessment period than Option 3, and on that basis is preferred over Option 3. This option is recommended.

3.1.3 Option 3 – Repair to 20 year design standard

This option proposes to refurbish the access tracks to a standard that will have a serviceable life of 20 years prior to requiring refurbishment again at an estimated cost of \$5.2 million (real 2021/22).

This option will provide:

- Access to Power and Water's assets for field crew and the required equipment.
- Safety for field crew when travelling to the remote locations.
- Enable Power and Water to provide reliable service to their customers.

The breakdown of the estimated cost of this option is shown in Table 6.

Table 6 Cost estimate for Option 3

Access track location		Design life (years)
Batchelor to Adelaide river		20
Adelaide River to Pine Creek		20
Pine Creek to Katherine		20
Leanyer Swamp		20
Access track for Lake Bennett Comms Site		20
Access track for Highestt Comms Site		20
Access track for Pine Creek Mesa Comms Site		20
Access track for Mount Bundy Comms Site		20
Total		

The NPC of this option is \$4.8 million (real 2021/22). Option 3 incurred a slightly higher NPC over the assessment period than Option 2, and on that basis is not preferred over Option 2. This option is not recommended.

3.2 Non-credible options

Our analysis also identified a number of options found to be non-credible. These options are described below and were not taken through to detail analysis for the reasons provided.

3.2.1 Capex/Opex Substitution – does not address the need

Since the driver of this investment is significant deterioration across a fleet of assets caused by the same design deficiency and environmental conditions, it is not feasible to substitute capital expenditure with operational expenditure to resolve the risk. Only capital expenditure to replace the switchgear will resolve the underlying issues.

4. Recommendation

The recommended option is Option 2 – Repair to a 5 year design standard at an estimated cost of \$1.3 million (real 2021/22) as the most prudent and cost effective to meet the identified needs.

The proposed program is consistent with the National Electricity Rules Capital Expenditure Objectives as the expenditure is required to maintain the quality, reliability, and security of supply of standard control services and maintain the safety of the distribution system.

4.1 Strategic alignment

The “Power and Water Corporation Strategic Direction” is to meet the changing needs of the business, our customers and is aligned with the market and future economic conditions of the Northern Territory projected out to 2030.

This proposal aligns with Asset Management System Policies, Strategies and Plans that contributes to the D2021/260606 “PWC Strategic Direction” as indicated in the table below.

Table 7 Alignment with corporate strategic focus areas

Strategic direction focus area		Strategic direction priority
1	Customer and the community at the centre	Improve Public Health and Safety
2	Always Safe	Cost Prudence

4.2 Dependent projects

There are no known projects or other network issues that are dependent on the resolution of this network issue.

4.3 Deliverability

We consider that this project is deliverable. This is a small scale project and is in line with historical expenditure levels for this program.

4.4 Customer considerations

As required by the AER’s Better Resets Handbook, in developing this program Power Services has taken into consideration feedback from its customers.

Feedback received through customer consultation undertaken at the time of writing this PBC, has demonstrated strong support amongst the community for appropriate expenditure to enable long term maintenance of the network to ensure continued reliability, maintainability and safety of supply.

4.5 Expenditure profile

Table 8 shows a summary of the expenditure requirements for the 2024-29 regulatory period.

Table 8 Annual capital and operational expenditure (\$'000, real 2021/22)

Item	FY25	FY26	FY27	FY28	FY29	Total
Capex	185	418	240	180	250	1,273
Opex	-	-	-	-	-	-
Total	185	418	240	180	250	1,273

4.6 High-level scope

A detailed scope and costing is provided in Appendix A.

Appendix A. Cost estimation

The scope of access track rehabilitation works is based on discussions with Power and Water technical staff and Contractors, including Infrastructure Vegetation Management Service P/L who are contracted to provide vegetation management on the PWC transmission line network. No fieldwork or ground truthing has been conducted to verify the proposed scope. As such these estimates are subject to revision when site inspections and design are carried out.

Rates used for estimates are referenced to previous estimates / works conducted including Robin Falls, Fountainhead and O'Shea Hill. General industry rates for higher design life, in the order of 20 years have also been used.

All rates applied include safety protocols, mobilisation, on-going costs, demobilisation, allowance for gaining access to the alignments, earthworks and minor drainage improvements, but no concrete works or sealing. However, allowances for project/ contract management, design, QA testing, AAPA, environmental and heritage clearances, procurement, escalation and design/ construction contingencies are not included, and may result in higher incurred costs.

The rates for the temporary repair of the access tracks to allow vehicle access in the short term. Over time access roads will be subject to erosion and degradation.

Table 9 Unit rate assumptions (000s real 2021/22)

Description	Unit of measure	Power	Water
Repair of minor creek crossings with rockfill	per crossing	1	1
Repair of significant creek crossings with rockfill	per crossing	1	1
Repair of access tracks in relatively flat terrain and not involving major erosion repairs. Includes grading only to reinstate shape. For grade, water and roll	per km	1	1
Repair of access tracks in more difficult terrain and involving some erosion requiring imported gravel or rocky fill to fill scours/ depressions + grade, water and roll to reinstate shape and density	per km	1	1
Repair of access tracks in more difficult terrain (eg elevated hilly areas similar to the Robin Falls Ch 1.0 to 2.0km) and involving significant erosion requiring imported gravel/ rocky fill/ rockfill to fill scours/ depressions + grade, water and roll to reinstate shape and density. Install some water diversion berms (whoa boys)	per km	1	1
Repair of severely eroded steep Jump Ups includes: filling scours with cement treated base, install water diversion berms using cement treated base and drainage improvements.	per km	1	1

For the communications hut access track a 5 year estimate was supplied. The 20 year cost was calculated based on the average increase of the other tracks from a 5 year to 20 year cost.

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