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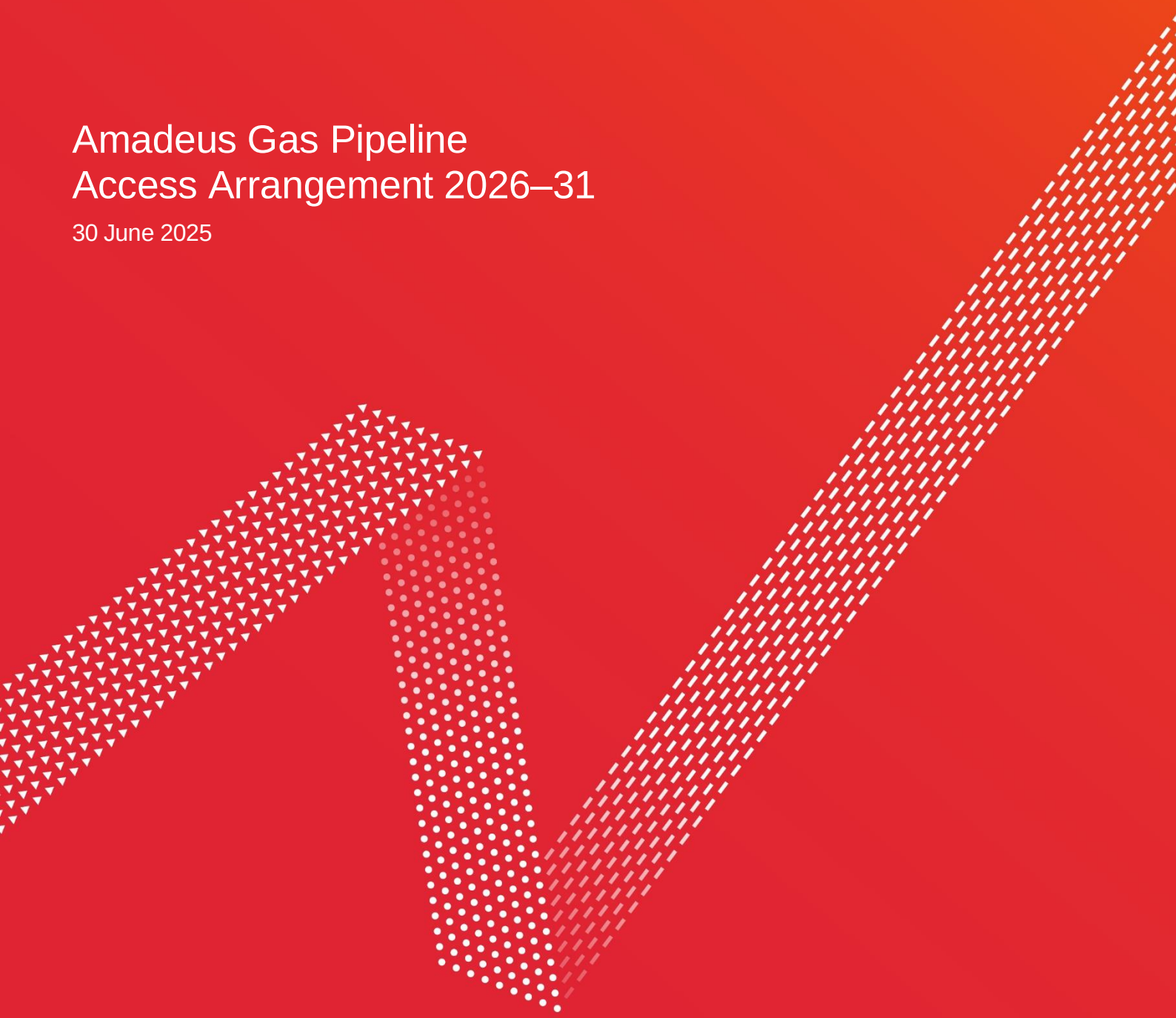
Cathodic Protection Business Case

Amadeus Gas Pipeline Access Arrangement 2026–31

30 June 2025



Contents

1. Overview

Number/ identifier	AGP_SIB_Cathodic protection
Description of Issue/ Project	Cathodic protection (CP) is necessary to ensure that pipeline metal loss due to corrosion does not occur as this would result in derating of the pipeline's capacity and would eventually lead to a leak or rupture. CP systems are needed to maintain the integrity of the 1600km of buried transmission pipeline and this is an ongoing program of work. This business case outlines the capital expenditure activities necessary over the 2026-31 period to ensure adequate CP is provided to protect the pipeline.
Options considered	New CP sites, upgraded CP ground beds and CP control unit upgrades are a requirement, as determined from the annual CP surveys and review of the performance of the CP system. The installation of new satellite data loggers along the AGP to monitor the effectiveness of CP is also included in the 2026–31 access arrangement. The following options are broadly considered: • Option 1: Do nothing during this regulatory period • Option 2: Establish new cathodic protection sites and upgrades at identified locations at an efficient cost.
Proposed Solution	The recommendation is to develop 5 additional solar powered CP sites, upgrade 2 existing CP anode beds and 5 CP controller units (CPU), negotiate 5 new easements for future CP sites and install satellite data loggers more or less every 15kms along the pipeline during the 2026–31 access arrangement period. The locations of the new CP sites and upgrades to existing CP sites will be determined using CP survey data.
Estimated Cost	$5.0 million ($ Real 30 June 2026)
Relevant standards	• AS 2832.1 Cathodic Protection of Metals: Pipes and Cables. • AS 2885.3 Pipelines: Gas and Liquid Petroleum Operations and Maintenance. • AGP Pipeline Licence
Consistency with National Gas Rules (NGR)	The investment in these CP assets complies with the capital expenditure criteria in Section 79 of the NGR because it: • is necessary to maintain and improve the safety and integrity of services (79(2)(c)(i) and (ii)); and • would be incurred by a prudent service provider acting efficiently, in accordance with accepted good industry practice, to achieve the lowest sustainable cost of providing services (79(1)(a)).

2. Program details

2.1. Background

Cathodic protection (CP) is essential to ensure corrosion of the steel pipeline does not occur. CP ensures the pipeline remains strong and safe over time, preventing leaks or bursts that could result in capacity derating, safety issues and/or environmental damage. CP uses an electric current to maintain the pipeline at the desired electrical potential and connects the pipeline to a sacrificial metal that corrodes instead of the steel pipe. CP slows the corrosion process down to negligible rates, as long as certain protection criteria can be met.

Corrosion readily occurs where there is any deficiency in the application of the final pipeline coating or where any damage or degradation to the coating occurs after commissioning. It is usual to install CP sites at intervals determined by a CP system design – for the AGP, CP sites were initially installed evenly along the pipeline. The CP sites are solar and battery powered with telemetry, the data from which is used to monitor whether the CP system is operating effectively.

The CP current drain provides evidence of the level of protection that is being applied by each CP system and from which any deterioration in the protection level can be determined. Annual CP surveys at test points along the pipeline are carried out to measure the real local effectiveness of the imposed current upon that pipeline section.

Where the existing system no longer provides the necessary protection requirements, it can be determined if a new site is required or if the existing CP site's anode beds are sufficiently depleted that an upgrade of these alone would provide the necessary improvement.

The standards that are relevant to this business case are:

— AS 2832.1 Cathodic Protection of Metals: Pipes and Cables,

— AS 2885.3 Pipelines: Gas and Liquid Petroleum Operations and Maintenance, and

— the AGP Pipeline Licence.

Augmentation of the CP system is undertaken through:

— Installing additional CP sites – for more detail, see section 3;

— Updating failing CP units – for more detail, see section 4; and

— Upgrading existing anode ground beds – for more detail, see section 5.

In addition, the installation of new satellite data loggers along the AGP is planned in the 2026–31 access arrangement. This data will significantly improve CP monitoring on the pipeline – for more detail, see section 6.

2.2. Assessment of options

Aged degradation of the HDPE (yellow jacket) coating on the AGP requires increased levels of CP. Where continued monitoring identifies that protection from the CP system is less than that required under AS2885, augmentation is required.

There are alternative techniques to provide CP, however they are typically more expensive, as they require much deeper excavation and refill, and are less effective as they are prone to ground water intrusion. Although those alternative methods may be possible and beneficial under specific circumstances, this business case accepts that they are not cost effective on the AGP and has focussed on the development of the traditional impressed current system.

Therefore, to ensure that CP levels can be maintained as required by AS 2885.3, AS2832 and the AGP licence, Amadeus focuses the CP system improvements on four major elements – new sites, replacement of obsolete units, ground bed replacements and the installation of satellite data loggers at CP test sites about every 15kms along the pipeline. The options for each of these can be found in sections 3 to 6 of this business case.

2.2.1. Inherent Risk assessment

The inherent business case risk is shown below, as well as the residual risk rating of the preferred options. The risk assessment is based on APA's Enterprise Risk Matrix – Projects.

For a worst-case scenario, we need to consider the potential ramifications of a failure of CP if these activities are not undertaken.

With a pipeline partially unprotected from corrosion, it could be assumed that corrosion occurs at a coating defect and the pipe wall thins to the extent where it fails and ruptures. A linear length could rupture where there is severe damage to the coating, such as a mechanical gouge removing the coating, or a large crack developing due to degradation of the polyethylene coating or seasonal ground movement.

A rupture is dramatic, causing severe asset damage and the potential for fatalities if people are present. Depending on the location, the pipeline might be out of service for days, weeks or even months, and recommencement may be subject to successful hydro-testing or only offered at a lower operating pressure.

Table 2–1: Inherent risk rating of the CP business case

Risk Area	Potential Impact	Option 1: Do nothing		Option 2: Efficient proactive expenditure	
		Likelihood / Impact	Inherent risk rating	Likelihood / Impact	Residual risk rating
Health & Safety	Fatality or injury	Rare / Catastrophic	Extreme	Rare / Major	Low
Environment	n/a	n/a	n/a	n/a	n/a
Operational	Disruption 1–3 months	Occasional / Minor	Low	Rare / Minor	Negligible
Compliance	Regulatory breach	Occasional / Major	High	Rare / Major	Low
Reputation & Customer	Adverse media, negative feedback	Occasional / Significant	Moderate	Rare / Significant	Negligible
Financial	Force Majeure and repair costs	Occasional / Significant	Moderate	Rare / Significant	Negligible
Untreated risk			**EXTREME**		**LOW**

The risk assessment indicates that there is the potential for extreme risk, resulting from the failure to provide effective CP of the pipeline. The impact is largely based upon the outcomes from failing to maintain a safe pipeline system and the associated disruption to normal business.

The preferred options presented in sections 3 to 6 lower the inherent risk from Extreme to a Low residual risk.

Financial assessment

A consideration of the positive and negative impacts of the expected financial outlays for each option is shown below.

A Net Present Value (NPV) calculation has been prepared for the installation of the new satellite data loggers, but NPVs have not been undertaken for the proposed new sites, replacement of obsolete units and the ground bed replacements as a realistic expenditure profile for the 'Do nothing' option is unable to be ascertained.

Table 2–2: Financial assessment of the CP business case for proposed new CP sites, replacement of obsolete CP units and the CP ground bed replacements

	Commentary
Option 1: Accept non-conformance with regulations and asset failure	• No proactive management of the CP for the pipeline will lead to pipeline corrosion. • Corrosion will reduce the capacity of the pipeline through gas leakage, potentially causing damage to the environment and people, as well as a loss of revenue. • To repair extensive levels of corrosion entails digging and replacing entire sections of pipeline. This is more expensive than maintaining on-going CP of the pipeline and will also require lengthy interruptions to gas supply. • Interruptions to customer supply and gas leakage reduces income as will any pipeline failure that leads to a fatality or injury, due to litigation costs and payments for damages. • Regulatory and licence breaches would lead to fines and potentially a loss of the pipeline licence. • These outcomes would severely impact share price and the longevity of the business. • Avoided capex cost in the earlier years will be more than offset by the potential financial and reputational cost of regulatory fines, penalties arising from reputational damage, legal action and the loss of the AGP operating licence.
Option 2: Planned approach to managing risks and costs*	• Replacements are identified from detailed CP survey data and field assessments. • Where possible, replacements take place with other works at the site, improving cost and resource efficiency. • Replacements and upgrades will improve the standardisation of field equipment, reduce obsolescence risk and the financial costs of carrying multiple spare parts. • Steady replacement rate over the coming years gives predictability in expenditure. • The installation of satellite data loggers will improve CP monitoring by providing near real-time data as to how well CP is working along the pipeline. This additional monitoring will reduce the need for manual surveys of each CP test from once a year to once every 5-years, freeing up a significant portion of staff to perform other maintenance works on the pipeline.

** There is a third option for the ground bed replacements, but in the interests of brevity it has not been included in the table above. See section 5.3 for more details.*

Based on the risk and financial assessments above, Amadeus' preferred option to appropriately balance costs and risks is Option 2 across all components of the CP business case.

2.3. Consistency with the National Gas Rules and other regulations

The AGP is a major national pipeline, and good practice requires it to be appropriately equipped to eliminate the risk of corrosion events. Licence conditions and Australian Standards require management to actively manage corrosion.

The planned capital expenditure on the AGP is designed to meet the capital expenditure objectives set out in in section 79(2)(c)(ii) of the National Gas Rules (NGR) as the work is necessary to maintain the integrity of service.

Consistent with Rule 79 of the National Gas Rules, APA considers that the capital expenditure is:

— Prudent – The expenditure is necessary in order to maintain and improve the safety of services and maintain the integrity of services to customers and is of a nature that a prudent service provider would incur. The program aligns with Australian Standard (AS) 2832.1 Cathodic Protection of Metals: Pipes and Cables, AS 2885.3 Pipelines: Gas and Liquid Petroleum Operations and Maintenance; and AS3000: Electrical Installations;

— Efficient – The works will be subject to APA's procurement policy. The field work will be carried out by the external contractor that has been used to date, who has demonstrated specific expertise in completing the installation of the facilities in a safe and cost-effective manner. The expenditure can therefore be considered consistent with the expenditure that a prudent service provider acting efficiently would incur; and

— Consistent with accepted and good industry practice – Addressing the risks associated with the cathodic protection system failure and replacing assets that have reached the end of their useful life is accepted as good industry practice. In addition, the reduction of risk to as low as reasonably practicable while balancing cost is consistent with Australian Standard AS2885.

2.4. Proposed costs for 2026–31

The total cost of the CP business case is shown below. More detail on each aspect of augmentation can be found in sections 3 to 6 of this business case.

Table 2–3 Total cost for CP business case ($'000s Real 30 June 2026)

	2026–27	2027–28	2028–29	2029–30	2030–31	Total
Additional CP sites	584	584	584	584	584	**2,920**
CP easements	–	–	–	–	433	**433**
Upgrade ground beds	151	–	151	–	151	**454**
Update failing CP units	54	27	–	54	54	**189**
Satellite data loggers	–	514	514	–	–	**1,028**
Total	**790**	**1,125**	**1,249**	**638**	**1,222**	**5,024**

3. Additional cathodic protection sites

3.1. Project objective and scope

New CP sites are determined from the results of annual CP surveys. Typically, these have revealed that on average along the length of the AGP, one additional site is required per year.

Current CP survey data confirms this, and the five sites planned for 2026–31 have been identified to ensure CP levels continue to meet the necessary protection criteria. New CP site planning is carried out in a five-year block to align with the access arrangement.

This allows sub-leases for the new CP sites to be arranged as a campaign, avoiding the need to obtain new sub-leases each year, some of which can be problematic to secure, potentially disrupting works planning.

Amadeus' procurements of sub-leases for the 2026–31 access arrangement period will take place in the final year of the current access arrangement (2025-26 financial year). Planning and procurement of the sub-leases for the following access arrangement period is required in 2030-31.

3.2. Background

The AGP was originally built with the number of CP sites in the CP system design. However, all metal pipelines require the addition of more CP sites over time, as the effectiveness of the original sites decline, and the pipeline coating degrades.

New sites typically require:

— an extension to the lease area from the current pipeline easement. This facilitates space and offset as needed for the anode bed and

— given the remote areas of the AGP, power to be supplied from solar panels and battery storage that are also installed at the site

— a CP monitoring system. When a CP monitoring system fails, an assessment can be conducted to determine whether repair or replacement is required.

3.3. Assessment of options

The options considered for the access arrangement period are:

— Option 1: Do nothing

— Option 2: install one new CP site per year

3.3.2. Risk assessment

Failing to provide adequate minimum CP protection guarantees that corrosion will occur where coating defects exist.

The addition of new sites to meet the calculated minimum protection criteria ensures that the section of pipeline covered by the system is fully protected.

Table 3–1: Risk assessment – New CP Sites

Risk Area	Potential Impact	Option 1	Option 2:	
		Inherent risk rating	Likelihood / Impact	Risk rating
Health & Safety	Fatality or injury	Extreme	Rare / Major	Low
Environment	n/a	n/a	n/a	n/a
Operational	Disruption 1-3 months	Low	Rare / Minor	Negligible
Compliance	Regulatory breach	High	Rare / Major	Low
Reputation & Customer	Adverse media, negative feedback	Moderate	Rare / Significant	Negligible
Financial	Force Majeure & repair costs	Moderate	Rare / Significant	Negligible
Untreated risk		**EXTREME**		**LOW**

Option 1

The 'Do Nothing' option carries a high risk that the CP system will fail. This will result in anode beds depleting, CP units not delivering sufficient power, and eventual pipeline corrosion and non-compliance with AS2832.1.

Although this option defers any capital expenditure, it increases the risk of corrosion and rectifying corrosion (once it occurs) will cost significantly more than bolstering the number of CP sites (option 2) to ensure protection remains.

Option 1 is not technically acceptable, nor aligned with the requirements of Amadeus' Pipeline Licence. It is not prudent nor consistent with good practice.

Option 2

Option 2 addresses the need to continually maintain the CP system in line with Australian Standard (AS) 2832.1 *Cathodic Protection of Metals: Pipes and Cables*, AS 2885.3 *Pipelines: Gas and Liquid Petroleum Operations and Maintenance*; and AS3000: *Electrical Installations*.

CP surveys and the assessment of the data they provide, trigger the required installation of new CP sites, replacement of anode beds or the upgrade of a CP unit from a low to higher power setting. This strategy has been in place and successfully inhibited corrosion for many years.

Option 2 is the only credible and practicable option. APA has found the necessary installation rate is approximately one new site per year.

3.3.4. Financial assessment

Net Present Value calculations have not been undertaken as a realistic expenditure profile for Option 1 is unable to be ascertained.

In addition, end-of-life replacement and rectification costs are inevitable, so the significant question is how the spend should be balanced to appropriately manage the associated risks.

Table 3–2: Financial assessment – New CP sites ($ Real 30 June 2026)

	Description	Cost
Option 1	Do Nothing	Higher than $3.4 million
Option 2	New CP Sites	$3.4 million

Amadeus preferred option that it believes appropriately balances costs and risks is the development of five additional solar powered CP sites, at locations to be determined through CP survey data.

3.4. Proposed costs for 2026–31

Land for new CP sites is acquired in advance to align with the five yearly access arrangement cycle. This means the land acquisition costs for the five new CP sites planned for the 2026–31 period are part of the current regulatory period's costs, and planned land acquisition costs in the final year of the 2026–31 regulatory period will relate to new CP sites to be installed in the 2031–2036 period.

Addressing site acquisitions for the five new CP sites in advance and as a campaign has proven to be an efficient means of securing sub-leases. It still allows for flexibility in the actual start date of each specific sub-lease and avoids instances where protracted negotiations negatively impact the planned timing of a new CP site installation.

The annual installation of the new CP sites will be carried out with a combination of APA and contract resources. The typical installation rate is one new site per year, therefore five new sites are proposed for this business case.

Amadeus has extensive history with installation of new CP sites and the forecast costs per site reflect recent experience, escalated by CPI.

Table 3–3: Estimated annual cost new CP sites ($'000s Real 30 June 2026)

Cost Category	2026–27	2027–28	2028–29	2029–30	2030–31	Total
CP Easements	–	–	–	–	433	**433**
Installation of new CP sites	584	584	584	584	584	**2,920**
Total	**584**	**584**	**584**	**584**	**1,017**	**3,353**

4. Cathodic protection unit upgrades

4.1. Project objective and scope

To ensure that CP levels can be maintained as required by AS 2885.3/ AS2832 and the AGP pipeline licence, obsolete CP units are required to be replaced.

It is proposed to continue the proactive approach of replacing one to two CP units per year based either upon condition assessment or as part of any other electrical upgrades that are required at a site.

Progressive replacement will gradually standardise the equipment that is in service, ensuring that CP is continuously maintained on the pipeline and reduce obsolescence risk.

4.2. Background

To ensure that CP levels can be maintained as required by AS 2885.1 / AS2832 and the AGP pipeline licence, the performance of the CP units is monitored to ensure that the cathode protection units are appropriately managing power and voltage. This is essential to ensure the pipeline is maintained at the ideal voltage to resist corrosion. The lead time for a new CP unit is approximately four months.

The CP units typically contain a number of proprietary printed circuit boards containing discrete components. Failures can occur through prolonged service and sometimes due to transient voltages on the pipeline, such as from lightning strike.

A number of the existing CP units are obsolete, and spare parts are difficult or impossible to obtain. There are also numerous models of CP units in use along the pipeline, making spare part salvaging and interchangeability difficult.

4.3. Assessment of options

The options considered for the access arrangement period are:

— Option 1: Do nothing

— Option 2: Gradually upgrade CP units in an efficient and cost-effective manner.

4.3.1. Risk assessment

Failing to provide adequate minimum CP protection will see corrosion occur where coating defects exist. Upgrading failing CP Units to ensure full functionality and meet the calculated minimum protection criteria will ensure full CP protection for the pipeline.

Table 4–1: Risk assessment – CP unit upgrades

Risk Area	Potential Impact	Option 1	Option 2	
		Inherent risk rating	Likelihood / Impact	Risk rating
Health & Safety	Fatality or injury	Extreme	Rare / Major	Low
Environment	n/a	n/a	n/a	n/a
Operational	Disruption 1–3 months	Low	Rare / Minor	Negligible
Compliance	Possibility of regulatory notice	High	Rare / Major	Low
Reputation & Customer	Adverse media, negative feedback	Moderate	Rare / Significant	Negligible
Financial	Force Majeure & repair costs	Moderate	Rare / Significant	Negligible
Untreated risk		**EXTREME**		**LOW**

4.3.2. Option 1

The 'Do Nothing' option increases the risk that the CP system will fail. This will result in the CP units not delivering sufficient or any power, and eventual pipeline corrosion and non-compliance with AS2832.1.

Although this option defers any capital expenditure, it increases the risk of corrosion and rectifying corrosion will cost significantly more than maintaining CP.

Option 1 is not technically acceptable, nor aligned with the requirements of the Amadeus' Pipeline Licence. It is not prudent nor consistent with good practice.

4.3.3. Option 2

Option 2 addresses the need to continually maintain the CP system in line with Australian Standard (AS) 2832.1 *Cathodic Protection of Metals: Pipes and Cables*, AS 2885.3 *Pipelines: Gas and Liquid Petroleum Operations and Maintenance*; and AS3000: *Electrical Installations*.

The CP unit is a relatively small but key component of a CP site. Ensuring that the protection being applied to the pipe wall is adequate by controlling voltage and/or power is a critical aspect and there is no logical alternative where impressed current systems are utilised.

A proactive approach is appropriate. Unreliable CP units incur high servicing costs which eventually makes them uneconomical. The sparing of existing CP units is currently not economical due to the range of models and age of units in the field.

Option 2 is the most efficient option. APA has found the most cost-effective installation rate is one to two CP unit upgrades per year.

Financial assessment

Table 4–2: Financial assessment – CP unit upgrades ($ Real 30 June 2026)

	Description	Costs
Option 1	Do Nothing	Extremely high
Option 2	Replace and upgrade CP systems as required	$189,000

The preferred option that appropriately balances costs and risks is the replacement of CP units on the pipeline based on condition.

4.4. Proposed costs for 2026–31

The CP units would be replaced by APA resources. Where other electrical or CP work it necessary at a site, the CP unit replacement would be completed in association with that work. The typical annual installation rate is one to two units per year.

Table 4–3: Estimated annual cost of CP unit upgrades ($'000s Real 30 June 2026)

Locations	2026–27	2027–28	2028–29	2029–30	2030–31	Total
Daly Waters	27	–	–	–	–	**27**
Kelly Well	27	–	–	–	–	**27**
Mereenie	–	27	–	–	–	**27**
Newcastle Waters	–	–	–	27	–	**27**
TBC	–	–	–	27	54	**81**
Total	**54**	**27**	**–**	**54**	**54**	**189**

5. Ground bed replacements

5.1. Project objective and scope

To ensure that CP levels can be maintained as required by AS 2885.3/ AS2832 and the AGP pipeline licence, CP ground bed replacements are required given anode beds naturally decay over time.

It is proposed to extend a ground bed (install a new ground bed to operate in parallel with what remains of the existing ground bed) every second year to return site capability back to that necessary for adequate CP. The exact number and location will be determined from detailed examination of the CP surveys. Experience has indicated that one ground bed needs replacing every two years.

5.2. Background

CP ground beds form part of the CP system on a pipeline and inherently decline over time. The ground bed is the anode, being a low resistance path to earth, which is connected to the CP unit that allows current to be applied to the pipeline. Current flowing onto the pipeline from the ground bed consumes the ground bed over time and it loses it capability. This process is accelerated when higher output currents are required or in instances where the system develops higher resistance.

To ensure that CP levels can be maintained as required by AS 2885.1/ AS2832 and the AGP pipeline licence, the performance of ground beds is assessed from the annual CP surveys and replacements are undertaken as required.

5.3. Assessment of options

The options considered for the access arrangement period are:

- Option 1: Do nothing
- Option 2: Replace Ground Beds
- Option 3: Deep bore CP anode

5.3.1. Risk assessment

The upgrade of failing CP anode beds ensures full functionality to meet the calculated minimum CP criteria to protect the pipeline.

Table 5–1: Risk assessment – CP ground bed replacements

Risk Area	Potential Impact	Option 1	Options 2 and 3	
		Inherent risk rating	Likelihood / Impact	Risk rating
Health & Safety	n/a	Extreme	Rare / Major	Low
Environment	n/a	n/a	n/a	n/a
Operational	Disruption 1–3 months	Low	Rare / Minor	Negligible
Compliance	Possibility of regulatory notice	High	Rare / Major	Low
Reputation & Customers	Adverse media coverage, negative feedback	Moderate	Rare / Significant	Negligible
Financial	Force Majeure & repair costs	Moderate	Rare / Significant	Negligible
Untreated risk		**EXTREME**		**LOW**

Option 1

The 'Do Nothing' option increases the risk that the CP system will fail. This will result in anode beds depleting, CP units not delivering sufficient power, and eventual pipeline corrosion and non-compliance with AS2832.1.

Although this option defers any capital expenditure, it increases the risk of corrosion and rectifying corrosion will cost significantly more than maintaining CP.

Option 1 is not technically acceptable, nor aligned with the requirements of Amadeus' Pipeline Licence. It is not prudent nor consistent with good practice.

Option 2

Option 2 addresses the need to continually maintain the CP system in line with Australian Standard (AS) 2832.1 *Cathodic Protection of Metals: Pipes and Cables*, AS 2885.3 *Pipelines: Gas and Liquid Petroleum Operations and Maintenance*; and AS3000: *Electrical Installations*.

Option 2 comes at a moderate cost and delivers more effective and reliable CP that is easier to maintain than Option 3.

Option 3

Option 3 also addresses the need to continually maintain the CP system in line with Australian Standards.

However, Option 3 is typically less effective, less reliable and more difficult to maintain. It also comes at a higher initial capital cost.

Financial assessment

Table 5–2: Financial assessment – CP ground bed replacement ($ Real 30 June 2026)

	Description	Costs
Option 1	Do Nothing	Extremely high
Option 2	Replace and upgrade ground beds as required	$454,000
Option 3	Use of deep bore CP anode	> $500,000

The preferred option that appropriately balances costs and risks is Option 2, upgrading ground beds at locations to be determined from CP survey data and avoiding the use of deep bore CP anodes.

5.4. Proposed cost for 2026–31

The ground bed design would be performed by specialised contractors if necessary. The work would typically be carried out with a combination of APA and contract resources. The typical annual installation rate is one refurbished ground bed every second year. The previous access arrangement had funding proposed for three sites and the same is proposed for the 2026–31 access arrangement period.

Table 5–3: Estimated yearly cost of CP ground bed replacement ($'000s Real 30 June 2026)

Locations	2026–27	2027–28	2028–29	2029–30	2030–31	Total
Daly Waters	151	–	–	–	–	**151**
Kelly Well	–	–	151	–	–	**151**
Mereenie	–	–	–	–	151	**151**
Total	**151**	**–**	**151**	**–**	**151**	**454**

6. Satellite data loggers for cathodic protection

6.1. Project objective and scope

To improve the monitoring of CP along the pipeline, it is proposed to install satellite CP data loggers at CP test sites at approximately 15km intervals along the pipeline. These will provide year-round data as to the effectiveness of CP on the pipeline.

This additional monitoring will reduce the need to undertake manual surveys of each CP test point on an annual basis, to once every 5-years, freeing up significant staff time to perform other maintenance works on the pipeline.

Whilst the AGP has CP test points at 2km spacings, the proposal is to install the satellite loggers at an average spacing of 15km.

6.2. Background

CP sites provide the CP to the pipeline and CP test sites (spaced at 2km intervals on the AGP) are used to test the effectiveness of CP along the pipeline.

Historically, the monitoring of CP test sites has been undertaken manually, with each test site visited annually. This frequency requires a balance between resource intensity, the necessity for data and having access to remote sites. Even then, manual testing provides only a once-a-year snapshot of how effective the CP protection is working on a particular section of pipeline, not how effective the CP is through the seasons.

Technological advances in satellite data loggers, that transmit data to the Brisbane Integrated Operating Centre (IOC) via satellite communications, means this ‘out of the box’ solution now provides an affordable, faster and more reliable transfer of CP data from remote locations.

In 2024–25, APA undertook a trial of satellite data loggers for monitoring CP across other pipeline assets. The trial proved to be a successful and cost-effective solution. Eight CP readings are collected by the data loggers each day before being transferred to the Brisbane IOC for recording and storage.

Based on these results, the intention is to install 101 satellite data loggers along the length of the AGP. This will provide detailed data as to the effectiveness of CP along the pipeline and how this varies by season. The data will also inform where further inspections or CP augmentation may be required.

The satellite data loggers do have a battery that will need to be replaced. For efficiency, these will be replaced every 5 years, as part of the manual survey site visit.

6.3. Assessment of options

The options considered for the access arrangement period are:

— Option 1: Change nothing – continue the manual, annual review of CP test sites

— Option 2: Install satellite CP data loggers along the entire AGP to capture more detailed data regarding the effectiveness of CP at different points.

6.3.1. Risk assessment

The satellite data loggers provide more detailed data regarding the effectiveness of CP along the pipeline. Tracking this data will allow for the early identification of any shortfall in CP at a location. This will trigger a manual check and ultimately reduce the potential for pipeline degradation arising from water ingress, when compared to the traditional fully manual testing approach.

Table 5–1: Risk assessment – satellite data loggers

Risk Area	Potential Impact	Option 1	Option 2	
		Inherent risk rating	Likelihood / Impact	Risk rating
Health & Safety	Fatality or injury	Moderate	Rare / Significant	Negligible
Environment	n/a	n/a	n/a	n/a
Operational	Disruption 1-3 months	Low	Rare / Minor	Negligible
Compliance	Regulatory breach	Moderate	Rare / Minor	Negligible
Reputation & Customers	Adverse media, negative feedback	Moderate	Rare / Significant	Negligible
Financial	Repair costs	Moderate	Rare / Significant	Negligible
Untreated risk		**Moderate**		**Negligible**

6.3.2. Financial assessment

Table 5–2: Financial assessment – satellite data loggers ($ Real 30 June 2026)

	Description	20-year NPV
Option 1	Change nothing – continue the manual, annual review of CP test sites	-$3,111,096
Option 2	Install Satellite Data Loggers	$3,302,568

Option 1

Whilst the inherent risk rating of this option is only moderate, the operating costs to obtain the point-in-time data is significant given it is a resource heavy exercise. This is represented by the large negative NPV for this option.

Option 2

This option reduces risk to a negligible level and, whilst it carries a significant upfront cost and the costs to replace the batteries in the data loggers every 5 years, this option frees-up staff time to undertake other maintenance tasks on the AGP, providing a positive NPV.

The preferred option that appropriately balances costs and risks is Option 2, Install satellite CP data loggers along the entire AGP.

6.4. Proposed cost for 2026–31

The satellite data loggers will be installed by AGP staff.

The batteries in the satellite data loggers will be replaced every 5 years, with the first of these costs being incurred in the 2031–36 access arrangement period.

Table 5–3: Annual estimated cost of satellite data loggers ($'000s Real 30 June 2026)

	2026–27	2027–28	2028–29	2029–30	2030–31	Total
101 installs	–	514	514	–	–	**1,028**
Total	**–**	**514**	**514**	**–**	**–**	**1,028**