Attachment 9.5

Capex Business Cases

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Dampier Bunbury Pipeline

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Capex DBP01: Compressor stations

1.1 Project approvals

Table 1.1: DBP01 Compressor stations – Project approvals

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1.2 Project overview

Table 1.2: DBP01 Compressor Stations - Project overview

Description of problem /opportunity	This business case covers the recurrent program of capital works necessary over the next five years to ensure the DBNGP's compressor stations are operating safely, reliably, within acceptable risk tolerances, and are providing a level of performance consistent with that expected by customers. There are ten boost compressor stations on the DBNGP. They run based on customers' gas requirements and must be able to be ramped up or down quickly. Deterioration in compressor station performance can impact pipeline integrity and compromise DBP's ability to fulfil customers' contracted gas supply. It is therefore important the ongoing capital works program is sufficient to maintain compressor station performance and mitigate integrity and reliability/performance risks. The compressor stations work program typically comprises 15-25 individual projects spread over a five year period. Projects cover a range of disciplines including replacing end of life assets, upgrading existing equipment to improve performance, and works to protect compressor station assets from corrosion or safety hazards. The long life of compressor station assets, coupled with the different age, location and utilisation of each compressor station, means the replacement and repair cycle of compressor stations can vary depending on the overall condition of assets. This business case proposes a $3.6 million decrease in the compressor stations capital program for the AA6 period compared to AA5 actuals. This decrease in forecast expenditure is due to a reduction in corrosion under insulation (CUI) works, and fire and gas (F&G) control and suppression system replacements, offset by a combination of increasing volumes on established programs of work and new projects to address emerging risks. The remainder of the program is a continuation of cyclical asset replacement projects such as dry gas seal replacement, overhauling valves, and replacing water bath heaters, as well as an ongoing corrosion prevention activity. As a result, the overall compressor station work program reflects a similar workload to that delivered during the AA5 period and is therefore practicable and deliverable.

Untreated risk	As per risk matrix = High
Option considered	• **Option 1** - Move to a replacement on failure policy for all compressor station assets (~$29 to $52 million) • **Option 2** - Deliver a prioritised capex program based on the most recent assessment of asset replacement schedules, performance and risk ($34.5 million) • **Option 3** – Limit the program to corrosion prevention and end of life replacements only ($25.6 million)
Proposed solution	The proposed solution is Option 2. We have developed a bespoke compressor station capex program for the next five years, founded on the ongoing cycle of compressor station asset replacement and refurb activities, including additional proactive capex activities identified and prioritised for the period. The program is informed by the most recent asset performance assessments, end of life asset replacement schedules, gas quality obligations and delivery capability/priority for the AA6 period. Option 2 is an ~9% decrease in real terms compared to historical expenditure during the AA5 period. Option 1 has the potential to be lower cost, but a reactive-only approach would increase operational risks over time and is not consistent with good asset management practice. Option 3 would have a lower overall cost during the AA6 period, but it would result in the deferral of proactive replacement and asset integrity works and extend the risk associated with the assets for longer than necessary.
Estimated cost	The forecast direct cost (excluding overheads) during the next five-year period (AA6) is $34.5 million (2024).

Corrosion prevention	2,704	2,304	2,124	2,009	1,909	**11,050**
ECI and comms EOL	1,135	165	1,130	815	815	**4,060**
Metering and valve replacement	965	980	980	980	1,280	**5,185**
EOL compression assets	2,819	1,443	2,550	1,455	2,081	**10,348**
Hazardous area rectification	345	345	345	345	345	**1,725**
Asset integrity	177	177	1,377	177	177	**2,083**
Total	**8,145**	**5,414**	**8,506**	**5,781**	**6,607**	**34,451**

Basis of costs	All costs in this business case are expressed in real unescalated dollars December 2024 unless otherwise stated.
Treated risk	As per risk matrix = Intermediate
Variation from AA5	The forecast compressor station program expenditure for AA6 is ~$3.6 million less than the forecast expenditure in AA5 of $38.1 million. This decrease in forecast expenditure is due to a reduction in corrosion under insulation (CUI) works, and fire and gas (F&G) control and suppression system

	replacements. These reductions are offset by a combination of increasing volumes on established programs of work and new projects to address emerging risks. Established programs that are increasing include the refurbishment of underground pipework, water bath heater replacement, air package replacement, and valve replacement. New projects to address emerging risks include, vibration monitoring ($0.4 million), hot gas path inspection and replacement ($1.2 million), rotor bundle replacement ($1.5 million), gas chromatograph upgrades ($1 million) and mainline flow meter replacement ($1.2 million).
Alignment to our vision	Delivering the ongoing Compressor Stations capex program aligns with AGIG's vision in relation to: • *Delivering for Customers* – the proposed investment is necessary to ensure integrity of supply and ensure shippers can use the pipeline, with gas delivered at the correct pressures and volumes • *Sustainably Cost Efficient* – the proposed investment in ECI, mechanical and corrosion prevention maximises the DBNGP's useful life and is considerably lower cost and safer than reactively replacing Compressor Station components over the long term
Consistency with the National Gas Rules (NGR)	**NGR 79(1)** – the proposed asset replacement, proactive works and upgrade program is consistent with accepted good industry practice, several practicable options have been considered, and market/unit rates have been tested to achieve the lowest sustainable cost of providing pipeline services. **NGR 79(2)** – renewal of rotating, ECI, power supply and mechanical equipment, repair/rectification and proactive works to protect from corrosion and safety hazards, or maintain performance are all necessary to ensure the continued operation of compressor stations to maintain the safety and integrity of services along the DBNGP. Compressor station functionality is a core process in the transportation of gas required to meet contracted obligations. Therefore, the proposed expenditure is conforming capex based on the grounds of NGR 79(2)(c)(ii). **NGR 74** – the forecast costs are based on the latest market rate testing, and project options consider the asset management requirements as per the latest Asset Management Plan. Cost assessments have been conducted for each option based on the best information available at the time of developing this business case. The estimate has therefore been arrived at on a reasonable basis and represents the best estimate possible in the circumstances.
Stakeholder engagement	Our shippers advised they highly value current levels of reliability and would be concerned if this were to change. They also expect DBP to maintain a strong focus on operational issues as it is important for reliability and emergency management. Our compressor stations program comprises ongoing and periodic activities to ensure the integrity of compressor stations. During a series of roundtable meetings, we shared an overview of our AA6 compressor stations work program. Shippers expressed no concerns with the compressors stations program and were comfortable with capex being no higher than that incurred during the previous regulatory period. Shippers recognised the criticality of compression assets and the need to maintain them in good working order. Shippers also queried whether asset values for assets that are replaced would be depreciated and written off and we confirmed that this is the case.
Other relevant documents	This business case should be read in conjunction with the following documents: • Asset Management Plan – General • Asset Management Plan – Electrical Control and Instrumentation

	• Asset Management Plan – Rotating Equipment • Asset Management – Pipeline Mechanical • Asset Management – Corrosion Protection

1.3 Background

Compressor stations are critical assets that support the transportation of gas to all customers. They run based on the gas requirements of customers and operations must be ramped up or down quickly to meet these needs. The DBNGP has ten compressor stations, each equipped with two compressors. Table 1.3 summarises the different asset types and components at each compressor station.

Table 1.3: Compressor station asset components

Compressor station asset type	Compressor station asset components	
Process	• Upstream and downstream main line valves (MLVs) • Pig launchers and receivers • Gas scrubbers • Turbine compressor units • Vent system	• After coolers • Station and units pipework • Station and units isolation valves • Station and units recycle valves • Station mainline bypass pipe
Utilities	• Turbine fuel gas system • Instrument gas system • GEA fuel gas system • Power generation – Gas engines and diesel engines • Electrical switch gear • 110V and 24V uninterruptible power supply (UPS) system (batteries and chargers) • Electrical cabling and cable ducts • Integrated earthing system	• Unit, station and mainline emergency shut down systems • Fire & gas (F&G) detection systems • Turbine compressor unit fire suppressant systems • Waste oil systems • Portable water systems (bores, piping and storage) • Air conditioning systems • Sewage system • Air compressors and associated driers
Facilities - Buildings	• Accommodation • Workshop • Warehouse • Store rooms	• Control room • Turbine buildings • Electrical switch room • Equipment room
Facilities - Grounds	• Station yard • Security fencing • Access roads • Airstrip	• Helipad • Drainage • Rubbish tip

DBP undertakes an ongoing capital works program, which is necessary to maintain the performance of compressor station assets. Compressor station works comprise a combination of end of life asset replacement, upgrading existing equipment, works to prevent corrosion, and making sure hazardous areas remain safe and compliant with standards.

Not all compressor stations or their associated assets have the same risk profile, so each is individually assessed for management and maintenance activities. Variances to the risk profile of individual assets can be caused by a number of factors, such as location, customer demand, whether the station runs all year around or only for some of the year, and age.[1] As a result, the volume of works and capital expenditure may vary across regulatory periods.

This business case sets out a proposal for a relatively small decrease the compressor stations capital works program during AA6 in order to meet the asset management requirements set out in the AMP. This business case also considers options to conduct minimal proactive works (essential corrosion replacement and end of life replacement only) or to move to wholly reactive compressor station asset replacement program.

1.3.1 Compressor stations capital works program

The proposed compressors stations capital works program is $34.5 million, a $3.6 million (~9%) decrease compared to that expected to be delivered during AA5.

The next five years (AA6) sees continuation of a number of well-established compressor station asset replacement programs. These include ongoing works to replace dry gas seals, water bath heaters, valves, and a range of electrical equipment at various compressors stations.

The AA6 period also sees continuation of works to address non-compliance issues in hazardous areas, and ongoing activity to address pipework corrosion. End of life asset replacement and corrosion prevention remain the most important risk mitigation activities to preserve the DBNGP's integrity, and therefore continue to comprise the bulk of the compressor stations capex program (~$20 million and ~$11 million respectively).

The make-up of corrosion prevention activities is changing slightly over the AA6 period, with a greater focus on refurbishment of below ground pipework. Inspections during AA5 identified below ground corrosion issues at compressor stations, Dampier facilities and Kwinana Junction. As a result, we are ramping up this aspect of the program, increasing expenditure on below ground pipework refurb by around $3.0 million over AA6. This is offset by reductions in our corrosion under insulation (CUI) program, which is decreasing by around $5.1 million decrease as we get on top of the CUI issue.

The AA6 period sees an increase in end of life asset replacements. Established programs of work such as the replacement of water bath heaters with electric units ($2.2 million increase), and air package replacements are $2 million higher than the AA5 cost, as more assets fall due for replacement. The rise in end of life asset replacement expenditure is offset by reductions in other programs, such as installation of fire suppression systems and electrical protection integrity testing.

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[1] Compressor stations were installed and overhauled at various stages over the past thirty years as the DBNGP went through various expansion stages. An overview of the commissioning dates of each compressor station can be found in the AMP.

However, several new projects are proposed for the AA6 period to address emerging risks identified during the AA5 period.

These new projects include replacing recycle and passing valves at compressors sites ($1.2 million), vibration monitoring ($0.4 million), hot gas path inspection and replacement ($1.2 million), rotor bundle replacement ($1.5 million) and mainline flow meter replacement ($1.2 million).

A summary of the AA6 compressor stations works program is shown in Table 1.4.

Table 1.4: Required compressor stations works program activities during AA6, $'000 2024

Project	Scope	2026	2027	2028	2029	2030	Total
Corrosion protection	• Refurbishment of below ground pipework • CP visibility of compressor stations • Painting above ground facilities • Repair CUI	2,704	2,304	2,124	2,009	1,909	**11,050**
ECI and comms EOL	• Fire suppression systems • Electrical protection integrity testing • Replace fire and gas detection systems • IP telephony routers and switches • Replace tertiary comms systems • Replace PA system	1,135	165	1,130	815	815	**4,060**
Metering and valve replacement	• Replace/overhaul recycle valves • Replace passing valves • Replace mainline ultrasonic flow meters • Replace/upgrade gas chromatographs	965	980	980	980	1,280	**5,185**
EOL compression assets	• Replace aged/failing water bath heaters • Replace dry gas seals at CS6, CS9, CS1 and CS2 • Replace/overhaul rotor bundles at 2 compressor stations • Replace compressor air packages at Stage4 units	2,819	1,443	2,550	1,455	2,081	**10,348**
Hazardous area rectification	Mandatory inspection and rectification of non-conformances in hazardous areas.	345	345	345	345	345	**1,725**
Asset integrity	• Aftercooler fan vibration monitoring • Hot gas path inspection and parts replacement • Pig interface wrap removal and inspection	177	177	1,377	177	177	**2,083**
Total		**8,145**	**5,414**	**8,506**	**5,781**	**6,607**	**34,451**

An overview of the activities listed in Table 1.4, including the drivers for each activity, is provided in Appendix B.

1.4 Risk assessment

Risk management is a constant cycle of analysis, treatment, monitoring, reporting and then identifying once again, with a commitment to balance outcomes sought with delivery and cost implications considered and assessed.

Our risk assessment approach focuses on understanding the potential severity of failure events associated with each asset and the likelihood that the event will occur.

Figure 1.1: Risk management principles



Based on these two key inputs, the risk assessment and derived risk rating then guides the actions and activities required to ensure safety and compliance are not compromised, while delivery of this outcome is done as efficiently and effectively as possible.

The risk rating assesses the consequence and likelihood of the risk. The risk of an event associated with failure of an asset is rated based on the combined effect of the consequence and likelihood rating to provide an overall risk rating. This risk rating guides the risk management and mitigation activities and facilitates prioritisation.

DBP's operational risk framework is based on AS/NZS 2885 and requires all identified risks ranked as intermediate or above to be addressed. For risks ranked as high DBP must 'Modify the threat, the frequency or the consequence to reduce the risk rank to intermediate or lower'.

Six areas are considered for each type of risk:

1. People – injuries or illness to employees and contractors or members of the public
2. Environmental impact – impact on the surroundings in which the asset operates, including natural, built and Aboriginal cultural heritage, soil, water, vegetation, fauna, air and their interrelationships
3. Supply – disruption in the provision of services/supply, impacting customers
4. Impact on AGIG/DBP – impact on AGIG (DBP) due to restrictions and enforcement, such as regulatory enforcement or legal actions
5. Reputation – impact on stakeholders' views of AGIG (DBP), including personnel, customers, investors, security holders, regulators and the community
6. Loss – financial impact on AGIG (DBP)

Compressor stations initiatives have been split into two categories for risk assessment:

1. those related to the integrity of compressor stations; and
2. those related to the reliability and performance of compressor stations.

The overall risk rating of managing and maintaining the integrity and the reliability and performance of compressor stations in line with relevant AMPs is outlined in the following sections.

1.4.1 Integrity – untreated risk

The primary risk event relating to compressor station integrity is that corrosion in compressor station pipework is undetected causing failure and a loss of supply event. This can severely harm DBP staff or the public, or prevents operation of the compressor station for a prolonged period affecting supply to one or more major customers.

The integrity risk rating associated with compressor stations is presented in Figure 1.2. If the risk remains untreated, a number of risks remain rated high. As a result, the compressor station integrity-driven initiatives are ranked high priority.

Figure 1.2: Integrity untreated risk rating – Compressor stations

	Trivial	Minor	Severe	Major	Catastrophic
Frequent					
Occasional					
Unlikely		Environmental	Supply Reputation Loss	DBP	
Remote					People
Hypothetical					

Negligible	Low	Intermediate	High	Extreme

The drivers of the risk rating for each area are discussed below.

- **People** – compressor stations, while designed to be unmanned, are used as base locations for roster teams to work. The compressor stations also contain stores and inventory, as well as accommodation. Given the potential consequences of fatal injuries if employees are working at stations at the time of an integrity breach, it is imperative that the ongoing capex program maintains the risk of integrity issues at the intermediate level. Maintaining high integrity at compressor stations promotes an acceptable level of safety workplace and shelter in emergencies for DBP employees. Allowing integrity levels to decline, and accepting a lower level of risk would require personnel and sensitive equipment to be located away from compressor stations due to the failure consequences of high pressure assets.

- **DBP** – compressor station integrity is critical to public safety and customer service/delivery. The consequence of a compressor station integrity issue is ranked major as it can cause loss of containment as well as short term or localised supply interruptions. This is likely to lead to introduction of restrictions or requirements by the technical regulator having a material impact on DBP's asset management practices and/or operations.
- **Reputation** – compressor station integrity works are required to ensure equipment performs to acceptable standards and safely. Inconsistent or unreliable performance due to underinvestment can lead to unplanned outages, which leads to irate customers, as well as unsafe operation due to deterioration causing loss of containment. Underinvestment in integrity activities may lead to reputational damage and outrage internally as well as externally.
- **Loss** – without the planned investment in managing compressor station integrity, there is a high risk the asset will be damaged. An integrity breach potentially costing millions of dollars in penalties and foregone revenue for both DBP and customers. Reactive costs to repair damage will likely escalate compared to the planned works program to maintain the design intent of the assets.
- **Supply** – compressor stations are integral to the effective operation of the DBNGP. Maintaining compressor station assets is necessary in ensuring DBP is able to safely and reliably deliver the forecast demand, as well be ready to meet contractual obligations of Shippers on any given day within the terms of shipper contracts. The advent of renewable electricity generation technology, which are prone to change without forward planning, puts pressure on the DBNGP to fill the gaps. Peaking demand has grown and will be a critical part of load management during the AA6 period. Shippers are expected to be able to access and use their peaking rights more regularly, therefore the compressor station integrity programs are necessary to ensure the pipeline line pack, and DBP can meet AA6 forecast throughput.

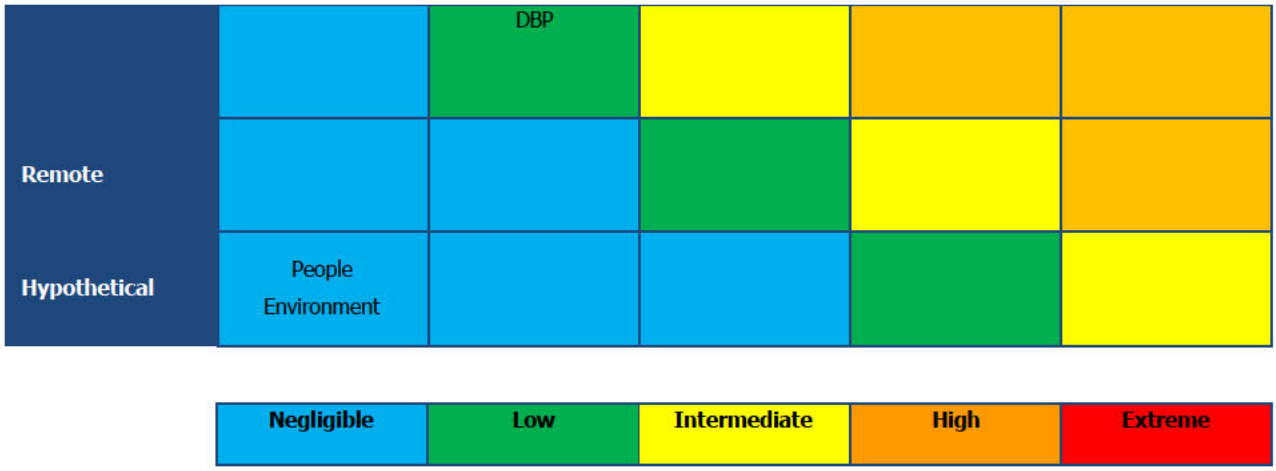
1.4.2 Reliability/performance – untreated risk

The primary risk event relating to compressor station reliability is that obsolete assets at compressor stations prevent effective operation of the compressor station causing prolonged outage affecting supply to several major customers.

The reliability/performance risk rating associated with compressor stations is presented in Figure 1.3. If the risk remains untreated, of the six risk areas, one is rated an intermediate risk.

Figure 1.3: Reliability/performance untreated risk rating – Compressor stations

	Trivial	Minor	Severe	Major	Catastrophic
Frequent					
Occasional					
Unlikely		Reputation Loss	Supply		



Compressor station reliability/performance driven initiatives are intermediate risk and medium priority, but are key in delivering a capex program that can be considered as efficient and achieving the lowest sustainable cost of delivering services. Only one risk area is rated intermediate or higher if the proposed compressor stations works are not undertaken:

- **Supply** – compressor station reliability/performance driven initiatives do not pose a threat to the effective operation of the DBNGP, but do expose shippers to localised supply issues, which can result in loss of productivity for the customer and financial penalties for DBP.

1.5 Options considered

Different options for delivering the ongoing compressor stations capital works program have been considered. The options are:

- **Option 1 -** Move to a replacement on failure policy for all compressor station assets (~$29-52 million).
- **Option 2 -** Deliver a prioritised capex program based on the most recent assessment of asset replacement schedules, performance and risk ($34.5 million). This is the recommended option.
- **Option 3 –** Limit the program to corrosion prevention and end of life replacements only ($25.6 million).

These options are discussed in the following sections.

1.5.1 Option 1 – Move to replacement on failure policy for all compressor stations projects

With this option, the volume of replacements undertaken during the AA5 period would be directly driven by the number of failures experienced on these assets, adopting a reactive rather than proactive approach to asset management.

1.5.1.1 Advantages and disadvantages

While it is not possible to predict with any accuracy the number of failures that will occur over the next five years, the DBNGP and most of its compressor stations have been operating for more than 40 years. Many compressor station assets are entering their 15 and 30-year replacement cycles during the AA6 period, which means the likelihood of failure will only increase if these assets are not replaced or overhauled proactively.

Given the higher cost of reactive replacement compared with proactive replacement (potentially two to five times higher per asset depending on asset type and location), the potential cost of works during AA6 is significantly greater than the proposed works program if widespread asset failure arises. If the number of asset failures is low, though the upfront capital cost of the program may be less than forecast, the problem is simply being pushed out further and DBP and its customers are exposed to more risk than is necessary. Neither of these outcomes are tolerable for DBP and its customers.

The requirements identified in the AMP is the prudent level of activity required to manage the integrity and reliability/performance risk associated with compressor station assets. If we moved to a reactive-only approach, all the high risks identified would not be addressed. An entirely reactive 'replace on failure' approach to managing compressor stations is not consistent with good asset management practice, and therefore not consistent with NGR 79(1)(a).

1.5.1.2 Achievement of objectives

This option would address only the assets that have actually failed, with a focus on returning them to an operational state as quickly as possible, rather than proactively managing and planning for them. This could impact throughput and contracted supply obligations. This option would also increase frequency of remote travel to address ad-hoc failures occurring, which is considered one of the highest risk activities for employees on the DBNGP. Unplanned availability of compressor units may also require changes to pipeline operation, resulting in extra fuel gas consumption and costs, particularly if a failure involves a long-lead item.

An entirely reactive approach may also result in non-compliance with regulatory requirements. For example, AS 60079 specifies electrical equipment in hazardous areas must be inspected every three years and any defects found must be rectified.

There would also be potential for non-compliance with Safe Work Australia recommendations[2] and employers duty of care[3], whereby minimum break requirements are not met when trying to get crew to reactive works promptly. To avoid this, a move to replacement on failure approach would require DBP to increase the size of its field work force to respond in peak times. This would reduce the overall utilisation of the field workforce.

Option 1 also does not align to DBP's contractual obligations of 98% reliability for gas supply.

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2 Safe Work Australia, Guide for Managing the Risk of Fatigue At Work, 2013.

3 Section 19(1), Occupational Safety and Health Act 1984 (WA).

Table 1.5 summarises DBP's corporate vision objectives and how a reactive compressor stations capital works program would align with them.

Table 1.5: Alignment with DBP vision – Option 1

Vision objective	Alignment
Delivering for Customers – Public Safety	N
Delivering for Customers - Reliability	N
Delivering for Customers – Customer Service	N
A Good Employer – Health and Safety	N
A Good Employer – Employee Engagement	-
A Good Employer – Skills Development	-
Sustainably Cost Efficient – Working within Industry Benchmarks	Y
Sustainably Cost Efficient – Delivering Profitable Growth	-
Sustainably Cost Efficient – Environmentally and Socially Responsible	N

1.5.1.3 Cost assessment

With this option, the unit costs incurred by DBP would almost certainly be higher. Corrective activities are likely to incur higher costs than planned alternative due to:

- Additional travel costs (planned activities allow DBP to share travel costs across different activities at the same location)
- Additional costs for expedited freight
- Additional costs for removing crews from other planned work to address a corrective maintenance requirement and then remobilising to complete the previous planned work

DBP would also incur unplanned operating expenditure, as failures could lead to interruption to supply and associated contract delivery breaches. Interruption to supply to major industrial sites could result in substantial penalties and refunds (depending on the contractual terms with the affected customer) and does not include any cost related to damage to customers' plant due to loss of gas supply.

While it is not possible to estimate precisely how many asset failures will occur during the AA6 period, broad cost estimates can be developed based by escalating the cost of the proposed works program if delivered reactively. It is a generally accepted asset management principle that delivery of works reactively is significantly more expensive that undertaking proactive or preventative works. Various sources cite the increase in reactive costs compared with proactive can be between two and five times[4] more than undertaking the same works proactively.

4 Marshall Institute, Omega engineering, ARMS reliability.

For the DBNGP, the cost difference for reactive versus proactive works varies depending on the type (and scarcity) of asset being replaced, as well as the remoteness of the asset from the Perth Metropolitan area. For example, compressor stations located in remote areas of the Pilbara and Gascoyne regions require more travel time, while major components, such as turbine inlet air combustion filters have a minimum three-month lead time. In DBP's experience, material costs can increase significantly where products are bespoke and/or have to be fast-tracked. Labour costs such as overtime, transport and additional resources can more than triple in a reactive/emergency scenario.

To develop a conservative estimate of what a reactive approach may cost, we have assumed an average increase of only 1.5 times the material and labour/contractor costs if projects were to be undertaken reactively (i.e. where assets fail or untenable risks arise). Applying this x1.5 escalation factor to the entire program results in a cost of $51.7 million if all works were delivered reactively.

However, the above estimate assumes the proposed compressor stations works program would still be delivered in full. Under a purely reactive-only program, we would not conduct proactive activities such as corrosion prevention, asset integrity works and hazardous area inspections. Work would be constrained to reactive end-of-life replacements only.

Even if we exclude proactive works from the compressor stations program, a reactive-only program would still cost approximately $30.9 million, and would deliver only a fraction of the proposed AMP requirements (see Table 1.6).

Table 1.6: Estimated cost of reactive program, $'000 2024

Project	AA6 proposed works program	Reactive program, escalation x1.5
Corrosion protection*	11,050	0
ECI and comms EOL	4,060	6,090
Metering and valve replacement	5,185	7,778
EOL compression assts	10,348	15,522
Hazardous area rectification*	1,725	0
Asset integrity*	2,083	0
Total	**34,451**	**29,390**

*Excluded from reactive program for forecasting purposes. Totals may not sum due to rounding.

Of course, it is feasible that not all end of life assets fail, in which case the costs of reactive asset replacement could be materially lower. However, deferring replacement until failure serves only to push the problem to a later date, as all assets will need to be replaced at some point. Similarly, far more assets may require reactive replacement than expected if we are not undertaking corrosion prevention and asset integrity investments. A major risk of a reactive program is that it provides little control and visibility of when major investments will be needed. Long periods of underinvestment will likely be followed by periods of extremely high costs as assets of a similar vintage being to fail. This would not represent efficient cost management.

It is also important to note that the estimated costs of a reactive only program do not include penalties and foregone revenue for DBP and customers. Penalties charged to DBP for non-supply can be substantial (depending on the contract terms with the affected customers). The cost impact of asset failure that leads to a 4-5 day supply outage, noting the likelihood of failure under this option is higher, can be tens of millions of dollars in addition to the higher cost of reactive works.

As shown by the above rule-of-thumb estimates, a reactive compressor stations capital works program is likely to cost between $29 million and $52 million.

In any event, costs associated with a predominantly replace on failure works program would not "be such as 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." [5]

Table 1.7: Comparison of reactive cost options, $'000 2024)

	AA6 proposed works program	100% reactive program Escalation x1.5	Reactive program, excluding CP, hazardous area rectification and asset integrity activities Escalation x1.5
AA6 total	34,451	51,677	29,390

1.5.1.4 Risk assessment

The following table shows the residual integrity and performance/reliability risk associated with compressor stations if the compressor stations capital works program is delivered on a replace on failure approach.

Table 1.8: Risk assessment – Option 1

Risk category	Integrity		Performance/Reliability	
	Untreated	Treated	Untreated	Treated
People	High	High	Neg	Neg
Environmental	Low	Low	Neg	Neg
Supply	Intermediate	Intermediate	Intermediate	Intermediate
DBP	High	High	Low	Low
Reputation	Intermediate	Intermediate	Low	Low
Loss	Intermediate	Intermediate	Low	Low

Essentially, Option 1 would not address the current risk effectively and therefore the overall treated risk rating would stay the same as if the risk was to remain untreated.

5 NGR 79(1)(a)

1.5.2 Option 2 – Deliver a prioritised capex program based on the most recent assessment of asset replacement schedules, performance and risk (recommended option)

With this option, the volume of activity undertaken in AA6 would be based on the criteria identified in the AMP, consistent with good asset management practice. This would involve a balance of proactive asset integrity and end of life replacements, delivered at a sustainable rate over the AA6 period.

1.5.2.1 Advantages and disadvantages

The major advantage with this approach is that it will enable the identified high and intermediate risks to be addressed by the end of the AA6 period. Importantly, it reflects a works program based on the latest information and provides sufficient flexibility to accommodate unforeseen projects (for example due to failure or third-party impacts) within the overall forecast capex allowance.

The main disadvantage of this approach is the higher estimated capital costs compared with more reactive programs (such as those presented in Options 1 and 3). As with all forecasts, Option 2 is also subject forecast inaccuracy. While the current AA6 forecast is lower than the AA5 actuals, it would only take a minor shift in project timing or pipeline/shipper requirements for the AA6 program to exceed historical costs.

1.5.2.2 Achievement of objectives

Option 2 would address all the assets that need to be replaced, repaired or inspected in the AA6 period. It will reduce the risk associated with a potential failure and any subsequent potential impact on the quality (accuracy and timeliness) of data available to support decisions relating to the pipeline.

Delivering the compressor stations works program will enable DBP to achieve contracted level of customer service and reliability, as well as mitigating the risk of public safety incidents. The proposed works program is fully resourced and deliverable and will promote optimal workforce utilisation.

Table 1.9: Alignment with DBP vision – Option 2

Vision objective	Alignment
Delivering for Customers – Public Safety	Y
Delivering for Customers - Reliability	Y
Delivering for Customers – Customer Service	Y
A Good Employer – Health and Safety	Y
A Good Employer – Employee Engagement	-
A Good Employer – Skills Development	-
Sustainably Cost Efficient – Working within Industry Benchmarks	Y
Sustainably Cost Efficient – Delivering Profitable Growth	-
Sustainably Cost Efficient – Environmentally and Socially Responsible	Y

1.5.2.3 Cost assessment

The estimated cost of this option is $34.5 million (see Table 1.4). By adopting a proactive, planned approach to the management of these assets, DBP can best manage the efficient delivery of the program, minimising the need for unplanned and disruptive repair work on the network, which might otherwise result in a failure or a production loss. A continuous improvement culture is embedded, constantly looking at doing things better and more effective, taking advantages of technological advances.

1.5.2.4 Risk assessment

The following table shows the residual integrity and performance/reliability risk associated with compressor stations if the compressor stations capital works program is delivered as per the prioritised capex program outlined in Option 2.

Table 1.10 : Risk Assessment – Option 2

Risk category	Integrity		Performance/Reliability	
	Untreated	Treated	Untreated	Treated
People	High	Intermediate	Negligible	Negligible
Environmental	Low	Negligible	Negligible	Negligible
Supply	Intermediate	Low	Intermediate	Negligible
DBP	High	Intermediate	Low	Negligible
Reputation	Intermediate	Negligible	Low	Negligible
Loss	Intermediate	Low	Low	Negligible

This option represents the lowest treated risk, as it is targeting the issues and associated risks identified in the AMP. It is therefore consistent with DBP's Risk Management Framework and the only option whereby we can maintain supply and achieve a 98% reliability contractual obligation at an efficient cost.

1.5.3 Option 3 – Limit the program to corrosion prevention and end of life replacements only

Under this option we would only conduct the corrosion prevention and end of life asset replacement works, as these are the most critical projects in the compressor stations program. Proposed investment in metering and valve replacement, hazardous area rectification, and asset integrity would be deferred into the future (or replaced/addressed reactively in the event of failure during AA6).

1.5.3.1 Advantages and disadvantages

This option has the advantage of reducing the expenditure forecast by around $9 million. It would allow the business to focus its activities on corrosion prevention and replacing end of life assets, which pose some of the highest risks to asset integrity.

A disadvantage of this option is that it would artificially constrain the work program to levels below that required to address identified compressor station risks. The metering and valve replacement, hazardous areas rectification, and asset integrity works are a combination of proactive upgrades and replacement works, driven by asset condition and the changing needs of the businesses. Each project is designed to mitigate an identified risk. Therefore, to not deliver these projects would not be consistent with a prudent asset manager reducing risks to ALARP.

For example, planned proactive works include replacing and/or updating software in gas chromatographs currently in use at compressors stations. These gas chromatographs are used to measure gas quality and are essential to enable accurate shipper supply and billing. The driver for replacing these gas chromatographs is to maintain quality of gas supply and ensure billing remains accurate. Where gas chromatographs are operable and not at end of life, it could be argued that replacement is discretionary and could be deferred to future regulatory periods. However, this exposes DBP to the risk of not being able to meet its gas quality and supply obligations to shippers. If these devices are not replaced/upgraded in a proactive manner, their performance may decline, shipper billing may prove inaccurate, and the chromatographs may not detect gas quality issues in a timely manner.

Similarly, there are a number of passing isolation and recycle valves that are aged, some of which have seized. While this may not pose problems under normal operations, it poses a significant issue where a section of pipework needs to be isolated for maintenance or emergency purposes. If we were to defer replacement of these valves into future regulatory periods, our business and our shippers continue to be exposed to a potentially significant supply risk, due to required maintenance works not being able to be performed safely.

It could be argued that these and our other proactive works are discretionary, and could be pushed into future regulatory periods. However, we consider that deferring these and other 'discretionary' works is not consistent with good asset management practice, and therefore not consistent with NGR 79(1)(a).

1.5.3.2 Achievement of objectives

Table 1.11 summarises how Option 3 aligns with AGIG's vision objectives.

Table 1.11: Alignment with our vision – Option 3

Vision objective	Alignment
Delivering for Customers – Public Safety	Y
Delivering for Customers - Reliability	Y
Delivering for Customers – Customer Service	Y

A Good Employer – Health and Safety	Y
A Good Employer – Employee Engagement	-
A Good Employer – Skills Development	-
Sustainably Cost Efficient – Working within Industry Benchmarks	Y
Sustainably Cost Efficient – Delivering Profitable Growth	-
Sustainably Cost Efficient – Environmentally and Socially Responsible	N

Option 3 would align with several of our vision objectives, as we would prioritise the highest risk projects for delivering during the period.

However, some identified proactive work would still be deferred. This means we would not be delivering the full suite of identified asset management activities identified for compressor stations over the next five years, which increase the potential for poorer service the need to carry risk for longer than is necessary. This approach may not be considered socially responsible.

1.5.3.3 Cost assessment

Option 3 would reduce the AA6 forecast by around $9 million, as shown in the following table.

Table 1.12: Estimated cost of reactive program, $'000 2024

Project	AMP proposed works program (Option 2)	Corrosion prevention and end of life replacements only (Option 3)
Corrosion protection	11,050	11,150
ECI and comms EOL	4,060	4,060
Metering and valve replacement*	5,185	0
EOL compression assts	10,348	10,348
Hazardous area rectification*	1,725	0
Asset integrity*	2,083	0
Total	**34,451**	**25,558**

*Excluded from Option 3 for forecasting purposes. Totals may not sum due to rounding.

It is important to highlight that while we would aim to reprofile our work program to make sure highest risk projects do not get deferred, any projects that do get pushed out will still need to be delivered at some point. The proposed work program is informed by current assessments of risks and asset condition. This means there is an identified need for all the proposed work. There are no guarantees that projects identified as candidates for deferral can be safely deferred, meaning the costs may need to be incurred irrespective of any attempts to reprofile the compressor stations program.

1.5.3.4 Risk assessment

The following table shows the residual integrity and performance/reliability risk associated with compressor stations if the compressor stations capital works program is limited to corrosion prevention and end of life replacements only.

Table 1.13 : Risk Assessment – Option 3

Risk category	Integrity		Performance/Reliability	
	Untreated	Treated	Untreated	Treated
People	High	Intermediate	Negligible	Negligible
Environmental	Low	Negligible	Negligible	Negligible
Supply	Intermediate	Low	Intermediate	Intermediate
DBP	High	Intermediate	Low	Low
Reputation	Intermediate	Negligible	Low	Low
Loss	Intermediate	Low	Low	Low

Under this option, the integrity risks would be reduced to a level similar to Option 2 as we would prioritise the most critical projects in the compressor stations program (corrosion prevention and end of life asset replacement, for example). However, the performance/reliability risk would remain at intermediate, as the proactive measures proposed to maintain asset performance and ensure supply continues to be reliable would not be delivered. Obsolete assets would remain at compressor stations until failure, increasing the likelihood of a severe supply outage when they do fail, as replacement parts would be more difficult to obtain.

1.6 Summary of options assessment

Table 1.14 presents a summary of how each option compares in terms of achieving DBP's objectives, the estimated cost, and the residual risk rating.

Table 1.14: Summary of options

Option	Achievement of objectives	Cost	Treated risk (integrity/reliability)
Option 1	This would fail to achieve safety and reliability objectives or meet industry standards.	$29 - $52 million	High / Intermediate
Option 2	This option reduces risks to acceptable levels and will enable DBP to address issues identified in the AMP and keep pace with the challenges of managing an ageing and increasingly complex asset.	$34.5 million	Intermediate / Low
Option 3	This option would reduce the most material risks; however, it would leave some intermediate risks unaddressed and is not consistent with good asset management practice.	$25.6 million	Intermediate / Intermediate

1.7 Proposed solution

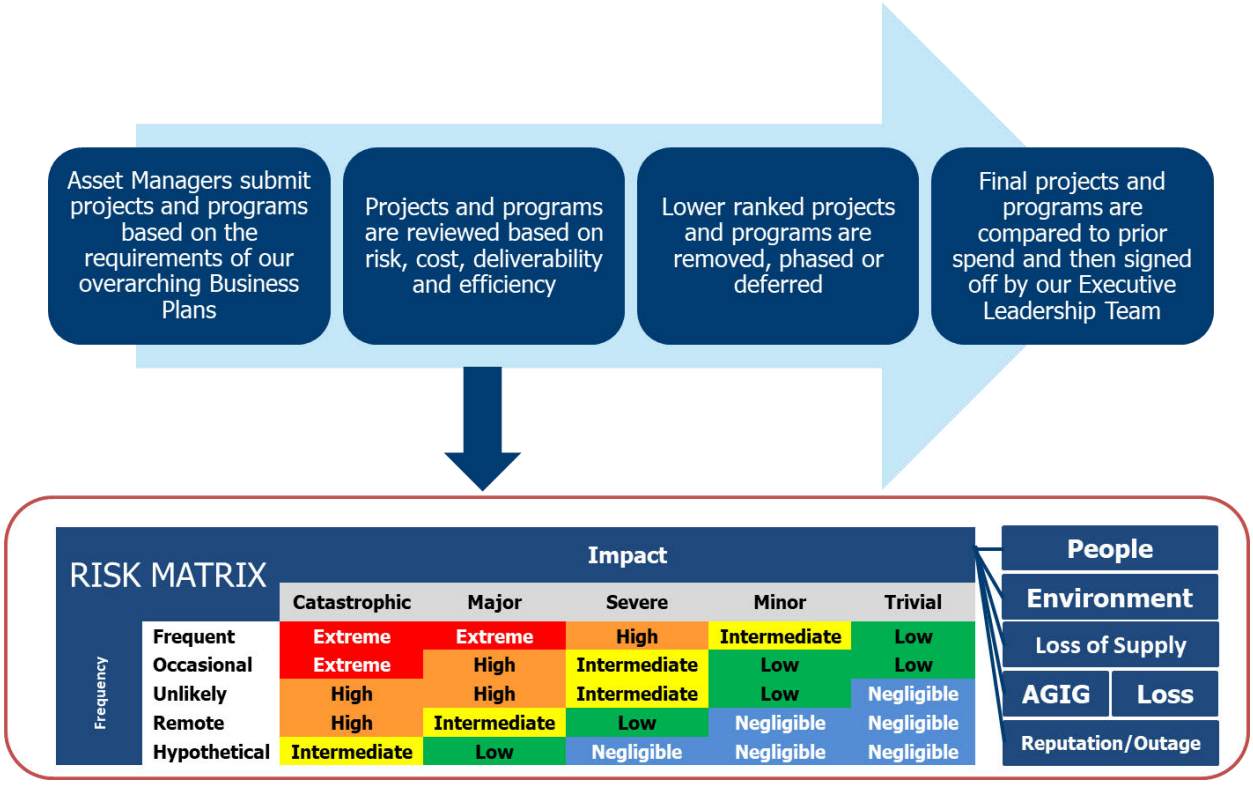
1.7.1 Why is the recommended option prudent?

Option 2 is the recommended option due to its alignment with DBP's Risk Management Framework, asset management principles and the primary manufacturer's specification. It supports DBP's vision and values and delivers for its customers on public safety, reliability of performance and customer service.

Figure 1.4 summarises how DBP develops its capital expenditure plans, and highlights that risks identified as intermediate or higher are prioritised, with lower risks removed or deferred from the capital program. Option 2 is consistent with this approach as it focuses on treating all intermediate or higher risks as soon as is reasonably practicable (by the end of the AA5 period).

Option 1 or 3 would not address the identified risks within the AA6 period and would increase the overall risk associated with the DBNGP as projects get pushed into AA7, leading to an even larger capital works program in the future.

Figure 1.4: DBP capex plan development process



Failure to proactively plan for the management and maintenance of the compressor station assets could result in catastrophic failure of an asset which would result in loss of throughput, excessive operating expenditure and impact on reliability and the ability to meet contractual obligations.

1.7.2 Estimating efficient costs

The unit rates used for all projects managed within this program of include the internal labour, external labour and materials/other costs forecast. Where possible, the unit rate used to determine the cost of the program in AA6 is based on a three year average actual cost incurred by DBP in

AA5. Where this has not been possible, these activities have been estimated based on the historical cost of a similar program of work.

One-off activities, such as a major asset replacement or pipeline refiguration project, are usually determined through market testing and where practicable, a competitive tender process.

Where a competitive tender has not yet occurred, the associated cost is estimated in two ways:

1. Where the work is sufficiently comparable to other work – the most recent historical average unit rate or actual cost and matched to similar locations where the program is delivered externally
2. Where the work is unique or greater than $5 million – an estimate is developed based on internal estimates from different engineering disciplines or from external engineering specialists

Specialist engineering disciplines, procurement and construction management activities are provided utilising internal resources, supplemented by external specialist input as required. This is the model that has been successfully deployed and implemented on the DBNGP under the existing AA5 and previous arrangements.

Key assumptions in the cost estimation for the compressor station program include:

- Costs are based on historical expenditure noting that these works are not new
- Estimates derived from contractual rates of vendors to be utilised
- Resource costs based on other similar projects ongoing at present or in previous AA periods
- Original equipment manufacturer contractual rates for spares and labour that are part of our services agreements

1.7.3 Consistency with the National Gas Rules

NGR 79(1)

Option 2 is consistent with NGR 79(1)(a), which requires that capital expenditure must be such as 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.

DBP considers that the capital expenditure is:

- **Prudent** – the project is based on replacement of existing assets are arriving at the end of their useful lives. Assets are scheduled to be replaced ahead of failure, minimising disruption to customers, mitigating pipeline integrity risk, and allowing for efficient resource scheduling. The proposed expenditure is there consistent with such that would be incurred by a prudent service provider

- **Efficient** – forecast expenditure is based on the actual unit cost incurred by DBP in the delivery of similar work undertaken in AA5. The design and operational delivery of the program is forecast for completion by internal staff and external resources. External resources are engaged as a result of formal contracts in place following the tender process, as per DBP's Procurement Policy. These services are reviewed annually by DBP's Contracts and Procurement functions, and new rates negotiated accordingly.

  Original Equipment Manufacturer (OEM) costs, while less controllable than labour costs, are also reviewed annually to test that the costs of spare parts and materials is consistent with market conditions. The review is undertaken by Contracts and Procurement. The proposed expenditure can therefore be considered consistent with the expenditure that a prudent service provider acting efficiently would incur
- **Consistent with accepted and good industry practice** – the proposed compressor stations works program follows good industry practice of aligning replacement activity with commitments embedded within the AMP and manufacturer's recommendations. DBP's commitment to continuous improvement and adopting new technologies/process where practicable is also consistent with ISO 55001, the prevailing industry asset management standard. Therefore, the proposed capital expenditure is such as would be incurred by a prudent service provider acting efficiently, in accordance with accepted good industry practice
- To achieve the **lowest sustainable cost of delivering pipeline services** – the proposed option achieves the lowest sustainable cost delivery of services by undertaking works that reduce risks to as low as reasonably practicable while maintaining reliability of supply. This mitigates the costs of reactive works and penalties resulting from asset failure. DBP is undertaking works in a proactive, planned and scheduled manner, with the volume of activity based on useful life and in line with manufacturer's guidance and associated support. It also considers continuous improvement in the way DBP manages assets throughout their lifecycle by introducing new and emerging techniques and technologies, which may reduce costs over the medium-to-long term

NGR 79(2)(c)(ii)

The proposed compressor station capital works program is necessary to maintain integrity of pipeline services. Replacing, repairing and/or managing these assets satisfies the grounds under Section 79(2)(c) of the National Gas Rules (NGR), which states capex is justifiable if:

(c) the capital expenditure is necessary:

(i) to maintain and improve the safety of services; or

(ii) to maintain the integrity of services; or

(iii) to comply with a regulatory obligation or requirement; …

There is a clear need to maintain the integrity of services, which would otherwise be compromised should these assets not be replaced, repaired or managed in line with the AMP and/or at the end of their useful life.

NGR 74

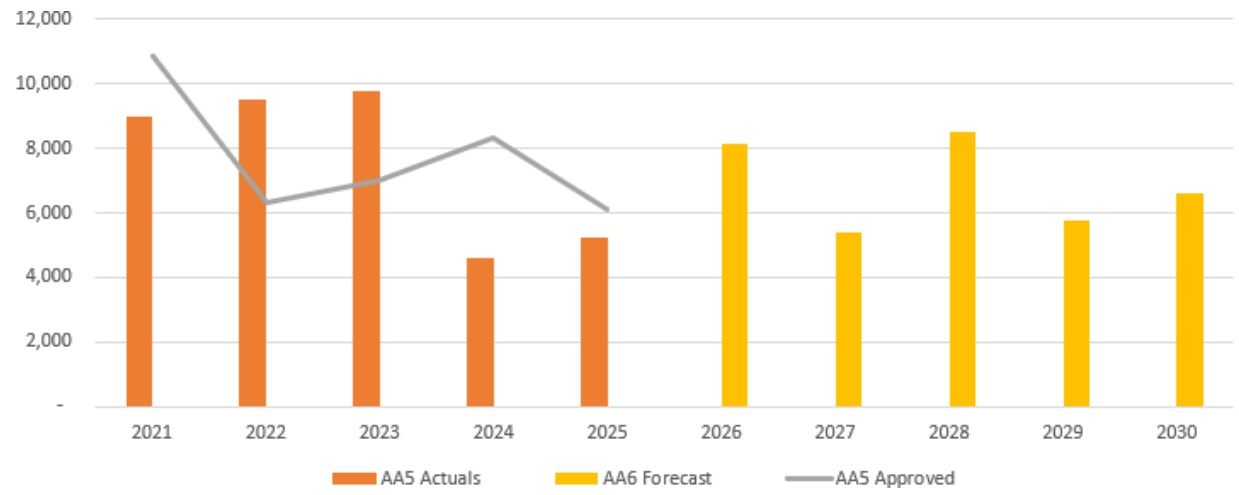
The forecast costs in this business case are based on the latest market rate testing, and project options consider the asset management requirements as per the latest AMP. Cost assessments have been conducted for each option based on the best information available at the time of developing this business case. The estimate has therefore been arrived at on a reasonable basis and represents the best estimate possible in the circumstances.

1.8 Comparison to previous periods

1.8.1 AA6 forecast compared to AA5

In AA6, a total expenditure of $34.5 million is forecast across the compressor stations works program. Figure 1.5, compares the AA6 compressor station capital expenditure against AA5 actuals and the approved AA5 forecast.

Figure 1.5: AA6 forecast compressor stations program expenditure, compared with AA5 actuals, $'000 2024



The forecast compressor station program expenditure for AA6 is broadly consistent with that incurred during the AA5 period, estimated at ~$3.6 million less than the forecast expenditure in AA5 of $38.1 million.

This decrease in forecast expenditure is due to a reduction in corrosion under insulation (CUI) works, and fire and gas (F&G) control and suppression system replacements. These reductions are offset by a combination of increasing volumes on established programs of work and new projects to address emerging risks.

The relatively consistent level expenditure for the AA6 period is driven by the need to continue established programs of work at the AA5 volumes. The AA5 compressor station program was a significant uplift on the AA4 program, a result of increased activities on an ageing asset. The AA5 program represents a more sustainable level of asset management activity, consistent with that necessary to maintain the integrity of a major gas transmission pipeline.

The AA6 forecast builds on the AA5 program and represents a level of investment we require to manage risks to ALARP and provide a level of service consistent with our customers' expectations.

1.8.2 AA5 variance

The variance between AA5 actuals and the approved AA5 forecast is minor, with only a $0.4 million variance currently being forecast by the end of the period. During the AA5 period we have endeavoured to work within the regulatory allowances. However, this means we have had to significantly reduce expenditure during the final two years of the period (2024 and 2025).

This change in expenditure profile is due to the discovery of high volumes of corrosion at compression stations during routine inspections, including unexpected occurrences of corrosion under pipework insulation. Corrosion issues led to significantly higher costs to deliver several projects. For example, in the project to relocate unit piping to above ground at CS3, the initial plan was to re-use the original pipe. However, additional works were required as the pipe was found to be corroded and had to be replaced with a new one, leading to a ~$500k project cost overrun.

Other unforeseen projects that had to be delivered included upgrading the fire and gas monitoring system at CS10, which had failed and had become obsolete, with no vendor support. We also had to replace the turbine combustion air inlet filter system at CS4/U2, which did not form part of the original AA5 forecast.

Though we have been able to work within the constraints of the approved AA5 forecast, it means we have had to defer some work to the AA6 period, which will now form part of the AA6 forecast. For example, some of the proposed works on ECI replacements (fire suppression systems, load bank control panels) that were identified for AA5 have been pushed into AA6 to allow us to remain within the AA5 forecasts. The need for these ECI replacements remains and it is not prudent to defer these works further.

Appendix A Risk assessment

Summary of compressor stations risk assessment - integrity

Project Ref No	Description	Primary Risk Event	Proposed Action		People	Environmental	Supply	DBP	Reputation	Loss
DBP01	Compressor stations	Corrosion in compressor station pipework is undetected causing failure and a loss of containment event. This can severely harm DBP staff and/or the public, or prevents operation of the compressor station for a prolonged period affecting supply to one or more major customers.	Untreated Risk	Likelihood	Remote	Unlikely	Unlikely	Unlikely	Unlikely	Unlikely
				Consequence	Catastrophic	Minor	Severe	Major	Severe	Severe
				Risk Level	HIGH	LOW	INTERMEDIATE	HIGH	INTERMEDIATE	INTERMEDIATE
			Option 1 – Move to a replacement on failure policy for all compressor station assets	Likelihood	Remote	Unlikely	Unlikely	Unlikely	Unlikely	Unlikely
				Consequence	Catastrophic	Minor	Severe	Major	Severe	Severe
				Risk Level	HIGH	LOW	INTERMEDIATE	HIGH	INTERMEDIATE	INTERMEDIATE
			Option 2 – Deliver a prioritised capex program including proactive asset integrity and methane reduction project	Likelihood	Hypothetical	Hypothetical	Remote	Remote	Remote	Remote
				Consequence	Catastrophic	Minor	Severe	Major	Minor	Severe
				Risk Level	INTERMEDIATE	NEGLIGIBLE	LOW	INTERMEDIATE	NEGLIGIBLE	LOW
			Option 3 – Limit the program to corrosion prevention and end of life replacements only	Likelihood	Hypothetical	Hypothetical	Remote	Remote	Remote	Remote
				Consequence	Catastrophic	Minor	Severe	Major	Minor	Severe
				Risk Level	INTERMEDIATE	NEGLIGIBLE	LOW	INTERMEDIATE	NEGLIGIBLE	LOW

Summary of Compressor Stations risk assessment – reliability/performance

Project Ref No	Description	Primary Risk Event	Proposed Action		People	Environmental	Supply	DBP	Reputation	Loss
DBP01	Compressor stations	Obsolete assets at compressor stations prevent effective operation of the compressor station causing prolonged outage of the compressor station affecting supply to one or more major customer.	Untreated Risk	Likelihood	Hypothetical	Hypothetical	Unlikely	Unlikely	Unlikely	Unlikely
				Consequence	Trivial	Trivial	Severe	Minor	Minor	Minor
				Risk Level	NEGLIGIBLE	NEGLIGIBLE	INTERMEDIATE	LOW	LOW	LOW
			Option 1 – Move to a replacement on failure policy for all compressor station assets	Likelihood	Hypothetical	Hypothetical	Unlikely	Unlikely	Unlikely	Unlikely
				Consequence	Trivial	Trivial	Severe	Minor	Minor	Minor
				Risk Level	NEGLIGIBLE	NEGLIGIBLE	INTERMEDIATE	LOW	LOW	LOW
			Option 2 – Deliver a prioritised capex program including proactive asset integrity and methane reduction project	Likelihood	Hypothetical	Hypothetical	Unlikely	Unlikely	Unlikely	Unlikely
				Consequence	Trivial	Trivial	Trivial	Trivial	Trivial	Trivial
				Risk Level	NEGLIGIBLE	NEGLIGIBLE	NEGLIGIBLE	NEGLIGIBLE	NEGLIGIBLE	NEGLIGIBLE
			Option 3 – Limit the program to corrosion prevention and end of life replacements only	Likelihood	Hypothetical	Hypothetical	Unlikely	Unlikely	Unlikely	Unlikely
				Consequence	Trivial	Trivial	Severe	Minor	Minor	Minor
				Risk Level	NEGLIGIBLE	NEGLIGIBLE	INTERMEDIATE	LOW	LOW	LOW

Appendix B Overview of compressor station program activities

B.1 Corrosion protection

B.1.1 Refurbishment of below ground pipework

Coating used on compressor station pipework has a life of about ten years. A coating refurbishment program has been in place since the DBNGP was commissioned to monitor the in service condition and replace before the coating failure leads to pipework corrosion. The condition of below ground pipework is reviewed annually to assess performance and rate of deterioration. Issues monitored include the following:

- Type of coating used
- Stations with single units and series operation capability (series operation has potential to deliver gas temperatures of up to 100 deg C into the station pipework before the aftercoolers)
- Historical performance of series operation and periods of exposure to high exit temperatures from the second unit
- Cathodic protection current demand and potential of the station pipework

The coating refurbishment program consists of the following:

- The PMO process of risk assessment to determine the levels of controls required to be at ALARP before full mobilisation
- The development of work packs and tools to ensure stabilisation of the pipework once excavated and the avoidance of long free spans causing additional stresses
- The selection and testing of the new coating systems to be used
- The selection of experienced personnel that can conduct excavation and coating repair works
- The coating repair systems to be adopted, curing time and selection of backfill material

For the AA6 period, we propose to continue our below ground pipeline refurbishment program, and will conduct the necessary repairs at the following compressor stations summarised in the table below.

Table Appendix B.1: Below ground pipework program

Station	Summary of works	Timing
CS9	CS9 hot section to be completed. Excavate buried piping, remove UHB epoxy pipe coating, which is blistered and deteriorating, blast and re-cost with Interzone 954 epoxy. Pig kicker lines should be included.	2026
CS3	Cold piping - inlet to compressor intake, intercooler inlet and outlet piping, kicker lines.	2027
CS5	2nd cycle - CS5 done in 2011. Evaluate Interzone 954 performance.	2028
Kwinana Junction	2nd cycle - CS10 done in 2012. Evaluate Interzone 954 performance	2029
CS4	2nd cycle - CS04 done in 2013. Evaluate Interzone 954 performance	2030

B.1.2 CP visibility of compressor stations

Station pipework is exposed to severe operating conditions, with fluctuating pressures, temperatures driven by the compressors and the ground conditions under which the pipes are buried. Cathodic protection (CP) is the primary form of protection, together with coating systems monitoring. This project proposes to install devices that can monitor the level of CP being injected and achieved at selected sections of the station pipework. This will enable remote adjustments to be made on a continuous basis.

The scope of work is to replace existing equipment with TRUs that have signal cards, which can send actual voltage and current via the SCADA system to the master station in Perth. Online visibility, alarms and reports can be generated to further enhance and improve the integrity monitoring devices of systems.

Currently, CP performance only be verified through site inspection, making prompt rectification very difficult.

The asset focus for this program includes:

- Hot buried pipework between the compressor discharges and after-coolers
- Station bypass pipework
- Downstream mainline
- Downstream loop line

The DBNGP CP system is visible at all MLV and meter station injection points, and this project brings compressor stations into line with all DBP's existing CP injection systems.

This investment would provide the following benefits:

- Enable the cathodic protection monitoring of station pipework in line with monitoring of the mainline and loop lines at MLVs and meter stations
- Reduces the need for field staff to take ad hoc readings that are prone to human errors
- Provide a more robust integrity monitoring system overall for compressor station pipework

CP visibility is an ongoing program of work. During the AA5 period, CP visibility was installed at CS9 and CS6. These costs have been used to inform the forecast costs for AA6, where we plan to introduce CP visibility at CS1 and CS2.

Table Appendix B.2: CP visibility program, $'000 2024

CP visibility program	Summary of works	Cost ($'000)
AA5 program	CP visibility installed at CS9 and CS6 • test points with reference electrodes and battery-powered radio telemetry installed on CS9 site. • Radio gateway unit put through FAT (factory acceptance testing) for compatibility with existing comms • Radio gateway unit installed at CS9 and hooked into existing comms – DBNGP Modbus SCADA system	408

CP visibility program	Summary of works	Cost ($'000)
AA6 program	Install CP visibility at CS1 and CS2 • Test points with reference electrodes and battery-powered radio telemetry • Radio gateway units installed and hooked into existing comms – DBNGP Modbus SCADA system • Estimated to cost ~$180k per site	360

B.1.3 Painting of above ground facilities

Above ground compressor station pipework is also exposed to corrosion. Paint used on above ground pipework at compressor stations is a function of stage of expansion and their adopted paint system. The compressor stations pipework have been expanded and added to the DBNGP in the following sequences of stages of development:

- The original compressor stations (1984) – CS2/1, 3/1, 4/1, 6/1, 7/1 – 40 years
- ACS project (1987) – CS1/1,CS3/2, CS5/1, CS5/2, CS8/1, CS8/2 – 37 years
- Stage 2 (1997) – CS6/2, CS9/1 – 27 years
- Stage 3A (2000) CS2/2, CS4/2, CS7/2 – 24 years
- Stage 4 (2004) – 20 years
- Stage 5A (2007) – 16 years
- Stage 5B (2010) - 14 years

In assessing compressor stations in most need for painting, the following criteria was used:

- Motivation 1 – climactic conditions
- Motivation 2 – observed conditions from inspections

CS1, 2, 8, 9 and 10 are located in high rainfall areas close to the coast and are therefore highly susceptible to corrosion. CS3, 4, 5, 6 and 7 are in remote areas, away from the coast and in relatively dry conditions. While corrosion is less of a risk in these remote locations, CS3, 4, 6 and 7 are subject to harsh conditions and very high temperatures, which can cause coatings and paintwork to deteriorate quickly.

Table Appendix B.3: Painting facilities - priorities

Priority	Motivation 1 – climatic conditions	Motivation 2 – observed condition	Compressor station
1	Close proximity to coast, high rainfall area and in and industrial area with lot of pollutants causing corrosion	Historical general inspection findings confirm severe coating degradation	3
2	Intermediate proximity to coast, medium rainfall area and in and not in an industrial area with lot of pollutants causing corrosion	Historical general inspection findings confirm intermediate coating degradation	2

Priority	Motivation 1 – climatic conditions	Motivation 2 – observed condition	Compressor station
3	Not close to the coast, low rainfall areas and not close to any industrial areas. Hot not humid areas	Historical general inspection findings confirm relative low coating degradation	7

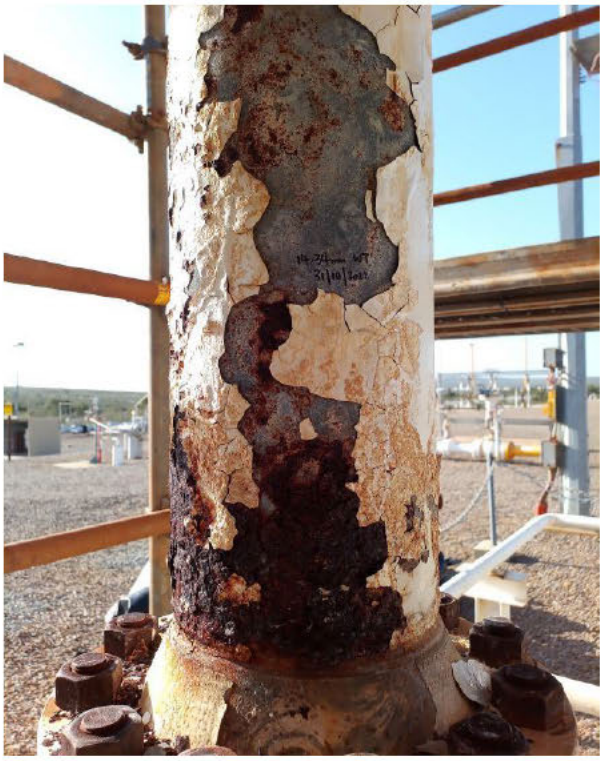
Table B.4: Painting facilities – forecast, $'000 2024

Compressor stations	2026	2027	2028	2029	2030	Total
Compressor station	CS2	CS3	CS7	-	-	3
Cost per facility	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Total cost ($'000)	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

B.1.4 Permanent repair of corrosion under insulation

Our inspection programs have identified significant volumes of corrosion occurring on insulated pipelines at compressor stations. As a temporary measure, we are addressing the CUI by applying a temporary carbon wrap. However, a permanent solution is required.

The worst affected compressor stations are CS8 and CS10, both of which have experienced substantial corrosion (see pictures below).





Carbon fibre wrap has been applied as a short term fix. However, we plan to repair the CUI at these two compressor stations by installing new permanent piping spools at a cost of [redacted] for CS8 and CS10 respectively.

B.2 ECI and communication end of life equipment

B.2.1 Installation of fire suppression system

Fire suppression systems are an important component in the safe and reliable operation of the DBNGP. In consultation with DBP's insurance assessors and compressor package vendors, and lessons learnt from a fire incident at CS10 during the AA4 period, DBP's Fire and Gas Policy requires that all new units must include suppressant systems. This approach is consistent with the requirements of ISO 21789:2009, which specifies a risk-based approach in respect of fire precautions in enclosures:

ISO 21789:2009

5.13.3 Enclosure fire precautions

5.13.3.1 General

The risk of fire shall be assessed in all enclosures and, where necessary, fire precautions shall be implemented in accordance with 5.15.

5.13.3.2 Gas turbine enclosure

An integrated fire protection system, including fire detection and suppression equipment, together with the necessary controls and instrumentation shall be provided in the gas turbine enclosure in accordance with 5.15. The system shall be able to detect fire automatically, directly or indirectly, and extinguish it reliably.

During the AA5 period, we installed new fire suppression systems at CS2 Unit 2 (CS2/2), CS4/2 and CS9/1. We had planned to instal fire suppression at CS6/2, however, this project was delayed and has been pushed into the AA6 period.

The new fire suppression system for CS6/2 is the only installation planned for the AA6 period. The system being installed at CS6/2 is the same specification as the water spray system recently installed at CS9/1. Forecast costs for CS6/2 are therefore based on CS9/1 actual costs.

We plan to install the fire suppression system at CS6/2 during 2026.

B.2.2 Electrical protection integrity testing

This is an ongoing program to verify the protection settings on switch gear installed during the initial DBNGP design. This program was developed out of findings at CS1, commenced as a trial during AA4 and was delivered throughout the AA5 period, at a rate of two stations per year.

Most of the switch gear along the DBNGP was installed as part of the initial design basis, and requires specialised testing equipment and expertise. Work includes protection setting testing of 415VAC air circuit breakers (ACB) and moulded case circuit (MCC) breakers, including inspection of the motor control centres. The full scope of work at each site is as follows:

MCC and controls inspection:

1) Check all power connections for tightness and re-toque as necessary

2) Inspect all cable connections for heat and stress

3) Inspect condition in cable compartments and terminations where possible

4) Record any damage found for future replacement

Ductor testing on the MCC:

1) Remove bus chamber plates as required

2) Check current transformers where possible

3) Inspect all plug spout connections, clean and re-grease as appropriate

4) Ductor tests main bus where accessible

5) 1kV Megger main bus insulation

ACB protection testing:

1) Visual inspection of ACB for damage

2) Inject secondary ACB protection relay for correct operation as per set points and curves

3) Test control wiring, and aux contacts

4) Record settings and test results

This work program allows us to extend the useful life of the assets, as well as conduct any minor rectifications.

Findings to date have confirmed the stability of the design and have identified no major issues, therefore the testing rate of two stations per year remains adequate. We therefore propose to continue the electrical protection integrity testing program at this same rate throughout the AA6 period.

The forecast cost is $165,000 per year, which is based on historical actual costs.

B.2.3 Station fire and gas system programmable logic controllers replacement

DBNGP compressor stations are protected by fire and gas detection systems, which alert our control centre to fire or loss of gas containment within compressor unit buildings, GEA enclosures and the yard area. Programmable logic controllers (PLCs) control these fire and gas monitoring systems, shutting down parts of the compressor station in an emergency.

PLCs must be replaced an ongoing basis as the equipment becomes obsolete and/or falls out of vendor support. For station fire and gas systems, replacement is based on a cycle of 18 years.

The PLCs at CS7 and CS9 are due for replacement during the AA6 period, and will be replaced in 2029 and 2030 respectively at a cost of [redacted] per unit. The forecast unit cost is based on historical actual costs for similar replacements.

B.2.4 IP telephony routers and switches

IP telephony systems are used as the primary means of office based and integrated communications at site when collaborating with other offices and compressor stations. The routers and switches for the telephony system are replaced on a ten year cycle and fall due for replacement during the AA6 period.

We will replace routers and switches at all ten compressor station sites during 2026 at an estimated cost of $170,000. This cost estimate is based on quotes provided by the telephony system vendor. To help deliver the program at the lowest efficient cost, these telephony works will be bundled with the public announcement (PA) system replacements, which are also scheduled for 2026.

B.2.5 PA system replacement at compressor stations

PA systems are used to ensure site personnel receive timely notice of key site activities, notifications or to advise of an emergency situation. The PA systems at our compressor sites and Kwinana Junction are at end of life. They are typically replaced on a ten year cycle and fall due for replacement during the AA6 period.

We proposed to replace the PA systems at all ten compressor station sites and the Kwinana Junction facility during 2026, at an estimated cost of $715,000. This cost estimate is based on vendor quotes. To facilitate efficient delivery, these PA replacements will be bundled with the IP telephony routers and switches replacement program also scheduled for 2028.

B.2.6 Tertiary communication system replacement at Compressor Stations

Communication systems at compressor stations are replaced and/or upgraded on a ten year cycle. The tertiary communication system used at all ten compressor station sites is due for replacement in 2028. The current tertiary satellite system is at end of life and is expensive to maintain. Newer technologies are becoming available, which DBP is seeking to implement as a substitute.

We are looking at utilising the Starlink satellite network as a replacement tertiary communications system. Starlink is currently used on a limited basis for general internet communications at compressor stations. Early discussions with Starlink have identified that a secure, private network system will be available via Starlink from 2025 onwards. On this basis, we intend to adopt a Starlink solution as a replacement for our end of life tertiary comms system in 2028.

Starlink will be installed at all ten compressor station sites at an estimated cost of $250,000. This cost estimate is based on current Starlink service costs and early discussions with the vendor.

Note the tertiary communications system is separate from the other telephony and PA systems, using different technology and installed by different crews. This means the Starlink work cannot be bundled with the IP telephony and PA system replacements at compressor stations scheduled for 2026. We will, however, seek to optimise our works program to allow the Starlink system to be installed at a cost effective rate and with minimal disruption.

B.3 End of life compression assets

B.3.1 Compressor air package replacement

Packaged air compressors are used at compressor stations to boost compressor units, provide air for dry gas sealing, and to provide instrument air. Air compressors are regularly inspected and then scheduled to be overhauled or replaced (as required) every 15 years.

The air compressors at the DBNGP Stage 4 units were last replaced/overhauled in 2006 and are overdue for end-of-life replacement. Eight air compressor packages are therefore scheduled for replacement over the next six years, with work commencing in 2025. This means seven compressor packages are scheduled for replacement during the AA6 period as per the table below.

Table Appendix B.5: Compressor air package replacement, $'000 2024

	2026	2027	2028	2029	2030	Total AA6
Number of packages	2	1	2	1	1	7
Compressor station site	CS9 Unit 2 CS1 Unit 2	CS7 Unit 2	CS3 Unit 3 CS4 Unit 3	CS6 Unit 3	CS7 Unit 3	
Cost per replacement	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	
Total cost ($'000)	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

B.3.2 Water bath heater replacement

There are six gas water bath heaters installed on compressor stations. These are located as follows:

- CS01 – 1 on Unit 1
- CS03 – 1 on Unit 2
- CS05 – 2 heaters, 1 on Unit 1 and 1 on Unit 2
- CS08 – 2 heaters, 1 on Unit 1 and 1 on Unit 2

The mandatory statutory inspections of these vessels is costly, at approximately $30k per unit, as the tube bundle needs to be removed from the shell. These inspections are required on each unit every four years.

Of the six heaters in service:

- Microbial corrosion has been identified in all heaters (see photos below)
- Microbial corrosion is present on both the shell and tube bundle in all heaters
- Tube bundles in four heaters have been replaced due to excessive corrosion, at a cost of approximately [redacted]0 per heater
- All replaced tube bundles have experienced recurrence of the microbial corrosion attack, while heater shells are also deteriorating and will need to be replaced, at a combined cost of approximately [redacted]0 per heater

Microbial corrosion is very difficult to remove and is not affected by the corrosion inhibitor. Due to the presence of the microbial corrosion, the frequency of the statutory inspections cannot be reduced by risk based inspection, and will need to be increased.

Photos of impacted internals of water bath heaters





To mitigate against the ongoing expense and integrity risk of these heaters, it is proposed that they be replaced with electric immersion heaters. Electric immersion heaters offer the following benefits over water bath heaters:

- They are not prone to microbial corrosion
- They do not require disassembly in order to carry out statutory internal inspections
- They do not require ongoing monitoring and maintenance of corrosion inhibitor
- Similar heaters installed on the pipeline have been found to be in excellent condition after many years of service, and have been approved for extended internal inspection intervals

B.3.2.1 Costing

The estimated cost to replace all six gas water bath heaters with electric immersion heaters is [redacted]. This is based on similar projects and quotes provided by immersion heater manufacturers.

The proposed program is summarised in the following table

Table Appendix B.5: Water bath heater replacement, $'000 2024

	2026	2027	2028	2029	2030	Total AA6
Scope	Install x2 120 kW heaters at CS8	CS5 engineering and procurement	Install x2 50 kW heaters at CS5 plus install conduit and pits at CS1 and CS3	CS3 and CS1 engineering and procurement	Install 50 kW heaters at CS1 and CS3	x2 120 kW heaters and x4 50 kw heaters and associated works
Cost ($'000)	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

There are likely to be efficiencies gained if all heaters are replaced in one program. Our plan is to deliver the work via a staged program that will replace two water bath heaters per year.

As a result of these replacements, ongoing asset management, inspection and maintenance costs are expected to reduce from approximately $180,000 per annum to less than $5,000 per annum

B.3.3 Dry gas seal replacement

The dry gas seals and buffer air seals are part of the gas compressor package designed to separate process gas from leaking to atmosphere. Dry gas seal is a non-contacting mechanical seal that works on the principles of aerodynamic forces to create and maintain a precisely defined gap during operation. All current operational units have dry gas seals installed.

This is an ongoing program of work, which we expect to continue throughout the AA6 period. A dry gas seal failure is very difficult to predict and replacement is done on failure. However, recent inspections have identified issues with the compressor package stub shafts, which are expected to increase as the fleet ages. It I therefore important we replace the seals and stay ahead of this issue before it becomes a significant problem.

The volume of activity for AA6 is based on recent actual volumes and assumes replacement of six in total, averaging one seal per year. Forecast costs are based on historical actuals.

The buffer seal is ordinarily replaced at the same time as the dry gas seal, to minimise disruption and maximise efficiency of effort. The forecast expenditure for AA6 reflects the assumption that for each dry gas seal that is replaced, the buffer seal will also be replaced at the same time.

B.3.4 Rotor bundle replacement

Rotor bundles are critical components within our compressors stations. The expected life for rotor bundles is 30 years. We have 16 rotor bundle units along the DBNGP, some of which have been in operation for more than 30 years. In particular, several of our Stage 3 and ACS expansion units have recently passed 100,000 hours of operation, and are either approaching or beyond their 30-year life expectancy.

We monitor performance of compression assets on an ongoing basis. Though we have not identified any material issues with rotor bundles to date, it is reasonable to expect that some of our most heavily utilised compressor stations will experience rotor bundle issues in the near future. During the AA6 period we plan to assess rotor bundle performance degradation, vibration and balance, and budget costs for replacing up to two rotor bundles within the AA6 period, at a cost of approximately [redacted] per unit.

B.4 Metering and valve replacements

B.4.1.1 Recycle valve replacement/overhaul

The core functions of recycle valves is to protect the compressor from a surge event during start up and shut down. The valves do this by redirecting high pressure gas from discharge to suction, ensuring no reverse flow in the compressor, which can cause catastrophic failure.

There are 41 recycle valves across the pipeline that require annual maintenance and/or overhauls. It is difficult to predict how many of the valves might fail or the proportion of overhauls vs replacements. We have therefore based the AA6 program on historical activities, which assumes:

- 12 recycle valves will be removed, stripped, inspected and overhauled
- 2 recycle valves will be replaced/overhauled

These volumes are based on current use factor of compressors and the utilisation to deliver for customers.

B.4.1.2 Compressor station valve replacement

Compressor station valves are an integral part of the maintenance and emergency shut down process. There are two types of isolation valves at compressor stations; station isolation valves and compressor unit isolation valves.

Station isolation valves isolate the entire compressor station from the main line while allowing gas to flow via the station bypass pipework. There are 20 station isolation valves on the pipeline – two per compressor station located at the station inlet and station discharge. There are two core components within station isolation valves – the valve itself and the actuator. The station isolation valves were installed as a single entity and aligned with the expansion of the pipeline. They have a recognised useful life of 25 years, though many of them have been in service for longer periods.

Unit isolation valves are generally ball valves used to isolate the compressor units (suction and discharge). When these valves are closed, the unit is isolated from the gas source and it can then be depressurised, so work can be conducted on this asset without the risk of exposure to high pressure gas. The process is also utilised in the event the unit needs to be isolated and vented due to fire and gas detection. There are 40 unit isolation valves on the pipeline. There are two core components within unit isolation valves – the valve itself and the actuator. These valves were installed as a single entity and align with the expansion of the pipeline. They have a useful life of up to 30 years and are replaced when an excessive leak rate is identified.

Valve replacement is an ongoing program of work. Our Pipeline Efficiency Team monitors the gas vented from all compressor stations when units are offline, and data is assessed to justify replacement when cost of vented gas aligns with cost to replace the valves that are leaking.

Station valves cost around [redacted] each to replace, while unit valves cost around $95,000 each. These estimates are based on historical costs. The following table shows the valve replacement program scheduled for the AA6 period.

Table Appendix B.7: Isolation valve replacement, $'000 2024

AA6 replacements		2026	2027	2028	2029	2030	Total
Station isolation valves (volume)	Volume		1	1	1	2	5
	Cost		[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Unit isolation valves	Volume	3					3
	Cost	[redacted]					285
Total cost ($'000)		[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

B.4.1.3 Replace and upgrade existing gas chromatographs

Under the Gas Supply (Gas Quality Specifications) Regulations 2010 and as part of the Work Health and Safety Act 2020, DBP has an obligation to deliver gas that is within specification as per the table below.

Table Appendix B.8: Gas Supply (Gas Quality Specifications) Regulations 2010

Item	Component	Amount or range
1.	Maximum total inert gasses	7.0 mol%
2.	Maximum carbon dioxide	4.0 mol%
3.	Minimum higher heating value	37.0 MJ/m ^{3}
4.	Maximum higher heating value	42.3 MJ/m ^{3}
5.	Minimum Wobbe Index	46.5
6.	Maximum Wobbe Index	51
7.	Maximum total sulphur: • unodorised gas • odorised gas	 10 mg/m ^{3} 20 mg/m ^{3}
8.	Maximum hydrogen sulphide	2 mg/m ^{3}
9.	Maximum oxygen	0.2 mol%
10.	Maximum water	48 mg/m ^{3}
11.	Hydrocarbon dewpoint over the pressure range 2.50 to 8.72 MPa (absolute)	below 0°C

We measure the quality of comingled gas using chromatographs (GCs) installed at CS1 (2 of), CS2, CS6, CS8 and Kwinana Junction (2 of). GC data is downloaded via the DBNGP SCADA master station once per hour. The data is used to assess the quality of gas and energy served, and is critical in the calculation of shipper supply and billing. It is therefore vital these assets are maintained appropriately and periodically upgraded/replaced.

The GCs at CS1, CS2, CS6, CS8 and Kwinana Junction have all been in situ for 8 to 14 years. These assets have a useful life of 10 to 12 years and will require replacement of ageing components and software.

It is important to highlight that the GCs at compressor stations measure the quality of comingled gas already in the pipeline and not the quality of gas being supplied by individual producers at inlet points.

As new gas supplies have entered the DBNGP, the composition of gas in the pipeline has changed, as well as the flow direction of the gas in some sections of the pipeline. The variety of producers means the potential for variations in quality of comingled gas increases. This means it is essential our GCs are fit for purpose and are located at strategic locations to enable monitoring and detection of substandard supply as well as appropriate measurement of energy content of the gas supplied to customers for accurate billing purposes.

To this end, we are proposing to install additional GCs at CS1, as the station serves as the 'hub' for gas supplies with different gas compositions converge and then redirected to different flow paths to customers in north and south as well as into other pipeline systems.

In addition, our current C6+ specification GCs cannot measure hydrocarbon dew points. We therefore propose to upgrade the GCs at these seven GCs to C9+ specification GCs, as they require replacement. This will allow more complex gas quality analysis, hydrocarbon dew point calculations and trace contaminant monitoring. Note the C9+ specification GCs we are proposing to install only address the hydrocarbon content and dew point requirements do not measure moisture and sulphur content, which require separate specialist devices discussed in the DBP15 Meter Stations business case. C9+ GCs are the current industry standard, so this investment will help bring our gas quality measurement capabilities in line with our peers.

The estimated cost per GC is [redacted]. This is derived from the historical costs of installing GCs at these locations. For the purpose of the AA6 forecast we have assumed we will address one site per year, at a total cost of [redacted]. However, we will look for opportunities to bundle compressor station works geographically and seek to deliver the GC replacement program as part of an optimised program.

B.4.1.4 Replacement of mainline USM flow meters at compressor stations.

Ultrasonic flow meters (USM) are installed at compressor station sites to measure the flow and pressure of gas passing through the facility. We use the data provided by these flow meters for monitoring of the health and status of the pipeline system for commercial operation as well as for technical analysis.

The mainline inlet flow meters at our ten compressor station sites have been in place for more than 25 years. These meters are no longer supported by the original manufacturer and like-for-like replacements are no longer available. We recently experienced performance issues with the mainline inlet flow meter at CS4, which stopped working. This prompted closer inspection of the meters installed at our other compressors stations, which highlighted various degrees of deterioration across the meter family due to their age and location.

Failures in mainline flow meters can have serious implications. [redacted]

Given the deterioration of our USM mainline meters and the criticality of the service they provide, we proposed to replace the welded USM mainline flow meters at all ten of our compressors stations with newer, fit-for-purpose clamp-on meters.

The project will be delivered between 2026-30 at a rate of two sites per year, replacing one meter per site. The estimated cost of installing a new clamp on meter is $120,000 per unit. This is based on a recent market assessment.

B.5 Hazardous area rectification

Inspection of hazardous areas is a mandatory requirement, performed in line with AS60079. The Standard states inspections of hazardous areas and equipment should be four-yearly, with repairs of non-conformances implemented based on degree of risk. This activity is monitored as part of the DBP's process safety dashboard.

DBP has been undertaking rectification projects during AA5 and has developed a good understanding of scope and costs. The hazardous area rectification program includes compressor stations, meter stations and pipeline and MLV sites. For the purpose of our inspection and rectification program, we split the DBNGP into two sections, north and south:

- CS1 to CS5 (north)
- CS6 to CS10 (south)

We cycle though inspection and rectification every four years, conducting inspections in one year and then conducting/completing rectification by the end of the following year (depending on how much rectification needs to occur). The rolling inspection and rectification program covers all compressor stations, meter stations and pipeline and MLV sites. Note this business case covers compressor stations only, the costs for meter stations and pipeline and MLVs are summarised in their respective business cases.

During the AA5 period, we delivered the inspection and rectification cycle as per the table below

Table Appendix B.9: AA5 inspection cycle

Focus area	2021	2022	2023	2024	2025
Inspection	CS6 to 10			CS1 to 5	CS6 to 10
Rectification	CS1 to 5	CS6 to 10			CS1 to 5

For the AA6 period, the cycle of inspection and rectification continues as per the table below.

Table Appendix B.6: AA6 inspection cycle

Focus area	2026	2027	2028	2029	2030
Inspection			CS1 to 5	CS6 to 10	
Rectification	CS6 to 10			CS1 to 5	CS6 to 10

The costs for inspecting and rectifying compressor stations will vary depending on the extent of damage found, location, and addition/mothballing of assets. During the AA5 period, we expect to

incur around $1.53 million in hazardous area inspection and rectification costs for compressor stations.

We cannot accurately forecast rectification costs for AA6 until the next cycle of inspections have been completed. However, it is reasonable to assume that as assets age and environments change, the cost of rectifications may increase, even if the volume of issues declines (i.e. we see a smaller number of issues but the issues we find are larger and cost more to address).

To develop the AA6 forecast, we have looked at historical actuals and assumed a slight increase across the period to account for the potential for larger/more challenging issues given the asset age. We will budget $345,000 per year for compressor stations, totalling $1.73 million over the period.

B.6 Asset integrity

B.6.1 Aftercooler fan remote vibration monitoring

Vibration monitoring provides early warning of aftercooler fan degradation and the potential for mechanical failure. Compressor stations along the DBNGP is do not currently have aftercooler fan vibration monitoring installed. Instead, the compressor stations have trip switches, which will trip off the station if there is excessive aftercooler fan vibration. If the station trips, this can cause supply outages, as well as resulting in reactive maintenance.

As the compressor stations age, the potential for vibration tripping increases. Rather than maintain the status quo and respond to vibration issues after a station trips off, we plan to install vibration monitoring equipment, which will continuously detect vibration and will alert the control room when vibration levels are approaching the point where the station is likely to trip. This will allow us to identify issues before they become serious by isolating the affected aftercooler bank to avoid supply outages.

Vibration monitoring is considered industry good practice and is relatively low cost, at around $35,000 per station. We therefore intend to install vibration monitoring at all ten compressor stations during the AA6 period, at a rate of two per year.

B.6.2 Hot gas path inspection and mid-life overhaul

As part of our ongoing compressor station management program, we periodically inspect and overhaul components within a station to ensure their operational integrity. One of the most important mid-life overhauls is the replacement of critical components of a compressor engine – typically combustion nozzles – that are exposed to hot gases and therefore subject to deterioration.

During the AA6 period, CS9/1 is due for hot gas path inspection and subsequent replacement of hot gas components. The estimated cost is $1.2 million, which is based on historical costs.

B.6.3 Piping interface wrap removal and coating

Pipework at compressor stations that interfaces with the ground is typically wrapped with a soil to air interface protection tape. This is to help protect the pipe from accidental damage to coating from stones and as a result of activities in the vicinity. As the tape ages and deteriorates it provides opportunity for water to be trapped where the tape overlaps or at the areas of disbondment, creating

an environment for corrosion to occur. While tape wrapping offers some protection, it is not as effective as a waterproof epoxy coating.

As part of our asset integrity program, we will excavate the area around the pipe/ground interface, remove the wrapping and apply an epoxy coating. This will be conducted at all ten compressors sites, and will be bundled with other compressor station works where practicable. We estimate the total cost over the AA6 period to be $535,000.

Capex DBP02: Pipeline and main line valves

1.1 Project approvals

Table 1.1: DBP02 Pipeline and MLV – Project approvals

Prepared by	Mathew Fuller, Senior Corrosion & Protection Engineer Andrew Stanwix, Principal Engineer – Mechanical C&P RE
Reviewed by	Jeff Kong, Head of Transmission Asset Strategy
Approved by	Tawake Rakai, EGM Transmission Asset Management

1.2 Project overview

Table 1.2: DBP02 Pipeline and MLV – Project overview

Description of problem /opportunity	This business case covers the program of ongoing capital works necessary over the next five years to ensure the pipeline and main line valve (MLV) assets are operating safely, reliably, within acceptable risk tolerances, and are providing a level of performance consistent with that expected by customers. The works program typically comprises around 15-20 individual projects spread over a five year period. Projects cover a range of disciplines including replacing end of life assets, upgrading existing equipment to improve performance, and works to protect pipeline and MLV assets from corrosion or safety hazards. These capex project activities are designed to enable equipment and assets that are essential to the ongoing safe operation of the DBNGP are fit for purpose and in working order, thereby extend the design life of the pipeline itself. Looped sections aside, the pipeline and MLVs have been in operation for more than 40 years. As assets age, they can deteriorate, which increases the likelihood of underperformance. As such, the ongoing levels of planned, preventative and proactive capex activity typically increases over time. The ongoing program of capex works can have peaks and troughs, particularly as installed electrical, control and instrumentation (ECI), mechanical or cathodic protection assets of a similar vintage reach end of life at the same time. To smooth the capex profile, our approach is to extend the life of assets where safe and prudent to do so. Where this is not possible, we will replace assets at the end of their technical life. The program is predominantly a continuation of ongoing works and maintenance techniques based on asset performance, age and inspection data. The overall expenditure proposed for Pipeline and MLV in AA6 is essentially the same as that undertaken in AA5 and represents a sustainable level of investment.
Untreated risk	As per risk matrix = High
Options considered	• **Option 1** – Move to a replacement on failure policy for all pipeline and MLV assets (~$17 million) • **Option 2** – Deliver a prioritised capex program based on the most recent assessment of inline inspection data, asset replacement schedules, performance and risk ($12.0 million) • **Option 3** – Deliver a prioritised capex program with additional provision for further corrosion-based dig ups ($16.6 million)

Proposed solution	The proposed solution is Option 2. DBP has developed a pipeline and MLV capex program founded on the ongoing cycle of pipeline and MLV asset replacement and refurbishment activities, plus additional capex activities identified and prioritised for the AA6 period. The program is informed by the most recent assessment of inline inspection data, asset performance assessments, end of life asset replacement schedules and delivery capability/priority for the AA6 period. Option 2 is aligned, in real terms, when compared to historical expenditure during the AA5 period. The advantage of Option 2 over Option 3 is that we have not included additional provision for dig-ups that are yet to be optimised, which can be achieved by scheduling relevant inline inspection earlier. Option 1 has the potential to be lower cost, but a reactive-only approach would increase operational risks over time and is not consistent with good asset management practice.
Estimated cost	The forecast direct cost (excluding overheads) during the next five-year period (AA6) is $12 million. Pipeline & MLV: 2,757 | 2,598 | 1,908 | 1,866 | 2,881 | **12,009**
Basis of costs	All costs in this business case are expressed in real unescalated dollars December 2024 unless otherwise stated.
Treated risk	As per risk matrix = Intermediate
Variation from AA5	The AA6 forecast is only around $762,000 (7%) more than the forecast expenditure in AA5 of $11.2 million.
Alignment to our vision	Delivering the ongoing pipeline and MLV capex program aligns with AGIG's vision in relation to: • *Delivering for Customers* – the proposed investment is necessary to ensure integrity of supply and ensure shippers can use the pipeline • *Sustainably Cost Efficient* – the proposed investment in ECI, mechanical and corrosion prevention maximises the DBNGP's useful life and is considerably lower cost that replacing large sections of the DBNGP itself
Consistency with the National Gas Rules (NGR)	**NGR 79(1)** – the proposed asset replacement, proactive works and upgrade program is consistent with accepted good industry practice, several practicable options have been considered, and market/unit rates have been tested to achieve the lowest sustainable cost of providing pipeline services. **NGR 79(2)** – dig ups to investigate, assess and repair the pipeline is critical to ensure the long term integrity of the primary asset, and renewal of electrical, control, instrumentation and mechanical equipment to protect from corrosion and safety hazards are all necessary to ensure the continued operation of the pipeline and MLVs. Pipeline and MLV functionality are core to the transportation of gas required to meet contracted obligations. Therefore, the proposed expenditure is conforming capex based on the grounds of NGR 79(2)(c)(i) and (ii). **NGR 74** – the forecast costs are based on the latest market rate testing, and project options consider the asset management requirements as per the latest AMP. Cost assessments have been conducted for each option based on the best information available at the time of developing this business case. The estimate has therefore been arrived at on a reasonable basis and represents the best estimate possible in the circumstances.

Stakeholder engagement	Shippers have told us they highly value current levels of reliability and would be concerned if this were to change. They also expect us to maintain a strong focus on operational issues as it is important for reliability, long term integrity of the buried assets and emergency management. The pipeline and MLV program of work is key to ensure long term integrity is attained and reliability is maintained at the level our customers require.
Other relevant documents	This business case should be read in conjunction with: • Asset Management Plan – Electrical Control and Instrumentation • Asset Management Plan – Corrosion Protection • Asset Management – Pipeline Mechanical • DBNGP Above Ground Piping Inspection Procedure • Risk Management Policy and Operational Risk Model (together our Risk Management Framework)

1.3 Background and context

All physical DBNGP assets are managed in accordance with the policies and principles of our asset management system framework. A key principle of the framework is effective management of asset risks. This includes identifying the likelihood and consequences of credible risk events and evaluating the adequacy of controls to mitigate those risks. These controls are supported by the relevant manufacturer's warranty and/or maintenance guidelines.

Pipeline assets include the primary pipeline asset that conveys natural gas and the pipeline sections within the compressor stations, which consist of piping and associated equipment up to the station isolation valves (e.g. pig launcher/receiver, station bypass and station emergency bypass).

The business case includes the following equipment and activities:

- Activities to excavate around primary pipeline and MLV assets to assess and repair actual and forecast areas of external corrosion
- The impressed current cathodic protection system (ICCP) equipment, which includes transformer rectifier units (TRU) and ground beds that are installed at MLVs to provide cathodic protection current to the DBNGP
- The microwave communication system that provides the primary communication to support the SCADA system
- The MLVs, which allow remote isolation of sections of the DBNGP. There are 157 MLVs on the DBNGP main pipeline and 37 MLVs on the loop line

The pipeline is buried in its own 30-metre-wide easement and is identified on the surface by the installation of danger marker signs designed to AS2885. These warning marker signs are one of the key measures of preventing the DBNGP from being damaged by third party activities. Management of the marker signs also forms part of the pipeline and MLV capital program.

The pipeline and the majority of MLV assets have been in service for more than 40 years and have been subject to an ongoing capital works program since installation. As assets age, they can deteriorate, which increases the likelihood of underperformance.

The replacement cycles of components and equipment are long and varied depending on the type of asset in question, which means the capex profile of the works program will vary as more (or fewer) assets are due for replacement. To smooth the capex profile, our approach is to extend the life of assets where safe and prudent to do so. Where this is not possible, we will replace assets at the end of their technical life.

The pipeline and MLV portfolio of assets have been managed such that there is a stable level of investment in those that are at or will reach the end of their design life and are therefore due for replacement.

1.3.1 Identified works for the AA6 period

A pipeline and MLV capex program is essentially a continuation of ongoing works and maintenance techniques based on asset performance, age and inspection data. A significant portion of proposed activities are consistent with those incurred historically, including TRUs and ground bed replacements, and replacing worn/failing isolation valves. During the AA6 period, the pipeline and MLV program requires a $300,000 uplift in the annual dig up program, which is based on inline inspections conducted on various pipelines. Table 1.3 summarises the proposed pipeline and MLV capital works program for AA6. Each program is described further in the following sections and in Appendix B.

Table 1.3: Summary of the proposed pipeline and MLV capital works program, $'000 2024

Project	Scope	2026	2027	2028	2029	2030	Total
Corrosion management	• Annual dig up program (RunCom)	451	451	451	451	451	**2,255**
Cathodic protection	• TRU replacement • Dig up of unpiggable pipes at facilities • Impressed current groundbeds • Painting of above ground facilities • Polarisation cell, surge protection and reference electrode replacement • Modify CP at Pinjar Meter Station • Replace Metal Oxide Varistors (MOVs) with 100V Gas Discharge Tubes (GDTs) • Replacement of failed insulation gaskets (IGs)s	1,299	1,125	900	900	900	**5,122**
In line inspection	• Isolation valve replacement (Pig barrel) • Mainline South conversion – study	900	900	450	100	-	**2,350**
EOL comms and other minor works	• Maintaining reference electrodes moisture level • Radio equipment at mainline sites • Radio equipment at spur sites • Kwinana Junction (third backup site)	-	15	-	309	1,423	**1,747**
Pipeline upgrades	• Pipeline corridor erosion repair • Hazardous area inspections	107	107	107	107	107	**535**
Total		**2,757**	**2,598**	**1,908**	**1,866**	**2,881**	**12,009**

1.3.1.1 Corrosion management and cathodic protection

Cathodic protection (CP) is a well understood and proven technique for extending the life of transmission pipeline assets. During the last five years we have observed an increasing occurrence of corrosion during our inspections, particularly corrosion under pipeline insulation. Continued investment in CP and other corrosion management measures remains critical to the long-term safe operation of the asset.

For the AA6 period we are not forecasting an uplift in corrosion protection works. The majority of the corrosion protection works are ongoing recurrent activities, such as TRU replacements, painting of above ground installations and routine activities such as impressed current ground be replacements.

Expenditure on these ongoing works is informed by historical volumes, and the estimated costs are consistent with those incurred during the current regulatory period. A number of CP assets such as polarisation cells, surge protectors, varistors and insulation gaskets have also been identified as due for replacement within the next five years.

The uplift of $300k in AA6 is in corrosion management, driven by the annual dig up program, which is a critical aspect of our pipeline asset management strategy. The annual dig up program is based on data from recent ILI runs and historical ILI runs, which allow us to compare pipeline condition and changes over time, a process known as "RunCom".

The RunCom process identifies sections or areas of the pipeline that require further investigation by identifying the growth of defects that have, or will have before the next in-line inspection, reached an Estimated Repair Factor (ERF) of >1. For context, a current or expected ERF threshold >1 triggers the need for further investigation AS 2885.5 section 9.3 "anomaly assessment". Due to the criticality of the DBNGP to Western Australia's energy requirements, we also adopt wall penetration exceeding (or expected to exceed at the next ILI run) 60% as a further trigger for dig up inspection.

Dig up inspection is conducted by excavating and exposing the pipeline and conducting physical investigations to confirm the nature and actual dimensions of external corrosion defects as well as any signs of stress corrosion cracking (SCC).

Figure 1.1: Example of a dig up



Figure 1.2: Example of concrete coated pipeline



Figure 1.3: Example of pipeline corrosion defect detected through ILI, RunCom and dig up corrosion management technique.



Following the above analysis technique, we are planning to conduct 49 dig ups during the next 5 year period. Of this, 18 (37%) are on the Mainline South – Kwinana Junction - Wagerup West pipeline. The Mainline South dig ups are prioritised to inform the asset management strategies for this critical pipeline going forward.

Table 1.4 summarises the CP and corrosion management program for the AA6 period. This program has been developed based on the most recent asset performance information and risk prioritisation.

Table 1.4: Summary of required CP works, $'000 2024

Project	Driver	Description	Estimated cost
Annual dig up program	Ongoing from AA5	The annual dig up program is based on ILI results, RunCom analysis and 'Looking for SCC' inspections, and an allowance to excavate and physically inspect the DBNGP.	2,255

Project	Driver	Description	Estimated cost
TRU replacement	Ongoing from AA5	No spares available for existing dual channel TRUs and therefore we plan to replace [redacted] (5 dual channels) per year with a minimum viable solution model.	1,250
Dig up of unpiggable pipes at facilities	Ongoing from AA5	Where ILI is not possible we use an ongoing process of DCVG, dig up, coating assessment and repair.	1,100
Painting of above ground facilities	Ongoing from AA5	Painting of 6 MLV sites per year based on condition	858
Impressed current groundbeds TRU Upgrade	Ongoing from AA5	Nine sites have been identified as having marginal current injection capability, all with 12 volt TRUs. We will replace the existing TRUs with higher voltage TRU's, which will bring performance to an acceptable level. Sites are: MLV31, MLV43, MLV46, MLV56, MLV58, MLV68, MLV79, MLV82, M2.	450
Polarisation cell, surge protection and reference electrode replacement	Periodic replacement, new for AA6	Replacement of MLV CP hardware - 50 sites Per site: 1 Polarisation Cells 8000 AUD 1 dehns 500 AUD 2 movs 150 AUD 1 BP12A 2100 AUD 1 reference electrode 4500	763
Modify CP at Pinjar Meter Station	Identified during inspection, new for AA6	The installation of electrical resistance corrosion probes at risers at Pinjar meter station. The project was instigated following recent dig ups and assessment of the effectiveness of polarisation cell replacements at risers when mitigating AC corrosion.	174
Replace Metal Oxide Varistors (MOVs) with 100V Gas Discharge Tubes (GDTs)	Identified during inspection, new for AA6	We have five MOVs at every MLV. We are transitioning to GDTs that have a lower voltage threshold, can handle more energy and don't deteriorate with multiple firings, unlike MOVs. The GDT units are more suited to the DBNGP application. Installation is planned during routine maintenance.	223
Replacement of failed insulation gaskets (IGs)s	Identified during CP surveys, new for AA6	IGs provide isolation of electrical current from the CP system, however they deteriorate and underperforming gaskets require replacement when identified during annual CP surveys.	175
Maintaining reference electrodes moisture level	Underperforming assets	Develop and install 20 permanent reference electrode arrangements with the installation of water tanks with drip feed. The arrangement will avoid units drying out. The installation includes a concrete foundation/anchor for tank.	130

1.3.1.2 In line inspection

In line inspection (ILI) covers any capex required to enable ILI devices (known as pigs) to travel along the pipeline. This includes such works as pipeline configuration and replacing/installing pig barrel isolation valves.

Isolation valves are critical assets along the DBNGP. Pig barrel isolation valves are used to isolate pipeline gas to pig barrels to enable essential maintenance works on pig barrels, or the safe installation and removal of pig barrels for conducting an ILI. Inspection and replacement/refurbishment of isolation valves is an ongoing program of work. Leaking or seized valves are identified for replacement once they are found to be faulty during routine maintenance activities.

We have identified five pig barrel isolation valves that need to be replaced. These five valves are required in the first three years of the period in order to facilitate ILI runs which are due in 2028 and 2029.

We do not propose and pipeline reconfiguration works to enable ILI during the AA6 period, however, there are section of Mainline South that are currently unpiggable, which we intend to make piggable during the AA7 period. We have therefore included costs for a study in 2029 to plan and prepare for these reconfiguration works.

Table 1.5 summarises the ILI capex program for the AA6 period.

Table 1.5: Summary of required ILI capex works, $'000 2024

Project	Driver	Description	Estimated cost
Isolation valve replacement (Pig barrel)	Ongoing from AA5	Ongoing project to replace valves that no longer positively isolate when closed. These faulty valves cannot be used to facilitate safe pigging. Replacing [redacted] over the 2026-2028 period.	2,250
Study – convert unpiggable sections on Mainline South to piggable	Ongoing as part of ILI program	Engineering study to identify the technical requirements and costs of reconfiguring currently unpiggable sections of Mainline South so that they are piggable.	100

1.3.1.3 End of life ECI upgrades and other minor works

ECI equipment is essential for the safe and ongoing operation of the DBNGP. ECI equipment includes items such as solar panels, radio, communication equipment and monitoring devices.

All of these assets have differing service lives and need to be replaced periodically as they near end of life (EOL) or start to underperform. The variety of asset lives means the ongoing upgrade and minor works program can vary significantly over time as families of assets fall due for replacement. To help smooth the program, we try to extend the life of assets where safe and prudent to do so, however this is not always practicable.

As each asset reaches EOL we consider whether to replace the asset with a like-for-like contemporary replacement, or whether an alternative technology is more suitable. We also consider whether the asset can be taken out of service completely or consolidated as part of another solution.

Table 1.6 summarises the ECI upgrades and other minor works identified for the next five years.

Table 1.6: Summary of End of life ECI upgrades and minor works, $'000 2024

Project	Driver	Description	Estimated cost
Radio equipment at mainline sites	End of life	EOL 8 year replacement of radio equipment (trans and receive, multiplexers) at CS10, KJN, 13 MLV sites and 17 meter station sites between MLV117-MLV157.	896
Radio equipment at spur sites	End of life	EOL 10 year replacement of radio equipment (trans and receive, multiplexers) at 6 spur sites.	827
Kwinana Junction KJN (third backup site)	Back up supply to manage integrity risk	Establishment of KJN as the third backup site for the control centre and replacement of equipment, including Network Management System (NMS), dark fibre multiplexers, power conversion equipment.	24
Total			**1,747**

1.3.1.4 Pipeline and facility upgrades

As the owner and operator of the DBNGP, we make ongoing investments to address performance issues and ensure compliance to standards by investing directly in the asset or by managing its environment. During the AA6 period we have identified a compliance project that helps avoid pipeline damage due to a lack of sufficient depth of cover.

We have also identified minor works to inspect and upgrade hazardous areas, as required by AS60079. The Standard states inspections of hazardous areas and equipment should be four-yearly, with repairs of non-conformances implemented based on degree of risk.

The required upgrade program is summarised in Table 1.7.

Table 1.7: Summary of pipeline upgrade works

Project	Driver	Description	Cost
Pipeline corridor erosion repair	Essential repairs to maintain integrity of supply	Depth of cover of the pipeline is a key requirement under AS/NZ 2885. Weather events and vehicle movements have eroded the DBNGP corridor over time. Investment is required to increase the depth of cover and maintain minimum standards. The alternative of dropping the pipeline is not cost viable.	430
Hazardous area upgrades	Inspections and resulting upgrades to comply with Australian Standards	A review of DBP's facilities in AA4 identified a need for an allowance to rectify issues as part of routine activities, thereby complying with AS/NZS 60079, which is series of standards that covers the design, selection, and installation of electrical equipment in hazardous areas to prevent fire and explosion risks. Minor works are likely at pipeline and MLV sites, therefore an allowance has been allocated to cover inspection costs and resulting works.	105

1.3.2 Summary

Undertaking the proposed program will address the identified high risks associated with the pipeline and MLV assets by the end of the next 5-year period. This program is consistent with our Asset Management System Framework.

The program forecast is developed from requirements outlined in the relevant AMPs and Safety Case, both of which are developed consistent with good industry practice and manufacturer requirements for maintenance and replacement.

1.4 Risk assessment

Risk management is a constant cycle of analysis, treatment, monitoring, reporting and then identifying once again, with a commitment to balance outcomes sought with delivery and cost implications considered and assessed.

Figure 1.4: Risk management principles



Our risk assessment approach focuses on understanding the potential severity of failure events associated with each asset and the likelihood that the event will occur. Based on these two key inputs, the risk assessment and derived risk rating then guides the actions and activities required to ensure safety and compliance are not compromised, while delivery of this outcome is done as efficiently and effectively as possible.

The risk rating assesses the consequence and likelihood of the risk. The risk of an event associated with failure of an asset is rated based on the combined effect of the consequence and likelihood rating to provide an overall risk rating. This risk rating guides the risk management and mitigation activities and facilitates prioritisation.

Our operational risk framework is based on AS/NZS 2885 and requires all identified risks ranked as intermediate or above to be addressed. For risks ranked as high we must *'Modify the threat, the frequency or the consequence to reduce the risk rank to intermediate or lower'.*

Six areas are considered for each type of risk:

1. People – injuries or illness to employees and contractors or members of the public
2. Environmental impact – impact on the surroundings in which the asset operates, including natural, built and Aboriginal cultural heritage, soil, water, vegetation, fauna, air and their interrelationships
3. Supply – disruption in the provision of services/supply, impacting customers
4. Impact on AGIG/DBP – impact on AGIG (DBP) due to restrictions and enforcement, such as regulatory enforcement or legal actions
5. Reputation – impact on stakeholders' views of AGIG (DBP), including personnel, customers, investors, security holders, regulators and the community
6. Loss – financial impact on AGIG (DBP)

Note that risk is not the sole determinant of what investment is required. Many other factors such as growth, cost, efficiency, sustainability and the future of the network are also considered when we develop engineering solutions. The risk management framework provides a valuable tool to manage our assets, and prioritise our works program, however it is not designed to provide a binary (yes/no) trigger for investment.

All equipment is replaced in accordance with manufacturer specifications, and a robust CP program is implemented in order to provide assurance of safe, reliable pipeline operations. Major risks associated with deferral of asset replacement or CP preventative works include:

- Potentially higher NPV as a result of penalties arising from breached shipper contracts where the pipeline and MLV are not operating to >98% reliability
- Increased safety incidents (people and environment) in the event of corrosion leading to gas fires in built up areas

Pipeline and MLV initiatives have been split into two categories for risk assessment:

1. Those related to the integrity of the pipeline and MLV assets
2. Those related to the reliability and performance of the pipeline and MLV assets

The overall risk rating of managing and maintaining the integrity and the reliability and performance of pipeline and MLV assets in line with relevant AMPs is outlined in the following sections.

1.4.1 Integrity – untreated risk

The primary risk event relating to pipeline and MLV integrity is that an inability to adequately identify defects on pipeline and MLVs, or lack of replacement of end of life equipment leading to deterioration, leads to asset failure and gas release. This is a major accident event that can severely harm DBP staff and/or the public, or prevent operation of sections of pipeline for a prolonged period affecting supply to one or more major customers.

The integrity risk rating associated with pipeline and MLV assets is presented in Figure 1.5.

Figure 1.5: Integrity untreated risk rating – Pipeline and MLV

	Trivial	Minor	Severe	Major	Catastrophic
Frequent					
Occasional					
Unlikely		Environmental	Supply Reputation Loss	DBP	
Remote					People
Hypothetical					

Negligible	Low	Intermediate	High	Extreme

Integrity driven initiatives are high risk and high priority, the highest rated risks are:

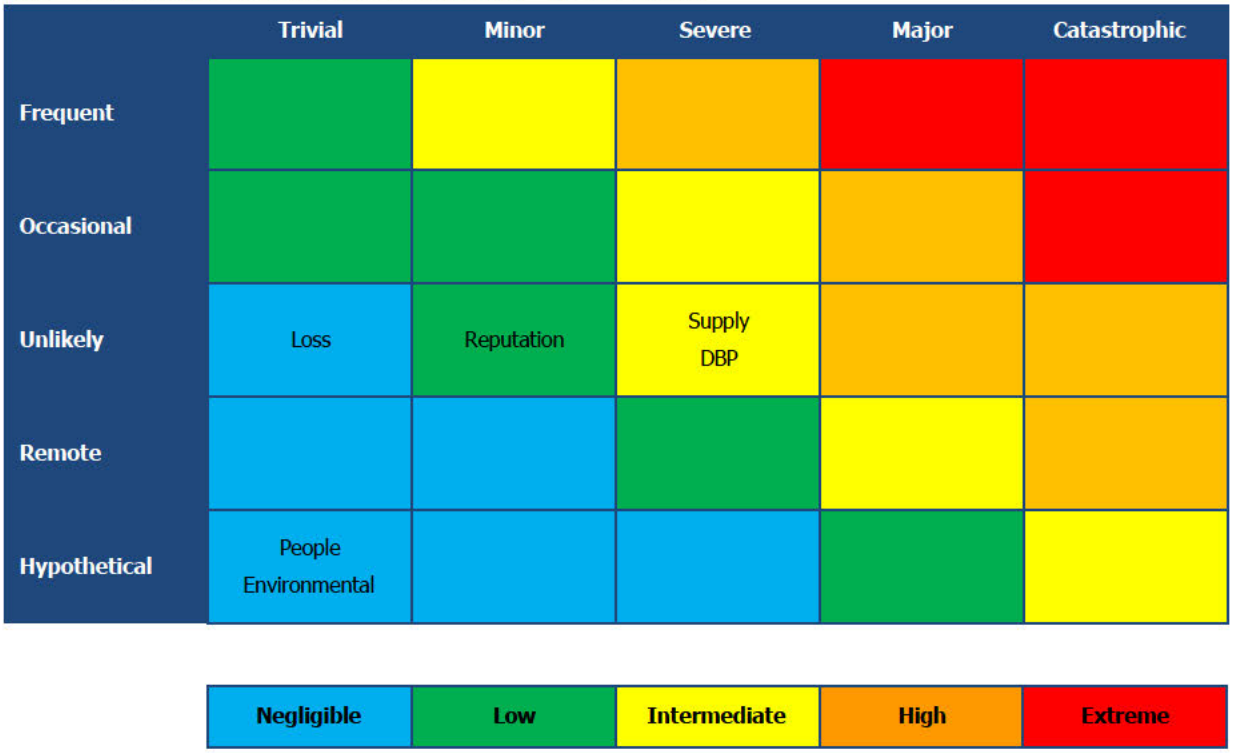
- **People** – protection of pipeline and MLV related assets are critical in maintaining people safety, as deterioration of these assets impacting on asset integrity can result in a major accident event with potential for multiple fatal injuries. Repeater sites are used as base locations for provision of communication continuity with SCADA as well as communication for the operation of MLVs, which used to limit inventory escape in an emergency
- **DBP** – pipeline and MLV related assets' integrity are critical to the delivery of public safety, delivering for customers and customer service. Extending the life of the assets and equipment ensure the long-term integrity, safety and value of the assets and thereby facilitating efficient and effective operation of the DBNGP
- **Reputation** – these activities are required to ensure equipment performance and asset integrity are to acceptable standards and maintained to perform the required function. Degradation in asset integrity resulting in a loss of containment could lead to long lasting reputation damage. Also, inconsistent and unreliable performance due to under investment in capital leads to higher efforts required to manage unplanned outages – working in extreme and challenging conditions to meet irate customers. Low investment in these activities will lead to reputational damage and outrage internally as well as externally as customer demands are exposed to unreliable operation of the DBNGP
- **Loss** – this risk simply implies that without the planned investment on integrity – the asset will be damaged and repairs costs escalate compared to planned works program to maintain the design intent of the assets
- **Supply** – pipeline and MLV assets are integral to the effective operation of the DBNGP and maintaining these assets is necessary in ensuring we are able to safely and reliably deliver the forecast demand, as well as be ready to meet contractual obligations of shippers on any given day within the terms of shipper contracts. The advent of renewable electricity generation technology, which are prone to change without forward planning, puts pressure on the DBNGP to fill the gaps. Peaking and bi-directional flow demand has grown and will be a critical part of load management during the AA6 period. Shippers are expected to be able to access and use their peaking rights more regularly, and for this reason the pipeline and MLV programs are required to ensure the pipeline line pack and deliverability can meet shipper requirements

1.4.2 Reliability/performance

The primary risk event relating to pipeline and MLV reliability is that failure of communication assets leads to loss of visibility from the control room, loss of data, or inability to operate the pipeline effectively.

The reliability/performance risk rating associated with pipeline and MLV assets is presented in Figure 1.6.

Figure 1.6: Reliability/performance untreated risk rating – Pipeline and MLV



Pipeline and MLV reliability/performance driven initiatives are intermediate risk and medium priority, but are key in delivering a capital program that can be considered as efficient and achieving the lowest sustainable cost of delivering services.

- **DBP** – Pipeline and MLV reliability/performance driven initiatives do not propose a threat to the effective operation of the DBNGP, but do expose us to unacceptable cost consequences through additional energy costs or additional remote travel for visual inspections or repairs
- **Supply** – pipeline and MLV assets are integral to the effective operation of the DBNGP and maintaining these assets is necessary in ensuring we are able to safely and reliably deliver the forecast demand, as well as be ready to meet contractual obligations of shippers on any given day within the terms of shipper contracts. Failure of ECI assets can lead to loss of visibility and control of pipeline assets, which can impact supply to shippers

1.5 Options considered

Different options have been considered to address the ability to ensure the pipeline and MLV assets continue to function as required for safe, reliable pipeline operations. The options are:

- Option 1 – Move to a replacement on failure policy for all pipeline and MLV assets
- Option 2 – Deliver a prioritised capex program based on the most recent assessment of asset replacement schedules, performance and risk
- Option 3 – Deliver a prioritised capex program with additional provision for further corrosion-based dig ups

These options are discussed in the following sections.

1.5.1 Option 1 – Move to a replace on failure policy

Due to the criticality of the DBNGP to WA's energy requirements, it is not permissible to allow the entire pipeline to fail. This option is therefore included in this business case for completeness, to assess the relative cost of reactive and proactive approaches.

Under this option, ongoing repairs and maintenance would only be conducted on a reactive basis. Pipeline and MLV ECI and mechanical assets would only be repaired or replaced in the event of failure. The rate of required repairs would likely increase as untreated assets age failures increase.

This option assumes no preventative investment occurs. Corrosion management and cathodic protection along the pipeline and MLV assets would therefore only be conducted when corrosion has caused damage to the assets.

1.5.1.1 Advantages and disadvantages

An advantage of Option 1 is that it has the lowest upfront capital cost. It also has the potential to be the lowest overall cost across the AA6 period, depending on how many and what type of assets fail.

The major disadvantage of a reactive approach is unpredictability. It is not possible to predict with accuracy the number of failures that will occur over the next five years. This means it is extremely challenging to budget time and resources for the period, as well as manage inventory costs. The reactive nature of the work also means uncertainty for our customers in terms of cost and potential supply impact.

Given many assets are becoming obsolete or reaching end of life during AA6, the likelihood of failure is higher than during AA5 if assets are not treated proactively. Given the higher cost of reactive replacement compared with proactive replacement (potentially two to five times higher per asset depending on asset type and location), the potential cost of works during AA6 is significantly greater than the proposed works program if widespread asset failure occurs.

Should the DBNGP corrode beyond allowable limits, the only alternative to stopping supply is to de-rate the asset by reducing the maximum operating pressure until replacement, which constricts the volume of gas we can transport. Under a worse scenario, there is potential that the pipeline will fail due to severe corrosion, leading to an uncontrolled loss of containment event with catastrophic safety consequences.

Should asset failure be lower than expected, though the overall cost of a reactive works program may be less than forecast, the requirements as identified in the AMP would not be delivered in full. The works program identified for the AA6 period (outlined in section 1.3.1 of this business case) is the prudent level of activity required to manage the safety, integrity and reliability/performance risk associated with the pipeline and MLVs. Therefore, all the high and intermediate risks identified would not be addressed.

The likely outcomes if we were to adopt Option 1 are not tolerable for us or for our customers. An entirely reactive replace on failure approach to managing the pipeline and MLVs is not

consistent with good asset management practice, and therefore not consistent with NGR 79(1)(a).

1.5.1.2 Achievement of objectives

Table 1.8 summarises how Option 1 aligns with AGIG's vision objectives.

Table 1.8: Alignment with our vision – Option 1

Vision objective	Alignment
Delivering for Customers – Public Safety	N
Delivering for Customers - Reliability	N
Delivering for Customers – Customer Service	-
A Good Employer – Health and Safety	N
A Good Employer – Employee Engagement	-
A Good Employer – Skills Development	-
Sustainably Cost Efficient – Working within Industry Benchmarks	N
Sustainably Cost Efficient – Delivering Profitable Growth	-
Sustainably Cost Efficient – Environmentally and Socially Responsible	N

A replacement on failure policy for all pipeline and MLV assets does not align with our vision objectives to deliver for customers in terms of public safety and reliability, being a good employer in terms of health and safety, or being sustainably cost efficient in terms of working within industry benchmarks.

A reactive approach would not address corrosion prevention measures to mitigate the risks identified as part of the 2008 Varanus Island incident, and would not align with good industry practice or prudent asset management principles.

Allowing corrosion equipment to fail will ultimately result in pipeline failure and a significant safety risk to the public or employees should such an occurrence happen in proximity to people. This reactive approach will increase the probability to interrupt contracted flow to much higher than ALARP and could result in not achieving the 98% reliability as a contracted obligation. It could further result in significant financial penalties if we cannot deliver to contracted obligations.

1.5.1.3 Cost assessment

With this option, the unit costs incurred would almost certainly be higher than a proactive work program. Corrective activities are likely to incur higher costs than planned alternatives due to:

- Additional travel costs (planned activities allow us to share travel costs across different activities at the same location)
- Increased likelihood of overtime and shift penalties (planned activities allow us to optimise staff rostering)
- Additional costs for expediated freight

- Additional costs for pulling crews off other planned work to address a corrective maintenance requirement and then remobilising to complete the planned work they were doing

We will also incur unplanned operating expenditure, as failures could lead to interruption to supply and associated contract delivery breaches. Interruption to supply to major industrial sites could result in substantial penalties (depending on the contractual terms with the affected customer). A replace on failure strategy is particularly unsuited when dealing with cathodic protection systems, which are in place to protect and be proactive.

If the cathodic protection systems are allowed to fail, they are no longer protecting the primary assets from corrosion. This may lead to large scale replacement of pipeline sections and MLVs that would otherwise have been prevented. Replacing a corroded section of pipeline is estimated to cost around $1.4 million per kilometre, not including the impact of shutting down sections of pipelines while repairs are being done.

While it is not possible to estimate precisely how many asset failures will occur during the AA6 period, broad cost estimate can be developed based by escalating the cost of the proposed works program if delivered reactively. It is a generally accepted asset management principle that delivery of works reactively is significantly more expensive that undertaking proactive or preventative works. Various sources cite the increase in reactive costs compared with proactive can be between two and five times[1] more than undertaking the same works proactively.

For the DBNGP the cost escalation for reactive vs proactive works varies depending on the type (and scarcity) of asset being replaced, as well as the remoteness of the asset from the Perth Metropolitan area. For example, pipeline and MLVs located in remote areas of the Pilbara and Gascoyne regions require more travel time, while bespoke components will have long lead times that would exacerbate continuity of supply issues.

To develop a conservative estimate of what a reactive approach may cost, we have assumed an average increase of only 1.5 times the material and labour/contractor costs if projects were to be undertaken reactively (i.e. where assets fail or untenable risks arise). Applying this x1.5 escalation factor to the entire program results in a cost of ~$18 million if all works were delivered reactively.

However, the above estimate assumes the pipeline and MLV works program would still be delivered in full. Under a purely reactive-only program, we would not conduct proactive activities such as dig ups, painting facilities or CP/MOV modifications. Work would be constrained to reactive end-of-life replacements only.

If we exclude proactive works from the pipeline MLV program, a reactive-only program would still cost approximately $10.7 million, and would deliver only a fraction of the proposed AMP requirements (see Table 1.9).

[1] Marshall Institute, Omega engineering, ARMS reliability.

Table 1.9: Estimated cost of reactive program, $'000 2024

Project	AMP proposed works program	Reactive program, escalation x1.5
Corrosion management*	2,255	0
CP*	5,122	3,956
ILI	2,350	3,325
EOL ECI and other minor works	1,747	2,621
Pipeline upgrades*	535	645
Total	**12,009**	**10,746**

*Dig ups, other proactive CP works, and hazardous area upgrades, which are all proactive works, are excluded in this option for forecasting purposes. Totals may not sum due to rounding.

It is also important to note that the estimated costs do not include costs associated with penalties and foregone revenue for us and our customers. The cost impact of asset failure that leads to a 4-5 day supply outage, noting the likelihood of failure under this option is higher, can be tens of millions of dollars in addition to the higher cost of reactive works.

As shown by these rule-of-thumb estimates, the pipeline and MLVs capital works program is likely to cost between $10 million to $18 million. Consideration is also not made to the impact of future costs from taking a reactive maintenance approach for a 5-year period, with future costs expected to escalate in remediated issues from poor asset management practices.

In any event, costs associated with a predominantly replace on failure works program would not *be such as 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.*[2]

Table 1.10: Comparison of reactive cost options, $'000 2024

Program category	AMP proposed works program	100% reactive program Escalation x 1.5	Reactive program, excluding dig ups and other proactive CP activities Escalation x1.5
Pipeline & MLV	12,009	18,015	10,746

1.5.1.4 Risk assessment

Table 1.11 shows the residual integrity and performance/reliability risk associated with the pipeline and MLV assets if a replace on failure approach is taken.

[2] NGR 79(1)(a)

Table 1.11: Risk assessment – Option 1

Risk category	Integrity		Performance/Reliability	
	Untreated	Treated	Untreated	Treated
People	High	High	Negligible	Negligible
Environmental	Low	Low	Negligible	Negligible
Supply	Intermediate	Intermediate	Intermediate	Intermediate
DBP	High	High	Intermediate	Intermediate
Reputation	Intermediate	Intermediate	Low	Low
Loss	Intermediate	Intermediate	Negligible	Negligible

1.5.2 Option 2 – Deliver a prioritised capex program based on the most recent assessment of asset replacement schedules, performance and risk

This approach assumes that all identified works are undertaken, including both preventative and corrective, to properly maintain and operate ECI and mechanical equipment on the pipeline and MLVs. Option 2 assumes the ILI inspection of Mainline South is brought forward from 2029 to 2027, which would allow us to defer up to 99 dig ups.

As discussed in DBP19: Pipeline and MLV Inspections, RunCom data on a 298 km section of Mainline South indicates that this section of pipeline may have experienced substantial corrosion and thinning of the pipe wall. The last ILI run on the Mainline South – Kwinana Junction – Wagerup West pipeline was conducted in 2021. The next run is due in 2029. We have recently re-evaluated the RunCom data from the 2021 and 2013 ILIs and found that the pipeline may be in worse condition than originally thought.

The confidence factors used in the original RunCom analysis to identify defects were too conservative. The analysis used apparent growth of >18% to flag that a defect was growing and needed further investigation. Upon reviewing our asset management practices, we consider an 18% threshold represents too great a growth factor and exposes the business to unreasonable asset integrity risk. We have therefore reassessed the RunCom results using a 10% growth threshold.

If we apply the 10% threshold, the ILI results show that 129 locations along the Mainline South have experienced defect growth of >10%. (Ref Baker Hughes RunCom report KMS-PI-REP-004-01.) Of the 129 dig ups, we know 30 are definitely required, as these locations were flagged in the original RunCom analysis and are already known to have ERF>1. However, this still leaves 99 further potential dig ups along the Mainline South.

Given the high volume (and high cost) of potential dig ups, we propose to bring forward the scheduled ILI of Mainline South by two years, to 2027. This would help us better understand the significance and growth of these defects and assess whether the 99 additional dig ups are required. We can then use the data from the 2027 ILI run to prioritise and potentially eliminate a significant proportion of dig ups.

Depending on the 2027 ILI results, we may be able to constrain the AA6 dig up program on this section of pipeline to 18 of the 30 ERF>1 digs only (the other 12 would be done in 2025). This would reduce the overall AA6 dig up program from 160 (across all pipelines) to 49.

The program of work identified under Option 2 is based on contemporary asset performance and age data, as well as delivery capacity and a risk prioritisation. The entire portfolio of project works for a minimum 5-10 year period is assessed as part of project portfolio risk ranking, which includes any undelivered works from AA5. The portfolio is reassessed with new asset information and performance, along with consideration of new technologies or other delivery options to address the risks.

This option also adopts a balanced approach to preventative and corrective CP consistent with asset management system requirements, Safety Case and good industry practice.

1.5.2.1 Advantage and disadvantages

The major advantage with this approach is that it will enable all high and intermediate risks to be addressed by the end of the AA6 period. Importantly, it reflects a works program based on the latest information, and affords opportunity to re-evaluate projects that were not delivered during the AA5 period.

This disadvantage of this option is that if the ILI run on Mainline South confirms all 129 dig ups are required, we would have to re-prioritise our capex program and defer some works to be able to accommodate the extra digs.

1.5.2.2 Achievement of objectives

Table 1.12 summarises how Option 2 aligns with AGIG's vision objectives.

Table 1.12: Alignment with our vision – Option 2

Vision objective	Alignment
Delivering for Customers – Public Safety	Y
Delivering for Customers - Reliability	Y
Delivering for Customers – Customer Service	-
A Good Employer – Health and Safety	Y
A Good Employer – Employee Engagement	-
A Good Employer – Skills Development	-
Sustainably Cost Efficient – Working within Industry Benchmarks	Y
Sustainably Cost Efficient – Delivering Profitable Growth	-
Sustainably Cost Efficient – Environmentally and Socially Responsible	Y

Option 2 would address the assets that need to be replaced in the period, thereby minimising risk associated with a potential failure. This is aligned with our objectives to maintain, public safety, reliability, and the safety of our employees.

Conducting the identified dig ups and bringing forward the ILI of Mainline would also allow us to understand the current condition of the pipelines, validate RunCom assumptions, and effectively manage any defect with ERF>1, which again helps maintain reliability.

Option 2 also looks to continuous improvement in the way assets are managed throughout their lifecycle by exploring emerging techniques and technologies, such as long range ultrasonic testing and stress concentration tomography for unpiggable assets. By using technology to replace or defer high cost activities such as dig ups and replacements, we are operating in a sustainably cost efficient manner.

1.5.2.3 Cost assessment

The estimated cost of this option is $12 million (Table 1.3).

By adopting a proactive, planned approach to the management of these assets, we can best manage the efficient delivery of the program, minimising the need for unplanned and disruptive repair work on the network, which might otherwise result in a failure or a production loss. A continuous improvement culture is embedded, constantly looking at doing things better and more effective, taking advantages of technological advances.

1.5.2.4 Risk assessment

This option represents the lowest treated risk. It is therefore consistent with our risk management framework and achieves a 98% reliability contractual obligation at the lowest sustainable cost.

Table 1.13 : Risk assessment – Option 2

Risk category	Integrity		Performance/Reliability	
	Untreated	Treated	Untreated	Treated
People	High	Intermediate	Negligible	Negligible
Environmental	Low	Negligible	Negligible	Negligible
Supply	Intermediate	Low	Intermediate	Low
DBP	High	Low	Intermediate	Low
Reputation	Intermediate	Low	Low	Negligible
Loss	Intermediate	Low	Negligible	Negligible

1.5.3 Option 3 – Deliver a prioritised capex program with additional provision for further corrosion-based dig ups.

This approach assumes the same as Option 2, that all identified works are undertaken, including both preventative and corrective, to properly maintain and operate ECI and mechanical equipment on the pipeline and MLVs. However, under Option 3 includes provision for an additional 99 digs ups.

As discussed in Option 2 and in DBP19: Pipeline and MLV Inspections, we have an opportunity to bring forward the ILI of the problematic Mainline South pipeline, so we can assess whether all 129 identified dig ups are required.

However, if we are not able (or chose not) to bring forward the pigging run, we would have to proceed with the identified 129 dig ups. This would increase the proposed number of dig ups from 49 (across all pipelines) to 160.

Under Option 3 we would therefore keep a provision of $4.6 million for the dig ups as a prudent measure.

1.5.3.1 Advantage and disadvantages

The major advantage with this approach is that it will enable all high and intermediate risks, as identified in the AMP, to be addressed by the end of the AA6 period. Importantly, it reflects a works program based on the latest information, and affords opportunity to re-evaluate projects that were not delivered during the AA5 period.

While the overall cost is higher than that incurred during the AA5 period, the whole-of-portfolio approach under Option 3 provides flexibility to accommodate for all the additional defects on Mainline South, should corrosion growth rates materialise as accurate, thereby requiring dig-ups.

The main disadvantage of this approach is that we may be undertaking more dig ups than are necessary, contributing to a substantially higher cost than that proposed in Option 2 if we bring forward the Mainline South ILI run.

1.5.3.2 Achievement of objectives

Table 1.12 summarises how Option 2 aligns with AGIG's vision objectives.

Table 1.14: Alignment with our vision – Option 2

Vision objective	Alignment
Delivering for Customers – Public Safety	Y
Delivering for Customers - Reliability	Y
Delivering for Customers – Customer Service	-
A Good Employer – Health and Safety	Y
A Good Employer – Employee Engagement	-
A Good Employer – Skills Development	-
Sustainably Cost Efficient – Working within Industry Benchmarks	N
Sustainably Cost Efficient – Delivering Profitable Growth	-
Sustainably Cost Efficient – Environmentally and Socially Responsible	Y

Option 3 would address the assets which need to be replaced in the period as they reach the end of their technical design life through age, performance or obsolescence, thereby minimising risk associated with a potential failure and any subsequent potential impact on the quality (accuracy and timeliness) of data available to support decisions relating to the pipeline.

Conducting the full 159 of identified dig ups would also allow us to fully understand the current condition of our pipelines, validate RunCom assumptions, and arrest any concerning trends related to ERF and pipeline thickness.

However, in forecasting the full 129 digs on Mainline South, whilst we are still investigating the potential corrosion issues, as well as bringing forward ILI to better inform our asset management strategy, is not considered prudent until better information is available.

Therefore, our assessment of Option 3 is that it aligns with our vision objectives, with the exception of being sustainably cost efficient, until such time better information is available.

1.5.3.3 Cost assessment

The estimated cost of this option is $16.6 million, which accounts for the extra 99 dig ups compared to Option 2.

1.5.3.4 Risk assessment

This option achieves the same level of treated risk as Option 2. It is therefore consistent with our risk management framework. However, it achieves this risk reduction at a higher overall cost.

Table 1.15 : Risk assessment – Option 3

Risk category	Integrity		Performance/Reliability	
	Untreated	Treated	Untreated	Treated
People	High	Intermediate	Negligible	Negligible
Environmental	Low	Negligible	Negligible	Negligible
Supply	Intermediate	Low	Intermediate	Low
DBP	HIGH	Low	Intermediate	Low
Reputation / outrage	Intermediate	Low	Low	Negligible
Asset damage / Loss	Intermediate	Low	Negligible	Negligible

1.6 Summary of options assessment

To assess the options, the costs, objectives and risk are considered for each option. A summary of the options assessment is shown in Table 1.16.

Table 1.16: Summary of options

Option	Achievement of objectives	Cost	Treated risk (integrity/reliability)
Option 1	Does not deliver for customers, a good employer or sustainably cost efficient	~$10 million to ~$17 million	High / Intermediate This option does not adequately address the identified risks to DBP, People, Reputation, Asset Damage and Supply
Option 2	Achieves all relevant aspects of vision to deliver for customers, be a good employer and be sustainably cost efficient	$12.0 million	Intermediate / Low This option appropriately addresses the identified risks to DBP, People, Reputation, Asset Damage and Supply and is considered ALARP
Option 3	Does not deliver for sustainably cost efficient	$16.6 million	Intermediate / Low

1.7 Proposed solution

1.7.1 Why is the recommended option prudent?

Option 2 is recommended for the pipeline and MLV program to ensure we continue to deliver safe and reliable pipeline services. Option 2 approach is consistent with good industry practice, delivers the required dig ups to address integrity concerns, considers learnings from the Varanus Island incident and in light of the recent Queensland Gas Pipeline incident, and follows the recommendations of our equipment providers and manufacturers, thereby ensuring continued repair and replacement. This option is selected to undertake replacement of equipment that no longer perform their design intent or are obsolete, and therefore sub optimal in their services.

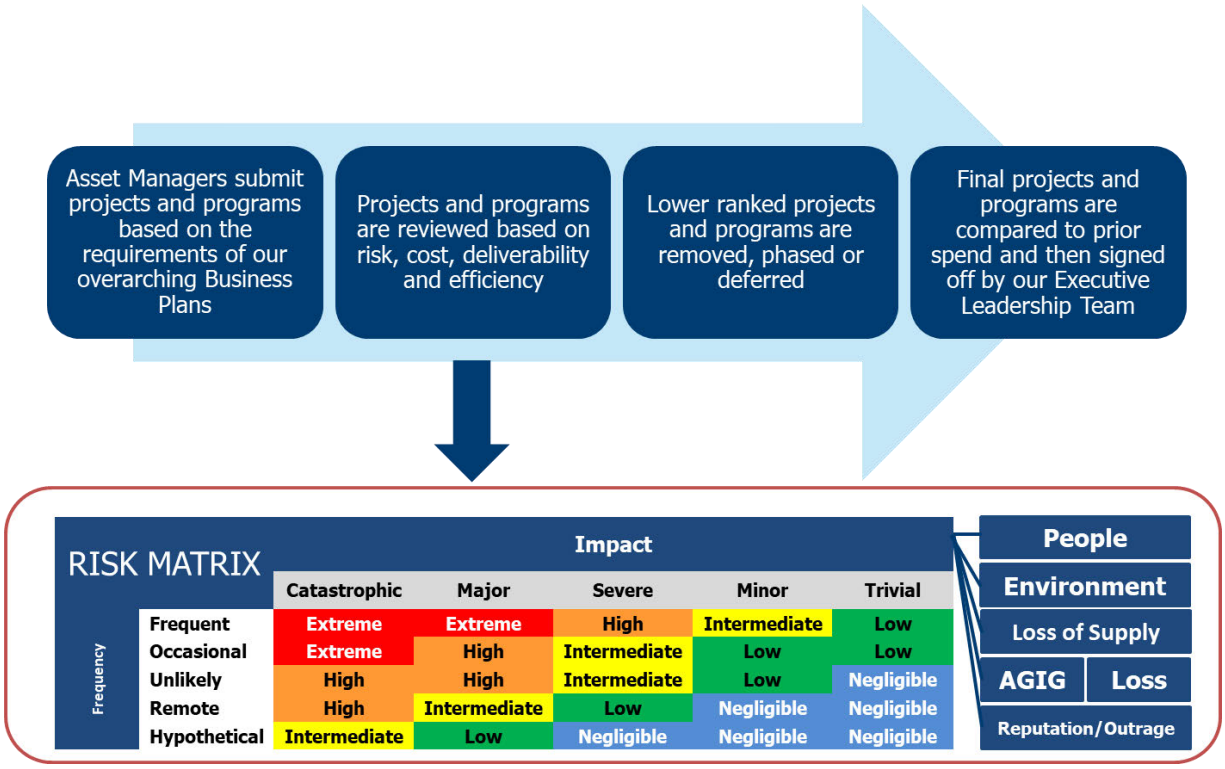
Although proactive corrosion management and CP costs are increasing, they are critical to the long term integrity of the pipeline in preventing future risks and would be expected for an aging pipeline. These solutions ensure minimal disruption to the required levels of customer services and optimises performance of pipeline and MLV assets across the asset lifecycle, while preserving public, environmental and employee safety. The program of work also sets us up for a successful ILI program during AA6.

Option 2 is consistent with this approach as it focuses on treating all intermediate or higher risks as soon as is reasonably practicable (by the end of the AA6 period). Option 1 would not address the identified risks within the AA6 period and would increase the overall risk associated with the DBNGP as projects get pushed into AA7, leading to an even larger capital works program in the future.

Option 3 is not considered prudent at this stage as further investigations are currently underway, and to conduct additional dig up costs without sufficient evidence that corrosion defects are >1 ERF would not be considerate of the impact on prices.

The following figure summarises how we develop our capital expenditure plans, and highlights that risks identified as intermediate or higher are prioritised, with lower risks removed or deferred from the capital program. Option 2 is consistent with this approach as it focuses on treating all intermediate or higher risks as soon as is reasonably practicable (by the end of the AA6 period).

Figure 1.7: Our capex plan development process



Failure to proactively plan for the management and maintenance of assets covered by the pipeline and MLV asset class could result in catastrophic failure of an asset which would result in loss of through-put, excessive operating expenditure and impact on reliability and the ability to meet contractual obligations.

1.7.2 Estimating the efficient costs

The unit rates used for all projects managed within this program of include the internal labour, external labour and materials/other costs forecast.

Where possible, the unit rate used to determine the cost of the program in AA6 is based on a three-year average actual cost incurred in AA5. Where this has not been possible activities have been estimated based on the historical cost of the same or similar programs of work.

The cost of 'one off' activities would usually be determined through a competitive tender process. Where a competitive tender has not yet occurred, the associated cost is estimated in two ways:

- Where the work is sufficiently comparable to other work – the most recent historical average unit rate or actual cost and matched to similar locations where the program is delivered externally

- Where the work is unique or greater than $5 million – an estimate is developed based on internal estimates from different engineering disciplines or from external engineering specialists.

Specialist engineering disciplines, procurement and construction management (EPCM) activities are provided utilising internal resources, supplemented by external specialist input as required.

Key assumptions in the cost estimation for the pipeline and MLV program include:

- Costs are based on historical expenditure noting that these works are not new
- Estimates derived from contractual rates of vendors to be utilised
- Resource costs based on other similar projects ongoing at present or in previous AA periods
- Original equipment manufacturer contractual rates for spares and labour that are part of our services agreements

1.7.3 Consistency with the National Gas Rules

NGR 79(1)

The option is consistent with the requirements of NGR 79(1), specifically we consider that the capital expenditure is:

- **Prudent** – the expenditure is necessary in order to address the identified ongoing operational requirements. The program is also broadly consistent with the approach adopted in AA5, with the justified increase in dig ups reflective of an ageing asset. The proposed expenditure can therefore be seen to be of a nature that would be incurred by a prudent service provider
- **Efficient** – the forecast expenditure is based historical average actuals and tender contract values. The proposed expenditure can therefore be considered consistent with the expenditure that a prudent service provider acting efficiently would incur
- **Consistent with accepted and good industry practice** – the proposed expenditure investigates and remediates pipeline faults with an ERF >1 as per RunCom methodology and considers industry learned lessons from the Varanus Island incident and focuses on preventative measures to ensure the long-term health of the asset. It also follows good industry practice by ensuring that critical infrastructure is maintained within its useful life, obsolescence risks are mitigated and projects consider current technological standards, therefore the proposed capital expenditure is such as would be incurred by a prudent service provider acting efficiently, in accordance with accepted good industry practice

- **Required to achieve the lowest sustainable cost of delivering pipeline services** – the proposed option achieves the lowest sustainable cost delivery of services by undertaking works that reduce risks to as low as reasonably practicable while maintaining reliability of supply. This mitigates the costs of reactive works and penalties resulting from asset failure. We are undertaking works in a proactive, planned and scheduled manner, with the volume of activity based on useful life, deliverability and in line with manufacturer's guidance and associated support. It also considers continuous improvement in the way we manage assets throughout their lifecycle by introducing new and emerging techniques and technologies, which may reduce costs over the medium-to-long term

NGR 79(2)

The proposed capex on pipeline and MLV assets is necessary to improve or maintain the safety, and to maintain the integrity of services, as required by NGR 79(2)(c)(i) and (ii). Specifically, it will:

- Maintain good industry practice in relation to prevention of corrosion of pipeline and MLV assets through preventative and corrective programs, thereby minimising the likelihood of pipeline pressure downgrade, leakage and/or explosion
- Maintain reliability of supply by ensuring that all ECI and mechanical equipment replacement programs are undertaken in line with the AMP, end of life cycle and manufacturer requirements.

NGR 74

Our forecasts for pipeline and MLV inspections are based on inspection cycles set out in Australian Standards (AS 2885 and AS 3788). The forecast cost per inspection type is based on historical costs. Therefore, the forecast is arrived at on a reasonable basis and represents the best forecast or estimate possible in the circumstances.

The proposed volume and timing of activity is guided by our asset management plans and has regard to our regulatory obligations, manufacturer's recommendations, Australian and International Standards. The work will be delivered by a mix of internal and external resources. External resources and materials are procured competitively in line with our procurement policy and purchasing procedure to promote efficient costs.

1.8 Comparison to previous periods

1.8.1 AA6 forecast compared to AA5

Table 1.17 shows the forecast AA6 expenditure compared with actual expenditure in AA5.

Table 1.17: AA5 forecast pipeline and MLV capital expenditure, compared with AA5 actual, $'000 2024

Forecast	2026	2027	2028	2029	2030	AA6	AA5 total	Variance
AA6 expenditure	2,757	2,598	1,908	1,866	2,881	**12,009**	**11,247**	**762**

The difference between the AA5 and AA6 forecasts is minimal, and reflects our efforts to adopt a smooth, sustainable, and deliverable expenditure program over the life of our primary asset.

Further information on all the proposed projects for AA6 is provided in Appendix B of this business case.

1.8.2 AA5 variance

Actual expenditure during the AA5 period is forecast to be $3.6 million higher than the amount determined in the AA5 Final Decision.

Table 1.18: AA5 actual expenditure compared with budget, $'000 2024

Actual v budget	2021	2022	2023	2024	2025	AA5
AA5 actual	2,118	5,174	1,705	1,115	1,136	11,247
AA5 approved	1,937	1,682	1,592	1,627	806	7,645
Variance						**3,602**

The primary drivers for the $3.6 million variance in AA5 were due to a small increase in activities to address unforeseen corrosion under insulation, the additional investigations and dig ups for the Mainline South RunCom results that will enable us to prudently defer further dig ups, as well as the Wheatstone Ashburton West Pipeline (WAWP) Interconnect project.

The WAWP Interconnect project cost $2 million and involves construction of a short loop of pipeline that is essential in the continuation of pipeline services on the DBNGP by enabling all industrial and metropolitan distribution customers to continue to benefit from bidirectional gas flow should there be supply interruptions or constraints between the Karratha Gas Plant and CS3. The pipeline is 1.8 km long and connects the WAWP to Loop 1, thereby maintaining pipeline integrity and domestic supply should there by supply constraints, restrictions or incidents.

Appendix A Risk assessment

Summary of Pipeline and MLV risk assessment

Integrity										
Project Ref No	**Description**	**Primary Risk Event**	**Proposed Action**		**People**	**Environmental**	**Supply**	**DBP**	**Reputation**	**Loss**
DBP02	Pipeline and mainline valves	Inability to adequately identify defects on pipeline and MLVs, or lack of replacement of end of life equipment leading to deterioration, leads to asset failure and gas release. This is a major accident event that can severely harm DBP staff and/or the public, or prevent operation of sections of pipeline for a prolonged period affecting supply to one or more major customers.	Untreated Risk	Likelihood	Remote	Unlikely	Unlikely	Unlikely	Unlikely	Unlikely
				Consequence	Catastrophic	Minor	Severe	Major	Severe	Severe
				Risk Level	HIGH	LOW	INTERMEDIATE	HIGH	INTERMEDIATE	INTERMEDIATE
			Option 1 – Move to a replacement on failure policy for all pipeline and MLV assets	Likelihood	Remote	Unlikely	Unlikely	Unlikely	Unlikely	Unlikely
				Consequence	Catastrophic	Minor	Severe	Major	Severe	Severe
				Risk Level	HIGH	LOW	INTERMEDIATE	HIGH	INTERMEDIATE	INTERMEDIATE
			Option 2 – Deliver a prioritised capex program based on the most recent assessment of inline inspection data, asset replacement schedules, performance and risk	Likelihood	Hypothetical	Remote	Remote	Remote	Remote	Remote
				Consequence	Catastrophic	Minor	Severe	Severe	Severe	Severe
				Risk Level	INTERMEDIATE	NEGLIGIBLE	LOW	LOW	LOW	LOW
			Option 3 – Deliver a prioritised capex program with additional provision for further corrosion-based dig ups	Likelihood	Hypothetical	Remote	Remote	Remote	Remote	Remote
				Consequence	Catastrophic	Minor	Severe	Severe	Severe	Severe
				Risk Level	INTERMEDIATE	NEGLIGIBLE	LOW	LOW	LOW	LOW

Reliability / Performance										
Project Ref No	**Description**	**Primary Risk Event**	**Proposed Action**		**People**	**Environmental**	**Supply**	**DBP**	**Reputation**	**Loss**
DBP02	Pipeline and mainline valves	failure of communication assets leads to loss of visibility from the control room, loss of data, or inability to operate the pipeline effectively.	Integrity+A1+A17:L31+A1+A17:L3+A17:K31	Likelihood	Hypothetical	Hypothetical	Unlikely	Unlikely	Unlikely	Unlikely
				Consequence	Trivial	Trivial	Severe	Severe	Minor	Trivial
				Risk Level	NEGLIGIBLE	NEGLIGIBLE	INTERMEDIATE	INTERMEDIATE	LOW	NEGLIGIBLE
			Option 1 – Move to a replacement on failure policy for all pipeline and MLV assets	Likelihood	Hypothetical	Hypothetical	Unlikely	Unlikely	Unlikely	Unlikely
				Consequence	Trivial	Trivial	Severe	Severe	Minor	Trivial
				Risk Level	NEGLIGIBLE	NEGLIGIBLE	INTERMEDIATE	INTERMEDIATE	LOW	NEGLIGIBLE
			Option 2 – Deliver a prioritised capex program based on the most recent assessment of inline inspection data, asset replacement schedules, performance and risk	Likelihood	Hypothetical	Hypothetical	Remote	Remote	Remote	Remote
				Consequence	Trivial	Trivial	Severe	Severe	Minor	Trivial
				Risk Level	NEGLIGIBLE	NEGLIGIBLE	LOW	LOW	NEGLIGIBLE	NEGLIGIBLE
			Option 3 – Deliver a prioritised capex program with additional provision for further corrosion-based dig ups	Likelihood	Hypothetical	Hypothetical	Remote	Remote	Remote	Remote
				Consequence	Trivial	Trivial	Severe	Severe	Minor	Trivial
				Risk Level	NEGLIGIBLE	NEGLIGIBLE	LOW	LOW	NEGLIGIBLE	NEGLIGIBLE

Appendix B Overview of program activities

B.1 Corrosion management and cathodic protection program

The DBNGP below ground gas transmission system has been designed with CP and corrosion management systems to help ensure it will last its design life. These engineering design features include the following:

- The pipeline is coated with Fusion Bonded Epoxy (FBE) for the mainline and a three layer coating system (3LPE) for the loops, both applied in the factory where the pipes were manufactured
- The laterals are coated with FBE, 3LPE and HDPE (Yellow Jacket) corrosion prevention coating system
- The weld areas of the two pipelines have coating systems that were applied in the field
- The coatings are designed to be the primary protective system employed to eliminate corrosion
- As there are always imperfections in any coating system, and in line with standard industry practice, the DBNGP is also equipped with Impressed Current Cathodic Protection system (TRUs and ground beds) that are installed at MLVs spaced every 30 km apart on the whole pipeline length. The CP systems use ground beds and current supplies to inject cathodic protection current into the pipeline, preventing corrosive metal loss at coating defects from causing leaks and ruptures. There are more than 63 TRUs installed on the DBNGP

In addition to these engineering measures, the DBNGP is annually tested to determine the adequacy of the CP system as determined from the potential and current flow measured at respective test points installed along the pipeline. The testing methodologies are deemed inferential hence why good and prudent pipeline operators conduct regular excavation programs annually to assess the adequacy of the controls in place are working and that the exposed metal at coating defects are well protected from corrosion.

The annual dig up allocation has been included in the program and allows the operator to determine best locations to be excavated to validate ILI results and to verify that the CP system is adequate based on the following conditions:

- The results of the annual CP survey may identify areas where there has been a change and showing in the depletion of potentials and increasing current demands
- The areas that coincide with defects from the ILI programs
- Known areas of low level of soil resistivity – salt pans, river crossings, wetlands, coastal areas
- Known areas of high level of soil resistivity – sand dunes, desert
- Areas exposed to foreign interference from other pipelines

- Areas exposed to Telluric currents and/or AC Induction from high voltage transmission lines

These factors optimise and drive the locations of areas to be excavated, noting the spread of the DBNGP from Dampier to Bunbury traversing the state from pastoral, wheat belt and the southwest.

The CP and corrosions management programs required in AA6 are summarised in the following sections.

B.1.1 Annual dig up program

The annual dig up program is designed to test the adequacy of the CP system and that we are meeting our Safety Case obligations. Note the ILI program is run every eight years, whereas annual excavations are design to physically inspect selected locations along the pipeline based on data collected from the annual surveys, ILI results and known high risk areas to integrity. This approach is considered prudent and standard industry practice, as opposed to just monitoring the CP readings and results.

Following the pig run comparison analysis (RunCom analysis) the following table identifies the required dig up schedule to ensure DBP continues to manage its assets in a prudent manner.

Table Appendix B.1: Dig up program

Pipelines	Previous Runs	Last Run	Next Run	Freq	SC/AMP Obligation	AA6 required excavations *
DBNGP Mainline DF -KJN	2011	2019	2028	8	8-10 years	7
DBNGP Mainline South - KJN - Wagerup West	2013	2021	2027**	8	8-10 years	18 (129**)
Wagerup West - Worsley-10" (Worsley Lateral)	2015	2021	2029	8	8-10 years	5
Wagerup West - Worsley-18" (Worsley Extension, Southern Loop)	2013	2021	2029	8	8-10 years	7
Russell Road Lateral	2012	2020	2029	8	8-10 years	1
Rockingham Lateral 150mm (Mason Rd MS – KNR MS)	2012	2020	2029	8	8-10 years	10

*ERF>1 and/or wall penetration exceeds 60% by next ILI
** Assumes Mainline South ILI can be brought forward two years. The full dig up program of 129 would be required if inline inspection cannot be brought forward.

The DBNGP Mainline South – Kwinana Junction - Wagerup West pipeline is driving the forecast expenditure of the dig ups and investigations (18 or 129 dig ups required).

During the AA5 period, the original RunCom reports were reviewed (and if necessary, the analysis repeated) for the DBNGP, using the results from in line inspections conducted in 2013 and 2020/21. It was found that the confidence factors used within the original RunCom analysis to identify growing defects were too conservative in many cases (apparent growth of >18% required to flag as growing.) This was subsequently adjusted to a 10% threshold, which highlighted the requirement to investigate 159 locations, 129 of them on Mainline South. (Ref Baker Hughes RunCom report KMS-PI-REP-004-01.)

Given the magnitude of the inspection required, further work is being conducted during 2025, including 12 dig ups at locations identified to have ERF>1, which will help inform the asset management strategy prior to committing a further $4 million to 5 million to the forecast. 18 dig ups are included in the forward forecast on Mainline South as these locations are already known to have ERF>1.

In order to proactively manage the asset as well as possible, we are also planning to conduct an inline inspection of the Mainline South two years early, as per the DBP19 Pipeline and MLV business case, which will also help us develop an appropriate asset management strategy and dig up schedule.

B.1.2 TRU replacement

The current TRUs reached full design life during the AA4 period and have been maintained using spare units and circuit boards, stocks of which are almost exhausted. These devices control the level of cathodic protection injected into the pipeline.

The original TRU models were built by Advanced Cathodic Protection Pty Ltd and the company was deregistered in September 2019. We have maintained the current asset for as long as possible using spares, however as the units are obsolete we can no longer source critical parts.

Figure Appendix B.1: Obsolete and aged TRU units to be replaced





The program will replace [redacted] (5 dual channels) per year for the period at a unit cost of [redacted] which is based on the latest available information from recent replacements and commissioning using MicroPi BF224 units, and historic unit rates of installation.

B.1.3 Dig up of unpiggable pipes at facilities

There are sections along the DBNGP that are not piggable. These are typically within DBP's facilities where pipes are not part of the mainline system and sit outside of the piggable system, for example compressor station bypass pipes, meter station internal piping, piping from Meter stations to client transfer points, etc.

With DBP's increasingly comprehensive inspections and the discovery of corrosion at key ground to air infaces, it is increasingly important that we inspect these non-piggable pipes and areas in a manner that prevents undetected corrosion leading to asset failure.

To achieve this, we identify areas of concern using DCVG and then excavate around the pipeline to perform a coating assessment and repair. An example of the assets concerned and dig up required can be seen in the figure below.

Figure Appendix B.2: example of an unpiggable pipeline at DBP's Pinjar Power Station Meter Station facility



51 locations are forecast for the 5 year period, with 30 locations already identified and 21 prospective locations that are based on the estimated rate of discovery from DBP's experience and inspection regime. The unit rate is forecast at [redacted], which is based on project actuals during the AA5 period.

B.1.4 Impressed current groundbeds

The associated ground beds will also be due for replacement as most of these have been in service since 1984.

The ground beds are designed to have loop resistances that allow for the efficient injection of current from the TRU. Continuous use of these ground beds after over 35 years of current injection has resulted in the gradual drying out of the ground bed backfill material resulting in high loop resistances and driving TRU power requirements higher.

The project is ongoing from AA5 and seeks to increase TRU voltage to maintain safe operating conditions, as opposed to replacing the groundbed, which would be significantly more costly.

Nine sites identified as having marginal current injection capability, all with 12 volt TRUs. The project will be completed in 2026 and 2027 and will replace the current TRUs with higher voltage units as per the following table.

Table Appendix B.2: Impressed Current Cathodic Protection groundbeds

Site	TRU solution	Cost
MLV31	2-channel TRUs	$ 36,000
MLV43	2-channel TRUs	$ 36,000
MLV46	2-channel TRUs	$ 36,000
MLV56	2-channel TRUs	$ 36,000
MLV58	2-channel TRUs	$ 36,000
MLV68	2-channel TRUs	$ 36,000
MLV79	2-channel TRUs	$ 36,000
MLV82	2-channel TRUs	$ 36,000
M2	2-channel TRUs	$ 36,000

B.1.5 Painting of above ground facilities

Aboveground main line valve pipework is also exposed to corrosion. Paint used on aboveground pipework at MLVs is the primary form of defence against corrosion caused by external environmental factors.

This is an ongoing programme of works and the forward forecast is based on actual historical requirements, and therefore we have rolled forward an average six MLVs to be painted per year. Each MLV paint system costs $28,700, which has been rolled forward into the AA6 forecast.

B.1.6 Polarisation cell, surge protection and reference electrode replacement

Polarisation cells are surge-diverting CP hardware located across electrically insulated joints where buried piping (protected by CP) connects to surface piping. They protect personnel from electric shock by earthing the buried piping during high voltage events.

Traditional "wet" polarisation cells consist of small plastic tanks containing a caustic solution and metal plates. They are high maintenance as the solution evaporates over time and may boil during lightning events. The caustic solution requires special handling precautions and disposal. High-energy lightning events can destroy a polarisation cell, although this is rare.

Wet polarisation cells are no longer available and are replaced by electronic alternatives as required. The replacement of ten Polarisation cells at a rate of two per year is sufficient to cover losses by attrition and improves the lightning robustness of the DBNGP.

Surge diverters ("spark gaps" or "Dehns") are surge-diverting CP hardware at electrically insulated joints. They protect the joints from lightning damage by providing a pathway around the insulation. High-energy lightning events can cause a surge diverter to fail and they then need replacing.

Metal Oxide Varistors (MOVs) are CP hardware used inside boxes and cabinets to protect electrical equipment from lightning and other surges. They deteriorate invisibly every time they stop a surge and eventually fail.

The BP12A module is a specific surge protection device for the "Micropi" TRU, twenty-three of which are installed on the DBNGP. They deteriorate invisibly every time they stop a surge and eventually fail.

Reference electrodes are a CP measurement device buried in the ground, which the TRUs use to automatically adjust their output to the correct level. In arid areas they are prone to drying out and sometimes do not recover. These are routinely checked and replaced but corrosion or coating damage can occur while a TRU operates at an incorrect level. A more robust and drought-resistant reference electrode solution will be implemented to improve reliability and integrity.

B.1.7 Modify CP at Pinjar Meter Station

Uniquely on the DBNGP, the buried outlet piping of Pinjar Meter Station runs within, and under, Pinjar Power Station. Accessing and maintaining this piping is difficult and coating breaches exist that are inaccessible by simple excavation. As such the Pinjar Meter Station site overlaps the power station hardware, creating a significant risk of AC corrosion.

The addition of buried corrosion probes at 10 risers will measure the site's CP effectiveness directly. Induced AC from the Power Station's overhead transmission lines can additionally be monitored and this will allow the CP to be fine-tuned to the conditions and maintain the integrity of the site piping.

The basis of installation costs are determined using the actuals from almost identical scopes of work for the installation of test points on another AGIG asset, Fortescue River Gas Pipeline (FRGP).

B.1.8 Replace Metal Oxide Varistors (MOVs) with 100V Gas Discharge Tubes (GDTs)

We have 5 MOVs at every MLV (3 in cabinet, 2 in F-box) and we are transitioning to GDTs that have a lower voltage threshold, can handle more energy and don't deteriorate with multiple firings, unlike MOVs.

The GDT units are more suited to the DBP application and to ensure efficient installation and lower overall costs they shall be installed during planned routine maintenance, therefore no dedicated mobilisation required.

420 units are required to be replaced over the 5-year period, with each site requiring a TC100A GDT from Leutron and a small adaptation required to the housing unit.

B.1.9 Replacement of failed insulation gaskets (IGs)

Annual CP surveys identify CP system deterioration and failing insulation gaskets. Insulation gaskets are critical to CP performance by providing isolation of earthed above-ground piping from cathodic protection systems.

IG's therefore provide electrical isolation between connecting sections of piping such as below-ground and above-ground piping. They deteriorate and begin passing current over time, which puts extra load on CP systems and can entirely prevent them from functioning.

This problem is most prevalent on compressor station fuel gas systems, although meter stations and other surface sites can also be affected. Replacement of gaskets requires local shutdown and bypassing for depressurisation of the piping involved. Scheduling is typically aligned with major maintenance of the relevant site.

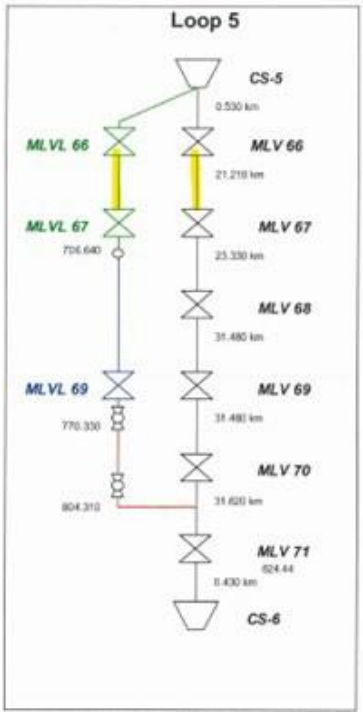
The most affected sites are compressor stations 2 to 7. Eight gaskets are due to be replaced on CS3 in 2025. A similar scope is anticipated for CS6 later in 2025, if scheduling constraints permit. Gasket failures of Compressor Stations 2, 4, 5 and 7 will be addressed as scheduling permits over the AA6 period. Gasket failures at other surface sites will be addressed reactively and according to priority.

As stated, gasket replacement requires de-pressurisation of the site in question and is therefore most efficiently addressed by a campaign where several are replaced simultaneously, with the basis of costs primarily being materials.

B.1.10 Pig barrel isolation valve replacement

The replacement of passing pig barrel isolation valves starting in 2023 and continues throughout AA6. The pig barrel isolation valve is required for positive isolation to launch and remove the pigging equipment during the inline inspection program. Failure of valves to effect safe isolation will result in pipe sections have to be vented from nearest MLV to accommodate pig launch and retrieval. This is a safety risk and the costs associated with vented gas are approximately $200,000.

As shown in the following diagram – venting the first sections downstream of CS5 for example equates to 42 TJ of gas when offline or 48 TJ when on line. This equates to approximately $250,000 of gas – as fuel burdening the DBNGP expenses costs. Venting the CS5 station pipework equates to about 2 TJ.



As the pipeline has now reached its 35 years of continuous service, and the number of ILI projects undertaken to date, the sealing capability of these valves can no longer support the safety requirements to provide positive isolation from mainline pressure when installing pigging equipment.

ILI is a license and Safety Case requirement to be conducted at the earliest 8 years and latest 10 years on all licensed pipelines. The AA4 ILI program and lessons learnt have driven this requirement to commence the controlled replacement of known passing valves prior to the ILI program forecast during AA6.

Five valves have been identified, four shall be replaced in 2026 and 2027 and the remain one in 2028. This timeframe enables the ILI to be conducted safely and cost effectively in alignment with regulatory obligations. The unit cost is based on actuals during the AA5 program of works.

B.1.11 Study – convert unpiggable sections on Mainline South to piggable

There is a small section of Mainline South that is currently unpiggable. As discussed in this paper, recent RunCom results have identified that parts of this pipe require increased focus on monitoring and assessment to ensure defect growths do not have a material impact on the pipeline integrity. Accordingly, we are conducting dig ups in the area to validate pipeline integrity, with potential for further dig ups in AA6, to gain assurance of the pipeline integrity.

In light of this, we plan to reconfigure the unpiggable parts of this pipeline to make it piggable to enable accurate identification of any defects. Given the time and resources required to conduct reconfiguration, we do not propose to undertake these reconfiguration works during the AA6 period. Instead, we propose to deliver these works during the AA7 period.

To ensure timely delivery of the program during AA7, we will need to conduct a detailed engineering study before the end of AA6. We have therefore included costs for a study in 2029 to plan and prepare for the Mainline South reconfiguration works.

The current estimate of $100,000 for a study is based on historical costs for similar works. We will, however, refine these costs in period as we commission the study.

B.1.12 Maintaining reference electrodes moisture level

This project involves the installation of 20 permanent reference electrode arrangements. Each reference electrode set up is accompanied by a water tank fitted with a drip feed system. These reference electrodes are crucial for ensuring that Transformer Rectifier Units (TRUs) can operate effectively in automatic mode, similar to how a thermostat functions. When functioning correctly, the reference electrodes provide accurate data, allowing the TRUs to adjust the current appropriately to maintain optimal conditions. However, when these electrodes dry out, they deliver false readings, causing the TRUs to supply either too much or too little current, which can lead to inefficiencies and potential issues in the system.

In locations where the reference electrodes are susceptible to drying out, the TRUs must be switched to a constant current mode because the automatic mode becomes unreliable. This is not an optimal mode of operation for the TRUs.

The addition of water tanks with drip feeds helps to maintain the necessary moisture levels, thus ensuring continuous and accurate data transmission. This solution therefore ensures consistent and reliable performance by preventing the drying out of reference electrodes.

The installation process includes the construction of concrete foundations or anchors for the tanks, providing stability and durability to the entire system. This comprehensive approach addresses the challenges of electrode drying, and enhances the overall reliability and efficiency of the TRU operations

B.2 End of life communications upgrades and other minor works

Table Appendix B.3: EOL comms projects

Project	Description
Radio equipment replacement	End of life 8 year replacement of radio equipment (trans and receive, multiplexers) at CS10, KJN, 13 MLV sites and 17 meter station sites between MLV117-MLV157
	End of life 10 year replacement of radio equipment (trans and receive, multiplexers) at 6 spur sites
Kwinana Junction as backup	Establishment of Kwinana Junction as the third backup site for Transportation Services Control Centre so that DBP has an adequate level of redundancy to allow remote monitoring of all systems associated with the DBNGP communications network. Kwinana Junction would be a facility for housing servers and data storage associated with SCADA (after Perth and Jandakot sites) and will have associated communication equipment. By continuous monitoring of all systems including continuous reporting of faults/issues, the operational and business risks associated with running a large complex communications network is minimised by the application of proactive maintenance techniques. Scope includes the replacement of equipment, including Network Management System switch, dark fibre multiplexers and power conversion equipment.

B.3 Pipeline and facility upgrades

B.3.13 Pipeline corridor erosion repair

Depth of cover of the pipeline is a key requirement under AS/NZ 2885 for pipeline protection from third party interference. Weather events as well as vehicle use by members of the public, erode DBNGP corridor over time and investment is required to reinstate the depth of cover and maintain minimum standards. Solving depth of cover issues can also be achieved by dropping the pipeline, however his is not cost viable option and been disregarded.

An allowance of $86,000 per year has been forecast, which is based on AA5 experience.

B.3.14 Hazardous area inspection and rectification

Inspection of hazardous areas is a mandatory requirement, performed in line with AS60079. The Standard states inspections of hazardous areas and equipment should be four-yearly, with repairs of non-conformances implemented based on degree of risk. This activity is monitored as part of the DBNGP's process safety dashboard.

A review of DBP's facilities in AA4 identified a need for an allowance to rectify issues as part of routine activities, thereby complying with AS/NZS 60079, which is series of standards that covers the design, selection, and installation of electrical equipment in hazardous areas to prevent fire and explosion risks.

DBP has been undertaking rectification projects before and during AA5 and has developed a good understanding of scope and costs. The hazardous area rectification program includes compressor stations, meter stations and pipeline and MLV sites. For the purpose of our inspection and rectification program, we split the DBNGP into two sections, north and south:

1. CS1 to CS5 (north)
2. CS6 to CS10 (south)

We cycle though inspection and rectification every five years, conducting inspections in one year and then conducting/completing rectification by the end of the following year (depending on how much rectification needs to occur). The rolling inspection and rectification program covers all compressor stations, meter stations and pipeline and MLV sites. Note this business case covers pipeline and MLVs only, the costs for compressors stations and meter stations are summarised in their respective business cases.

During the AA5 period, we delivered the inspection and rectification cycle as per the table below.

Table Appendix B.4: AA5 inspection program

Focus area	2021	2022	2023	2024	2025
Inspection	CS6 to 10			CS1 to 5	CS6 to 10

Rectification	CS1 to 5	CS6 to 10			CS1 to 5

For the AA6 period, the cycle of inspection and rectification continues as per the following table.

Table Appendix B.5: AA6 inspection program

Focus area	2026	2027	2028	2029	2030
Inspection			CS1 to 5	CS6 to 10	
Rectification	CS6 to 10			CS1 to CS	CS6 to 10

The costs for inspecting and rectifying pipeline and MLV sites will vary depending on the extent of damage found, location, and addition/mothballing of assets. We cannot accurately forecast rectification costs for AA6 until the next cycle of inspections have been completed. However, it is reasonable to assume that as assets age and environments change, the cost of rectifications may increase, even if the volume of issues declines (i.e. we see a smaller number of issues but the issues we find are larger and cost more to address).

To develop the AA6 forecast, we have looked at historical actuals and assumed a slight increase across the period to account for the potential for larger/more challenging issues given the asset age. We will budget $21,000 per year for meter stations, totalling $105k over the period.

Capex DBP03: Operational technology

1.1 Project approvals

Table 0.1: DBP03 Operational technology – Project approvals

Prepared by	Allan Butler, Senior SCADA Engineer
Reviewed by	Jeff Kong, Head of Transmission Asset Strategy
Approved by	Tawake Rakai, GM Transmission Asset Management

1.2 Project overview

Table 0.2: DBP03 Operational technology – Project overview

Description of problem /opportunity	This business case outlines the ongoing replacement and upgrade program for DBP's operational technology (OT) assets. Over the AA6 period we will need to continue our asset replacement program to address a number of end of technical life, obsolete hardware and software assets: • The hardware replacement program will continue, replacing assets at their end of life. This includes assets such as supervisory control and data acquisition (SCADA) storage, uninterruptible power supplies (UPS), ethernet switches, communication system servers and switches • The ongoing software program will continue, investing in OT-related software to ensure it is current, patched and supported. Maintenance activities will continue throughout the software's useful life to fix bugs, undertake patching and improve functionality. We will also commence two new asset replacement programs. The first is to replace our fleet of obsolete remote terminal units (RTUs), and the second project is for the replacement of the SCADA system associated with control room operations. 183 RTUs at mainline valves (MLVs) and meter stations have reached the end of their technical life and need replacing with contemporary units. In AA6 are aiming to replace 50% of the MLV and meter station RTUs and all 64 of the flow measurement RTUs, thereby maintaining visibility and control of these critical sites. The SCADA system in the control room is obsolete and will fall outside of support by the original equipment manufacturer (OEM). This system is critical to provide visibility and control over the operation of the pipeline. The SCADA software was last updated in 2016. We have extended the support contract once already, and will need to again to allow us to implement the new system. The OT program of work has been developed such that key areas of risk are addressed in priority, any usable spares can be utilised to extend programs and the volume of replacement is achievable.
Untreated risk	As per risk matrix = High

Options considered	• **Option 1** – Move to a replacement on failure policy (no upfront capex) • **Option 2** – Proactively replace end of life OT assets within five years, and RTUs over 10 years [redacted]) • **Option 3** – Proactively replace all end of life OT assets within 5 years [redacted]
Proposed solution	Option 2 is the proposed solution. Over the AA6 period we will proactively refresh all end of life OT assets except our RTU population. Given the size of the obsolete RTU fleet, we will look to undertake the RTU population over a 10-year horizon. We will prioritise the replacement program based on the criticality of each asset to the operation of the pipeline, ensuring all RTUs required for flow measurement and critical operational sites are replaced in the AA6 period.
Estimated cost	The forecast direct cost (excluding overheads) during the next five-year period (AA6) is $24.6 million.

$'000 2024	2026	2027	2028	2029	2030	Total
[redacted]						

Basis of costs	All costs in this business case are expressed in real unescalated dollars December 2024 unless otherwise stated.
Treated risk	As per risk matrix = Low
Variation from AA5	[redacted]
Alignment to our vision	Replacing OT equipment proactively in line with the end of its technical design life and reducing the risk of control system failure aligns with the following aspects of our vision: • *Delivering for Customers* as the end of life replacement of OT equipment across our network will ensure the continued reliability of supply and mitigate the risk of pressure related events, and ensure accurate data is captured and used for customer billing purposes • *Sustainably Cost Efficient* as the cost of replacing assets at the end of their technical design lives as part of a proactive planned program is the lowest sustainable cost of managing the risk of a significant failure of the control system as it is lower cost than a reactive replace on failure program
Consistency with the National Gas Rules (NGR)	**NGR 79(1)** – The proposed solution is consistent with good industry practice, several practicable options have been considered, and market rates have been tested to achieve the lowest sustainable cost of providing this service. **NGR 79(2)** – The proposed forecast capex is justifiable under NGR 79(2)(c)(i), (ii) and (iii), as it is necessary to maintain and improve the safety of services, maintain the integrity of services and comply with regulatory obligations. **NGR 74** – The forecast costs are based on the latest actuals and advice from the OEM. Project options consider the asset management requirements as per

	the latest AMP. Cost assessments have been conducted for each option based on the best information available at the time of developing this business case. The estimate has therefore been arrived at on a reasonable basis and represents the best estimate possible in the circumstances.
Stakeholder engagement	Shippers have told us they value current levels of reliability and would be concerned if this were to change. They also expect us to maintain a strong focus on operational issues as it is important for reliability, long term integrity of the buried assets and emergency management. This proposed program of work is designed to ensure the pipeline operates in line with good industry practice, safety standards and compliance requirements, thereby helping maintain a safe and reliable service to our customers. The proposed solution to replace these assets at the end of their technical lives will also help to maintain the reliability of gas supply at the lowest sustainable cost, minimising the impact on customers' bills.
Other relevant documents	This business case should be read in conjunction with: • Asset Management Plan • Asset Management Plan – SCADA Master Station • Risk Management Policy and Operational Risk Model (together our Risk Management Framework) • DBP23: Cybersecurity • DBP10: Jandakot redevelopment

1.3 Background

OT is critical to the operation of the DBNGP, communicating all operational and billing information from remotely located assets to the Transportation Services Control Centre (TSCC) in Perth. Our SCADA system is ring fenced, protected by a demilitarised zone (DMZ) and firewalls to minimise the probability of cyber security threats. Investment in these is included in our business case DBP23: Cybersecurity.

The OT network is interconnected by a wide area network (1,600 kilometres in length). It consists of processing equipment (servers, RTUs and operator stations) as well as network equipment (routers, switches, firewalls, terminal servers and protocol converters). Communication between the main control site and disaster recovery site at Jandakot is via a fibre ring, established to achieve security and resilience of service in the event of an emergency requiring the control room to move to Jandakot.

Figure 1.1 shows the design of the OT network for DBP.

[redacted]



Our OT assets as depicted in Figure 1.1 are used to:

- Manage safe asset monitoring and the controlled despatching of gas transmission from the producers to our customers
- Facilitate the efficient deployment of resources to meet alerts and alarms during the operations and maintenance of the transmission system by our Transmission Operations teams
- Facilitates the acquisition of hourly billing data from the field flow computers (RTU) to master station (Data Centre at AMP and Jandakot) for billing information validation and assures via CRS the validated billing information is available to all our customers in a timely manner
- Facilitates the online monitoring of the health of the gas transmission system and assessment of asset performance
- Facilitates the comparison of the actual performance of the gas transmission system against design and drives improvements in operation
- Ensures that the OT Network is secure and protected from cyber-attack and provides tools for the efficient investigations and assurance of business continuity if the OT network is breached

We manage our OT assets in accordance with the technical design life of individual assets consistent with OEM recommendations. We are required to maintain our SCADA equipment in line with:

- AS2885 which outlines the standard design, construction, operation, and maintenance of high-pressure gas pipelines
- AS60079, which for example sets the industry standards for the maintenance for electrical equipment in explosive atmospheres

We undertake regular inspections, with communications equipment tested daily, our main and back-up control room equipment inspected weekly and field equipment at least annually.

Our asset management approach is to replace equipment when it is technically obsolete. Having end of life and unsupported OT assets increases the likelihood of the SCADA system and/or supporting OT equipment failing. A failure of these assets (hardware or software) can result in the loss of visibility and/or control of one or more assets and a pressure incident affecting the safety and reliability of services to customers. In the event of a loss to a remote site, decisions and protocols developed to maintain safety and efficiency at the affected area are impeded or shut down.
Over the next five years, we propose to continue the ongoing program of works and replace critical OT assets that will reach the end of the technical life, which includes two new replacement projects that have been removed from ongoing works due to their significance in AA6. These two new projects and the established hardware and software replacement projects are discussed in the following sections.

1.3.1 Hardware

We will replace a number of OT servers and switches in the AA6 period. Additional hardware upgrades to firewalls, and the introduction of a new cloud services network (CSN) are required to support our OT program. Discussion of these upgrades is provided in business case DBP23: Cybersecurity.
Below is a table of our OT hardware program for the AA6 period.

Table 0.3: Overview of the AA6 hardware replacement program, $'000 2024

Project	Summary	Cost
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]

1.3.2 Software

We undertake major and minor upgrades on a regular basis in accordance with OEM recommendations. For each upgrade we consider whether the software remains fit-for-purpose and best value for money to provide the necessary capabilities.
In the AA6 period, a number of our software systems are due to be upgraded or replaced as shown in the table below. It should be highlighted that there are a number of other software applications that support our OT capabilities. These are covered in business case DBP23: Cybersecurity. This includes Privileged Access Management and Version Dog.

Table 0.4: Software upgrade summary, $'000 real

Project	Summary	Cost
[redacted]	[redacted]	[redacted]
Ansible – Patch automation software	Major upgrade in 2028	[redacted]
[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]
SolarWinds – Network monitoring	Planned install in 2025, major upgrade in 2030	[redacted]
Gas measurement software	Upgrade to latest version for all RTU, flow computers, field equipment, software for meters etc over AA6	[redacted]
[redacted]	[redacted]	[redacted]
[redacted]		[redacted]

[redacted]

[redacted]

1.3.2.2 Ansible

Ansible is an IT automation application that we use to undertake straight forward configuration management such as patch automation for our OT systems. The use of Ansible for these simple but time consuming tasks helps deliver timely, consistent, reliable patching for our critical OT assets to ensure they remain available and secure. [redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

1.3.2.5 SolarWinds

SolarWinds is a software application that we use to monitor and manage our pipeline assets. It provides the following operational functionality for DBP:

- Network performance monitoring: SolarWinds helps monitor the performance of the network infrastructure that supports SCADA systems, ensuring reliable communication between pipeline assets
- Real-time alerts: It provides real-time alerts for any anomalies or issues on the pipeline, allowing for quick response to potential problems that could affect operations
- Asset management: SolarWinds can track and manage the various pipeline assets, such as sensors, valves, and communication devices, ensuring they are functioning correctly and efficiently
- Security monitoring: It helps in monitoring the security of the network, detecting any unauthorised access or potential cyber threats, which is crucial for the safety and integrity of the pipeline
- Data analysis and reporting: SolarWinds collects and analyses data from the field, providing detailed reports that can help in making informed decisions about maintenance and upgrades

This software is due for major upgrade in 2030.

1.3.2.6 Gas measurement software upgrade

DBP is investing in a refreshed fleet of RTUs ovher the AA6 period. To derive maximum value from these new units, it is prudent to operate on the most recent software versions, which will improve accuracy and reliability. Modern gas measurement software offers features such as real-time data processing, enhanced calibration capabilities, and comprehensive data analytics. These features help maintain control over gas flow measurement, reducing the risk of errors and ensuring we align with good industry practice for our customers.

The latest gas measurement software will include integration of cybersecurity measures to protect critical data and infrastructure from potential threats. By investing in up-to-date software, we can ensure our operations are not only efficient and reliable, but also secure.

1.3.3 Replacement of obsolete RTUs and flow computers

As part of the overall metering accuracy systems, flow computers are essential to the overall metering accuracy. They calculate the flow rate of the gas by using the input data from the sensors and applying appropriate algorithms and compensate for temperature and pressure variations to ensure accuracy.
Flow computers reach end of life around 8-10 years due to obsolescence. As with meters, we test and refurbish flow computers where possible. However, we have identified that 60% to 70% of our flow computer population is more than 15 years old and obsolete. Given the importance of these assets, we have developed a replacement program based on historical knowledge of their performance as well as asset age and risk. Over the AA6 period we will need to replace 64 obsolete flow computers at 24 sites.
RTUs are microprocessor-controlled electronic devices used to interface with various sensors, actuators, and other devices along the DBNGP. We have a number of different RTUs in use:

- [redacted]

These RTUs are integrated into the SCADA system to provide comprehensive monitoring and control capabilities across the entire pipeline network. They are critical to collect data and transmit it to the SCADA system as well as receive remote commands from the control room to operate field devices such as valves and pumps.
Over a 10-year period, we will need to replace:

- 50 obsolete RTU SCADAPaks at MLVs
- 69 obsolete RTU SCADAPaks at meter stations

Ideally and from a risk perspective we would like to replace all these obsolete units over five years, however the program has been extended to ten years to ensure deliverability and minimise the impact on customer bills. We will need to replace all the flow computers, and will replace half the RTU population over the AA6 period, with the remaining half to be maintained through short term asset life extension strategies and potentially the use of spare parts and swapping.

1.3.4 Replacement of obsolete SCADA systems

We have used [redacted] software as the SCADA software package in DBP control room operations since 1984. Our agreement with [redacted] is a 'customer first' agreement, which includes annual maintenance and support patches with minor upgrades to the current version. The current SCADA system [redacted]) was deployed in 2011 and last upgraded in 2016. This system is at the end of its technical life in 2024. A major upgrade was therefore due in 2024, however the upgrade has been deferred and the scope of work has been extended from a major upgrade to a full replacement due to the incremental improvements that a new system will enable.
[redacted] The cost of the control room is not

included in this business case, but the set-up will leverage the proposed replacement SCADA system implemented under this business case.
Key aspects of the SCADA replacement control room upgrade are shown in the following table.

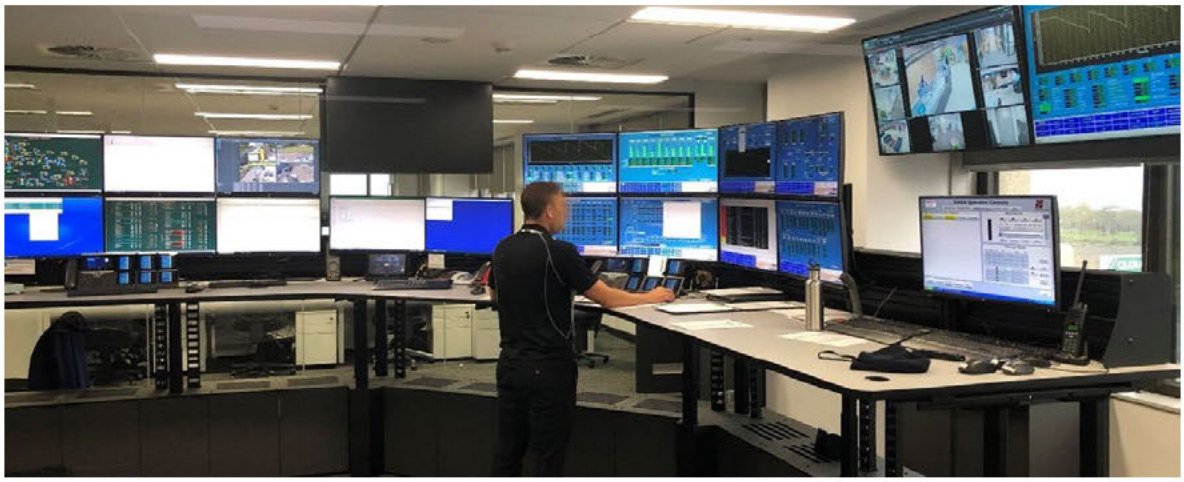
Table 0.5: Key aspects of the SCADA upgrade project

Asset	Scope
SCADA system	Implementation of [redacted], including the following activities: • Architecture design and specification development • Procurement and installation • Testing and validation • Deployment and monitoring • Training and documentation
SCADA alarm criticality upgrade	The evaluation and enhancement of the alarm system by: • Identification and categorization of alarms • Assessing the importance of, and eliminating nuisance alarms • Assessing, and where required revising the prioritisation of alarms based on potential impact on safety, operations and asset performance • Assessing, and where required revising response procedures
SCADA system	Upgrade to next version of [redacted]

DBP's control room is critical to pipeline operations and is underpinned by the SCADA systems, which enables critical functions such as:

- Receipt, transport and deliver the scheduled gas quantities in the most efficient manner practicable
- Monitor shipper behaviour and liaise with shippers and producers regarding outages, operating limitations, etc
- Supervise and control the DBNGP, including compressor stations, MLVs, meter stations, odorant systems, digital microwave communication system and gas chromatographs
- Report and, where necessary, respond to equipment faults (e.g. by starting an alternative unit or station)
- Monitor the quantity, quality, temperature and pressure of gas entering and exiting the pipeline, and take actions where necessary (e.g. isolation of out of specification gas entering the pipeline)
- Interface with planning and scheduling functions to co-ordinate the execution of maintenance and project work, including authorising equipment outages and issuing of Pipeline Integrity and Supply Authorisation (PISA)
- Maintain the pipeline operation plan, detailing the forecast of all approved work that impacts on the operation of critical equipment at compressor stations
- Monitoring of afterhours personnel vehicle travel movements and respond to panic alarms

Figure 0.2: DBP control room (TSCC)



The project was originally planned to be completed by external service providers, however a strategic review of delivery has identified an insourcing opportunity to upskill staff and deliver the project at a lower cost. This has reduced the forecast cost of this project by approximately $1.7 million.

1.4 Risk assessment

Risk management is a constant cycle of analysis, treatment, monitoring, reporting and then identifying once again, with a commitment to balance outcomes sought with delivery and cost implications considered and assessed.

Figure 0.3: Risk management principles



Our risk assessment approach focuses on understanding the potential severity of failure events associated with each asset and the likelihood that the event will occur. Based on these two key inputs, the risk assessment and derived risk rating then guides the actions and activities required to ensure safety and compliance are not compromised, while delivery of this outcome is done as efficiently and effectively as possible.

The risk rating assesses the consequence and likelihood of the risk. The risk of an event associated with failure of an asset is rated based on the combined effect of the consequence and likelihood rating to provide an overall risk rating. This risk rating guides the risk management and mitigation activities and facilitates prioritisation. DBP's Operational Risk Framework is based on AS/NZS 2885 and requires all identified risks ranked as intermediate or above to be addressed. For risks ranked as high we must *'Modify the threat, the frequency or the consequence to reduce the risk rank to intermediate or lower'.*

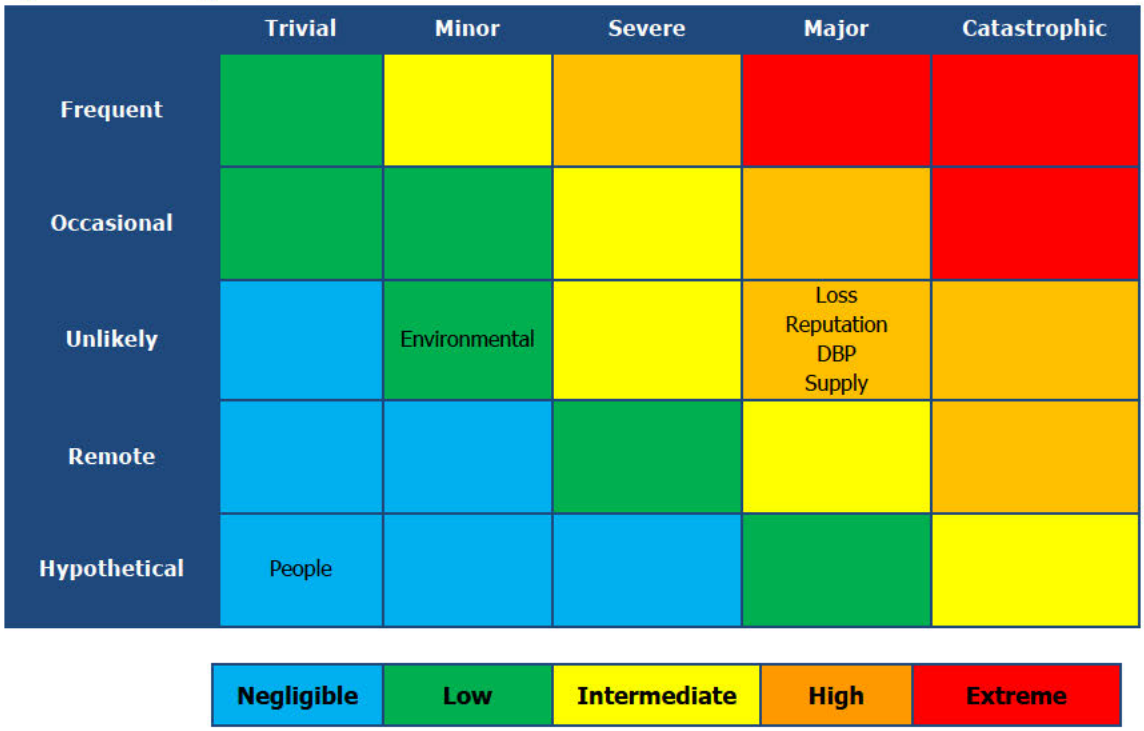
Six areas are considered for each type of risk:

1. People – injuries or illness to employees and contractors or members of the public
2. Environmental impact – impact on the surroundings in which the asset operates, including natural, built and Aboriginal cultural heritage, soil, water, vegetation, fauna, air and their interrelationships

3. Supply – disruption in the provision of services/supply, impacting customers
4. Impact on AGIG/DBP – impact on AGIG (DBP) due to restrictions and enforcement, such as regulatory enforcement or legal actions
5. Reputation – impact on stakeholders' views of AGIG (DBP), including personnel, customers, investors, security holders, regulators and the community
6. Loss – financial impact on AGIG (DBP)

The primary risk event for OT assets is the failure of communications between the control room and field assets resulting in inadequate visibility and control in an emergency event. The overall risk rating of our OT assets is presented in Figure 0.4.

Figure 0.4: Risk rating



The drivers of the risk rating for each area are discussed below.

- **DBP** – the inability to maintain visibility and/or control of our critical fields assets via the SCADA system could prevent a timely and effective response in and emergency event. The consequence of interrupted communications between the control room and pipeline assets could threaten the effective operation of the DBNGP for a substantial period
- **Reputation** – maintenance of our SCADA and communications systems is critical to ensure we have visibility of the state and operation of our assets along the pipeline. Inconsistent or unreliable performance due to underinvestment can lead to unplanned outages, which leads to irate customers. Underinvestment in integrity activities may lead to reputational damage and outrage internally as well as externally

- **Loss** – without the planned investment in maintaining our SCADA and communications systems, there is a high risk that our field assets could be damaged where our pipeline monitoring, control and maintenance is not able to respond appropriately given a lack of information being fed back from our assets in the field. Reactive costs to repair damage will likely escalate compared to our planned works program to maintain the design intent of the assets
- **Supply** – our SCADA and communications systems are integral to the effective operation of the DBNGP. Maintaining these assets in a reliable condition is necessary in ensuring DBP is able to safely and reliably deliver the forecast demand, as well be ready to meet contractual obligations of Shippers on any given day within the terms of shipper contracts. A server failure can disrupt these operations, leading to potential downtime and loss of control over the pipeline. A failed SCADA server could also create vulnerabilities that cyber attackers might exploit, leading to unauthorised access, data breaches, or even sabotage of pipeline operations

1.5 Options considered

Alternatives options for management and maintenance of SCADA for the AA6 period which have been considered are:

- Option 1 – Move to a replacement on failure policy
- Option 2 – Proactively replace end of life OT assets within five years, and RTUs over 10 years
- Option 3 – Proactively replace all end of life OT assets within 5 years

These options are discussed in the following sections.

1.5.1 Option 1 – Move to a replacement on failure policy

Under this option proactive replacements or upgrades would not be done on SCADA hardware or software. Instead, we would only replace SCADA equipment or upgrade software where the asset fails or becomes inoperable.

1.5.1.1 Advantages and disadvantages

The main advantage of this option is the potentially lower cost. If assets continue to operate satisfactorily, then there will be little requirement for capital investment. Maintaining the existing hardware and software also means there will be no disruption to continuous operations during changeover of systems, and no staff training would be required.

The primary disadvantage of this option is that there would be a growing risk of SCADA system failure and outages. As the hardware and software ages and becomes obsolete, not only does the likelihood of outages increase, but the cost and timeframe to bring the system would increase due to difficulty in getting the parts and expertise to repair them when they do malfunction.

We would also miss the opportunity to implement a contemporary SCADA solution in the new Jandakot control room, which is scheduled for development during the AA6 period.

1.5.1.2 Achievement of objectives

Table 0.6 outlines how Option 1 will support the achievement of our vision objectives in AA6.

Table 0.6: Achieving objectives

Vision objective	Alignment
Delivering for Customers – Public Safety	N
Delivering for Customers – Reliability	N
Delivering for Customers – Customer Service	N
A Good Employer – Health and Safety	-
A Good Employer – Employee Engagement	-
A Good Employer – Skills Development	-
Sustainably Cost Efficient – Working within Industry Benchmarks	N
Sustainably Cost Efficient – Delivering Profitable Growth	-
Sustainably Cost Efficient – Environmentally and Socially Responsible	-

This option does not deliver against any of the vision objectives for delivering for customers, being a good employer and being sustainably cost efficient. Replacement on failure increases the likelihood and duration of system interruptions, impacting on essential information reaching the control room.
Loss of visibility in the control room could mean compressor stations and meter stations need to be manned with commands (such as valve closures or engine starts) undertaken on site, introducing additional expenditure and the potential for unnecessary disruption.

1.5.1.3 Cost assessment

There is no upfront capex associated with this option. However, it is safe to assume that unit rates for replacement of servers would increase as it would be done in an emergency (corrective) scenario. It is also reasonable to expect that operating unsupported software could also introduce additional costs, with the potential for a security threats and system instability increasing.

1.5.1.4 Risk assessment

This option does not change the risk from the untreated risk.

Table 0.7: Risk assessment

Risk category	Untreated	Treated
People	Negligible	Negligible
Environment	Low	Low
Supply	High	High
DBP	High	High
Reputation	High	High

Loss	High	High

1.5.2 Option 2 – Proactively replace end of life OT assets within five years, and RTUs over 10 years

Under this option we will refresh our software and hardware in line with our software and hardware refresh schedule, upgrade our obsolete RTUs over a 10 year period and upgrade our SCADA system to ensure we maintain communications between our field assets and control room, providing visibility and control of asset along the pipeline.

1.5.2.1 Advantages and disadvantages

The advantage of this option is that it reflects an achievable number of asset replacements and software upgrades that balances risk and uses asset life extension strategies for are portion of obsolete RTUs. The program aligns with good industry practice and ensures service level agreements in place with providers that can be relied upon to deliver some spare parts, as well as utilising our own stock, and ensures availability of service agents when needed.

The disadvantage of this option is that we will be carrying the risk associated with obsolete RTUs for ten years rather than five.

1.5.2.2 Achievement of objectives

Table 0.8 outlines how proactive replacement will support the achievement of our vision objectives in AA6.

Table 0.8: Achieving objectives

Vision objective	Alignment
Delivering for Customers – Public Safety	Y
Delivering for Customers – Reliability	Y
Delivering for Customers – Customer Service	Y
A Good Employer – Health and Safety	-
A Good Employer – Employee Engagement	-
A Good Employer – Skills Development	-
Sustainably Cost Efficient – Working within Industry Benchmarks	Y
Sustainably Cost Efficient – Delivering Profitable Growth	-
Sustainably Cost Efficient – Environmentally and Socially Responsible	-

This option delivers against our vision objectives of delivering for customers and being sustainably cost efficient, as it replaces and upgrades SCADA hardware and software in a planned and proactive way to support the 24/7 remote control of the DBNGP. This ensures effective, safe and reliable operations is maintained. A delivery solution for SCADA replacement of control room assets has been developed to upskill internal resources and software upgrades are aligned to the new fleet of RTUs.

1.5.2.3 Cost assessment

With this option, the total cost incurred in AA6 is [redacted] as shown in the following table.

Table 0.9: Cost breakdown – Option 2, $'000 2024

	2026	2027	2028	2029	2030	Total
Hardware	[redacted]					
Software	[redacted]					
RTU and flow computer replacement	[redacted]					
SCADA system	[redacted]					
Total	[redacted]					

By adopting a proactive, planned approach to the management of these assets, DBP can best manage the efficient delivery of the program, minimising the need for unplanned and disruptive repair work on the SCADA and communications systems, which might otherwise result in the prolonged loss of communications, or visibility or control of critical pipeline assets.

A continuous improvement culture is embedded, constantly looking at doing things better and more effective, taking advantages of technological advances. The planned nature of replacements, aligned with the end of life, obsolescence, good industry practice, manufacturers and support vendors guidelines allows us to accurately forecast costs and achieve optimal unit rates for hardware replacements and software support.

1.5.2.4 Risk assessment

Table 0.10 shows that this option moderates the threat, the frequency and/or the consequence to reduce the risk rank to intermediate or lower.

Table 0.10: Risk assessment

Risk category	Untreated	Treated
People	Negligible	Negligible
Environment	Low	Negligible
Supply	High	Negligible
DBP	High	Low
Reputation	High	Low
Loss	High	Negligible

This option represents the lowest treated risk, as it is targeting the issues and associated risks.

1.5.3 Option 3 – Proactively replace all end of life OT assets within five years

This option is the same as option 2, but it considers accelerating the replacement of the obsolete meter station and MLV RTUs by five years.

1.5.3.1 Advantages and disadvantages

The advantage of this option is that it achieves the greatest risk reduction in a shorter timeframe than the other options. Having obsolete RTUs at meter station and MLVs is suboptimal. We expect that more failures and reactive maintenance will be required the longer these assets are left in operation. Replacing these assets in a shorter timeframe is therefore a valid consideration and reflects the actions a of a prudent operator.
The disadvantage of this option is the cost and delivery challenge. In order to deliver an RTU program of this scale within five years, additional skilled resources in an already limited skills sector would need to be contracted. This may cause the unit rates to increase significantly, which would be a real risk to the project feasibility. In addition to the technical resources, additional administration and coordination resources would be required to assist managing the project.

1.5.3.2 Achievement of objectives

Table 0.11 outlines how this option will support the achievement of our vision objectives in AA6.

Table 0.11: Achieving objectives

Vision objective	Alignment
Delivering for Customers – Public Safety	Y
Delivering for Customers – Reliability	Y
Delivering for Customers – Customer Service	Y
A Good Employer – Health and Safety	-
A Good Employer – Employee Engagement	-
A Good Employer – Skills Development	-
Sustainably Cost Efficient – Working within Industry Benchmarks	Y
Sustainably Cost Efficient – Delivering Profitable Growth	-
Sustainably Cost Efficient – Environmentally and Socially Responsible	-

This option aligns with all the same vision objectives as option 2 as it achieves the same benefits in a reduced timeframe. However, it does so at a significantly higher cost.

1.5.3.3 Cost assessment

Adopting this option would cost $31.5 million as shown in the following table.

Table 0.12: Cost breakdown – Option 3, $'000 2024

	2026	2027	2028	2029	2030	Total
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
RTU and flow computer replacement	2,752	2,971	3,409	3,409	3,409	**15,950**
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

1.5.3.4 Risk assessment

Table 0.13 shows that this option moderates the threat, the frequency and/or the consequence to reduce the risk rank to intermediate or lower.

Table 0.13: Risk assessment

Risk category	Untreated	Treated
People	Negligible	Negligible
Environment	Low	Negligible
Supply	High	Negligible
DBP	High	Low
Reputation	High	Low
Loss	High	Negligible

This option would be the least risk option for DBP. However, the granularity of the risk matrix does not reflect the magnitude of the risk change vs Option 2. This is because DBP has put in place strategies to manage the obsolete RTUs that extend through to AA7, therefore the change in risk is not material enough for the corporate risk register.

1.5.4 Summary of options assessment

To assess the options, the costs, objectives and risk are considered for each option. A summary of the option assessment is shown in Table 0.14.

Table 0.14: Summary of options assessment

Option	Achievement of objectives	Cost	Treated risk
Option 1 - Move to a replacement on failure policy	This option does not achieve our objectives of delivering for customers, being a good employer or sustainably cost efficient	No upfront capex	This option does not adequately address the high risks to DBP, Reputation and Asset Damage
Option 2 - Proactively replace end of life OT assets within five years, and RTUs over 10 years	This option achieves our objectives of delivering for customers and being sustainably cost efficient	[redacted]	This option appropriately addresses the high risks
Option 3 - Proactively replace all end of life OT assets within 5 years	This option achieves our objectives of delivering for customers and being sustainably cost efficient	[redacted]	This option appropriately addresses the high risks

1.6 Proposed solution

1.6.1 Why is the recommended option prudent?

Option 2 offers a prudent approach to managing the SCADA system, significantly reducing the likelihood of failures that could lead to pressure-related incidents and their associated safety and operational impacts. By maintaining clear visibility of key network assets, it allows for the timely diagnosis and rectification of performance issues before they escalate into larger problems.
Ensuring pressure control of existing SCADA assets is crucial for preventing pressure incidents, thereby safeguarding the safety and reliability of services provided to customers. This option also ensures that we can keep the risk of our critical network assets failing at an acceptable level, adhering to the principle of keeping risks 'as low as reasonably practicable' (ALARP).
Furthermore, this approach includes replacing end-of-life assets with contemporary equivalents, which often come with significantly improved functionality. This not only enhances operational efficiency but also aligns with compliance requirements of safety and reliability standards such as AS2885 and 60079, as well as following good industry practice. By maintaining compliance with these standards, we ensure we are operating within the bounds of regulatory expectations and good practice.
In addition, providing critical information about our network assets facilitates prudent and efficient long-term investment in our network. This help ensure resources are allocated wisely, contributing to sustainable and strategic growth. Overall, option 2 not only addresses immediate operational concerns but also supports the long-term viability and enhancement of the SCADA system, making it a robust choice for managing network performance and ensuring the safety and reliability of services.

1.6.2 Estimating the efficient costs

For all replacements, recent historical actuals are used as the basis for future forecasts. These have all been achieved based on commercially negotiated rates secured in line with our Procurement Policy and Purchasing Procedure.

The forecast unit rates for all initiatives managed within this program are inclusive of internal labour, external labour/contractors, materials, travel and other costs.
Procurement of the servers is conducted in line with our Procurement Policy and Purchasing Procedure which requires a written quote from multiple vendors to secure the most competitive price for the equipment. The vendors most recently engaged are those with a proven track record in delivering reliable services and support, including [redacted] The lowest price vendor is selected in all instances for the procurement of appropriate [redacted]

1.6.3 Consistency with the National Gas Rules

NGR 79(1)

Option 2 is consistent with NGR79(1)(a), which requires that capital expenditure must be such as 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. DBP considers that the capital expenditure is:

- **Prudent** – The project will proactively replace OT assets that are beyond, or will reach the end of their technical lives in AA6. An effective SCADA system and associated assets are critical to the operation and monitoring of the DBNGP and hence the proposed expenditure is of a nature that would be incurred by a prudent service provider
- **Efficient** – The forecast expenditure is based on the actual unit costs incurred by DBP in the delivery of similar work undertaken in AA5. DBP purchases OT assets through a range of vendors based on quotes received. The design and operational delivery of the SCADA replacement system is forecast for completion by the sole software provider, [redacted]. The scale of the RTU replacement project ensures efficient in scale, without requiring the recruitment of further resources where there is a current skills gap in the market. Therefore, the proposed expenditure is consistent with that a prudent service provider acting efficiently would incur
- **Consistent with accepted and good industry practice** – The proposed project follows good industry practice of aligning replacement activity with commitments embedded within the AMP and manufacturer's recommendations. DBP's commitment to continuous improvement and adopting new technologies/process where practicable is also consistent with ISO55001, the prevailing industry asset management standard. Replacing obsolete equipment is in line with good practice and timing software upgrades to maximise RTU capabilities are the actions of a prudent operator. Therefore, the proposed capital expenditure is such as would be incurred by a prudent service provider acting efficiently, in accordance with accepted good industry practice
- To achieve the **lowest sustainable cost of delivering pipeline services** – The sustainable delivery of services includes reducing risks to ALARP and maintaining reliability of supply, whilst achieving the lowest sustainable costs by undertaking the replacement program in a proactive, planned and scheduled manner with the most appropriate volume of activity based on useful life and in line with manufacturer's guidance and associated support

NGR 79(2)(c)

The proposed OT works program is necessary to maintain integrity of pipeline services. Replacing, repairing and/or managing these assets satisfies the grounds under NGR 79(2)(c), which states capex is justifiable if:

(c) the capital expenditure is necessary:

(i) to maintain and improve the safety of services; or

(ii) to maintain the integrity of services; or

(iii) to comply with a regulatory obligation or requirement.

There is a clear need to maintain the integrity of services, which would otherwise be compromised should these assets not be replaced, repaired or managed in line with the AMP and/or at the end of their useful life.

NGR 74

The forecast costs in this business case are based on the latest market rate testing, and project options consider the asset management requirements as per the AMP. Cost assessments have been conducted for each option based on the best information available at the time of developing this business case. The estimate has therefore been arrived at on a

reasonable basis and represents the best estimate possible in the circumstances.

1.7 Comparison to previous periods

1.7.1 AA6 forecast compared to AA5

In AA6, capital expenditure of $24.6 million is forecast for the OT program. Table 0.15 shows the forecast AA6 expenditure compared with actual expenditure in AA5.

Table 0.15: AA5 forecast OT capital expenditure, compared with AA5 actuals, $'000 2024

	2026	2027	2028	2029	2030	AA6	AA5 total	Variance
Capital expenditure	[redacted]							

The increased capital works program in AA6 is driven by the need to replace obsolete RTUs in the field, and bring the SCADA system up to a contemporary fit for purpose version. These two projects will allow us to mitigate a critical risk – that we do not have visibility and/or control of our critical field asset in an emergency event.

[redacted]

Appendix A Comparison of risk assessments

Summary of SCADA risk assessment

Project Ref No	Description	Primary Risk Event	Proposed Action		People	Environmental	Supply	DBP	Reputation	Loss
DBP03	OT	The primary risk event for OT assets is the failure of communications between the control room and field assets resulting in inadequate visibility and control in an emergency event.	Untreated Risk	Likelihood	Hypothetical	Unlikely	Unlikely	Unlikely	Unlikely	Unlikely
				Consequence	Trivial	Minor	Major	Major	Major	Major
				Risk Level	NEGLIGIBLE	LOW	HIGH	HIGH	HIGH	HIGH
			Option 1 – Move to a replacement on failure policy	Likelihood	Hypothetical	Unlikely	Unlikely	Unlikely	Unlikely	Unlikely
				Consequence	Trivial	Minor	Major	Major	Major	Major
				Risk Level	NEGLIGIBLE	LOW	HIGH	HIGH	HIGH	HIGH
			Option 2 – Proactively replace end of life OT assets within five years, and RTUs over 10 years	Likelihood	Hypothetical	Unlikely	Unlikely	Unlikely	Unlikely	Unlikely
				Consequence	Trivial	Trivial	Trivial	Minor	Minor	Trivial
				Risk Level	NEGLIGIBLE	NEGLIGIBLE	NEGLIGIBLE	LOW	LOW	NEGLIGIBLE
			Option 3 – Proactively replace all end of life OT assets within 5 years	Likelihood	Hypothetical	Unlikely	Unlikely	Unlikely	Unlikely	Unlikely
				Consequence	Trivial	Trivial	Trivial	Minor	Minor	Trivial
				Risk Level	NEGLIGIBLE	NEGLIGIBLE	NEGLIGIBLE	LOW	LOW	NEGLIGIBLE

Capex DBP09: Compressor package control system replacement

1.1 Project approvals

Table 1.1: DBP09 Compressor package control system replacement – Project approvals

Prepared by	Jignesh Shah, Senior Electrical, Control & Instrumentation Engineer
Reviewed by	Jeff Kong, Head of Transmission Asset Strategy
Approved by	Tawake Rakai, GM Transmission Asset Management

1.2 Project overview

Table 1.2: DBP09 Compressor package control system replacement – Project overview

Description of problem /opportunity	This business case covers the capital works necessary to replace obsolete turbine compressor package control systems (turbine control systems) over the next five years. Turbine control systems allow us to control, protect and monitor the turbine compressors situated along the pipeline. The control systems also enable us to optimise system efficiency and availability, and enhance compressor function, pipeline and process stability. Deterioration in compressor performance can impact pipeline integrity and compromise our ability to fulfil customers' contracted gas supply. The turbine control systems have a technical design life of 18 years. At the end of the technical design life, the original equipment manufacturer (OEM) no longer provides technical support or spare parts, and the equipment quickly becomes incompatible with current systems. The systems are therefore replaced on an 18-year cycle. In the AA6 period, 10 of the 20 turbine control systems will reach the end of their technical life.
Untreated risk	As per risk matrix = **Intermediate**
Options considered	• **Option 1** – Move to a replacement on failure policy (no upfront capex) • **Option 2** – Complete one per year (availability constrained) [redacted] (this is the recommended option) • **Option 3** – Replace all obsolete turbine control systems in AA6 [redacted]
Proposed solution	The recommended option will see us replacing five of the ten obsolete turbine control systems at a rate of one per year. This is relatively consistent with the delivery rates in AA5, is required to maintain availability of systems to meet customer demand, and will help smooth the control system replacement profile over future years.
Estimated cost	The forecast direct cost (excluding overheads) during the next five-year period (AA6) is [redacted]

Estimated cost	<table><tr><th>$'000 real 2024</th><th>2026</th><th>2027</th><th>2028</th><th>2029</th><th>2030</th><th>Total</th></tr><tr><td>Total</td><td>[redacted]</td><td>[redacted]</td><td>[redacted]</td><td>[redacted]</td><td>[redacted]</td><td>[redacted]</td></tr></table>
Basis of costs	All costs in this business case are expressed in real unescalated dollars December 2024 unless otherwise stated.
Treated risk	As per risk matrix = **Intermediate**
Variation from AA5	The forecast expenditure for AA6 is [redacted] lower than the [redacted] we expect to incur in AA5. The incremental decrease in AA6 is a result of a reduction in volumes to ensure there is sufficient availability of assets to maintain customer demand, and also to help smooth the profile of the program over time.
Alignment to our vision	This option would address assets at the end of their technical life in a prioritized manner to ensure we are able to address the highest risk assets first, while maintaining sufficient availability of compressor units to meet customer demand. This achieves our vision objectives of delivering for customers in terms of public safety and reliability, being a good employer in terms of health and safety, and is sustainably cost efficient in terms of working within industry benchmarks.
Consistency with the National Gas Rules (NGR)	This project complies with the following National Gas Rules (NGR): **NGR 79(1)** – the proposed asset replacement program is consistent with accepted good industry practice, several practicable options have been considered, and market/unit rates have been tested to achieve the lowest sustainable cost of providing pipeline services. **NGR 79(2)** – the replacement of obsolete turbine control systems is necessary to ensure the continued operation of compressors to maintain the safety and integrity of services along the DBNGP. Compressor station functionality is a core process in the transportation of gas required to meet contracted obligations. Therefore, the proposed expenditure is conforming capex based on the grounds of NGR 79(2)(c)(ii). **NGR 74** – the forecast costs are based on the latest market rate testing, and project options consider asset management requirements as per the latest AMP. Cost assessments have been conducted for each option based on the best information available at the time of developing this business case. The estimate has therefore been arrived at on a reasonable basis and represents the best estimate possible in the circumstances.
Stakeholder engagement	Shippers have told us they highly value current levels of reliability and would be concerned if this were to change. They also expect us to maintain a strong focus on operational issues as it is important for reliability and emergency management. The turbine control system replacement program is necessary to the continued operation of compressors to maintain the safety and integrity of services along the DBNGP.
Other relevant documents	This Business Case should be read in conjunction with: • Asset Management Plan (TEB-001-0024-07) • Asset Management Plan – Electrical Control and Instrumentation (TEB–001–0024-05) • Risk Management Policy and Operational Risk Model (together our Risk Management Framework)

1.3 Background

All physical DBNGP assets are managed in accordance with the policies and principles set out in the Asset Management Plan (AMP).

Turbine compressor package control systems (turbine control systems)[1] enable our operations staff to control, protect and monitor the 20 turbine compressors installed along the DBNGP. The control systems provide an interface for displaying the current and historical status of the plant, and allow the compressors to be operated remotely from our Control Centre. More recently, turbine control systems can also be used to optimise system efficiency and availability, and enhance compressor function and pipeline and process stability.

Turbine control systems are critical to:

- **Maintain a reliable supply of gas to be transported along the pipeline** – Without a fully functioning turbine control system, both the turbine and compressor cease to operate even if they are fully functional. A turbine control system failure could therefore compromise the supply gas along the DBNGP and to customers.
- **Maintain the safe operation of the pipeline** – For example, failure to automatically shut down the turbine and/or compressor when needed (placing the assets in a safe state in the event of abnormality or operational concerns) could risk asset damage and injury to people who may be operating on or near this equipment.
- **Maintain data capture on turbine performance and alarms** – A turbine control system failure could prevent historical logs being stored and therefore limit the analysis and diagnostics able to be performed.

The DBNGP has 20 turbine control systems, two at each of the ten compressor stations. Each turbine control system has a technical design life of around 18 years. At the end of the technical design life, the OEM no longer provides technical support or spare parts and the equipment quickly becomes incompatible with current systems. The timing of the need for these assets to be replaced, aligns with the various stages of the historical DBNGP expansion, with turbine control systems lasting around 18 years from installation.

We hold stock of a certain number of critical and frequently used spare parts, which are then run-down to extend the life of assets further. Subsequently, as we replace equipment, any useful parts are re-purposed for the repair of in-service equipment until the stock is depleted. At this point, equipment must be upgraded to the latest model following the manufacturer's recommended upgrade path.

Our turbine control system replacement program started in 2015.

This business case sets out a proposal to continue the turbine control system replacement program during AA6 in order to meet the asset management requirements set out in the AMP. This business case also considers options to replace all the remaining units, or to move to reactive replacement only.

[1] A turbine control system upgrade/replacement as recommended by the original equipment manufacturer would include the removal and replacement of the Human Machine Interface (HMI), Programmable Logic Controller (PLC), fire and gas systems, relays, push buttons, isolators and any other associated hardware. More information is provided in the Asset Management Plan – Electrical Control and Instrumentation.

1.3.1 Technology upgrades

Eighteen of the 20 turbine control systems are manufactured by [redacted]r. Recently, [redacted]has upgraded its standard control systems to include a new control optimisation package. The additional functionality will improve the efficiency of turbine compressors and will also standardise data analytics and improve our fault investigation process.

While there are many benefits of the new control optimisation package, it is not compatible with our existing control system. We will need to upgrade each of our turbine control systems to fully monetise the benefits of the optimisation package through achieving asset uniformity.

As part of this business case, we have considered the time over which we should undertake the replacement program so as to ensure the maximum useful life of these assets is achieved, while exploiting maximum benefit from the optimisation package. Option 1 considers the merits of replacing all outstanding control systems (17) within the next five years, while Option 3 considers replacing the control systems over the next ten years as they each reach the end of their technical design lives.

1.3.2 Turbine control systems replacement program

Based on the remaining technical life and risk associated with each turbine control system, the replacement schedule over AA4 to the end of AA6 is summarised in Table 1.3.

Table 1.3: Replacement cycle for turbine control systems

Facility	Unit	AA4	AA5	AA6	AA7
CS1/1	[redacted]			·	·
CS1/2	[redacted]		·	·	
CS2/2	[redacted]	·			
CS2/3	[redacted]		·		
CS3/1	[redacted]			·	
CS3/3	[redacted]		·		
CS4/2	[redacted]	·			
CS4/3	[redacted]		·		
CS5/1	[redacted]			·	
CS5/2	[redacted]			·	·
CS6/2	[redacted]				·
CS6/3	[redacted]		·		
CS7/2	[redacted]	·			
CS7/3	[redacted]		·		
CS8/1	[redacted]			·	
CS8/2	[redacted]			·	·
CS9/1	[redacted]			·	·

Facility	Unit	AA4	AA5	AA6	AA7
CS9/2	[redacted]		·	·	
CS10/3	[redacted]		·		
CS10/4	[redacted]			·	·

1.4 Risk assessment

Risk management is a constant cycle of analysis, treatment, monitoring, reporting and then identifying once again, as shown below in Figure 1.1, with a commitment to balance outcomes sought with delivery and cost implications considered and assessed.

Our risk assessment approach focuses on understanding the potential severity of failure events associated with each asset and the likelihood that the event will occur.

Figure 1.1: Risk management principles



Based on these two key inputs, the risk assessment and derived risk rating then guides the actions and activities required to ensure safety and compliance are not compromised, while delivery of this outcome is done as efficiently and effectively as possible.

The risk rating assesses the consequence and likelihood of the risk. The risk of an event associated with failure of an asset is rated based on the combined effect of the consequence and likelihood rating to provide an overall risk rating. This risk rating guides the risk management and mitigation activities and facilitates prioritisation.

Our Operational Risk Framework is based on AS/NZS 2885 and requires all identified risks ranked as intermediate or above to be addressed. For risks ranked as high we must *'Modify the threat, the frequency or the consequence to reduce the risk rank to intermediate or lower'.*

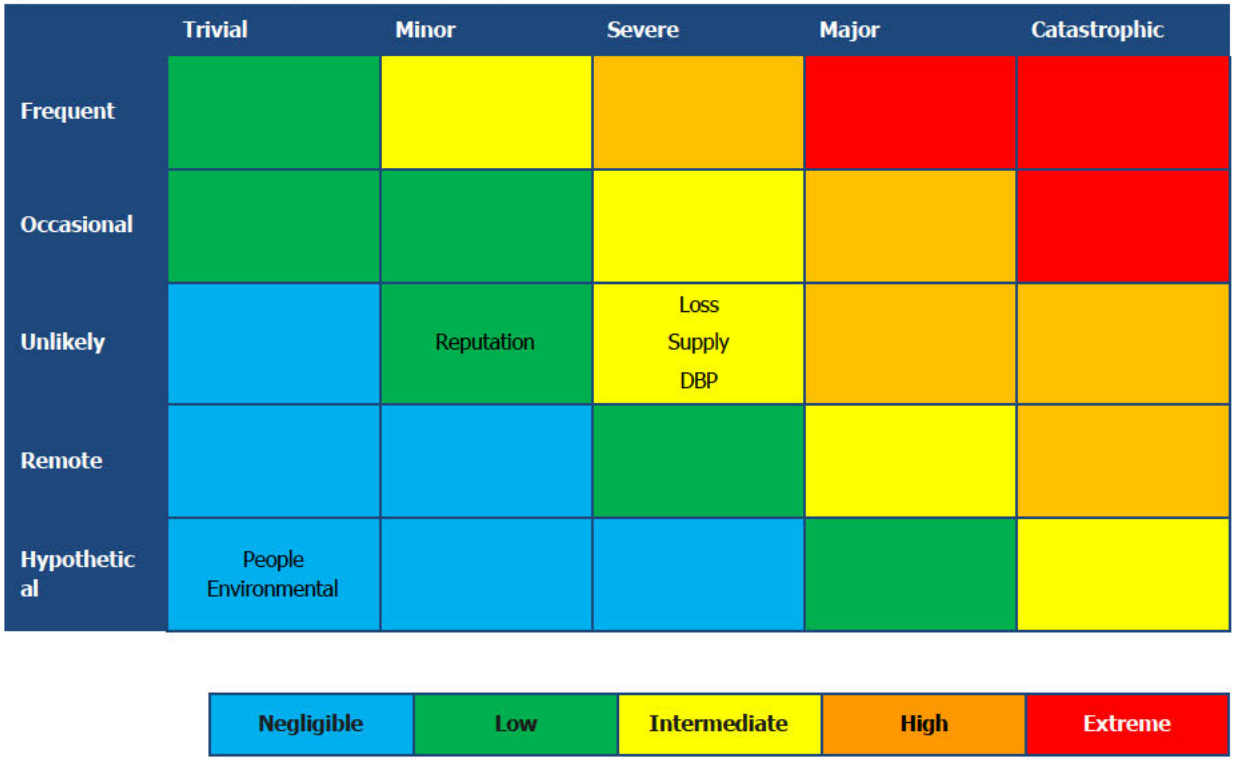
Six areas are considered for each type of risk:

1. People – injuries or illness to employees and contractors or members of the public
2. Environmental impact – impact on the surroundings in which the asset operates, including natural, built and Aboriginal cultural heritage, soil, water, vegetation, fauna, air and their interrelationships
3. Supply – disruption in the provision of services/supply, impacting customers
4. Impact on AGIG/DBP – impact on AGIG (DBP) due to restrictions and enforcement, such as regulatory enforcement or legal actions
5. Reputation – impact on stakeholders' views of AGIG (DBP), including personnel, customers, investors, security holders, regulators and the community
6. Loss – financial impact on AGIG (DBP)

1.4.1 Untreated risk

The primary risk event associated with turbine control systems is failure of an end of life and out of support control system for the associated compressor engine, causing unavailability of the compressor unit impacting reliable delivery of gas to customers. The untreated risk is presented in Figure 1.2.

Figure 1.2: Untreated risk rating – compressor package control systems



Turbine unit control systems which are not replaced at the end of their useful life and for which there is minimal or no support from the manufacturer are classed as an intermediate risk, but are key in delivering a capex program that can be considered as efficient and achieving the lowest sustainable cost of delivering services.

The key risks identified as being intermediate or higher if the proposed turbine control system works are not undertaken relate to the continuity of supply. These initiatives do not pose a threat to the effective operation of the DBNGP, but do expose shippers to localised supply issues, which can result in loss of productivity for the customer affecting our reputation, and may attract financial penalties for DBP.

1.5 Options considered

A number of options have been considered in relation to improving the accommodation facilities at compressor stations.

- Option 1 – Move to a replacement on failure policy
- Option 2 – Complete one per year (availability constrained)

- Option 3 – Replace all obsolete turbine control systems in AA6

These options are discussed below.

1.5.1 Option 1 – Move to replacement on failure policy

With this option, the volume of turbine unit control system replacements undertaken in the next AA period would be directly driven by the number of failures experienced on these assets, with a reactive rather than proactive approach to the replacement management.

While it is not possible to predict the exact number of failures that will occur over the next five years, the fact that some control systems have exceeded and many control systems are approaching their 18-year replacement cycles during the AA6 period, the likelihood of failure is expected to significantly increase. Given the higher cost of reactive replacement compared with proactive replacement (potentially two to five times higher per asset depending on asset type and location), the potential cost of works during AA6 is significantly greater than the proposed proactive turbine control system upgrade program if widespread asset failure arises.

Should asset failure be lower than expected, though the overall cost of a reactive compressor station may be less than forecast, the upgrade program identified in the AMP would not be delivered in full. The program identified in the AMP is the prudent level of activity required to manage the integrity and reliability/performance risk associated with compressor package control systems. Therefore all the risks identified would not be addressed.

Neither of these outcomes are tolerable for us and our customers. An entirely reactive 'replace on failure' approach to managing turbine control systems is not consistent with good asset management practice, and therefore not consistent with NGR 79(1)(a).

1.5.1.1 Achievement of objectives

This option would address only the assets which have actually failed, with a focus on returning them to being operational as quickly as possible, rather than proactively managing and planning for them. This option does not align with our vision objectives.

Delivering for customers in terms of public safety and reliability as unit control is not a "plug and play" replacement, rather it requires significant engineering investment in the design and build of hardware. Hardware is not "off the shelf" and is built overseas and is shipped, with installation taking a minimum of four weeks.

Our objective of being a good employer would not be met as a reactive program would require additional unplanned remote travel to be incurred and potentially that some compressor units are manned or 'manually' operated. Further, reactive replacement is not consistent with good asset management practice and is not sustainably cost efficient.

Table 1.4: Alignment to vision objectives – Option 1

Vision objective	Alignment
Delivering for Customers – Public Safety	N
Delivering for Customers – Reliability	N
Delivering for Customers – Customer Service	-
A Good Employer – Health and Safety	N
A Good Employer – Employee Engagement	-
A Good Employer – Skills Development	-
Sustainably Cost Efficient – Working within Industry Benchmarks	N
Sustainably Cost Efficient – Delivering Profitable Growth	-
Sustainably Cost Efficient – Environmentally and Socially Responsible	-

1.5.1.2 Cost assessment

With this option, the unit costs incurred would almost certainly be higher. Corrective activities are likely to incur higher costs than planned alternative due to:

- additional travel costs (planned activities allow us to share travel costs across different activities at the same location);
- additional costs for expediated freight; and
- additional costs for removing crews from other planned work to address a corrective maintenance requirement and then remobilising to complete the previous planned work.

We would also incur unplanned operating expenditure, as failures could lead to interruption to supply and associated contract delivery breaches. Interruption to supply to major industrial sites could result in a refund of around [redacted] per day and does not include any cost related to damage to customers' plant due to loss of gas supply.

Financial penalties could also be incurred due to curtailment of pipeline supply capacity while resources are mobilised to remote locations, and we await the arrival of spare parts. We could increase our supply of spare parts. However, these units are approaching end of life with no vendor support and we will be repairing a unit that is nearing end of life and failure is expected to be more frequent. Therefore, this would result in an additional cost, and would be only reducing the time of potential supply interruption, not the instance of interruption itself.

While it is not possible to estimate precisely how many asset failures will occur during the AA6 period, broad cost estimate can be developed based by escalating the cost of the proposed works program if delivered reactively. It is a generally accepted asset management principle that delivery of works reactively is significantly more expensive than undertaking proactive or preventative works. Various sources cite the increase in reactive costs compared with proactive can be between two and five times[2] more than undertaking the same works proactively.

[2] Marshall Institute, Omega engineering, ARMS reliability.

For the DBNGP, the cost escalation for reactive vs proactive works varies depending on the type (and scarcity) of asset being replaced, as well as the remoteness of the asset from the Perth Metropolitan area. For example, compressor stations located in remote areas of the Pilbara and Gascoyne regions require more travel time, while control systems have a minimum one-month installation period following overseas procurement of equipment. In our experience, material costs can increase significantly where products are bespoke and/or have to be fast-tracked, while transport and additional resources can lead to labour costs more than tripling in a reactive/emergency scenario.

Taking a conservative approach, if we assume a weighted average increase of only 1.5 times the material and labour/contractor costs if the turbine control system upgrades were to be undertaken entirely reactively, we estimate the program would cost approximately [redacted] to deliver, albeit that this cost would not necessarily be incurred in the AA6 period.

1.5.1.3 Risk assessment

As shown in the table below, this option does not change the untreated risk.

Table 1.5: Risk assessment Option 1

Risk category	Untreated	Treated
People	Negligible	Negligible
Environmental	Negligible	Negligible
Supply	Intermediate	Intermediate
DBP	Intermediate	Intermediate
Reputation	Low	Low
Loss	Intermediate	Intermediate

1.5.2 Option 2 – Complete one per year (availability constrained)

With this option, the volume of turbine unit control system replacements undertaken in AA6 would be based on the criteria identified in the AMP, incorporating optimisation targeting more critical units, consistent with good asset management practice and in consideration of ensuring we are able to maintain pipeline operations with units out of service.

The replacement is in line with the recommendations of the manufacturer of the control systems, who advised customers to plan for system replacement following the recommended upgrade path as the assets will no longer be supported and spare parts can no longer be sourced.

The equipment is not off the shelf, is shipped from overseas, and is not plug and play, taking a minimum of four weeks to complete a replacement. Therefore a planned proactive replacement is necessary to ensure availability of compressor units to meet customer demand as these units cannot be operated without the unit control system.

1.5.2.1 Achievement of objectives

This option would address as many of the end of life assets as possible while ensuring the availability of compressor units to meet customer demand.

This achieves our vision objectives of delivering for customers in terms of public safety and reliability, being a good employer in terms of health and safety, and is sustainably cost efficient in terms of working within industry benchmarks.

Table 1.6: Alignment to vision objectives – Option 2

Vision objective	Alignment
Delivering for Customers – Public Safety	Y
Delivering for Customers – Reliability	Y
Delivering for Customers – Customer Service	Y
A Good Employer – Health and Safety	Y
A Good Employer – Employee Engagement	-
A Good Employer – Skills Development	-
Sustainably Cost Efficient – Working within Industry Benchmarks	Y
Sustainably Cost Efficient – Delivering Profitable Growth	-
Sustainably Cost Efficient – Environmentally and Socially Responsible	-

1.5.2.2 Cost assessment

The estimated cost of this option is [redacted], with an estimated unit rate for planned replacements of [redacted].

By adopting a proactive, planned approach to replacement for these assets, we can best manage the efficient delivery of the program, minimising the need for unplanned and disruptive repair work on the network, which might otherwise result in a failure on the turbine or a capacity loss.

Planned replacement programs can be managed with improved commercial outcomes, with the ability to negotiate favourable terms for the acquisition and delivery of parts from suppliers.

1.5.2.3 Risk assessment

Option 2 represents the lowest residual risk, as it is targeting the individual assets in line with the manufacturers' recommendation and the AMP.

Table 1.14: Risk assessment – Option 2

Risk category	Untreated	Treated
People	Negligible	Negligible
Environmental	Negligible	Negligible
Supply	Intermediate	Low
DBP	Intermediate	Low

Reputation	Low	Negligible
Loss	Intermediate	Low

1.5.3 Option 3 – Replace all obsolete turbine control systems in AA6

With this option we would replace all 10 control systems that are at the end of their technical life in AA6. This would be a condition-based prioritised program of work, but would include four additional units that would otherwise need to be completed in AA7.

While the overall cost of the program of works would be the same, the program would be completed over five years rather than eight (availability constrained).

1.5.3.1 Achievement of objectives

This option would address as many of the end of life assets as possible, but at the cost of an increase chance of a loss of supply event.

This achieves our vision objectives of delivering for customers in terms of public safety, being a good employer in terms of health and safety, and is sustainably cost efficient in terms of working within industry benchmarks. However, it is at the expense of reliability.

Table 1.7: Alignment to vision objectives – Option 3

Vision objective	Alignment
Delivering for Customers – Public Safety	Y
Delivering for Customers – Reliability	N
Delivering for Customers – Customer Service	Y
A Good Employer – Health and Safety	Y
A Good Employer – Employee Engagement	-
A Good Employer – Skills Development	-
Sustainably Cost Efficient – Working within Industry Benchmarks	Y
Sustainably Cost Efficient – Delivering Profitable Growth	N
Sustainably Cost Efficient – Environmentally and Socially Responsible	-

1.5.3.2 Cost assessment

The estimated cost of this option is [redacted], with an estimated unit rate for planned replacements of [redacted].

By adopting a proactive, planned approach to replacement for these assets, we can best manage the efficient delivery of the program, minimising the need for unplanned and disruptive repair work on the network, which might otherwise result in a failure on the turbine or a capacity loss.

Planned replacement programs can be managed with improved commercial outcomes, with the ability to negotiate favourable terms for the acquisition and delivery of parts from suppliers.

1.5.3.3 Risk assessment

Option 3 does not represent the lowest residual risk, as the DBP and supply risks are higher than option 2 due to the increased likelihood that multiple units may be out of service at one time to achieve the replacement rate.

Table 1.14: Risk assessment – Option 3

Risk category	Untreated	Treated
People	Negligible	Negligible
Environmental	Negligible	Negligible
Supply	Intermediate	Intermediate
DBP	Intermediate	Low
Reputation	Low	Negligible
Loss	Intermediate	Low

1.6 Summary of cost/benefit assessment

To assess the options, the costs, objectives and risk are considered for each option. A summary of the option assessment is shown in Table 1.8.

Table 1.8: Summary of cost/benefit analysis

Option	Achievement of objectives	Cost	Treated risk
Option 1: Replace on failure	This would not achieve any of our objectives	No upfront capex	The risk would not be reduced from the untreated risk of intermediate
Option 2: Complete one unit per year	This is the only option which supports the achievement of objectives and meets industry standards	[redacted]	This option addresses our key safety and operational risks with minimal impact on supply to customers. It is therefore the lowest risk option and ALARP.
Option 3: replace all obsolete units	This option is inconsistent with delivering for customers and being sustainably cost efficient	[redacted]	The option introduces a loss of supply risk for our customers when compared to option 2. It is therefore not ALARP.

1.1 Proposed solution

1.6.1 Why is the recommended option prudent?

Option 3, planned proactive replacement of turbine package control systems, is the recommended solution due to its alignment with our Risk Management Framework, asset management principles and the manufacturer's specification.

The useful technical life of 18 years is used as the guide for replacement, and then replacement is planned around criticality of units and other operational requirements to ensure deliverability of the replacements with minimal impact to customer supply. While we aim to replace these

units at the end of 18-year estimated life, deliverability and operational considerations override this. Accordingly, replacement schedule is staged taking into consideration availability of redundancy and criticality of each compressor station in delivering the forecast gas supply demand.

Any increase in volume of replacement activity for these assets might result in the generation of unnecessary additional expense, and major interruption to the availability of compressor units to meet customer demand.

Any deferral puts the units at risk of becoming non-operational and given the lead time required to design, build, ship and install unit controls, it is not possible to complete this work reactively without major impacts to supply.

Failure to proactively plan replacements for the turbine unit control systems might result in catastrophic failure of an asset which would result in capacity compromise and potential for curtailment to the customer and associated financial penalty for failure to deliver as per contractual commitments.

1.6.2 Estimating the efficient costs

As noted in the Final Plan Attachment 8.7 - Cost Estimation Methodology, the unit rate for the replacement program includes the internal labour, external labour and materials/other costs forecast.

The unit rate used to determine the cost of the program in AA6 is based on historical experience and actual costs have been further tested against a recent formal quote from [redacted] for a unit replacement cost, their contractual yearly increase and the cost for local resources.

Specialist engineering disciplines, procurement and construction management (EPCM) activities are provided utilising both internal and external resources.

Key assumptions which have been made in the cost estimation for compressor package control system replacements include:

- all units in AA6 will reflect most recent unit rates estimates;
- market estimated rates for project management and delivery;
- no allowance for impact of foreign exchange fluctuation; and
- we do not currently undertake any foreign currency hedging activities or otherwise seek to manage potential currency fluctuation impacts. This is assumed to be unchanged in AA6, so the unit rate in AUD for the purchase of equipment may change.

1.6.3 Consistency with the National Gas Rules

NGR 79(2)

Turbine unit control systems provide critical safety and control functions for effective compressor station operation. Their replacement and upgrade, in line with manufacturer

specifications and obsolete equipment, maintains the safety and integrity of our transportation services and is therefore consistent with NGR 79(2)(c)(i) and (ii).

NGR 79(1)

The option is also consistent with the requirements of NGR 79(1), specifically we consider that the capital expenditure is:

- **Prudent** – The project is based on the replacement of an existing asset which has arrived at the end of its useful life, specifically the control system is obsolete, no longer supported by the manufacturer and spare parts are not readily available. The history of failures of control systems demonstrates the deterioration of these assets as they approach twenty years in service. The proposed expenditure can therefore be seen to be of a nature that would be incurred by a prudent service provider.
- **Efficient** – The forecast expenditure is based on the actual unit replacement cost incurred in the replacement of similar unit control systems in AA5. The OEM-provided equipment will be purchased in bulk where possible under existing contracts to ensure optimised unit pricing and minimised foreign exchange exposure and/or the need for multiple engineering design engagements also. The proposed expenditure can therefore be considered consistent with the expenditure that a prudent service provider acting efficiently would incur.
- **Consistent with accepted and good industry practice** – The proposed project follows good industry practice of aligning replacement activity with commitments embedded within the AMP and manufacturer's recommendations therefore the proposed capital expenditure is such as would be incurred by a prudent service provider acting efficiently, in accordance with accepted good industry practice.
- To achieve the **lowest sustainable cost of delivering pipeline services** – The sustainable delivery of services includes reducing risks to as low as reasonably practicable and maintaining reliability of supply, whilst achieving the lowest sustainable costs by undertaking the replacement program in a proactive, planned and scheduled manner with the most appropriate volume of activity based on useful life and in line with manufacturer's guidance and associated support.

NGR 74

NGR74(2) requires that a forecast of estimate:

a) must be arrived at on a reasonable basis; and
b) must represent the best forecast or estimate possible in the circumstances.

The forecast costs in this business case are based on the latest market rate testing, and project options consider the asset management requirements as per the latest AMP. Cost assessments have been conducted for each option based on the best information available at the time of developing this business case. The estimate has therefore been arrived at on a reasonable basis and represents the best estimate possible in the circumstances.

1.2 Comparison to previous periods

1.6.4 AA6 forecast compared to AA5

In AA6, capital expenditure of [redacted] is forecast for the compressor package control system program. Table 1.9 shows the forecast AA6 expenditure compared with actual expenditure in AA5.

Table 1.9: AA6 forecast capital expenditure, compared with AA5 actual ($'000)

Forecast spend ($'000)	2026	2027	2028	2029	2030	AA6	AA5 total	Variance
Capital expenditure	[redacted]							

The variance is due to the lower volume of replacements proposed to be undertaken in AA6. In AA5 we will have replaced six units, with a seventh to be largely complete, with commissioning expected in early 2026.

1.6.5 AA5 variance

Actual expenditure during the AA5 period was [redacted] lower than the amount determined in the AA5 Final Decision.

Table 1.10: AA5 actual expenditure compared with ERA approved allowance

Actual v budget ($'000)	2021	2022	2023	2024	2025	AA5
AA5 actual	[redacted]					
AA5 approved	-	5,608	5,612	5,616	2,810	**19,646**
Variance	**-**	**-596**	**-970**	**917**	**-710**	**-1,350**

Actual costs for AA5 were relatively consistent with the capex program approved in the ERA's Final Decision. The primary difference in actuals is that the unit planned for 2025 (CS9/2) will not be complete. Some work will still be required to be undertaken in 2026. The expenditure for this has been included in the AA6 forecast.

Appendix A Comparison of risk assessments

Summary of risk assessment

Project Ref No	Description	Primary Risk Event	Proposed Action		People	Environmental	Supply	DBP	Reputation	Loss
DBP09	Compressor package control systems	Failure of an end of life and out of support control system for the associated compressor engine, causing unavailabilty of the compressor unit impacting reliable delivery of gas to customers.	Untreated Risk	Likelihood	Hypothetical	Hypothetical	Unlikely	Unlikely	Unlikely	Unlikely
				Consequence	Trivial	Trivial	Severe	Severe	Minor	Severe
				Risk Level	NEGLIGIBLE	NEGLIGIBLE	INTERMEDIATE	INTERMEDIATE	LOW	INTERMEDIATE
			Option 1 – Move to a replacement on failure policy (no upfront capex)	Likelihood	Hypothetical	Hypothetical	Unlikely	Unlikely	Unlikely	Unlikely
				Consequence	Trivial	Trivial	Severe	Severe	Minor	Severe
				Risk Level	NEGLIGIBLE	NEGLIGIBLE	INTERMEDIATE	INTERMEDIATE	LOW	INTERMEDIATE
			Option 2 – Complete one per year (availability constrained)[redacted]	Likelihood	Hypothetical	Hypothetical	Remote	Remote	Remote	Remote
				Consequence	Trivial	Trivial	Severe	Severe	Minor	Severe
				Risk Level	NEGLIGIBLE	NEGLIGIBLE	LOW	LOW	NEGLIGIBLE	LOW
			Option 3 – Replace all obsolete turbine control systems in AA6	Likelihood	Hypothetical	Hypothetical	Occasional	Remote	Remote	Remote
				Consequence	Trivial	Trivial	Severe	Severe	Minor	Severe
				Risk Level	NEGLIGIBLE	NEGLIGIBLE	INTERMEDIATE	LOW	NEGLIGIBLE	LOW

Capex DBP10: Jandakot site redevelopment

1.1 Project approvals

Table 1.1: DBP10 Jandakot site redevelopment – Project approvals

Prepared by	Travis Hatfield, National Property Manager
Reviewed by	James Smith, Head of Transmission Operations
Approved by	Tawake Rakai, Head of Transmission Asset Management

1.2 Project overview

Table 1.2: DBP10 Jandakot site redevelopment – Project overview

Description of problem /opportunity	The Jandakot redevelopment project was included as part of the AA5 determination and was due for construction during 2024 and 2025. However, the global pandemic and subsequent changes in work practices resulted in a two-year deferral of the project. The redevelopment project is now entering the detailed design and planning phases throughout 2024/25, with the construction works to be conducted throughout the AA6 period. The redevelopment need has not changed during the current period and the requirement to replace the existing 35-year-old facilities remains. We have used the planning phase to revisit the scope in light of the new working environment post COVID, as well as industry good practice for office, training, workshop and operational site working. Construction of a purpose-built facility in Jandakot will also provide a [redacted] Over the past five years, commercial building costs in Western Australia have increased significantly. Factors such as global supply chain disruptions, increased demand for materials, and rising labour costs have all contributed to this rise. The average annual increase in commercial construction costs has been around 5.2%, which has resulted in a revised capex forecast for the project. Given the change in the construction market, we have looked into the possibility of developing a new operational centre in a different location, or finding a fit for purpose facility already constructed. However, redevelopment of the existing site remains the only practicable solution from a financial and operational perspective.
Untreated risk	As per risk matrix = High
Options considered	• **Option 1** – Reactive approach to addressing ongoing issues (no upfront capex but ongoing annual opex of $350k, which is likely to rise as facilities age) • **Option 2** – Build new facilities at a different location (~$66.2 million) • **Option 3** – Redevelop facilities on existing site over 3 years (this is the recommended option) ($35.6 million)
Proposed solution	The proposed solution is Option 3, which is to develop the site as soon as practicable. We expect the construction works will take up to three years to complete. The project will be split into phases so that work can be delivered at a sustainable rate, without disruption to ongoing operations.

Estimated cost	The forecast direct cost (excluding overheads) during the next five-year period (AA6) is $34.3 million (2024). Jandakot redevelopment: 1,100 / 16,525 / 16,700 / - / - / 34,325
Basis of costs	All costs in this business case are expressed in real unescalated dollars December 2024 unless otherwise stated.
Treated risk	As per risk matrix = Intermediate (ALARP)
Variation from AA5	The forecast expenditure for AA6 is $31.1 million more than the forecast expenditure in AA6 of $3.2 million. The increase in AA6 is a result of the change in project timing, which means the construction work originally anticipated for AA5 will instead incur during the AA6 period.
Alignment to our vision	Delivering the Jandakot project aligns to AGIG's vision in relation to: • *A Good Employer* – the Jandakot redevelopment will deliver a fit for purpose work environment which is at industry standard. This provides employees with reasonable conditions in which to work, adequate training facilities for the Technical and Operational Support, Planning, Supply and Administration teams including the planners, schedulers, reception, warehousing and stores services • *Sustainably cost efficient* – the proposed investment will allow us to reduce the ongoing costs of repairing and maintaining the existing sites, which have been increasing as the site ages. The proposed capital cost is consistent with industry standards for comparable utility businesses
Consistency with the National Gas Rules (NGR)	**NGR 79(1)** – the proposed Jandakot development program is consistent with accepted good industry practice, several practicable options have been considered, and the proposed investment is comparable with similar projects undertaken by other utility businesses in the Jandakot area. **NGR 79(2)** – the proposed development is designed to address identified safety risks to personnel on the current Jandakot site. The project will improve ingress and egress conditions on site, enabling the overall supply chain of services (which includes transportation and storage of materials and provision of office facilities for field crew) to be safer and more reliable. The investment is therefore consistent with NGR 79(2)(c)(i) **NGR 74** – the current estimate has been developed via costs provided by a third party company that specialises in office/warehousing redevelopments, based on a high level scope provided by AGIG. Costs will be refined further as more detailed planning is conducted and a market tender process is held in 2025. We therefore consider that the cost estimate provided is the best possible in the circumstances at the time of developing this business case, and that costs have been arrived at on a reasonable basis.
Stakeholder engagement	Our shippers have advised us that they highly value current levels of reliability and would be concerned if this were to change. They also expect us to maintain a strong focus on operational issues as it is important for reliability and emergency management. Our Jandakot redevelopment project will improve warehousing, office space, parking, site access and amenities to ensure it can continue to meet the needs of the business. The City of Cockburn has been engaged to obtain preliminary advice in relation to planning approval. Verbal advice was provided indicating this expansion would be acceptable.

Other relevant documents	This business case should be read in conjunction with: • DBNGP Safety Case (TEB-003-0004-01) • Risk Management Policy and Operational Risk Model (together our Risk Management Framework)

1.3 Background

The Jandakot depot accommodates the Transmission Operations Team which consists of:

- Technical and Operational Support, Planning, Supply and Administration teams including the planners, schedulers, reception, warehousing and stores services
- Office facilities for Transmission Operations support functions, training and hand over of roster work teams
- A demountable training facility
- A workshop facility
- Transmission Operations base for local services and Transmission Operations teams
- A central warehouse facility containing strategic and operational spares of the DBNGP
- Storage of strategic pipes, fittings and equipment
- Light vehicle, mobile plant and heavy vehicle parking areas

The facility also serves as an [redacted] and emergency operations centre when required.

The existing facilities were constructed in the 1980s by the State Energy Commission of Western Australia (SECWA) and have been used by DBP since. The original site plan was for a small depot that housed local support teams consisting of engineers, supervisor and trades persons. An estimated 30 staff were allocated in the original designs.

As the DBNGP has been expanded over the decades, additional staff were located to Jandakot, requiring extra office space. This additional office space has been provided using demountable buildings (dongas). When the DBNGP was privatised in 1998 and acquired by Epic Energy, two major operational changes were undertaken; the closure of two northern depots (based in Geraldton and Karratha); and introduction of a roster work pattern. Each of these changes led to consolidation of operational activities at Jandakot, requiring further office space and depot facilities, which have again been accommodated by using dongas and transportable storage facilities.

Figure 1.1 shows the Jandakot facility, which is located in proximity to good road transport access for major customers in the Kwinana industrial area.

Figure 1.1: Jandakot depot aerial view



The Jandakot site redevelopment is an ongoing project, originally planned for construction during 2024 and 2025. However, delays and disruption in the building industry resulting from the COVID-19 pandemic, and subsequent labour/materials shortages, means the timeframe for delivery has shifted. Therefore, the planning and design phases are occurring in 2024/25, with construction to occur during 2026 to 2028.

1.3.1 What are the drivers for the proposal?

Since its construction in the 1980s, the operational focus of the Jandakot site has evolved from a small depot servicing the southern area of the DBNGP, to today's major operational facility that features office space, warehousing, vehicle management and maintenance, training facilities, [redacted].

The expansion in functions means the accommodation and warehouse facilities are now beyond their capacity. This has resulted in growing workplace health and safety issues, security risks and limited storage capacity. Even a review of work patterns following the pandemic has not helped to address these challenges. Put simply, the facilities are cramped and no longer suitable.

Jandakot has a training facility used by operational staff every 11 days for meetings and regular training events. This facility is substandard and offers limited capacity and resources for training. [redacted], and there is a significant amount of asbestos on site.

Investment in the Jandakot facility over the past few decades has been limited and reactive. Minimal capex has been incurred to refurbish or expand the Jandakot site (the last significant investment was ~$250,000 for construction of a demountable building in 2017). Short term fixes have been preferred over long term solutions, with the focus being on investing in the pipeline rather than the facilities for those people who have to maintain it.

One of AGIG's objectives is to be A Good Employer. When AGIG acquired the DBNGP in 2017, its focus was on investing in one of Western Australia's most important infrastructure assets as well as investing in the people responsible for keeping it operational. That focus remains today, which is why we are committed to proceeding with the long-overdue redevelopment of the Jandakot facility.

The aim is to completely redevelop the Jandakot site, creating a workplace that can accommodate day to day operations, is in keeping with workplace standards, and provides our staff a safe and attractive place of work.

Key issues that need to be addressed are:

- **Asbestos management** – the site contains a significant amount of asbestos, which needs to be removed before it deteriorates and becomes a major health hazard
- **Onsite traffic movement and vehicle management** – current traffic ingress and egress exposes pedestrians to high levels of risk
- **Office space limitations** – the current office space is insufficient to accommodate the 65 permanent and 55 transient staff who use the site
- **Warehousing** – permanent warehouse capacity is insufficient and the temporary storage domes require frequent repair
- [redacted]

A description of these issues is provided in Appendix A.

1.3.2 Key success factors identified during planning and design phases

At time of preparing this business case, the Jandakot redevelopment is in finished concept planning / design stage. Detailed design and finalised itemised costings will be refined during 2025. Costs will be informed by a market tender process, with the aim of making a final investment decision by middle to late 2025 and commencing development in early 2026. The early concept is provided in Appendix B, for reference.

The design must address all the areas of non-compliance and underperformance identified in Appendix A. However, to ensure we are not over scaling the development, we are applying a

maximum of 13 sqm per person[1] for the primary office space, which is based on Government Office Accommodation standards and common industry practice. An overview of the design principles is provided in the following sections.

1.3.2.1 Safety and security

Ensuring safety and security is paramount in the design of our facilities. A clear separation will be maintained between the operational zone and the front-of-house office zone to minimise interference and enhance security. Heavy vehicle routes will be distinctly separated from pedestrian paths to avoid accidents and streamline traffic flow. The strategic positioning of the warehouse and office will provide better surveillance of the northern boundary, enhancing the overall security of the premises. Additionally, an open and well-lit route with good visibility will be established for after-hours access, ensuring a safe and secure environment for staff at all times.

1.3.2.2 Operational excellence

Operational excellence will be achieved by relocating the car park to the south to replace current structures, including the office. This strategic move ensures that front-of-house facilities can continue their operations without disruption. Additionally, this plan creates an uninterrupted zone for the warehouse, storage, and laydown areas, dedicated solely to operational activities, streamlining processes and improving overall efficiency.

1.3.2.3 Staff experience

The arrival experience for staff will be enhanced by the journey through the banksia woodland, promoting sustainable modes of transport and connecting them with nature from the moment they arrive. Additionally, a variety of outdoor spaces will be created to link operational staff with office staff, fostering a connected and inclusive environment that encourages interaction, collaboration, and a sense of community.

1.3.2.4 Environmental responsibility

Environmental responsibility is at the forefront of our design strategy. By orienting the office building optimally, we aim to minimise heating and cooling costs and reduce energy expenditure. This is achieved by maximising natural light and capturing the cooling effects of the summer south and south westerly winds. Additionally, the building is nestled into a woodland clearing, creating a cooler microclimate and reaping the benefits of green space, which further enhances the building's environmental performance.

[1] 13 sqm includes all meeting rooms, breakout space, circulation and storage space.

1.3.2.5 Sustainability opportunities

As well as environmentally responsible we have identified multiple sustainability opportunities through the design phase, which will be incorporated into the final solution.

- Passive design:
  - Optimal orientation for passive solar design
  - Thermal lag through positioning of solid rammed earth walls
- Energy and water:
  - Optimise renewable energy through PVs on roof surfaces
  - Utilising natural elements (wind, sun, views)
  - Increase permeable surfaces for more sustainable water management.
  - Water reuse (harvesting, low - no water plants, greywater reuse)
- Outdoor spaces and biodiversity:
  - Minimise removal of existing vegetation and enhance existing woodland
  - Achieve net positive biodiversity with new landscaped areas
  - Native species, low to no water planting
  - Microclimates for cool, outdoor areas. Natural vegetation for shading
- Wellbeing:
  - Woodland arrival & green space connections, quiet areas, reflection spaces
  - Natural materials for healthy building, better air quality.
  - Natural ventilation and lighting for better physiological outcomes
- Waste:
  - Reuse / salvage existing elements - warehouse, demountable structures
  - Reuse removed asphalt as crushed hardcore in landscaping
  - Reuse any removed vegetation as landscape elements or mulch
  - material selection - natural, healthy, low carbon, local first
- Transport:
  - reduced vehicle movements and assoc. emissions
  - sustainable modes of transport (shuttle, elec. scooters, great quality EoT)
  - provide electric vehicle charging stations
- Climate resilience:
  - Critical infrastructure raised to protect against future climate shifts
  - Facade design to higher U-values for better thermal performance
- Materials:
  - Robust materials and design for longevity and minimal maintenance

- Potential for timber frame to office, gym pavilion, training / cafe.
- Local first, low carbon materials (rammed earth, terracotta cladding)

1.4 Risk assessment

Risk management is a constant cycle of analysis, treatment, monitoring, reporting and then identifying once again, with a commitment to balance outcomes sought with delivery and cost implications considered and assessed.

Figure 1.2: Risk management principles



Our risk assessment approach focuses on understanding the potential severity of failure events associated with each asset and the likelihood that the event will occur.

Based on these two key inputs, the risk assessment and derived risk rating then guides the actions and activities required to ensure safety and compliance are not compromised, while delivery of this outcome is done as efficiently and effectively as possible.

The risk rating assesses the consequence and likelihood of the risk. The risk of an event associated with failure of an asset is rated based on the combined effect of the consequence and likelihood rating to provide an overall risk rating. This risk rating guides the risk management and mitigation activities and facilitates prioritisation.

Our Operational Risk Framework is based on AS/NZS 2885 and requires all identified risks ranked as intermediate or above to be addressed. For risks ranked as high we must *'Modify the threat, the frequency or the consequence to reduce the risk rank to intermediate or lower'.*

Six areas are considered for each type of risk:

1. People – injuries or illness to employees and contractors or members of the public
2. Environmental impact – impact on the surroundings in which the asset operates, including natural, built and Aboriginal cultural heritage, soil, water, vegetation, fauna, air and their interrelationships
3. Supply – disruption in the provision of services/supply, impacting customers
4. Impact on AGIG/DBP – impact on AGIG (DBP) due to restrictions and enforcement, such as regulatory enforcement or legal actions
5. Reputation – impact on stakeholders' views of AGIG (DBP), including personnel, customers, investors, security holders, regulators and the community
6. Loss – financial impact on AGIG (DBP)

There are several plausible risk events for the Jandakot site due to the cumulation of issues over many years. The highest and most frequently encountered risks are associated with vehicle movement and poor storage of materials. The primary risk event assessed for the purpose of this business case is that the outdated facility with poor traffic separation, results in increasing

hazards for personnel, resulting in an increase in slips, trips and falls, and potential vehicle accidents.

The current (untreated) risk rating is presented in Figure 1.4. Two elements of risk are rated as intermediate, two low risk and two negligible. Though no risks are rated high, we are required by our risk management framework to moderate the threat, the frequency or the consequence to reduce risks to intermediate or lower. If a risk cannot feasibly be reduced below intermediate, then we must take action to reduce it as low as reasonably practicable (ALARP). We consider that the current risk rating is not ALARP.

Figure 1.3: Risk rating – Untreated risk

	Trivial	Minor	Severe	Major	Catastrophic
Frequent					
Occasional			People DBP		
Unlikely	Loss Supply	Reputation Environmental			
Remote					
Hypothetical					

Negligible	Low	Intermediate	High	Extreme

The drivers behind intermediate risk ratings are discussed below:

- **DBP** – Risks to security, safety and degradation associated with materials stored on site. The current warehouse does not provide sufficient cover or effective protection from either inclement weather or theft. Failure to appropriately store materials and equipment has resulted in approximately $0.5 million of materials being written off in the last 12 months, which is neither a prudent nor efficient cost for a service provider to incur. There are also compliance risks associated with the presence of asbestos, WorkSafe guidelines, and City of Cockburn environmental standards
- **People** – There are risks to employees, contractors and visitors due to the current traffic flow. There is potential for a vehicle incident resulting in an increased frequency or severity of a safety incident, noting that safety incidents currently account for 14% of reported safety incidents at Jandakot. The current office environment also exposes employees to excessive noise, distractions, temperature variations and lack of privacy

1.5 Options considered

Several options for redevelopment of the Jandakot facility have been considered. The primary options discussed in this business case are:

- Option 1 – Continue to take a reactive approach to addressing issues with the facility as they arise
- Option 2 – Build new facilities at different location
- Option 3 – Redevelop facilities on existing site over 3 years

Other options that were considered but dismissed were to find an already-constructed site that suits DBP's needs, or to redevelop the Jandakot site over a longer timeframe.

The option to move to alternative facilities is not practicable. DBP's operational requirements are unique, and we have not been able to find a ready-made alternative facility in a suitable location or that would not require significant investment to meet our operational requirements. Any relocation would also involve substantial disruption to current employees, who may also need to relocate.

An option to develop the site over a longer timeframe (5-7 years) in order to spread the costs over two AA periods was considered, but dismissed due to the need to address the risk as soon as practicable. As discussed in this paper, the Jandakot site has been subject to underinvestment and makeshift solutions for decades. Even the currently proposed development has already been delayed by two years due to the pandemic.

The risks and inefficiencies at the current Jandakot site are real. The facilities are substandard and staff are becoming disgruntled. As a good employer it is imperative that we follow through on our commitment to our people that the site will be redeveloped, and that we do it as soon as practicable. DBP is competing with the resources sector and other employers for skilled labour. The WA skilled jobs market is tight and it is becoming increasingly difficult to attract and retain staff. Therefore delaying this project any longer than absolutely necessary would be detrimental to our staff, our culture and our productivity.

1.5.1 Option 1 – Continue to take a reactive approach to addressing issues with the facility as they arise

Under this option minor ongoing repairs and maintenance would continue on a reactive (corrective) basis. Where an issue is identified, we will take action to address it, and any expansion requirements would continue to be accommodated through demountables and temporary/portable buildings.

1.5.1.1 Advantages and disadvantages

The advantage of this option is that there is no foreseeable upfront capital cost. We would continue to incur operating expenditure consistent with historical levels, although this is likely to increase as the facility ages. This option would also not require DBP to relocate any materials or staff, minimising disruption in that sense.

However, the disadvantages of this option are considerable. Given the ongoing degradation of facilities, the annual costs of maintaining the site and addressing issues are expected to rise. There is also the likelihood of a sizeable (yet unforecastable) capital outlay if any of the facilities fail during the AA6 period or new structures/buildings are required urgently.

More importantly, there is limited ability to increase the capacity of the facility or reduce the safety risk arising from increasing movement of vehicles, machinery and people around the site. The working conditions for staff would continue to deteriorate, training of employees and contractors would need to occur off site, and accommodation would need to be sourced, all of which would drive additional cost. These is also potential for DBP failing to meet WorkSafe and City of Cockburn safety and environmental compliance requirements if no substantive corrective actions are taken to address site conditions.

1.5.1.2 Achievement of objectives

The following table outlines how this option will support the achievement of our vision objectives in AA6.

Table 1.3: Achieving objectives – Option 1

Vision objective	Alignment
Delivering for Customers – Public Safety	-
Delivering for Customers – Reliability	-
Delivering for Customers – Customer Service	-
A Good Employer – Health and Safety	N
A Good Employer – Employee Engagement	N
A Good Employer – Skills Development	N
Sustainably Cost Efficient – Working within Industry Benchmarks	Y
Sustainably Cost Efficient – Delivering Profitable Growth	-
Sustainably Cost Efficient – Environmentally and Socially Responsible	N

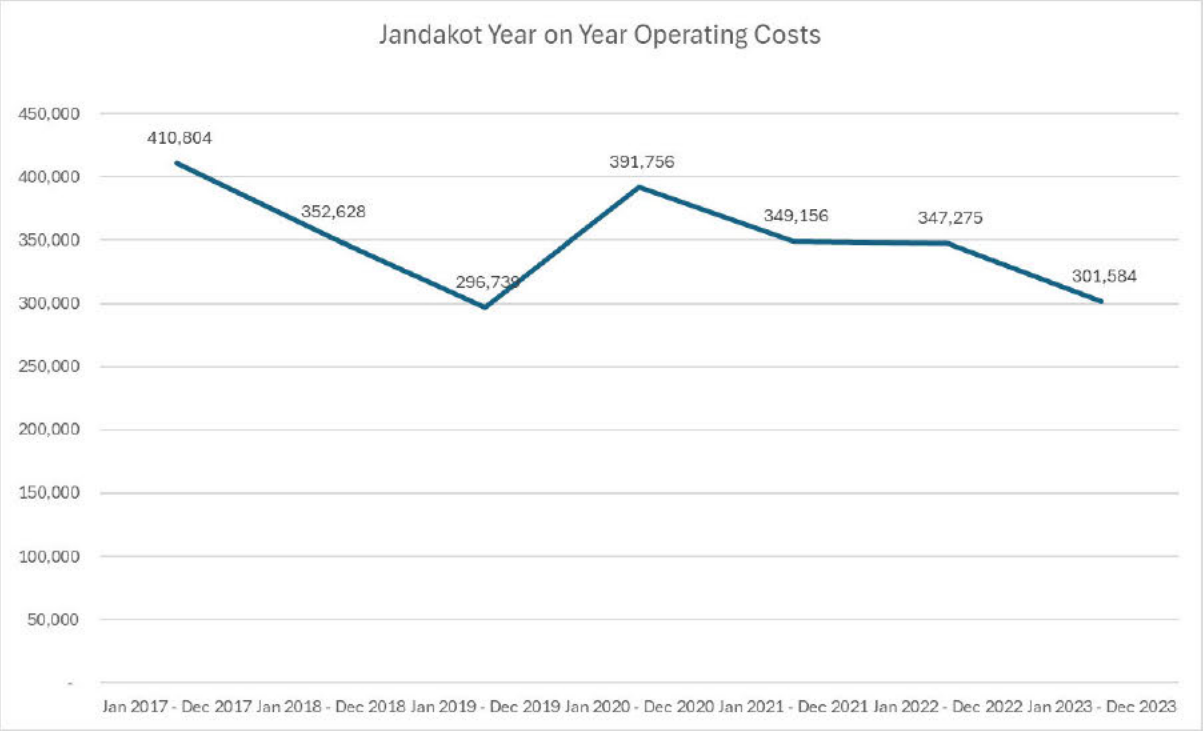
This option does not deliver against our vision objectives of being a good employer as it leaves safety hazards and operational constraints unmitigated. While this option is potentially lower cost and therefore within cost benchmarks, it is not environmentally and socially responsible as the ongoing environmental issues onsite (asbestos, waste, etc.) would not be addressed thoroughly.

1.5.1.3 Cost assessment

There is potential for this option to require little or no capital investment, however, this is dependent on no significant building failures or new office space/storage requirements occurring during the AA6 period.

Operating costs for the site are high, averaging $350,000 per year since 2017 (see Figure 1.5). While we have attempted to constrain operating costs to the extent we can, it is expected that without substantial redevelopment, the ongoing cost of maintaining the facility will increase, as is typical with ageing buildings, with no corresponding improvement in the work environment. Further, each year approximately $70,000 in stock is lost due to degradation.

Figure 1.4: Jandakot operating expenditure 2017 to 2023, $2024



1.5.1.4 Risk assessment

Not redeveloping the Jandakot facility does little to address the current risk. The risk to people would remain intermediate and not ALARP, and would likely increase overtime if no substantial investments to address traffic flow and other material safety issues were made.

Table 1.4: Risk assessment – Option 1

Risk category	Untreated	Treated
People	Intermediate	Intermediate
Environment	Low	Low
Supply	Negligible	Negligible
DBP	Intermediate	Intermediate
Reputation	Low	Low
Loss	Negligible	Negligible

1.5.2 Option 2 – Build new facilities at different location

Under this option a new site would be identified and purchased, and new facilities would be built. The existing Jandakot site would be sold.

1.5.2.1 Advantages and disadvantages

The advantage of this option is that it gives the organisation a 'blank canvas' to develop a fit-for-purpose facility for a modern transmission operations business. Any development would not be constrained by the size, location and environmental requirements of the existing Jandakot site. It is important to highlight that this option would only be viable if the new site could be

purchased at a lower price than the existing Jandakot site could be sold, or if the new site is in a significantly better location from a pipeline operations perspective.

The major disadvantage – other than the challenge of finding a suitable alternative site – is the cost. Using an outside third party for analysis, we have estimated that the cost to establish a new operational depot to achieve the same outcomes and benefits would be approximately $66 million. On top of this there would additional costs associated with a physical site move of operational personnel, including critical communications equipment, from Jandakot to a new operational depot.

Building at a new location would also see significant upheaval and disruption to our ongoing 24-hour operations, which would introduce additional risks to the build.

1.5.2.2 Achievement of objectives

The following table outlines how Option 2 will support the achievement of our vision objectives in AA6.

Table 1.5: Achieving objectives – Option 2

Vision objective	Alignment
Delivering for Customers – Public Safety	-
Delivering for Customers – Reliability	-
Delivering for Customers – Customer Service	-
A Good Employer – Health and Safety	Y
A Good Employer – Employee Engagement	Y
A Good Employer – Skills Development	Y
Sustainably Cost Efficient – Working within Industry Benchmarks	N
Sustainably Cost Efficient – Delivering Profitable Growth	-
Sustainably Cost Efficient – Environmentally and Socially Responsible	Y

This option delivers against almost all of our vision objectives, however, it could be argued that developing a new site from scratch is not sustainably cost efficient if a more suitable and lower-cost site cannot be found.

1.5.2.3 Risk assessment

Building a new facility at a new location would address all the identified risks to ALARP. Given the frequency of traffic movement and proximity to staff at any site, the risk of a vehicle/pedestrian incident is unlikely to be lower than intermediate. However, through good design we can reduce the frequency of a traffic incident from occasional to unlikely, which while still gives rise to an overall intermediate risk under the matrix, can be considered ALARP.

Under Option 2 the likelihood of being non-compliant with safety and environmental requirements is reduced, mitigating the DBP and reputational risk.

Table 1.6: Risk assessment- Option 2

Risk category	Untreated	Treated
People	Intermediate	Intermediate
Environment	Low	Low
Supply	Negligible	Negligible
DBP	Intermediate	Low
Reputation	Low	Negligible
Loss	Negligible	Negligible

1.5.2.4 Cost assessment

The third party cost assessment to establish a new operational depot is $66.2 million. The additional cost is primarily the costs associated with the purchase of land in a suitable location, which is estimated at approximately $22.5 million. A breakdown of the estimated cost is provided in the following table.

Table 1.7: Cost breakdown – Option 2, $'000 2024

Description	Cost estimate
Construction costs	
Site preparation and external services	1,832
Parking and laydown areas	2,537
Townhall	621
Outdoor amenity and landscaping	2,098
Site fencing, gats, entry statement and signage	508
Authority headworks	750
Warehouse	7,139
Office building, training, and [redacted]	18,626
End of trip / gym	700
Subtotal construction costs	**34,810**
Design contingency = 5%	1,741
Construction contingency = 5%	1,741
Sustainability initiatives	662
Building Act compliance	174
Professional fees	3,311
Alternative site acquisition	22,500
Stamp duty	1,270
Total estimated project cost	**66,209**

The above estimates are an indicative and preliminary opinion of probable cost based on a concept without definition of design specification or quality.

General exclusions to this estimate are:

- GST

- Relocation costs to alternate site location
- Business disruption cost
- Commercial benefit or gain from the sale of existing premise
- Escalation beyond November 2025
- Latent condition
- Development application (DA) conditions
- Works outside the site boundary
- Works to retained structures
- Major redirection or diversion of existing services infrastructure
- Rock excavation
- Dewatering
- Decanting & temporary staff accommodation costs
- Temporary storage costs
- AGIG specific ICT, AV etc (for [redacted])
- Client management & operational costs
- Client contingency
- Legal & financing costs
- Public art

1.5.3 Option 3 – Redevelop facilities on existing site over 3 years

With this option, the Jandakot depot would undergo significant redevelopment during 2026-2028 to support future needs as well as address the current issues, including:

- Construction of a contemporary office space to accommodate existing and future planned workforce, including parking and other vehicle access resources designed and managed in a way that minimises exposure to the potential for harm
- Construction of an additional warehouse facility to house materials and equipment safely and securely in a weather resistant environment, with improved boundaries and security to reduce current potential for theft. The improved facilities, removal of demountables and improved vegetation management will also contribute to better safeguarding against snakes
- Fit for purpose training rooms to appropriately upskill staff and the contractor workforce
- [redacted]

The project would be phased over three years in AA6, with planning, design and selection of contractors completed in 2026 and all groundworks and major construction activities occurring over the following two years.

1.5.3.1 Advantages and disadvantages

The major advantage of this option is that it would address the current safety, environmental, and productivity/efficiency issues at the Jandakot site. It would significantly improve workforce culture and engagement, and would help us retain and attract talent. By developing the facility, we would be following through on a commitment made to the workforce when AGIG purchased the ageing assets and facilities in 2017. It also demonstrates our long-term commitment to operating and investing in one of Western Australia's most vital infrastructure assets.

There are also financial benefits, as well as operational benefits, to staying at the same location. For example, some areas of car park can be re-used, some of the warehousing facilities can be integrated into the new design, the plan can integrate new buildings into the existing landscape and therefore avoid additional landscaping costs.

The disadvantage of this option is the cost and disruption. While the overall cost currently being proposed is consistent with similar developments by other businesses (e.g. ATCO Gas developed its Jandakot site at a total cost of approximately $35 million ($2025) over several years), it does represent a substantial investment. Further, while measures will be taken to minimise disruption to people and our operations, some disruption during the most intensive periods of work is inevitable. This is one of the reasons why we want to construct the new site over as short a timeframe as practicable, rather than having to impact people's jobs for longer and demobilising/mobilising building crews over an elongated construction program.

1.5.3.2 Achievement of objectives

The following table outlines how this option will support the achievement of our vision objectives in AA6.

Table 1.8: Achieving objectives – Option 3

Vision objective	Alignment
Delivering for Customers – Public Safety	-
Delivering for Customers – Reliability	-
Delivering for Customers – Customer Service	-
A Good Employer – Health and Safety	Y
A Good Employer – Employee Engagement	Y
A Good Employer – Skills Development	Y
Sustainably Cost Efficient – Working within Industry Benchmarks	Y
Sustainably Cost Efficient – Delivering Profitable Growth	-
Sustainably Cost Efficient – Environmentally and Socially Responsible	Y

This option delivers against all relevant vision objectives as it provides a safe and secure facility for staff, contractors, visitors and customers, whilst upgrading the facilities to meet current and future operational requirements, including unique staff training requirements. The proposed program, while high cost, is comparable to industry benchmarks.

1.5.3.3 Cost assessment

The total capital cost of redeveloping the Jandakot site s $35.6 million, of which $34.3 million will be incurred during the AA6 period. Ongoing operating and maintenance expenditure is expected to reduce due to improved efficiencies of energy ratings for newly constructed buildings.

Table 1.9: Cost assessment – Option 3, $'000 2024

Project	2026	2027	2028	2029	2030	Total
Jandakot redevelopment	1,100	16,525	16,700	-	-	34,325

A formal procurement process will be undertaken to ensure expenditure is based on the results of a competitive tender process to ensure the works are delivered at an efficient cost. There will be costs associated with disruption and temporary housing of employees, which will be expected to be costed into the tender process. A detailed design, consultation and plan of the project is underway.

The current estimate is based on a third party expert report undertaken by [redacted]) and represents the best estimate required to deliver the scope.

A breakdown of the full $35.6 million estimate is provided in the following table.

Table 1.10: Cost breakdown – Option 3

Description	Cost estimate ($,000)
Construction costs	
Demolition	308
Site preparation and external services	984
Parking and laydown areas	1,310
Townhall	621
Outdoor amenity and landscaping	1,066
Site fencing, gats, entry statement and signage	304
Authority headworks	500
Warehouse	4,342
[redacted]	18,626
End of trip / gym	700
Staging / works sequencing	431
Subtotal construction costs	**29,191**
Design contingency = 5%	1,460
Construction contingency = 5%	1,460
Sustainability initiatives	662
Building Act compliance	146
Professional fees	2,780
Total estimated project cost	**35,629**

The above estimates are an indicative and preliminary opinion of probable cost based on a concept without definition of design specification or quality. The costs have been adjusted with

the annual construction cost escalation factors provided in the architect's indicative cost estimate.

General exclusions to this estimate are:

- GST
- Relocation costs to alternate site location
- Business disruption cost
- Commercial benefit or gain from the sale of existing premise
- Escalation beyond November 2025
- Latent condition
- DA conditions
- Works outside the site boundary
- Works to retained structures
- Major redirection or diversion of existing services infrastructure
- Rock excavation
- Dewatering
- Decanting & temporary staff accommodation costs
- Temporary storage costs
- AGIG specific ICT, AV etc ([redacted]
- Client management & operational costs
- Client contingency
- Legal & financing costs
- Public art

Comparison with the ATCO Gas Australia Jandakot redevelopment

The proposed $35.6 million investment for the Jandakot development is comparable with the recent redevelopment of ATCO Gas Australia's operations centre, which neighbours DBP's site at Jandakot. Based on publicly available information (see Appendix C), the redevelopment of ATCO Gas Australia's Jandakot facility cost approximately $27.2 million in nominal dollars, across two stages of development in 2014 and 2019. ATCO's Jandakot development provides a useful comparison to the proposed DBP Jandakot development, as it features redevelopment of ATCO's offices and operational complex at the site.

If we escalate the publicly available values for the ATCO projects into 2025 dollars, ATCO's Jandakot development would have cost approximately $35.2 million. It should be highlighted that the Australian construction market has changed significantly since 2019, with the post-pandemic environment driving significantly higher materials and labour costs. Analysis from the Australian Bureau of Statistics suggests building construction costs have increased by 31.3%

from September quarter 2020 to June quarter 2024, with non-residential building construction costs increasing by 27.1%.[2]

While inflation has been factored into the $35.2 million escalation for ATCOs project, it is reasonable to assume that the actual construction costs of ATCO's Jandakot development would have been significantly higher had the facility been built today.

On this basis, we consider the proposed capital investment in DBP's Jandakot site is a sound estimate, developed on a reasonable basis, using the best information available in the circumstances.

1.5.3.4 Risk assessment

Redeveloping the Jandakot site would address all the identified risks to ALARP. As discussed under Option 2, the risk of traffic accidents would remain rated intermediate but would be ALARP, and the DBP and reputational risks would be mitigated. However, Option 3 would achieve this risk outcome at a significantly lower cost than if we were to move to a new site.

Table 1.11: Risk assessment- Option 3

Risk category	Untreated	Treated
People	Intermediate	Intermediate
Environment	Low	Low
Supply	Negligible	Negligible
DBP	Intermediate	Low
Reputation	Low	Negligible
Loss	Negligible	Negligible

1.6 Summary of cost/benefit assessment

A summary of the option assessment is shown in Table 1.12.

Table 1.12: Summary of options assessment

Option	Achievement of objectives	Cost	Treated risk (integrity/reliability)
Option 1 – Reactive approach to addressing issues	This option does not achieve our objective of being a good employer	No upfront capital identified. Ongoing opex of ~$350 k per year is likely to rise.	This option does not reduce the overall rating to ALARP
Option 2 – Build new facilities at a different location	This option does not achieve our objective of being a good employer or being sustainably cost efficient	66.2 million	This option reduces the people risk to ALARP and mitigates the compliance and reputational risks

[2] Insights into Output of Building construction prices | Australian Bureau of Statistics

Option 3 – Redevelop facilities on existing site over 3 years	This option achieves our objectives of being sustainably cost efficient, delivering for customers and being a good employer	35.6 million	This option reduces the people risk to ALARP and mitigates the compliance and reputational risks

1.7 Proposed solution

1.7.1 Why is the recommended option prudent?

The proposed solution, Option 3, is recommended because it is the timeliest option that will address the identified safety and other risks identified in an efficient and prudent manner. It is important to highlight that the proposed redevelopment is consistent with industry standards and will be delivered at a cost comparable to similar recent projects, adjusted for today's construction market. While DBP is competing with the mining and resources sector for skilled labour, we do not intend to develop a facility that mirrors one of the many state-of-the-art fly-in-fly-out facilities in the Pilbara. The refreshed Jandakot site will be fit for purpose and developed to contemporary standards, informed by input and feedback from the people who will be working there.

Option 1 would see us retain facilities that are over 30 years old, non-compliant with current industry requirements, including disability access, and does not provide mitigation for the traffic risks related to vehicle and pedestrian movements. This is not preferable nor reflective of a responsible employer.

Option 2 is not considered efficient as sourcing alternate land to purchase and construct a purpose build facility and warehouse will likely result in higher costs than redeveloping Jandakot, as well as greater disruption to staff and operations.

1.7.2 Consistency with the National Gas Rules

Option 3 is the preferred solution and mitigates the safety, security and operational risks currently experienced on site while addressing our future operational requirements.

NGR 79(1)

The option is consistent with National Gas Rule 79(1)(a), to achieve the lowest sustainable cost of providing services. Consistent with the requirements of NGR 79, we consider that the capital expenditure is:

- **Prudent** – The expenditure is necessary in order to address the identified safety concerns as soon as reasonably possible. The project is also based on the replacement of an existing asset which has arrived at the end of its useful economic life. The proposed expenditure can therefore be seen to be of a nature that would be incurred by a prudent service provider.

- **Efficient** – The forecast expenditure is based on an estimate only. A formal procurement process will be undertaken once in principle support of the strategic intent is secured, which will ensure efficient prices are offered based on a competitive tender process. The proposed expenditure can therefore be considered consistent with the expenditure that a prudent service provider acting efficiently would incur.
- **Consistent with accepted and good industry practice** – The proposed project involves providing a work environment to employees, contractors and visitors which is safe from harm. It also follows good industry practice and design specifications for comparable utilities and for employers of choice who offer contemporary work spaces. The proposed DBP Jandakot development mirrors the recent ATCO Gas Australia Jandakot redevelopment, both in terms of costs and standards. One this basis we consider the proposed capital expenditure is such as would be incurred by a prudent service provider acting efficiently, in accordance with accepted good industry practice.

To achieve the **lowest sustainable cost of delivering pipeline services** – The sustainable delivery of services includes reducing risks to as low as reasonably practicable and maintaining reliability of supply. It will also help reduce inventory loss and ongoing site operational costs (heat, power, general repairs, etc).

NGR 79(2)

The option is consistent with NGR 79(2)(c)(i) as the capex is necessary to maintain and improve the safety of services, specifically by:

- Improving the safety for all staff and contractors through improved ingress and egress conditions on site, enabling the overall supply chain of services (which includes transportation and storage of materials and provision of office facilities for field crew) to be safer and more reliable
- Ensuring materials stored for pipeline maintenance and/or repairs are available and in good condition (without risk of theft or weather damage) and can be used safely

NGR 74

The current estimate has been developed via costs provided by a third party company that specialises in office/warehousing redevelopments, based on a high level scope provided by AGIG. Costs will be refined further as more detailed planning is conducted and a market tender process is held in 2025.

We therefore consider that the cost estimate provided is the best possible in the circumstances at the time of developing this business case, and that cost have been arrived at on a reasonable basis.

1.8 Comparison to previous periods

1.8.1 AA6 forecast compared to AA5

In AA6, capital expenditure of $34.4 million is forecast for the Jandakot redevelopment project. Table 1.11 shows the forecast AA6 expenditure compared with actual expenditure in AA5.

Table 1.13: AA5 forecast capital expenditure, compared with AA5 actual, $'000 2024

Forecast spend	2026	2027	2028	2029	2030	AA6	AA5 total	Variance
Capital expenditure	1,100	16,525	16,700	-	-	**34,325**	**3,173**	**31,152**

The Jandakot redevelopment is currently in the planning and design phase for the remainder of AA5. Construction of the buildings will occur in AA6, hence the uplift in spend profile.

1.8.2 AA5 variance

Actual expenditure during the AA5 period was $5.3 million lower than the amount determined in the AA5 Final Decision.

Table 1.14: AA5 actual expenditure compared with budget, $'000 2024

Actual v budget	2021	2022	2023	2024	2025	AA5
AA5 actual	-13	69	135	202	2,780	**3,173**
AA5 approved	920	0	0	7,010	2,509	**8,520**
Variance	**-933**	**69**	**135**	**-6,808**	**271**	**-7,266**

The Jandakot redevelopment project was originally planned for 2024 and 2025. The global pandemic and the subsequent new operating environment that has emerged post COVID-19 caused the project to be deferred by two years, as the scope of the project needed to be redefined and reflective of a contemporary design that also addressed all compliance issues.

This has resulted in some spend in AA5 to pursue the design and planning phases, along with minor temporary fixing at the existing site that will ensure structures remain safe, even if not ideal in design.

Appendix A Current Jandakot site issues

A.1 Asbestos management

The site contains asbestos. The risk of exposure is increasing, with a number of incidents arising in recent years with the asbestos cable pit and the incinerator. The age of the facility and the extent of asbestos present throughout the site means we need to undertake significant remediation works to decontaminate the site completely.

While asbestos removal could be undertaken without a complete redevelopment of the site (and will be undertaken at some point even if the redevelopment was to be delayed), we have an opportunity to build it into the overall scope of the redevelopment project and get the asbestos removed for a potentially lower cost through economies of scope.

A.2 Office space

The current office space does not appropriately accommodate the existing 65 permanent staff and 55 transient staff. The staff are housed in deteriorating transportable buildings and converted electrical/mechanical workshops that do not provide adequate space for their duties. The current office space fails to meet current or future needs and expectations of staff, contractors and visitors. There is inadequate space for meeting rooms, training, or storage.

A.3 Warehousing

Our inventory of equipment and spare parts is warehoused in a combination of a purpose built sheds, temporary domes, and open lay down areas.

Figure Appendix A.1: Existing Jandakot warehouse



The Jandakot site holds emergency spares required for the pipeline, repairable items, and consumable spares that have long lead times that can't be sourced locally. The balance of inventory vs just-in-time purchases is reviewed annually with a view to continuously improve our storage efficiency [3], however our options are limited.

Due to the permanent storage facility exceeding capacity, we have purchased mobile dome storage to help keep inventory in a ready to use state. However, these dome units require regular maintenance and repair. Both domes have had the rear wall replaced on average every six months due to wear and tear. We propose that the temporary inventory storage is replaced with a purpose built addition to the current permanent storage to reduce opex expenditure and remove the partial weather damage to the items being housed.

[3] A recent example of our ongoing approach to optimise inventory management is decision to order as required replacements for the end-of-life solar boost compressor o rings. They have been stored since 2009 and are now out of date, however, can be delivered within 3 weeks therefore do not require onsite storage.

In summary, the material management and logistics practices currently in situ in the Jandakot depot are sub optimal due to:

- Unsuitable storage for materials which exposes materials to degradation and theft
- Unsuitable access for deliveries, forklifts and other vehicles
- Insufficient existing warehouse racking and access requirements
- Inability to accommodate expansion of our assets and different emergency equipment such as spare compressors

It is conservatively estimated that the cost in relation to damaged goods (in most instances corrosion) as a result of inadequate warehousing facilities is approximately $70,000 per annum.

A.4 Vehicle management

One of the primary drivers for the Jandakot site redevelopment is the safety risk facing employees, contractors and visitors from vehicle movements on site. Jandakot traffic consists of at least 20 movements per day of:

- Heavy vehicles for logistics and transport
- Service vehicles with vehicle storage requirements for light and heavy vehicles and mobile plant
- Light vehicles for staff and visitors

Current traffic ingress and egress represent a safety risk that we do not consider tolerable. We have made changes to traffic flow and management and added controls to mitigate the risk to the extent we can. However, to reduce the risk to ALARP requires reengineering of the traffic and pedestrian flow throughout the entire site, including parking, logistics, and vehicle maintenance.

A revised plan detailing office locations, staff parking, logistics deliveries and storage, light and heavy vehicle movements, and vehicle and mobile plant storage is being developed as part of the Jandakot redevelopment scope. A proposed concept for the revised site configuration and vehicle movement is shown below.

[redacted]



A.5 Training and meeting facilities

We have an extensive training program coordinated by our in-house training and development team. Employees and contractors receive all mandatory training required of their role to ensure our strict safety requirements are met. Additionally, training that is identified as necessary for the employee's role, current capabilities and skills requirements will then be arranged as part of an individual development plan.

The training facilities available to employees and contractors in Jandakot are limited to:

- A demountable building with limited digital media systems
- Workshops that facilitate hands-on training on specialised equipment

Jandakot has several small and medium sized meeting rooms, two of which are equipped with digital media systems. However, the current facilities are insufficient to accommodate training for the Transmission Operation division, or to host large staff sessions.

A purpose built facility that would satisfy meeting and training requirements would be included in the development project. The room would allow for catering for large staff meetings and be able to be divided into smaller meeting rooms as required.

It would also be set up to train our people in specific transmission pipeline skills that are not found anywhere else. Conducting training this way ensures our staff have relevant materials and equipment for education purposes, improves the utilisation of staff time and reduces the costs associated with training and travel.

[redacted]

[redacted]

A.7 Safety hazards recorded at Jandakot

As discussed, the ongoing hazards, incidents, and near misses are not acceptable. While we have controls in place to try to improve safety, the number of incidents is likely to increase unless significant site redevelopment with new controls take place. The following figures are recent extracts from our safety management system register, and shows the type and frequency of incidents that occur on site.

[redacted]

EventID	Date and Time of Event	Report Type	Report Subtype	Brief Description of Event	Detailed Description of Event
13244	14/01/2019 6:40 AM	Hazard	Safety	Several DBP employees' private vehicles blocking busy morning Princep Rd traffic due to electronic gate access swipe card requirement	Several vehicles waiting to enter Jandakot DBP private vehicle car park (due to swipe card access requirement until auto opening at 0645 hrs) were banked up along Princep Rd blocking other early morning road users including heavy vehicles and pedestrians.
13281	31/01/2019 12:00 AM	Hazard	Environment	Fire System hydrant booster - valve maintenance.	During maintenance a large amount of water was released onto West Gate drive. As a result, the water flowed down the side of the drive and into the bushland area. Due to the pressure, amount and speed of water flow, subsidance has occurred.
13311	13/02/2019 2:00 PM	Hazard	Safety	Hazard with pedestrians not able to view approaching vehicle traffic near warehouse receivals area	Noticed vehicle and pedestrian traffic cannot view on coming vehicles, mainly couriers, at the side of the Supply warehouse receivals area.
13351	20/02/2019 8:00 AM	Hazard	Safety	Lighting replacement required within the Supply Warehouse	There are approximately 16 fluro's requiring replacement in Warehouse "A Store". This was reported by Lawrence Sweeney during the Monthly Jandakot Safety Meeting 20/02/19.
13496	08/04/2019 3:00 PM	Hazard	Environment	Snake sighting and removal form Jandakot Depot.	A Dugite, approximately 300mm in length, was located between 2 vehicles in the Administration Building undercover car bays.
13615	20/05/2019 12:00 AM	Hazard	Safety	FTS office south west corner) excessive noise coming from Air conditioner	Unable to work due to constant excessive humming noise coming from office air conditioner through roof. There is nothing wrong with AC, it is a design issue.
13657	10/06/2019 8:00 AM	Hazard	Environment	Flooding of the TPS building breezeway at Jandakot during a short heavy rain downpour	During a short heavy rain downpour the breezeway of the TPS building in Jandakot had some flooding. Water was leaking through the roof. Drains were not clearing properly, and appeared to be blocked. Down pipes appeared to be draining in the incorrect area ie on bends located on the roof. The lunch room was very close to becoming flooded as well. Some detail can be seen in the attached photos.
15092	31/10/2019 12:00 AM	Hazard	Safety	Trip hazard identified in TPS building	Ethernet cables removed as there was no hazard mat to ensure safe movement between desks. We need to add an additional set of cables so looking to procure a hazard mat.
15109	06/11/2019 12:00 AM	Hazard	Safety	Potential trip hazard in TPS office	Ethernet cables from a distribution point to the hot desks in the TPS room at Jandakot had the potential to cause a trip hazard. Desk moved closer to the distribution point to remove this hazard.
15211	17/12/2019 9:00 AM	Hazard	Safety	swollen ULP fuel containers found in rear of DBP127	Swollen ULP fuel containers were found in open section of the rear of DBP127 in the limestone parking area by a staff member . Presumably they had been left there by the outgoing roster and custodian of the vehicle. Daytime temps have been very hot lately and the fuel in the plastic containers had expanded greatly.

15761	23/06/2020 9:40 AM	Hazard	Security	Odorant shed door not closing properly, found not locked effetively several times.	The odorant shed door had become harder to close and it would feel like it had completely shut before lock had latched closed completely. As a result, the shed door has been found several times where it could be pulled open without the use of a key.

EventID	Date and Time of Event	Report Type	Report Subtype	Brief Description of Event	Detailed Description of Event
15778	27/06/2020 11:35 AM	Hazard	Safety	Jndkt Facilities Office - Safety Initiative - instal a table / shelf externally and adjacent to both East & West doors	Jndt Facilities Office - it would be very helpful to have a shelf ,or table, adjacent to the outside of both East and West doors for the temporary placement of larger/heavy/awkward items being carried to have somewhere to place it so the person entering doesn't have to either balance/hold the item with one hand , or bend over to place it on the landing, whilst opening the door. The shelf/table would be at around 1M above the landing floor level to allow easy placement and retrieval of said item(s)
16030	14/09/2020 2:44 PM	Hazard	Safety	Facilities office desk damaged and unsuitable for use.	Planning Improvement personnel identified a office desk in the Facilities office that is damaged and no longer suitable for further use until replaced.
16070	28/09/2020 7:19 AM	Hazard	Safety	SPOT GEO test function fail. Location - In the ocean off the Gulf of Guinea in Africa.	When testing SPOT device HELP test function, during vehicle inspection at Jandakot, my location was shown as in the ocean off the Gulf of Guinea in Africa and proceeded to send multiple HELP notifications.
16107	09/10/2020 1:00 PM	Hazard	Safety	Karratha to Jandakot flight, FMO exited with sore body	Return flight from Karratha to Jandakot is been carried out with small twin prop plane at full capacity. FMO exited the plane with a sore body after the 3hr journey in cramped conditions.
16139	21/10/2020 10:30 AM	Hazard	Safety	TROLLEY IS BROKEN, MAY CAUSE SOMEONE TO SLIP AND HURT THEM SELF IF BREAKS.	TROLLEY IS BROKEN, MAY CAUSE SOMEONE TO SLIP AND HURT THEM SELF IF BREAKS.
16166	27/10/2020 10:49 AM	Hazard	Environment	Administration Building - Eastern Exit Door. Adult bob-tail goanna located against wall.	The goanna had moved inside one of the pest control bait boxes. It was encouraged to exit the bait box and then moved away into the garden area between the Administration Building and Lands/Mainline TL demountable building.
16316	16/12/2020 11:00 AM	Hazard	Safety	Slip hazard identified at entry to Supply office door, Jandakot.	Was entering the Supply office door and noticed that the rubber mat had recently been removed by unknown persons (possibly contractors working at the facility over past couple of days). Underneath where the mat was placed was a large build up of silt and stones which were causing a slip hazard - see images (before and after).
16320	17/12/2020 1:00 PM	Hazard	Environment	IBC 1000ltr stored on undersized bunded pallets	Noticed IBC 1000Ltr stored on 240Ltr bunded pallets
16321	17/12/2020 2:08 PM	Hazard	sset/Equipmen	Access Door, warehouse "B" damaged	The door locking mechanism in warehouse "B" west side is damaged. It was previously known the door required attention and quotes are currently pending to have this door repaired.
16365	08/01/2021 9:39 AM	Hazard	Safety	Parts overhanging from bin locations in A Store Jandakot.	Some parts were overhanging from their locations in A Store. This could lead to both tripping/item damage.
16373	11/01/2021 7:19 AM	Hazard	Safety	Switch (On/Off) button is faulty	The switch is not actioning as per design and background of socket is exposed.

EventID	Date and Time of Event	Report Type	Report Subtype	Brief Description of Event	Detailed Description of Event
16386	17/01/2021 7:41 AM	Hazard	Safety	Fire Exit pathway is partially blocked.	Found a cage left in the right of way which was partially obstructing the path to the fire exit in B Stores in Jandakot.
16391	18/01/2021 1:42 PM	Hazard	Safety	Leaf litter build-up at Jandakot facility is causing a slip hazard at doorways.	Recent high winds have caused leaves to fall from trees. There is now a build-up in some gutters and across a couple of doorways such as the entrance to the Mainline and Day Crew buildings.
16405	22/01/2021 9:14 AM	Hazard	Safety	Stock items stored on top of the shelving unit and not in bin locations.	Found items (x 2 cartons ,604.74.004) being stored on top of shelving in 'A Store' in Jandakot. Due to insufficient space for this particular item, the x 2 items have been placed on top of the shelving unit and not in bin locations.
16433	31/01/2021 12:32 PM	Hazard	Safety	Obstruction in front of wall mounted Fire extinguisher	Noticed in Supply warehouse "A" that a safety step was obstructing clear access to a fire extinguisher. Photo attached.
16455	09/02/2021 6:20 AM	Hazard	Supply	Tubing (Stock) laying in Bay 2 in B Store where it is likely to be damaged.	Tubing is stored (ready for travel) where it has the potential to be damaged as it has a coating on it .
16460	10/02/2021 11:11 AM	Hazard	sset/Equipmen	Water down pipe dislodged from Maintenance overhaul workshop	Noticed on north east corner of Maintenance over haul workshop that a down pipe has dislodged from approximately halfway down and the straps that secure down pipe are damaged.
16466	12/02/2021 1:30 PM	Hazard	sset/Equipmen	Faulty PowerPoint switch in TPS lunch room. General Power TPS Building Lunch Room.	Found the power switch on the General Power point in the TPS lunch room where the sandwich press and blender is connected to be broken with exposed internals. Advised FTS E&I immediately and he commenced repair. No further action required.
16486	18/02/2021 4:43 AM	Hazard	Safety	Cartons of items found on floor next to the office desk walkway.	Items placed in the walkway around the office desk, this is a trip hazard.
16602	16/03/2021 2:14 PM	Hazard	Safety	Uncovered a gas feed leading into mainline equipment shed; vulnerable to possible damage.	Whilst conducting investigative service works in the Jandakot depot. I uncovered a gas feed leading into the mainline equipment shed (previously the old incinerator shed).; It's a 40mm copper service with a ball valve capped off. The way the valve/pipework was left appeared to be vulnerable to damage.
16685	20/04/2021 6:50 AM	Hazard	Safety	Found Stock items located on top of racking again.(Location is 6 A Top)	Stock items (013.11.100 x 2) located on top of racking in A store Jandakot.
16763	20/05/2021 2:00 PM	Hazard	Safety	Jandakot East Gate failed to operate after power outage	After the monthly test of the Jandakot DEA, the Eastern Gate of the facility would not open. Would not operate using vehicle FOB's or the manual override button located inside the gate control panel. This could be a potential safety issue in the event of an actual evacuation procedure.

EventID	Date and Time of Event	Report Type	Report Subtype	Brief Description of Event	Detailed Description of Event
16887	18/07/2021 4:17 PM	Hazard	Safety	Roof leaking water down on top of switch board.	Inside the machine area in the Jandakot workshop the roof is leaking and dripping water on top of switch board causing water to pool on top and run down the front. switch board has been isolated until the roof leak has been fixed.
16921	30/07/2021 10:32 AM	Hazard	Safety	Walkway in Jandakot A Store blocked with kits/cartons	Found multiple items blocking the walkway to an exit door in A Store in Jandakot Stores.
16990	23/08/2021 11:30 AM	Hazard	Safety	Ladder has no the safety bar, has broken off.	Ladder has no the safety bar, has broken off.
17001	25/08/2021 7:58 AM	Hazard	sset/Equipmen	Jandakot Facility - Significant Corrosion on Shelter Structural Support at FTS Car Park	2 holes have appeared in the structural steel upright square section at ground level. See photos attached
17094	22/09/2021 9:06 AM	Hazard	Safety	Jandakot Facilities Overhaul Workshop - during disassembly of Ledeen actuators, potentially Asbestos gaskets encountered	During the disassembly of the Ledeen actuators from CS08-1 unit valves, FMO found old gaskets, that could potentially contain Asbestos.
17119	29/09/2021 3:00 PM	Hazard	sset/Equipmen	Wooden transport cover over Solar Bundle,(Ex. Cs01-U1) deteriorated	The wooden transport cover over the solar bundle (Ex. Cs01-U1) has deteriorated over the years, it is leaning to one side and may eventually pose a collapse hazard. The roof of the wooden cover appears to have fallen onto the bundle that is wrapped in white plastic wrap. Location of the solar bundle in wooden box is Supply warehouse "B", Outside west wall.
17130	04/10/2021 12:52 PM	Hazard	Safety	Jandakot. Contractor on Office roof working on gutter cleaning not in fall prevention.	Observed contractor working 6 meters away from the harness attachment on a slack fall prevention rope on the edge of the roof. The pendulum effect would have the contractor on the ground if he fell from the roof.
17147	14/10/2021 12:00 AM	Hazard	Environment	Thursday, 14.10.2021 Andrew noticed the hazard of a bee hive inside a cable drum in the Project Dome.	Photo attached indicating area where bee hive is located.
17176	27/10/2021 11:28 AM	Hazard	Safety	Bee Swarm forming in the Project dome	On approaching the Project dome noticed a swarm of bees just inside, on the RHS. They were swarming around a wooden crate. see attached photo.

EventID	Date and Time of Event	Report Type	Report Subtype	Brief Description of Event	Detailed Description of Event
17180	29/10/2021 8:22 AM	Hazard	sset/Equipmen	DBP207 - 1EZN 515 electrical system problems	DBP207 is being relocated to the Tanami pipeline and had to be checked out electrically to make it reliable to use on the harsh roads. During the checks, approximately 150m of cabling was removed and discarded. This was partially redundant equipment, which is not being used any more and was not removed during the decommissioning of the equipment, or just add on wiring. Some of the wiring was not connected to standard and only did not fail due to the vehicle operating in the metro area.
17181	29/10/2021 9:37 AM	Hazard	sset/Equipmen	DBP 201 - 1GUV 896 had several electrical issues	DBP 201 - 1GUV 896 is being send to the Tanami pipeline. During electrical checks and remedial work, several electrical issues were found. An accessory circuit was connected to the ECU power supply, which could have disabled the vehicle in the event of a fault in this circuit. Connections were sub-standard and could have lead to severe damage of the electrical system. The UHF radio antenna was connected to a mobile phone antenna. The sat phone antenna was not connected to the system.
17197	04/11/2021 9:40 AM	Hazard	Safety	Crate of filters placed in location bin with broken lid and nails exposed, not fit for transport.	Picking inventory and found the stock placed in the bin with nails exposed and lid was clearly broken off and sitting on top of the crate.
17222	19/11/2021 10:11 AM	Hazard	Safety	Jandakot Odorant Shed - Lights not working	The Odorant Shed lights are not working. I suspect it is due to the 2 external lights that have come away from the wall (the vertical one has water inside). All of the lights are on the same circuit judging by the labels on the switches. I'd suggest that the 2 lights and cabling on the south wall can be removed and terminated to a JB.
17252	30/11/2021 10:00 AM	Hazard	Safety	Bee hive located in one of the East Domes on site	Chad Northan was working in one of the East Domes and needed to leave as a large number of bees were active in the dome.
17253	30/11/2021 10:00 AM	Hazard	Safety	Bee hive located in one of the East Domes on site	Chad Northan was working in one of the East Domes and needed to leave as a large number of bees were active in the dome.
17371	04/01/2022 10:16 AM	Hazard	Security	Wilson security report that during an evening patrol, they found a gate into one of the domes was open and insecure	Wilson patrol were conducting internal patrol of the depot and found external gate & fence as well as all buildings to be secure. Found one of gates to the domes open, with the lock unsecured. They secured the gate and vacated premises. Wilson reported this incidence to depot leadership on 4th Jan as part of their report.
17441	10/02/2022 8:07 AM	Hazard	Safety	Spotted a pallet high up in B Store with large circular filters stored in a pyramid shape, with sellotape (had peeled of) holding them together , x 4 levels high, in effect nothing was holding them together.	In B Store Jandakot found stock unsafely stored (Photos attached) Filter 018.01.129 in B4A4 location.
17442	10/02/2022 10:45 AM	Hazard	Safety	Supply 1.5 Ton forklift - 308FG25-41635 DBP 340 requires a full set of new tyres as worn down past the marker level .	Urgently require new tyres . Supply 1.5 Ton forklift - 308FG25-41635 DBP 340 requires a full set of new tyres as worn down past the marker level .
17443	11/02/2022 7:55 AM	Hazard	sset/Equipmen	Jandakot Gents Shower - Broken Shower Head	Shower head broke when attempting to adjust the shower head before entering shower. Most likely broke due to age and calcium build up seizing shower head in place

EventID	Date and Time of Event	Report Type	Report Subtype	Brief Description of Event	Detailed Description of Event
17452	14/02/2022 7:00 AM	Hazard	Safety	Tree limb has fallen over and is partially blocking access road opposite ATCO. This is at the location of their pedestrian crossing on Prinsep Rd. In addition, the ATCO pedestrian crossing has faded considerably.	A large tree limb has fallen about a week ago and it obscures any person wanting to use the pedestrian crossing from approaching traffic. Vehicles are still being parked on the verge so there will be people crossing the road. This fell about a week ago but it remains in situ so raising so that Western power can be notified and queried as to the plan to remove it. The pedestrian crossing is very faded. If ATCO still want personnel to use this, it should be re-painted.
17466	16/02/2022 9:39 AM	Hazard	Safety	16.02.2022 Foot Protection Must Be Worn In This Area sign found on the ground outside Warehouse A roller shutter door.	This sign was originally installed on the external wall to Warehouse A, immediately opposite the main south-facing entrance door. Due to environmental factors over the years since its installation, it had obviously become very brittle and broken off either because of high winds or simply because it was so brittle it came away from the screws.
17501	02/03/2022 7:31 AM	Hazard	Safety	Fire Hazard	A significant amount of dry leaf litter has accumulated on the south side of the Jandakot Facility administration buildings. Ignition of this leaf litter fuel load could result in the adjacent buildings catching fire.
17574	07/04/2022 12:09 PM	Hazard	sset/Equipmen	Jandakot DEA service identified failed mounts on generator mounted local controller box.	The Jandakot DEA service (1000934139) was completed by Westrac field service technician, during the maintenance it was identified that the generator mounted local controller box vibration mounts had deteriorated and almost failed (see pictures). Although outside the regular maintenance service scope, the technician notified AGIG host of hazard, and that replacement parts were available and could be picked up and supplied same day.
17874	04/08/2022 8:57 AM	Hazard	Safety	bollard protecting southern water tank has been hit a number of times by vehicle traffic arriving/departing Jandakot Facility.	On carrying out a walk-around the facility late last Thursday afternoon identified the bollard. Visible signs of the bollard being consistently hit by vehicle traffic.
17924	18/08/2022 1:00 PM	Hazard	Safety	The cornice in the ladies toilet next to the breezeway is hanging down in left corner of room	The cornice in the ladies toilet next to the breezeway is hanging down in left corner of room
17926	18/08/2022 1:00 PM	Hazard	Safety	Exit lights are not working in many area's across the Jandakot Facility	Exit lights are not working in many area's across the Jandakot Facility
17944	25/08/2022 8:09 AM	Hazard	Security	Jandakot facility front automated gate failed to close fully after hours	Facilities Field Team on call leading hand notified after hours that the Jandakot Cleaners had identified the facility front gate was not closing completely, compromising the security of the jandakot facility. Cleaners stayed on site until oncall leading hand attended site and investigated fault, the gate would stop closing at approximately 50cm from the fully closed position.

EventID	Date and Time of Event	Report Type	Report Subtype	Brief Description of Event	Detailed Description of Event
17945	25/08/2022 2:43 PM	Hazard	Safety	Damp mould smell within TPS Location of Jandakot	Sitting at desk in TPS Office kept inhaling damp mold smell, asked if others could smell and several people agreed. Health risks associated with mold can cause allergic reactions, including sneezing, runny nose, red eyes, and skin rashes.
17990	08/09/2022 9:25 AM	Hazard	Safety	Found large carton on 'Top Shelve" where nothing is permitted to be stored.	Found large carton on 'Top Shelf' where nothing is permitted to be stored.
18009	17/09/2022 8:15 AM	Hazard	Safety	Found Ball Valve on a bowed pallet not fit for purpose	A large valve spotted on a bowed pallet up on the racking in B Store. On closer inspection the centre rail was snapped on the pallet, timber rails were bellied due to weight of the valve, therefore not secure. (Photos attached)
18033	26/09/2022 10:46 AM	Hazard	Other	Rusted gas bottles stored at rear Stores Facility	whilst walking up the back of Jandakot Facility to do machinery start up came across stored Rusty Gas bottles , Dont know if any gas in side or even an issue , just thought needed some attention .
18036	28/09/2022 7:00 AM	Hazard	Safety	Milling machine guard found not fitted and machine/area not cleaned	When returning to the workshop, the milling machine was found to have been used, but not cleaned. There was a large amount of swarf on the floor around the machine. The guard was also not fitted to the machine.
18037	29/09/2022 11:49 AM	Hazard	Safety	Extension cord in the workshop was found damaged	New starter found one of the 10A extension cords damaged, when checking it before use.
18057	10/10/2022 11:58 AM	Hazard	Environment	Bee Hive located in eastern most storage dome.	Whilst attempting to locate stock items in the eastern dome, employee disturbed a large bee hive housed within a filter and its associated carton.
18065	12/10/2022 9:44 AM	Hazard	Safety	Carton located on top of the shelving unit inside warehouse A.	Located a carton on top of shelving unit. It was identified as a safety risk as no items are to be placed on top of the shelves.
18251	05/12/2022 7:44 AM	Hazard	Environment	Bees on shading in smoking area at jandakot	There is a swarm of bees on the shade in the smoking area at the Jandakot facility please do not disturb

18357	25/01/2023 2:41 PM	Hazard	Environment	Jandakot facility health concern over airborne particulates from limestone vehicle car park.	Widespread concern from Transmission Operations Jandakot staff that use the limestone hardstand car park over the amount of dust created from wind and vehicle movement. The concern over the dust generated was raised during the combined Jandakot staff & facilities safety meeting on 25/01/23. The Limestone dust from the hardstand car park has raised respiratory health concerns, as well excessive dust settling over vehicles and being blown into the transmission operations field office. The Safety data sheet for Limestone (see attached) was located on Chemalert, and states that 'Chronic exposure to respirable crystalline silica at higher levels could result in lung fibrosis (silicosis), and Chronic Obstructive Pulmonary Disease'. The issue of dust from the carpark has gradually become worse during the hotter summer months where the originally compacted limestone has broken down to sand. The car park may require wetting down and further compaction to reduce the dust.

EventID	Date and Time of Event	Report Type	Report Subtype	Brief Description of Event	Detailed Description of Event
18528	31/03/2023 7:00 AM	Hazard	Safety	Came into work and found flooding over the floor in Warehouse B in Jandakot Stores.	B Store /Warehouse flooding . Large puddles covering a large area of floor from rain during the night. 30/03/2023 - 31/03/2023
18530	31/03/2023 11:03 AM	Hazard	Safety	Found Burst Pipe ,underground, outside B Store. Leaking.	Found large quantity of water coming from a large crack in the tarmac, burst pipe and leaking quite badly.
18770	03/07/2023 10:48 AM	Hazard	Safety	Jandakot Lunch Room - Smoke detectors did not alarm	Despite extremely burnt toast filling kitchen with smoke, smoke detection system did not alarm. There was a lot of smoke. See attachment for remnants of bread.
18795	13/07/2023 7:19 AM	Hazard	sset/Equipmen	Jandakot - Corroded gutter above Water Feature, west site of Kitchen / Amenities Block	Gutter has corroded through in about a 1 meter
18834	28/07/2023 10:23 AM	Hazard	Safety	A puddle of water found in B Store, this is coming from a hole in the roof.	Found a puddle of water in isles 4/5 in B Store Jandakot Warehouse, clearly the roof is leaking.
19152	17/11/2023 3:12 PM	Hazard	Safety	Empty IBC's over stacked at the rear of the storage domes.	Jandakot supply staff observed the empty IBC's over stacked in the area between the storage domes and welding shed. Observations reported to Supply Leading Hand and advised to submit INX.
19186	27/11/2023 12:10 PM	Hazard	Safety	Toyota wheel and tyre returned to Jandakot from CS02 in Pallecon	A damaged Toyota wheel & tyre has been returned to Supply/Jandakot in the CS02 Pallecon. The wheel & tyre weighs approximately 60kg and in the process of it being loaded and transported to Jandakot it has caused damage within the Pallecon. The sides of Pallecon have been popped out and will need to be pop riveted back in. Along with this, this should have been strapped to a pallet as it could have caused a lower back injury to someone trying to remove it from the Pallecon. This has been mentioned multiple times in the past, yet it keeps happening.
19561	18/03/2024 2:49 PM	Hazard	Safety	Jandakot Facility - Damaged pavers identified outside lunch room	Pavers between lunch room, PLC hut & IACS hut have been damaged, with some lifting and creating a trip hazard.
19777	28/05/2024 5:30 PM	Hazard	Safety	Guttering had separated from the Administration building in two areas.	On departing Jandakot Facility last night I noticed that two sections of guttering had separated from the building.
20297	14/11/2024 10:48 AM	Hazard	sset/Equipmen	Jandakot brew room tap producing scalding hot water.	Hot water tap when turned on was found to be producing scalding temperature hot water. On investigation of the electric hot water unit under the sink, found thermostat on unit had been set to 85°C. This is dangerously hot and will scald skin instantly. At 68°C it can take only one second to cause third-degree burns (Queensland Government 2020; VBA 2022). Australian National Construction Code - B2P2 - Heated water supplied by a heated water service must be delivered from the point of discharge of fixtures and appliances at a temperature which is unlikely to scald. Action should be taken to ensure this cannot be altered above the threshold for scalding.
20361	03/12/2024 8:26 AM	Hazard	Supply	1000Ltr Helicopter fuel IBC leaking	New steel 1000Ltr IBC's delivered filled with the Helicopter fuel (kerosene) and put onto bund. When truck driver arrived to start weighing items and getting ready for the run he went to pick up IBC to weigh for truck and Fuel contents started to leak from the "vent cap" on top of the IBC. Noticed this immediately and placed back on the bund and came and reported it to myself.
17224	21/11/2021 10:48 AM	Injury	Jandakot depot- FMO tripped over from a raised service		While walking from the PLC lab adjacent to the lunch room I tripped on the raised concrete border of a service pit. Sore right shoulder.

[redacted]

Figure Appendix B.1: High level brief



Figure Appendix B.2: Concept designs for Jandakot

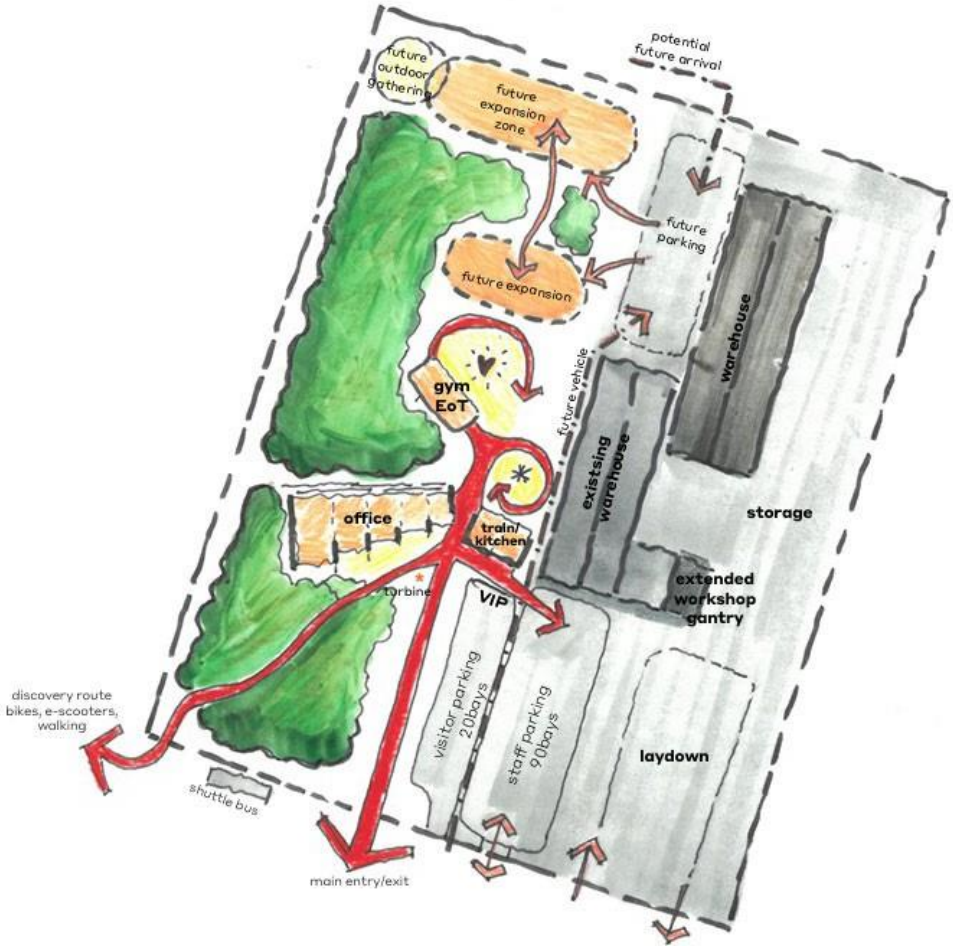
Existing Structures & Site Features

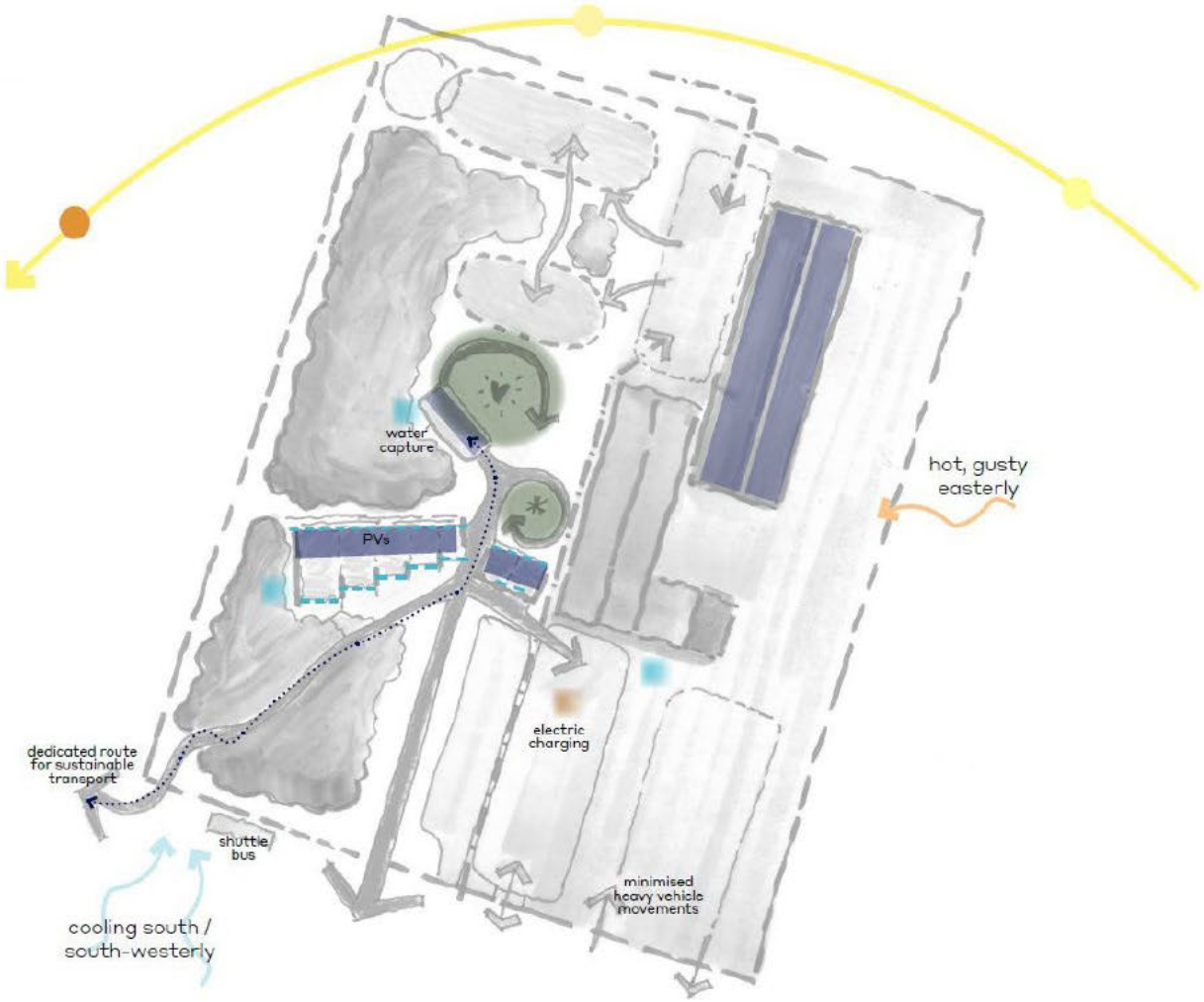
LEGEND

01 | ATCO Hydrogen Campus
02 | Degraded Bushland
03 | Healthy Bushland (Retain If Possible)
04 | Project Storage Area
05 | Staff Parking
06 | Bike Store
07 | Pump House
08 | Odorant Shed
09 | Facilities and Mainline Storage
10 | Administration / Management
11 | TSCC First Aid / Projects Workshop
12 | Technical & Pipeline Support
13 | Warehouse A
14 | Warehouse B
15 | Uncovered Laydown Area
16 | Facilities Lands Mainline Team Leaders
17 | Lunch Room & Amenities
18 | Spinifex Room
19 | Overhaul Workshop
20 | West Dome Storage
21 | East Dome Storage
22 | Civil Storage Shed
23 | Vehicle Wash down Bay
24 | Bushland Views

WOODS BAGOT

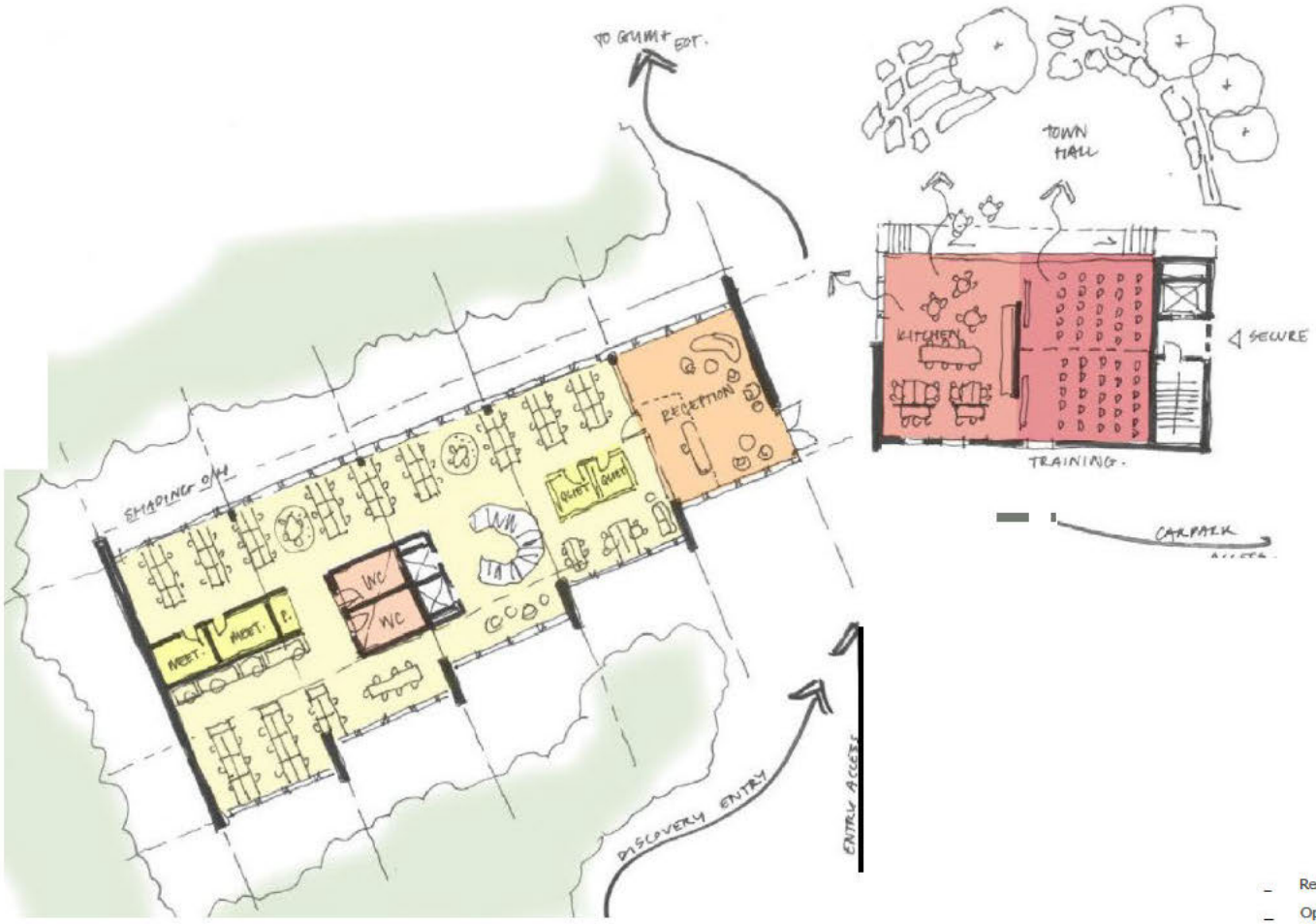





water capture
PVs
hot, gusty easterly
electric charging
dedicated route for sustainable transport
shuttle bus
minimised heavy vehicle movements
cooling south / south-westerly

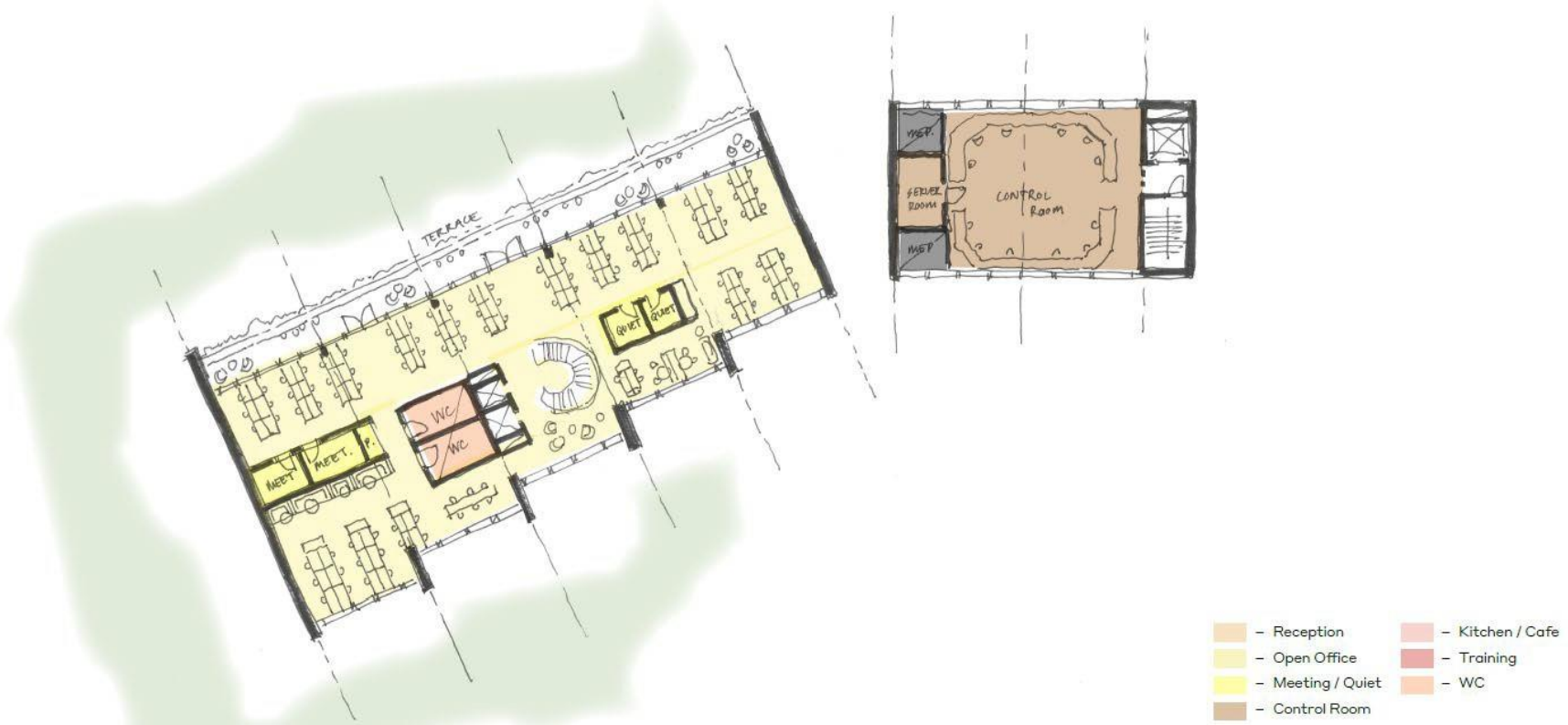
The Office

Ground loor



- Reception
- Open Office
- Meeting/ Quiet
- Kitchen/ Cafe
- Training
- WC

The Office
First Floor




AGIG

Appendix C Cost benchmarking

Based on publicly available information, the redevelopment of ATCO Gas Australia's Jandakot facility cost approximately $27.2 million in nominal dollars, across two stages of development in 2014 and 2019. ATCO's Jandakot development provides a useful comparison to the proposed DBP Jandakot development, as it features redevelopment of ATCO's offices and operational complex at the site. If we escalate the publicly available values for the ATCO project, which are in 2014 and 2019 dollars, into 2025 dollars, ATCO's Jandakot development cost approximately $35.2 million. It should be noted that the Australian construction market has changed significantly since 2019, with the post-pandemic environment driving significantly higher materials and labour costs. Analysis from the Australian Bureau of Statistics suggests building construction costs have increased by 31.3% from September quarter 2020 to June quarter 2024, with non-residential building construction costs increasing by 27.1%.[4]

While inflation has been factored into the $35.2 million escalation, it is reasonable to assume that the actual construction costs of ATCO's Jandakot development would have been significantly higher had the facility been built today.

Table Appendix C.1: Estimate of ATCO Gas Australia's Jandakot redevelopment in 2025 dollars.

Jandakot facility	Investment & basis of dollars	Investment in 2025 dollars	Source	Additional
ATCO Jandakot Head Office	$14 million (2014)	$19.2 million (2025)	EMCa Final Technical Report to ERA – Public Version.PDF	Jandakot redevelopment 279 In the AA3 period the Jandakot Operational Centre was established at a cost of $14.0m, being $3.6m (35%) higher than the ERA allowance. ATCO advised that following review, the ERA considered the higher expenditure as conforming capex[95]. The Jandakot warehouse and training centre were the final phases of redevelopment at this site to be progressed during AA4

[4] Insights into Output of Building construction prices | Australian Bureau of Statistics

			Microsoft Word - GDS - ATCO - AA4 - Draft Decision - PUBLIC pg 90	$136.57 million for the third access arrangement period is conforming under the NGR. *Structures and Equipment Capital Expenditure* 381. ATCO has spent $33.47 million on structures and equipment capital ex during the third access arrangement period:[158] • $14 million on Jandakot operational centre; • $1.10 million on Mardella depot;
Warehouse and training centre	$9.6 million (2019)	$12.1 million (2025)	ATCO revised plan - 2020-24 Revised Plan	The training centre and warehouse redevelopment were treated as two projects in the ERA forecast. However, as the projects occurred simultaneously and involved cross-overs, the two projects became integrated into a single project. The project was included in our AA4 submission in 2014. Table 5.17 outlines the expenditure and approval milestones for the Jandakot Redevelopment project. **Table 5.17:** Investment reconciliation overview

EXPENDITURE BREAKDOWN		$M 2019 REAL
Internal approvals	AA4 Submission	[redacted]
	Business Case: Supports the completion of the redevelopment of the existing Operations Depot at the Jandakot site at a cost of $9.6M. The preferred option exceeded the AA4 allowance of $6.8M. As such, the business case proposes the remaining amount ($2.9M) to be re-allocated from the planned Osborne Park Depot purchase[51].	[redacted]
	Pending Change Control	[redacted]
NGR Compliance	**Total actual capex ($M 2019 real)**	[redacted]

Clean Energy innovation hub	$3.5 million (2019)	$3.9 million (2025)	CSIRO - https://research.csiro.au/hyresource/clean-energy-innovation-hub/?form=MG0AV3	**Clean Energy Innovation Hub** The Perth-located Clean Energy Innovation Hub incorporates the production, storage and use of hydrogen in micro-grid system applications, including blending with natural gas and in power use. **Main proponents:** ATCO **Main end-use classification:** Microgrid applications – natural gas blending, power use **Status:** Operating – official opening in mid-2019 **Estimated cost:** AUD$3.53 million **Other involvement:** **Production details:** Hydrogen production – 23 tonnes per annum maximum capacity **Location:** Western Australia, Australia **Announced funding:** AUD$1.79 million – Australian Renewable Energy Agency (ARENA) **Project description** The original purpose of the project is to build and operate a 'microgrid' hybrid energy system enabled by renewable gas technology (including hydrogen) and the integration of renewable gas with solar and batteries. The Clean Energy Innovation Hub, which has been in operation since mid-2019 at ATCO's Jandakot Operations Centre in Perth, Western Australia, operates along the following lines:
Total	**$27.1 million (nominal)**	**$35.2 million (2025)**	**n/a**	**n/a**

Appendix D Photos of existing Jandakot site




01


02


03


04


05


06

Appendix E Comparison of risk assessments

Summary of risk assessment

Project Ref No	Description	Primary Risk Event	Proposed Action		People	Environment	Supply	DBP	Reputation	Loss
DBP10	Jandakot redevelopment	Outdated facility with poor traffic separation and inadequate storage results in increasing hazards for personnel, resulting in an increase in slips, trips and falls, and potential vehicle accidents.	Untreated Risk	Likelihood	Occasional	Unlikely	Unlikely	Occasional	Unlikely	Unlikely
				Consequence	Severe	Minor	Trivial	Severe	Minor	Trivial
				Risk Level	INTERMEDIATE	LOW	NEGLIGIBLE	INTERMEDIATE	LOW	NEGLIGIBLE
			Option 1 - Continue to take a reactive approach to addressing issues with the facility as they arise	Likelihood	Occasional	Unlikely	Unlikely	Occasional	Unlikely	Unlikely
				Consequence	Severe	Minor	Trivial	Severe	Minor	Trivial
				Risk Level	INTERMEDIATE	LOW	NEGLIGIBLE	INTERMEDIATE	LOW	NEGLIGIBLE
			Option 2 - Build new facilities at different location	Likelihood	Unlikely	Remote	Unlikely	Unlikely	Unlikely	Unlikely
				Consequence	Severe	Severe	Trivial	Minor	Trivial	Trivial
				Risk Level	INTERMEDIATE	LOW	NEGLIGIBLE	LOW	NEGLIGIBLE	NEGLIGIBLE
			Option 3 - Redevelop facilities on existing site over 3 years	Likelihood	Unlikely	Remote	Unlikely	Unlikely	Unlikely	Unlikely
				Consequence	Severe	Severe	Trivial	Minor	Trivial	Trivial
				Risk Level	INTERMEDIATE	LOW	NEGLIGIBLE	LOW	NEGLIGIBLE	NEGLIGIBLE

Capex DBP12: Regulatory

1.1 Project approvals

Table 1.1: DBP12 Regulatory – Project approvals

Prepared by	Will Chivell, Manager Regulatory Strategy Jeff Kong, Head of Transmission Asset Strategy
Reviewed by	Jeff Kong, Head of Transmission Asset Strategy
Approved by	Tawake Rakai, EGM Transmission Asset Management

1.2 Project overview

Table 1.2: DBP12 Regulatory – Project overview

Description of problem /opportunity	The *Work Health and Safety Act 2020* and associated *Work Health and Safety (Petroleum and Geothermal Energy Operations) Regulations 2022 (PAGEO Regulations)* require a Safety Case to be in place for all petroleum pipeline operations. The PAGEO Regulations require a Regulator approved 'Safety Case' for the pipeline to be developed and maintained, with a comprehensive review and revision on a five-yearly basis. The DBNGP Safety Case demonstrates our ability to: • Systematically identify people safety hazards associated with the pipeline • Assess the risks from the hazards • Minimise the risks so far as is reasonably practicable (SFAIRP) to an acceptable level by implementing necessary risk reduction measures This business case supports the costs of undertaking that five-yearly review which includes a review of the Formal Safety Assessment (FSA) and independent audit of the Safety Case.
Untreated risk	As per risk matrix = High
Options considered	• **Option 1** – Undertake the five-yearly review of the Safety Case ($570,000) • **Option 2** – Do not undertake the five-yearly review of the Safety Case (no upfront capex)
Proposed solution	We propose to undertake the five-yearly review of the safety Case in line with our regulatory obligations in 2027. This includes in internal review of our Safety Case to: • Analyse changes that have occurred that impact on the safety of the pipeline as well as safety of people, and confirm that the risks are continued to be SFAIRP minimised, ensuring no significant new risks from those changes that have not been assessed • Review technical inspections that have occurred as part of the assessment of fitness for purpose review as required by AS2885 • Collectively update all non-significant changes that previously did not require a revision of the Safety Case to reflect the current practice • Redemonstrate that risks associated with the safety of the pipeline and safety of people from the pipeline operation are at an acceptable level and SFAIRP minimised

	It also involves the review of the FSA, and an independent audit of the Safety Case as a whole.
Estimated cost	The forecast direct cost (excluding overheads) during the next five-year period (AA6) is $570,000.

$'000 2024	2026	2027	2028	2029	2030	Total
FSA	-	570	-	-	-	**570**

Basis of costs	All costs in this business case are expressed in real unescalated dollars December 2024 unless otherwise stated.
Treated risk	As per risk matrix = Intermediate
Variation from AA5	The forecast expenditure for AA6 is consistent with the estimated expenditure in AA5 of $570,000.
Alignment to our vision	The completion of the five-yearly review of the Safety Case will ensure we are compliant with legislation to allow continued operation of the DBNGP. The maintenance and revision of the Safety Case ensures we manage our risks appropriately to maintain the integrity and operations of the pipeline. This means it delivers against all relevant vision objectives of delivering for customers, being a good employer and being sustainably cost efficient as it mitigates significant risks to safety, environment, operations and financial performance.
Consistency with the National Gas Rules (NGR)	**NGR 79(1)** – the proposed completion of the Safety Case review is required by legislation and therefore is also consistent with accepted good industry practice. Non-compliance is not an option as we would lose our pipeline operations license. **NGR 79(2)** – the maintenance of our Safety Case is required by law, it is also necessary to provide a safe working environment for all staff and contractors, and critical to the safety of our staff and the public. The safe operation of our pipeline is also essential to maintain and improve the safety of services, maintain the integrity of services and/or comply with a regulatory obligation or requirement. On this basis the proposed expenditure is conforming capex based on the grounds of NGR 79(2)(c)(i), (ii) and (iii). **NGR 74** – the forecast costs are based on the costs associated with the last review, escalated for known increases as required and options consider the asset management requirements as per the latest Asset Management Plan. Cost assessments have been conducted for each option based on the best information available at the time of developing this business case. The estimate has therefore been arrived at on a reasonable basis and represents the best estimate possible in the circumstances.
Stakeholder engagement	Our shippers told us they highly value current levels of reliability and would be concerned if this were to change. They also expect us to maintain a strong focus on operational issues as it is important for reliability and emergency management.
Other relevant documents	This Business Case should be read in conjunction with: • Asset Management Plan - General • Safety Case • Risk Management Policy and Operational Risk Model (together our Risk Management Framework)

1.3 Background

All physical DBNGP assets are managed in accordance with the policies and principles set out in the Asset Management Plan (AMP) which is part of our Asset Management System Framework.

A key principle of the Asset Management System Framework is effective management of asset risks which includes identification of risks and evaluation of the adequacy of controls in terms of physical safeguards and asset maintenance requirements.

The DBNGP is operated and managed in accordance with the *Work Health and Safety Act 2020* and the associated *Work Health and Safety (Petroleum and Geothermal Energy Operations) Regulations 2022*, which require us to develop and maintain a Regulator accepted[1] 'Safety Case' for the pipeline and undertake a comprehensive review and revision on a five-yearly basis.

In addition, Australian Standard AS2885 requires a review of safety management study at a period not exceeding five-years.[2] Safety management studies conducted for the DBNGP make up the key component of the Formal Safety Assessment (FSA) for systematic identification of hazards and control of their risks.

The Safety Case is required to demonstrate our ability to:

- Systematically identify people safety hazards associated with the pipeline
- Assess the risks from the hazards
- SFAIRP minimise the risks to an acceptable level by implementing necessary risk reduction measures

The Safety Case provides detailed descriptions of systems and processes that have been established and employed to ensure safe operation from every aspect, with a focus on management of threats that could lead to a 'Major Accident Event', which are events with the potential for multiple fatalities. This information is presented in three key sections of the Safety Case covering:

1. Physical safeguards incorporated in the design based on standards, codes and hazards identified
2. Key hazards and threats that have been identified from the FSA
3. Systems, policies and procedures in place to ensure effectiveness of safeguards as well as management of residual risks

A comprehensive five-yearly review is required as the DBNGP (as with all pipelines) is exposed to changes, some of which can have a significant impact on the risk levels, effectiveness of safeguards or introduction of new hazards. Such changes could include changes to land use around the pipeline, condition of asset, changes in technology, changes in regulatory requirements, changes in customer requirements and changes in work practices or processes.

[1] The Safety Case is subject to acceptance by the Department of Mines, Energy, Industry Regulation and Safety (DEMIRS) as the Regulator.

[2] Compliance with AS2885 is a condition of the DBNGP operating licences and a requirement of the Safety Case itself.

The current five-yearly review of the Safety Case was approved by the Regulator on 13 June 2022. Note, whilst there have been further revisions since the last five-yearly review due to incorporation of additional assets or changes to operations, PAGEO Regulations require a five-yearly review and revision from the date of the previous 5 yearly revision. Therefore, we are required to submit a revised Safety Case no later than June 2027.

This business case covers the next five-yearly review of the Safety Case which will:

- Analyse changes that have occurred that impact on the safety of the pipeline as well as safety of people, and confirm that the risks are continued to be controlled to ALARP, ensuring no significant new risks from those changes that have not been assessed
- Review technical inspections that have occurred as part of the assessment of remaining life review as required by AS2885
- Collectively update all non-significant changes that previously did not require a revision of the Safety Case to reflect the current practice
- Redemonstrate that risks associated with the safety of the pipeline and safety of people from the pipeline operation are at an acceptable level and ALARP

As part of providing assurance, the revision scope will also include an audit to verify the existence and evaluate the effectiveness of controls for management of hazards to an acceptable. This is a critical aspect of the Safety Case submission process to verify the accuracy of claims made in the document.

1.3.1 Proposed approach to review and revisions

The proposed approach to undertake the review will be broadly consistent with the review undertaken in 2027 as follows:

- Conduct a review of FSA including:
  - Review of changes to the pipeline, land use, crossings, projects, etc
  - Review of recent incidents
  - Review existing safety studies, such as HAZOPs and Pipeline Safety Management Studies
- Review and revise the facility description with input from the FSA review
- Conduct a review of Safety Management System in light of change of appliable legislation and standards, and incorporation of input from the FSA review

1.4 Risk assessment

Risk management is a constant cycle of analysis, treatment, monitoring, reporting and then identifying once again, with a commitment to balance outcomes sought with delivery and cost implications considered and assessed.

Our risk assessment approach focuses on understanding the potential severity of failure events associated with each asset and the likelihood that the event will occur.

Figure 1.1: Risk management principles



Based on these two key inputs, the risk assessment and derived risk rating then guides the actions and activities required to ensure safety and compliance are not compromised, while delivery of this outcome is done as efficiently and effectively as possible.

The risk rating assesses the consequence and likelihood of the risk. The risk of an event associated with failure of an asset is rated based on the combined effect of the consequence and likelihood rating to provide an overall risk rating. This risk rating guides the risk management and mitigation activities and facilitates prioritisation.

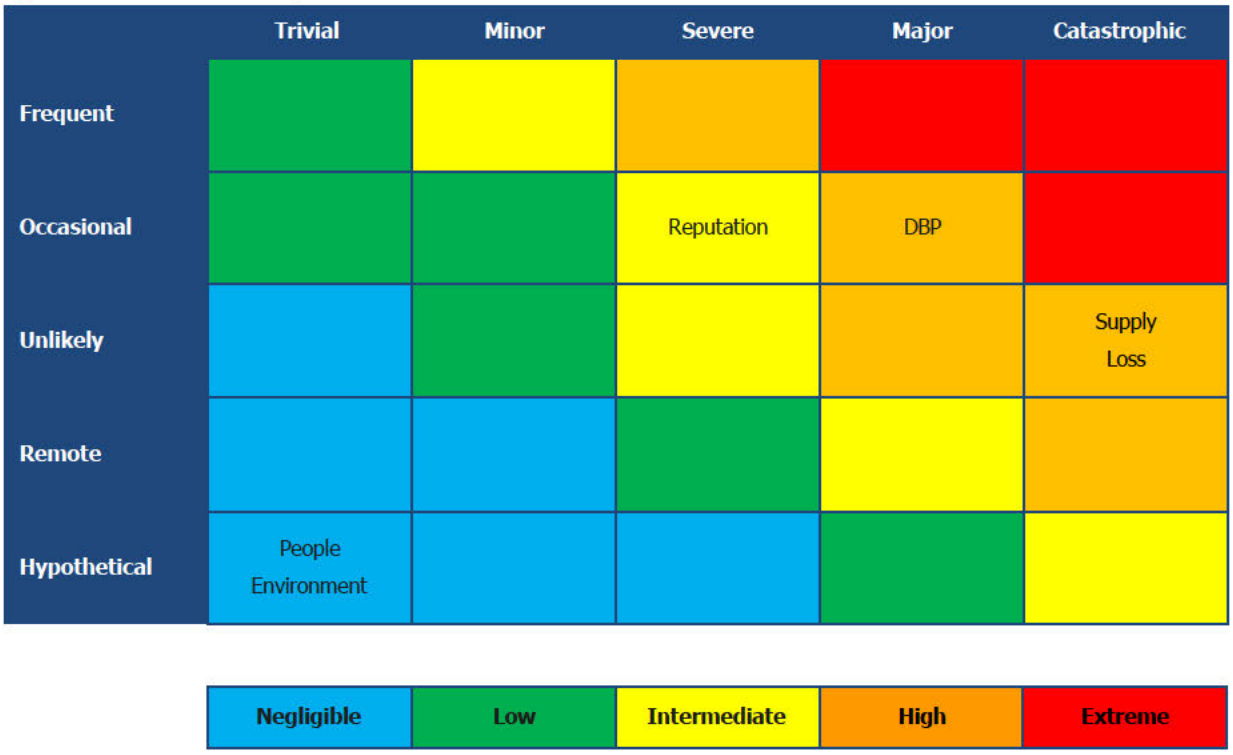
DBP's operational risk framework is based on AS2885 and requires all identified risks ranked as intermediate or above to be addressed. For risks ranked as high DBP must 'Modify the threat, the frequency or the consequence to reduce the risk rank to intermediate or lower'.

Six areas are considered for each type of risk:

1. People – injuries or illness to employees and contractors or members of the public
2. Environmental impact – impact on the surroundings in which the asset operates, including natural, built and Aboriginal cultural heritage, soil, water, vegetation, fauna, air and their interrelationships
3. Supply – disruption in the provision of services/supply, impacting customers
4. Impact on AGIG/DBP – impact on AGIG (DBP) due to restrictions and enforcement, such as regulatory enforcement or legal actions
5. Reputation – impact on stakeholders' views of AGIG (DBP), including personnel, customers, investors, security holders, regulators and the community
6. Loss – financial impact on AGIG (DBP)

The primary risk event is that the Safety Case is not audited and DBP becomes non-compliant with the *Work Health and Safety Act 2020*, which may result in a prohibition notice from the regulator, requiring ceasing of pipeline operations. The overall risk rating of not undertaking the five-yearly Safety Case review is presented in Figure 1.2.

Figure 1.2: Untreated risk rating



The drivers of the risk rating for each area are discussed below.

- **DBP** – Untreated, DBP would be non-compliant with legislative requirements and would risk receiving a prohibition notice or losing its operating licence.
- **Supply** – Untreated, DBP runs the risk of being issued a prohibition notice from the regulator to cease operations. This would impact supply to customers, resulting in outages and significant penalties.
- **Loss** – Not undertaking an independent audit of our FSA could result in a non-compliance with our safety regulation obligations, and the associated penalties and fines.
- **Reputation** – Untreated, DBP would be non-compliant with legislative requirements and would risk losing its operating licence. Even the risk of losing our operating licence would damage DBP's reputation, as well as that of other AGIG businesses.

1.5 Options considered

The options we have considered are:

- Option 1 – Undertake the five-yearly review of the Safety Case
- Option 2 – Do not undertake the five-yearly review of the Safety Case

The options are discussed in the following sections.

1.5.1 Option 1 – Undertake the five-yearly review of the Safety Case

Under this option we would undertake a comprehensive review of the current Safety Case with the view to ensuring there have been no changes that introduce additional risks or heighten

existing risk levels and that the existing controls remains to be operational and effective. Any improvements identified that lead to better safety and/or operational performance will be crystallised in the AMP and relevant safety systems.

1.5.1.1 Advantages and disadvantages

The advantage of option 1 is that it will allow us to remain compliant with our regulatory obligations, as well as providing a reference point for re-assessing our asset management practices and how they meet safety expectations.

The disadvantages of option 1 is the cost of the audit and any subsequent activities to address audit findings.

1.5.1.2 Achievement of objectives

Table 1.4 outlines how this option will support the achievement of our vision objectives in AA6.

Table 1.3: Achieving objectives

Vision objective	Alignment
Delivering for Customers – Public Safety	Y
Delivering for Customers – Reliability	Y
Delivering for Customers – Customer Service	-
A Good Employer – Health and Safety	Y
A Good Employer – Employee Engagement	-
A Good Employer – Skills Development	-
Sustainably Cost Efficient – Working within Industry Benchmarks	Y
Sustainably Cost Efficient – Delivering Profitable Growth	-
Sustainably Cost Efficient – Environmentally and Socially Responsible	Y

The completion of the five-yearly review of the Safety Case will ensure we are compliant with legislation, and our license requirements as a pipeline operator. The maintenance and revision of the Safety Case ensures we manage our risks appropriately to maintain the integrity and operations of the pipeline. This means Option 1 delivers against all relevant vision objectives as it mitigates significant risks to safety, environment, operations and financial performance.

1.5.1.3 Cost assessment

The forecast capex under this option is $570,000 for the AA6 period as shown below.

Table 1.4: Summary of costs, $'000 2024

	2026	2027	2028	2029	2030	Total
Total	-	570	-	-	-	**570**

1.5.1.4 Risk assessment

Table 1.6 shows that undertaking the five-yearly review of the Safety Case in 2027 will modify the threat, the frequency or the consequence to reduce the risk rank to intermediate or lower, as required by our risk management framework.

Table 1.5: Risk rating - Option 1

Risk category	Untreated	Treated
People	Negligible	Negligible
Environmental	Negligible	Negligible
Supply	High	Negligible
DBP	High	Negligible
Reputation	Intermediate	Negligible
Loss	High	Negligible

1.5.2 Option 2 – Do not undertake the five-yearly review of the Safety Case

Under this option we would not undertake a comprehensive review of the current Safety Case in 2027, and would be non-compliant with our legislative obligations as a pipeline operator.

1.5.2.1 Advantages and disadvantages

The advantage of option 2 is that it avoids audit costs and any subsequent revisions to our asset management practices. The disadvantage is that we would remain at risk of non-compliance.

1.5.2.2 Achievement of objectives

Table 1.7 outlines how this option will support the achievement of our vision objectives in AA6.

Table 1.6: Achieving objectives

Vision objective	Alignment
Delivering for Customers – Public Safety	N
Delivering for Customers – Reliability	N
Delivering for Customers – Customer Service	-
A Good Employer – Health and Safety	N
A Good Employer – Employee Engagement	-
A Good Employer – Skills Development	-
Sustainably Cost Efficient – Working within Industry Benchmarks	N
Sustainably Cost Efficient – Delivering Profitable Growth	-
Sustainably Cost Efficient – Environmentally and Socially Responsible	N

This option does not deliver against any of our vision objectives.

1.5.2.3 Cost assessment

There is no upfront capital cost associated with this option.

1.5.2.4 Risk assessment

Option 2 does not 'moderate the threat, the frequency or the consequence to reduce the risk rank to intermediate or lower' as it does not change the risk from the untreated risk.

Table 1.7: Risk rating - Option 2

Risk category	Untreated	Treated
People	Negligible	Negligible
Environmental	Negligible	Negligible
Supply	High	High
DBP	High	High
Reputation	Intermediate	Intermediate
Loss	High	High

1.6 Summary of cost/benefit assessment

To assess the options, the costs, objectives and risk are considered for each option. A summary of the option assessment is shown in Table 1.8.

Table 1.8: Summary of cost/benefit analysis

Option	Achievement of objectives	Cost	Treated risk
Option 1 – Undertake the five-yearly review of the Safety Case	This option achieves our objectives of delivering for customers, being a good employer and being sustainably cost efficient	$0.57 million	Intermediate This option addresses the high risks to DBP/ Reputation
Option 2 – Do not undertake the five-yearly review of the Safety Case	Does not align with any of our objectives of delivering for customers, being a good employer or being sustainably cost efficient	No upfront capital cost	High Does not adequately address identified high and intermediate risks to DBP, People, Reputation, Loss and Supply

1.7 Proposed solution

1.7.1 Why is the recommended option prudent?

Option 1 is the proposed solution as it complies with legislative requirements and supports a prudent approach to safety and risk management. Option 1 also ensures that any changes to operating conditions that occur within the five-year period are taken into consideration in the Safety Case revision at an individual and aggregate level.

Option 3 is not considered viable as it would risk the loss of our pipeline operations licences and damage DBP and more broadly AGIG's reputation.

1.7.2 Estimating the efficient costs

The costs are estimated by using historical costs of undertaking previous reviews and revisions to the Safety Case, with the most recent expenditure incurred in 2021.

The forecast unit rates for all projects/initiatives managed within this program are inclusive of internal labour, external labour/contractors, materials, travel and other costs.

1.7.3 Consistency with the National Gas Rules

Option 1 is the proposed solution as it complies with legislative requirements and supports a prudent approach to safety and risk management. Option 1 also ensures that any changes to operating conditions that occur within the five-year period are taken into consideration in the Safety Case at an individual and aggregate level.

NGR 79(2)

The proposed completion of the Safety Case review is required by legislation and therefore is also consistent with accepted good industry practice. Non-compliance is not an option as we would lose our pipeline operations license.

The Safety Case is the primary document outlining how the operation of the DBNGP is conducted in compliance with legislative obligations under the PPA and MoSoPO Regulations and other license conditions, therefore is consistent with NGR 79(2)(c)(iii) to comply with a regulatory obligation or requirement.

On this basis the proposed expenditure is conforming capex based on the grounds of NGR 79(2)(c)(i), (ii) and (iii).

NGR 79(1)

The proposed solution is prudent, efficient, and consistent with accepted and good industry practice and will achieve the lowest sustainable cost of delivering pipeline services:

- **Prudent** – The expenditure is necessary in order to address the identified ongoing operational requirements of the Safety Case, set in legislation. The proposed expenditure can therefore be seen to be of a nature that would be incurred by a prudent service provider.
- **Efficient** – The expenditure is consistent with other operators and is based on prudent, incremental improvements to the Safety Case, at market tested labour rates. The proposed expenditure can therefore be considered consistent with the expenditure that a prudent service provider acting efficiently would incur.
- **Consistent with accepted and good industry practice** – The proposed expenditure reflects requirements of legislation and therefore good industry practice. The proposed capital expenditure is therefore such as would be incurred by a prudent service provider acting efficiently, in accordance with accepted good industry practice.
- To achieve the **lowest sustainable cost of delivering pipeline services** – The sustainable delivery of services includes reducing risks to ALARP and maintaining reliability of supply, whilst achieving the lowest sustainable costs by undertaking the works in line with the relevant useful life. The revision of the Safety Case facilitates these objectives across our pipeline assets.

NGR 74

The forecast costs are based on the costs associated with the last review, escalated for known increases as required and options consider the asset management requirements as per the latest Asset Management Plan. Cost assessments have been conducted for each option based on the best information available at the time of developing this business case. The estimate has therefore been arrived at on a reasonable basis and represents the best estimate possible in the circumstances.

1.8 Comparison to previous periods

1.8.1 AA6 forecast compared to AA5

In AA6, capital expenditure of $571,000 is forecast for the Safety Case review. Table 1.3 shows the forecast AA6 expenditure compared with actual expenditure in AA5.

Table 1.9: AA6 forecast capital expenditure, compared with AA5 actuals, $'000 2024

	2026	2027	2028	2029	2030	AA6 total	AA5 total	Variance
Capital expenditure	-	570	-	-	-	**570**	**571**	**-1**

1.8.2 AA5 variance

Actual expenditure during the AA5 period was $198,000 higher than the amount determined in the AA5 Final Decision. This is because in its final decision, the ERA reduced the allowance to around $315,000. Actual expenditure was $571,000 which was more in line with our AA5 forecast of $500,000.

Table 1.10: AA5 actual expenditure compared with budget, $'000 2024

	2021	2022	2023	2024	2025	AA5
AA5 actual	571	-	-	-	-	**571**
AA5 approved	372	-	-	-	-	**372**
Variance	**198**	-	-	-	-	**198**

Appendix A Comparison of risk assessments

Summary of risk assessment

Project Ref No	Description	Primary Risk Event	Proposed Action		People	Environmental	Supply	DBP	Reputation	Loss
DBP12	Regulatory	Non-compliance with Work Health and Safety Act 2020 which may result in a Prohibition Notice from the Regular requiring ceasing of pipeline operations	Untreated Risk	Likelihood	Hypothetical	Hypothetical	Unlikely	Occasional	Occasional	Unlikely
				Consequence	Trivial	Trivial	Catastrophic	Major	Severe	Catastrophic
				Risk Level	NEGLIGIBLE	NEGLIGIBLE	HIGH	HIGH	INTERMEDIATE	HIGH
			Option 1 - Undertake the five-yearly review of the Safety Case	Likelihood	Hypothetical	Hypothetical	Hypothetical	Remote	Remote	Hypothetical
				Consequence	Trivial	Trivial	Trivial	Minor	Minor	Trivial
				Risk Level	NEGLIGIBLE	NEGLIGIBLE	NEGLIGIBLE	NEGLIGIBLE	NEGLIGIBLE	NEGLIGIBLE
			Option 2 - Do not undertake the five-yearly review of the Safety Case	Likelihood	Hypothetical	Hypothetical	Unlikely	Occasional	Occasional	Unlikely
				Consequence	Trivial	Trivial	Catastrophic	Major	Severe	Catastrophic
				Risk Level	NEGLIGIBLE	NEGLIGIBLE	HIGH	HIGH	INTERMEDIATE	HIGH

Capex DBP15: Meter stations

1.1 Project approvals

Table 1.1: DBP15 Meter stations – Project approvals

Prepared by	Salman Azhar, Senior Rotating Equipment Engineer, AGIG Mathew Fuller, Senior Corrosion & Protection Engineer, AGIG Vikrant Kumar, Senior Gas Measurement Engineer, AGIG Dave Martin, Head of Mainline, AGIG Jignesh Shah, Senior Electrical Engineer, AGIG Andrew Stanwix, Senior Mechanical Engineer, AGIG
Reviewed by	Jeff Kong, Head of Transmission Asset Strategy, AGIG
Approved by	Tawake Rakai, GM Transmission Asset Management, AGIG

1.2 Project overview

Table 1.2: DBP15 Meter stations – Project overview

Description of problem /opportunity	This business case covers the program of capital works necessary over the next five years to ensure metering facilities continue to operate safely, reliably, and within acceptable risk tolerances. Ongoing investment is also necessary to meet the gas delivery, quality and remote operability requirements as specified by our commercial agreements and relevant legislation such as *Work Health and Safety Act 2020* and associated *Work Health and Safety (Petroleum and Geothermal Energy Operations) Regulations 2022, and Gas Supply (gas quality specifications) Regulations 2010.* We own and operate 58 meter stations along the DBNGP, each designed to meet differing delivery specifications and with varying age profiles, depending on the timing of the associated customers connecting to the system. Meter stations need to be maintained in a way that is compliant with Australian Standards 2885, 3000 and 60079. Meter stations are subject to an ongoing capital works program, designed to ensure they are operating to a level of performance consistent with that expected by customers and shippers. This includes asset replacement, upgrades and preventative maintenance works. The program is predominantly a continuation of ongoing works and maintenance techniques based on asset performance, age and inspection data. However, the program of work for AA6 is larger than that completed during the AA5 period. A cyclical peak in age based end of life replacement projects falls due in AA6, which means work volumes are higher over the next five years. For example, expenditure on heater fuel gas train replacements in AA6 is expected to be around $1.4 million more than in AA5 due to the fact seven heaters are falling due for replacement during the period. In addition to the increase in cyclical asset replacement several new projects are required to address emerging risks. These include gas quality measurement devices and meter recertifications.
Untreated risk	As per risk matrix = High

Options considered	• **Option 1** – Maintain historical (AA5) levels of annual investment for meter station assets ($19.3 million) • **Option 2** - Move to a replacement on failure policy for all meter station assets (~$26 million to $44 million) • **Option 3** - Deliver a prioritised capex program based on the most recent assessment of asset replacement schedules, performance and risk ($32.3 million)
Proposed solution	The proposed solution is Option 3. DBP has developed a bespoke meter station capex program for the next five years, founded on the ongoing cycle of meter station asset replacement and refurbishment activities, including additional capex activities identified and prioritised for the period. The program is informed by the most recent asset performance assessments, end of life asset replacement schedules, gas quality obligations and delivery capability/priority for the AA6 period.
Estimated cost	The forecast direct cost (excluding overheads) during the next five-year period (AA6) is $32.3 million.

Meter Stations	9,089	9,169	5,787	4,191	4,111	**32,349**

Treated risk	As per risk matrix = Intermediate
Variation from AA5	The forecast expenditure for AA6 is ~$13 million more than the forecast expenditure in AA5 of $19.2 million. Most projects in the meter stations portfolio of works are recurrent activities with similar levels of investment. However, the overall increase in AA6 is the result of increasing volumes in a few key existing programs of ongoing works, as well new projects to address emerging issues. Ongoing programs with increasing investments are those such as heater fuel gas train replacements ($1.4 million increase), turbine meter refurbishments ($2.2 million increase) and odorant facility replacements ($1 million increase). New projects are: • Installing moisture, hydrogen sulphide (H2S) and sulphur analysers to monitor gas quality issues ($4.7 million) • Meter recertifications ($1.2 million) • Installing gas chromatographs at producer inlet points ($6.0 million)
Alignment to our vision	Delivering the ongoing meter station capex program aligns with AGIG's vision in relation to: • *Delivering for Customers* – the proposed investment is necessary to ensure integrity of supply and ensure shippers pay the correct amount for use the pipeline • *Sustainably Cost Efficient* – the proposed investment in meter stations ensures the fair and correct billing for all our customers and ensures the ongoing integrity of our metering assets
Consistency with the National Gas Rules (NGR)	**NGR 79(1)** – the proposed asset replacement, proactive works and upgrade program is consistent with accepted good industry practice, several practicable options have been considered, and market/unit rates have been tested to achieve the lowest sustainable cost of providing pipeline services.

	NGR 79(2) – meter station assets are critical to ensure accurate billing and supply to all customers as per their contracts and our legislative requirements, as well as ensuring that gas meets all relevant specifications. Replacing and refurbishing end of life equipment at meter stations ensures safety (particularly in terms of delivered pressure and gas specification), accuracy (in delivery volumes and billing), reliability (of supply, pressure and specification) and compliance (as a gas market participant). Therefore, the proposed expenditure is conforming capex based on each of the grounds of NGR 79(2)(c)(i) to (iii). **NGR 74** – the forecast costs are based on the latest market rate testing, and project options consider the asset management requirements. Cost assessments have been conducted for each option based on the best information available at the time of developing this business case. The estimate has therefore been arrived at on a reasonable basis and represents the best estimate possible in the circumstances.
Stakeholder engagement	Our shippers told us they highly value current levels of reliability and would be concerned if this were to change. They also expect us to maintain a strong focus on operational issues as it is important for reliability and emergency management. The meter stations program comprises ongoing and periodic activities to ensure the integrity of our meter stations. During a series of roundtable meetings, we shared an overview of our AA6 meter stations work program. Shippers were broadly comfortable with the proposed asset replacement program, recognising the cyclical nature of asset replacement. However, several shippers voiced concerns relating to the potential for non-specification gas entering the pipeline. Gas quality carries significant risk for shippers, both in terms of safety and billing accuracy. There was therefore support for DBP's proposal to address concerns by installing additional gas quality measurement devices at meter stations. During our shipper roundtables we were asked where the gas chromatographs would be installed. We clarified that that gas chromatographs would be installed at selected key inlet points to monitor gas quality, ensuring accurate gas quality measurements without needing devices at every outlet. Also, AGIG confirmed it needed continuous monitoring of hydrogen sulphide, total sulphur and water to maintain visibility, provide timely updates, and trace back through gas supply agreements. We acknowledged that sulphur represents a significant threat to health and pipeline integrity, emphasising the need to ensure that gas supplied into the DBNGP does not exceed the gas quality specifications limits.
Other relevant documents	This Business Case should be read in conjunction with: • Asset Management Plan • Asset Management Plan – Metering • Risk Management Policy and Operational Risk Model (together our Risk Management Framework)

1.3 Background and context

All physical DBNGP assets are managed in accordance with the policies and principles of our asset management system framework. A key principle of the asset management system framework is effective management of asset risks. This includes identifying the likelihood and consequences of credible risk events and evaluating the adequacy of controls to mitigate those risks. These controls are supported by the relevant manufacturer's warranty and/or maintenance guidelines.

Meter stations are located at inlet and outlet facilities. They include gas measurement and associated equipment to meet the gas delivery requirements as specified by standard shipper contracts, reference service contracts, relevant legislation, regulatory instruments and Australian Standards. Gas outlet and bi-directional (inlet and outlet) meter stations are normally located on the DBNGP easement or lateral easement immediately prior to the custody transfer point of the transported gas.

Meter station functionality and accuracy is critical to ensure gas is supplied safely as well as all billing data is accurate and reliable. Typically, metering stations contain the following equipment:

- Remote isolation valves
- Gas filtration
- Flow meters
- Flow computer and access to gas chromatograph data
- Pressure control system
- Temperature control system including heaters
- Odorant injection facilities
- Instrumentation
- Communication system
- Power supply (AC, DC and batteries)
- Compound fence, security and earthing

It is a requirement to maintain meter stations appropriately in order to conform to our Shipper Standard Contracts and relevant Australian Standards (including AS2885, AS3000 and AS60079). Further, each facility is bound by a unique set of compliance requirements for safety (as captured by the DBNGP Safety Case), gas specification (odorant content, gas quality, gas pressure, gas temperature) and gas measurement systems (measurement uncertainty and data quality).

All meter station equipment is relied upon to deliver gas at our agreed contractual standard reliability (98% uptime) and with tolerable levels of risk calculated using a hazard and operability studies (HAZOP), fault tree analyses and other our formal risk assessment methods.

Gas metering facilities are also located at the ten compressor stations along the DBNGP and at Kwinana Junction. These metering facilities measure the gas use at the compressor stations as well as mainline and compressor unit gas flows.

Metering equipment is categorised as:

- Gas measurement equipment
- Pressure and flow control
- Gas heating
- Odorant facilities
- Programmable Logic Controllers (PLC)
- Tools and test equipment
- Systems and compliance

Meter Station equipment is located in a facility with fenced compounds. The equipment must be visible to the DBNGP control room via remote terminal units and communication equipment and must have reliable AC and DC power supply to power the equipment installed.

Many of our meter station assets have been in service since the DBNGP first came into operation 40 years ago. Newer meter station assets have been installed as and when new customers have connected to the pipeline. This means the age profile and relative condition of meter station assets varies significantly along the pipeline.

All meter stations are subject to an ongoing capital works program. As assets age, they can deteriorate, which increases the likelihood of underperformance. As such, the ongoing levels of planned, preventative and proactive capex activity typically increases over time. The ongoing program of capex works can have peaks and troughs. The replacement cycles of components and equipment are long and varied depending on the type of asset in question, which means the capex profile of the capital works program will vary as more (or fewer) assets are due for replacement. Where possible we seek to standardise equipment to more efficiently manage asset classes going forward. To smooth the capex profile, our approach is to extend the life of assets where safe and prudent to do so. Where this is not possible, we will replace assets at the end of their technical life.

1.3.1 Identified works for the AA6 period

The meter stations capex program for AA6 is essentially a suite of ongoing works and maintenance techniques based on asset performance, age and inspection data. Recurrent activities include valve certifications, metering replacements and refurbishments, pipework corrosion treatment, facility investment, odorant systems and heater related investments, all of which are continuing from the AA5 period, with forecast unit costs based on historical actuals.

However, a cyclical peak in end of life replacement falls due during the AA6 period, which means work volumes are higher over the next five years. For example, expenditure on heater fuel gas train replacements in AA6 is expected to be around $1.4 million more than in AA5 due to the fact seven heaters are falling due for replacement during the period.

Similarly, odorant expenditure on odorant injections systems is around $1 million higher over the next five years as the existing [redacted] is obsolete and no longer supported by the manufacturer. It must therefore be replaced with an alternative contemporary injection system.

Increases in these areas are offset by reductions in other projects such as addressing corrosion under insulation (~$400,000), inlet and outlet valve replacement (~$1.4 million) and soil/air interface tape removal (~$1 million), plus other site-specific issues that arose during the AA5 period.

A further driver of the increase in meter stations expenditure compared to AA5 actuals are a number of key projects necessary to address emerging issues. These projects are:

- Turbine meter refurbishments ($3.3 million);
- Installing moisture and sulphur analysers to monitor gas quality issues ($4.6 million)
- Valve recertifications ($4.5 million)
- Installing gas chromatographs at producer inlet points ($6.0 million)

Overall, the works program during AA6 will be ~69% larger than that undertaken during AA5, requiring an additional $13 million over the five years.

Table 1.3 summarises the proposed meter stations capital works program for AA6. Each program is described further in the following sections and in Appendix B.

Table 1.3: Summary of the proposed pipeline and MLV capital works program, $'000 2024

Project	2026	2027	2028	2029	2030	Total
Metering replacement and refurbishment	952	952	952	952	952	**4,762**
Heater fuel gas train replacement	550	1,100	1,100	1,100	-	**3,850**
Valve certification	898	898	898	898	898	**4,490**
Pipework corrosion	783	783	783	783	783	**3,915**
Odorant systems	670	-	670	-	1020	**2,360**
Meter certification and recalibration	393	393	393	393	393	**1,965**
Gas chromatograph installation	2,750	3,250	-	-	-	**6,000**
Hazardous areas	65	65	65	65	65	**325**
Gas quality measurement	2,028	1,728	926	-	-	**4,682**
Total	**9,089**	**9,169**	**5,787**	**4,191**	**4,111**	**32,349**

1.3.1.1 Metering replacement and refurbishment

Depending on the meter type, gas meters have a service life of 12 to 15 years. Their service life can be affected by their usage and location, meaning some meters may fail prematurely

while others can operate safely and accurately beyond the OEM's recommended life, subject to testing and recalibration.

We manage our metering assets based on performance and age. This is standard industry practice. As gas meters age they are more likely to fall in accuracy, they are therefore subject to periodic testing to ensure they record the flow of gas within tolerance standards. Where meters are found to fail testing and recalibration, they are either refurbished and put back into service, or replaced with fit-for-purpose new assets. Similarly, where a type of meter has become obsolete – in that the model is no longer supported and spare parts are unavailable – these would also be replaced.

This proactive approach of testing and refurbishment or replacement ahead of failure ensures our metering fleet remains within tolerances and our customers can be confident that billing is accurate.

Table 1.4 summarises the expected meter replacement requirements for the AA5 period.

Table 1.4: Meters replacement/refurbishment requirements, $'000 2024

Project	Driver	Description	Estimated cost
Turbine meter refurbishment	Ongoing from AA5, uplift required for the AA6 period	Turbine meters that can no longer be recertified and shall therefore be replaced. Replacement of [redacted] per year over 10 year period starting from 2026	3,304
Coriolis meter replacement	Ongoing from AA5	Ongoing end of life replacement program to replace [redacted] Coriolis meters per year over the next 5 years.	708
Annual USM meter replacement	Ongoing from AA5	Replacement of [redacted] failed meter per year	750
Total			**4,762**

1.3.1.2 Heater fuel gas train replacement

Gas heaters play an essential role in maintaining gas temperatures above the minimum allowance temperature (freezing point), by warming the gas prior to a pressure cut. Warming the gas prior to a significant pressure cut mitigates the risk of the Joule-Thompson effect reducing the gas temperature too low, such that components and the downstream pipeline may be subject to freezing conditions and damage.

Gas trains play a critical role in gas heaters by ensuring a safe and efficient fuel supply. These systems serve as intermediaries between the fuel source and the burner. Their function is to regulate gas pressure and flow, in addition to providing essential safety mechanisms.

The replacement of heater fuel gas trains is an ongoing and established program of works to meet a 35-year asset life period. To achieve replacement in a timely manner, two units per year to be replaced over 10 years, and is done so in compliance to AS3814 (Type B) standards.

During the AA5 period we replaced two fuel gas trains per year, and we propose to continue this rate during AA6.

Table 1.5: Heater fuel gas train replacements, $'000 2024

Project	Driver	Description	Estimated cost
Heater fuel gas train replacement	Ongoing from AA5	Part of a 35 year replacement program, with a plan to replace averagely 2 heaters a year for the next 10 years, including design compliance to AS3814 (Type B).	3,850

1.3.1.3 Valve certification

Isolation valve and pressure control valve/pressure regulator overhaul is an ongoing program of works that is a continuation of the current levels of activities delivered during AA5. Pressure control valve or pressure control regulators are one of the most crucial equipment, whereby supplied pressure to customers is protected so that potential catastrophic failure of downstream customers is prevented.

Isolation valves serve emergency isolation of gas supply as well as for maintenance purposes to prevent further escalation of an undesired event or to enable our work to be conducted safely.

Valves must be tested to ensure their intended function with respect to safety and operational purposes. Where valves fail testing, they must either be overhauled or replaced as soon as possible. During the AA6 period we have identified ten isolation and control valves that are due for overhaul and or replacement. Table 1.6 shows the estimated cost for AA6.

Table 1.6: Isolation and control vale certification and replacement program, $'000 2024

Project	Driver	Description	Estimated cost
Meter station valves and control valves overhauls	Periodic testing and certification. Ongoing from AA5	Valve overhaul and where not possible/practical, replacement is an essential part of our safety management system to ensure that they remain fit for purpose and we remain compliant with our obligations under the Australian Standards.	4,490

1.3.1.4 Pipework corrosion

Pipework at meter stations is susceptible to corrosion both above and below ground. Though measures are in place to prevent or slow corrosion, we still conduct regular inspections to check that meter station pipework remains fit for purpose, as well as maintain a proactive preventative approach through the use of protective paint. When corrosion is detected through ongoing inspections it is important we replace or repair the affected pipework, as well as investigate cathodic protection measures.

Table 1.7 summarises the meter station pipework repairs and corrosion treatments identified for the next five-year period.

Table 1.7: Meter station pipework repairs and corrosion treatment, $'000 2024

Project	Driver	Description	Estimated cost
Belowground pipework repairs	Safety and integrity-driven program, ongoing from AA5	Repair or replacement of belowground piping at meter stations due to corrosion defects, the estimate is based on historic actuals as well as further investment needed	1,710

		regarding corrosion under insulation and at ground to air transitions.	
Painting of aboveground facility	Safety and integrity-driven program, ongoing from AA5	The continuation of painting four meter stations per year. The four meter stations are selected based on historic averages and is prioritised through ongoing inspections.	1,145
Aboveground pipework repairs	Safety and integrity-driven program, ongoing from AA5	Repair or replacement of aboveground piping at meter stations due to corrosion defects, the estimate is based on historical actuals and the known escalating issue of corrosion on our assets.	570
Earthing replacement and AC mitigation of facilities	Safety and integrity-driven program, ongoing from AA5	Monitoring - measure AC current density and measure corrosion rate with ER probe. 167 Type J (AC mitigation) test points exist, expected 25% require refurbishment.	490
Total			**3,915**

1.3.1.5 Odorant systems

Odorant systems play a crucial role in gas transmission by ensuring gas leaks are detectable downstream of our metering facilities. Detecting gas leaks early enhances safety, prevents accidents, and protects both people and property. During AA5 an [redacted]

This project is to upgrade pressure safety equipment in DBNGP odorant facilities at six sites over a six year period. The solution will be constructed to ensure compliance with Australian Standard 1210 carbon steel vessels, thereby mitigating the risks identified at Pinjarra.

It is operationally and cost efficient to simultaneously improve the overall design during the upgrade to overcome several operational practices that currently expose personnel to unnecessary and potentially hazardous contact with the odorant and its fumes. Therefore, the associated valves, regulators, safety valves and instruments will be replaced at the same time.

Six sites have been identified as below with the following upgrades, with four due in the AA6 period.

Table 1.8: Odorant system proposed sites

Site	Scope	Timing
Ellenbrook MS	Replace odorant storage tank with vessel	2025 (AA5)
Pinjarra Town	Replace odorant storage tank with vessel	2025 (AA5)
Harvey MS	Replace odorant storage tank with vessel	2026
Carnarvon MS	Replace odorant storage tank with vessel	2028
Eradu Rd MS	Install new odorant injection panel and gas panel	2030
Cockburn Cement MS (Pye Rd)	Install new odorant injection panel and gas panel	2030

Table 1.9: Odorant system works, $'000 2024

Project	Driver	Description	AA6 Estimated cost
Removal of high risk odorant units and installation of new systems	Safety-driven program, ongoing from AA5	Removal of 6 odorant storage vessels and replacement with industry standard injection pump systems.	2,360

1.3.1.6 Meter certification and recalibration

Measuring the volume of gas delivered is an essential and critical service we provide to ensure the fair and accurate allocation of gas and billing information on behalf of our shippers. To make certain our fleet of meters are performing within accuracy tolerances, we must calibrate our meters. Meters are sent away to a third party to be recalibrated and certified and purchasing strategic spare meters that can used in the meantime.

Recalibration refers to the process of adjusting a meter to ensure its accuracy. It involves comparing the meter's readings to a known standard and making necessary adjustments to correct any discrepancies.

Recertification is a broader process that involves verifying the entire performance of the meter against its original specifications. This includes recalibration but also encompasses additional tests to ensure the meter meets all required standards and regulations.

Coriolis and ultrasonic meters are our primary metering types at our stations. We recalibrate and recertify Coriolis meters on a 10-year cycle and ultrasonic meters on a 20-year cycle, depending on the equipment configuration, with single meter runs having significantly more frequent recalibration requirements. This is aligned with the original equipment manufacturer advice on the assets' technical lives.

Many of our meters are operating beyond their recalibration/certification cycle. Due to the changing dynamics of gas flows along the pipeline, coupled with the increasing instances of sub-specification gas entering the pipeline, the risk associated with uncertified and improperly calibrated meters has increased in recent years. Therefore, the urgency to conduct this work has increased.

Given the age of the assets, it is likely a significant portion of meters sent away for recalibration and certification may be found to be unserviceable and therefore require replacement. This has been factored into the metering replacement/refurb forecast.

The proposed meter recalibration and certification program is summarised in Table 1.10.

Table 1.10: Meter recalibration and certification program, $'000 2024

Project	Driver	Description	Estimated cost
Meter certification	Meters overdue for certification to ensure measurement accuracy.	Coriolis overhaul and calibration – 3 per year ongoing USM overhaul and calibration – 3 per year ongoing	1,245
Meters for recalibration	Meters overdue for recalibration to ensure measurement accuracy.	Meters to facilitate calibration –	720

Project	Driver	Description	Estimated cost
		Three Coriolis meters with ongoing replacement program - 1 inch, 3 inch and 4 inch. Four ultrasonic meters (USM) with ongoing replacement programs - 4 inch, 6 inch, 8 inch and 10inch models.	
Total			**1,965**

1.3.1.7 Hazardous area inspection and rectification

Hazardous areas around natural gas installations are classified based on the potential risk of gas leaks and the presence of explosive atmospheres. These classifications help in determining the appropriate safety measures and equipment needed to prevent accidents and ensure safe operations around natural gas installations. A review of DBP's facilities in AA4 identified a need for an allowance to inspect and rectify issues as part of routine activities, thereby complying with AS/NZS 60079, which is series of standards that covers the design, selection, and installation of electrical equipment in hazardous areas to prevent fire and explosion risks.

Hazardous area inspection is therefore a current and ongoing project with an allowance to rectify non-conformance issues for hazardous areas, which is based on known current issues and a reasonable estimate of foreseeable costs.

Table 1.11 summarises the facilities upgrades identified for the upcoming five-year period.

Table 1.11: Hazardous area rectification requirements, $'000 2024

Project	Driver	Description	Estimated cost
Hazardous area rectification	Ongoing safety-driven program	This project allowance is to inspect and subsequently rectify non-conformances in Hazardous Areas, and is based on known current issues and a reasonable estimate of foreseeable costs.	325

1.3.1.8 Gas quality measurement

The Gas Supply (Gas Quality Specifications) Regulations 2010 place an obligation on DBP and producers to deliver gas within a strict set of specifications. Allowing non-specification gas to enter the pipeline can cause a range of issues for DBP and for shippers, ranging to billing inaccuracy through to significant asset damage and the potential for serious harm. It is therefore vital DBP has visibility of the quality of gas that enters the pipeline from gas production sites.

Over the past decade, several new gas production facilities have connected to the DBNGP. These include the Gorgon and Wheatstone projects, and the more recent Waitsia facility. Several new facilities are expected to come online over the coming decades, as further onshore and offshore gas reserves are developed.

As the number of gas supply points increases, so too does the potential for non-specification gas to enter the pipeline. Currently, while we have gas chromatographs (GCs) located at compressor stations to measure the hydrocarbon content of co-mingled gas, we do not have

continual monitoring at the inlet points. We rely on spot-checks at inlet meter stations to measure the moisture and sulphur content of gas coming into our pipeline, while the hydrocarbon content – used to calculate energy served and billing – is provided to us by the gas producers, who have GCs on their side of the custody transfer point.

During the AA6 period, our aim is to undertake two projects to address growing risks associated with non-specification gas:

- Asset integrity and safety issues caused by unknown quantities of moisture, sulphur and hydrogen sulphide (H_2S) entering the DBNGP
- Billing inaccuracy due to poor visibility of GC data from producers

The first project is to install moisture analysers and sulphur H_2S analysers at each of the inlet sites except Waitsia, which only requires a moisture analyser. Thes assets will be owned and operated by DBP, allowing constant monitoring of gas quality. This will give us sufficient visibility and control over the quality of gas entering our pipeline, so we can mitigate the potential safety and integrity risks posed by high moisture and sulphur content.

The second project is to install GCs at each meter station to measure the hydrocarbon content of the gas coming into the DBNGP. Although gas producers are required to provide their GC data to us, it is often not provided in a timely manner, which can lead to billing inaccuracy. This concern has been raised to us by shippers. We therefore propose to address this concern by installing our own GCs, on our side of the custody transfer point.

The following table shows the consolidated gas quality measurement program. Note we plan to install the moisture and sulphur/H_2S analysers at a rate of one site per year, meaning we will address five sites during the AA6 period, completing the project by 2032. However, given the concerns raised by shippers on provision of GC data and billing accuracy, we will expedite the new GC installations for earlier in the AA6 period.

Table 1.12: Gas quality measurement requirements

	2026	2027	2028	2029	2030	Total
Install moisture, sulphur/H2S analysers and hut at five sites	2,028	1,728	926	0	0	4,682
Install GCs at KGP, Varanus Island, Pluto	2,750	-	-	-	-	2,750
Install GCs at Macedon, Gorgon, Wheatstone	-	3,250	-	-	-	3,250
Total	**4,778**	**4,978**	**926**	-	-	**10,682**

1.4 Risk assessment

Risk management is a constant cycle of analysis, treatment, monitoring, reporting and then identifying once again, with a commitment to balance outcomes sought with delivery and cost implications considered and assessed.

Our risk assessment approach focuses on understanding the potential severity of failure events associated with each asset and the likelihood that the event will occur.

Figure 1.1: Risk management principles



Based on these two key inputs, the risk assessment and derived risk rating then guides the actions and activities required to ensure safety and compliance are not compromised, while delivery of this outcome is done as efficiently and effectively as possible.

The risk rating assesses the consequence and likelihood of the risk. The risk of an event associated with failure of an asset is rated based on the combined effect of the consequence and likelihood rating to provide an overall risk rating. This risk rating guides the risk management and mitigation activities and facilitates prioritisation.

Our Operational Risk Framework is based on AS/NZS 2885 and requires all identified risks ranked as intermediate or above to be addressed. For risks ranked as high we must *'Modify the threat, the frequency or the consequence to reduce the risk rank to intermediate or lower'.*

Six areas are considered for each type of risk:

1. People – injuries or illness to employees and contractors or members of the public
2. Environmental impact – impact on the surroundings in which the asset operates, including natural, built and Aboriginal cultural heritage, soil, water, vegetation, fauna, air and their interrelationships
3. Supply – disruption in the provision of services/supply, impacting customers
4. Impact on AGIG/DBP – ability of AGIG (DBP) to operate the asset(s) without restrictions due to regulatory enforcement or legal actions
5. Reputation / outrage – impact on stakeholders' views of AGIG (DBP), including personnel, customers, investors, security holders, regulators and the community
6. Loss – financial impact on AGIG (DBP)

Meter stations initiatives have been split into two categories for risk assessment:

1. those related to the integrity of meter stations; and
2. those related to the reliability and performance of meter stations.

The overall risk rating of managing and maintaining the integrity and the reliability and performance of meter stations in line with relevant AMPs is outlined in the following sections.

1.4.1 Integrity – untreated risk

The primary risk event relating to meter station integrity is corrosion in meter station pipework and equipment is undetected causing failure and a loss of containment event. This is a major accident event that can severely harm DBP staff and/or the public, or prevent operation of the meter station for a prolonged period affecting supply to one or more major customers.

The integrity risk rating associated with meter stations is presented in Figure 1.2. If the risk remains untreated, of the six risk areas, two are rated high risk and three are rated intermediate risks. As a result, the meter station integrity-driven initiatives are ranked high risk and high priority.

Figure 1.2: Integrity untreated risk rating – Meter stations

	Trivial	Minor	Severe	Major	Catastrophic
Frequent					
Occasional					
Unlikely		Environmental	Supply Reputation Loss	DBP	
Remote					People
Hypothetical					

Negligible	Low	Intermediate	High	Extreme

Specifically, there is a risk to:

- **DBP** – inaccurate or incorrect data on pipeline operations presents a major risk to effective operations of the DBNGP. It has flow on impact on services to our customers who rely on reliable gas supplies to be available and validated daily
- **People** – ineffective pressure and temperature controls presents a safety risk at customer supply points, which has the potential to cause rupture or explosion and result in fatalities. Reliable odorant injection is important to ensure dose of odorant in the gas streams can be detectable across the whole population that use natural gas
- **Reputation** – inaccurate meter, billing or supply issues, including breach of relevant gas specifications where control valves and associated equipment fail to adequately control temperature due to failure of meter equipment would lead to widespread complaints and anger from shippers and regulators

- **Asset damage** – incorrect pressure or temperature control could lead to over-pressurisation at customer supply points and cause damage to their equipment and failure of equipment could also damage other assets at meter stations
- **Supply** – failure of meter equipment could lead to severe loss of supply interruptions and/or serious incidents

1.4.2 Reliability/Performance – untreated risk

The primary risk event relating to meter station reliability is that obsolete assets at meter stations prevent effective operation of the meter station causing inaccurate billing, gas quality issues, or localised supply issues.

The reliability/performance risk rating associated with meter stations is presented in Figure 1.3.

Figure 1.3: Reliability/performance untreated risk rating – Meter stations

	Trivial	Minor	Severe	Major	Catastrophic
Frequent					
Occasional		Reputation	DBP Supply Loss		
Unlikely					
Remote					
Hypothetical	Environmental		People		

Negligible	Low	Intermediate	High	Extreme

Meter stations reliability/performance driven initiatives are intermediate risk and medium priority, but are key in delivering a capex program which can be considered efficient and achieving the lowest sustainable cost of delivering services.

- **DBP** – meter stations reliability/performance driven initiatives do not pose a threat to the effective operation of the DBNGP, but do expose customers to unacceptable cost consequences through inaccurate metering leading to 'underbilling' as well as non-compliance issues in terms of inaccurate data sent to market
- **Loss** – underperforming or inaccurate meter stations can lead to misrepresentation of pressure or temperature data. This may lead to over-pressurisation at customer supply points

- **Supply** – poor reliability and performance can lead to uncertainty around gas quality, particularly as new supply comes onstream. This can lead to supply interruptions where there are concerns around gas moisture or sulphur content

1.5 Options considered

Different options have been considered to ensure meter station facilities continue to function safely, reliably and accurately. The options are:

- Option 1 – Maintain historical (AA5) levels of annual investment for meter station assets
- Option 2 – Move to a replacement on failure policy for all meter station assets
- Option 3 – Deliver a prioritised capex program based on the most recent assessment of asset replacement schedules, performance and risk

The options are discussed in the following sections.

1.5.1 Option 1 – Continue with historical levels of investment

Under this option we would take the rolling average of annual spend for the past five years and apply this average to each year moving forward. The work program would be prioritised by risk, with annual expenditure capped at historical levels (adjusted for inflation). Only projects that fall within the annual cap would be delivered.

1.5.1.1 Advantages and disadvantages

This option has the advantage of providing absolute clarity to DBP and its customers of annual expenditure and resulting impact on tariffs. It would also place greater onus on the business prioritise only the very highest risk treatments.

A disadvantage of this option is that it would artificially constrain the work program to levels below that required to address identified meter station risks within a reasonable timeframe. Under this option we would deliver a capital program within the expenditure limits set during AA5 rather than consistent with current requirements.

The average annual spend for the current regulatory period is approximately $3.9 million per year, with the forward forecast for the AA6 period being $5.9 million per year. If we constrained the meter stations works program to $3.9 million per year, at a high level it means approximately 60% of the proposed project expenditure would need to be deferred. We would of course reprioritise works to make sure the highest risk / most urgent projects were delivered; however the size of the expenditure reduction means some high/intermediate risks would likely not be addressed within the capex allowance.

Further, deferring works to later access arrangement periods only serves to delay investment and increase the risk being carried by DBP. Investment in items such as metering assets are essential to the ongoing operation of the pipeline. Any volumes not delivered during the AA6 period would still need to be delivered during the following period – potentially at a higher cost.

Option 1 may also prove too inflexible if and when unforeseen projects arise during the period.

1.5.1.2 Achievement of objectives

Table 1.13 summarises how Option 1 aligns with AGIG's vision objectives.

Table 1.13: Alignment with our vision – Option 1

Vision objective	Alignment
Delivering for Customers – Public Safety	N
Delivering for Customers - Reliability	N
Delivering for Customers – Customer Service	N
A Good Employer – Health and Safety	N
A Good Employer – Employee Engagement	-
A Good Employer – Skills Development	-
Sustainably Cost Efficient – Working within Industry Benchmarks	Y
Sustainably Cost Efficient – Delivering Profitable Growth	-
Sustainably Cost Efficient – Environmentally and Socially Responsible	N

Option 1 would fail to address all the end of life and obsolescence asset management objectives for meter station assets. All risks ranked high would not be addressed during the period. This is inconsistent with our risk management framework. The highest priority public safety risks would, however, be prioritised.

It is expected that as metering facilities age there is general trend towards increasing proactive capital investment to maintain integrity and performance. However, a lack continuous improvement in metering accuracy strategies through calibration and certification, as well as underinvestment in gas quality measurement aligned with industry good practice, would not meet the expectations of our shippers and customers.

As a result, under Option 1 we would not be delivering for customers in terms of safety, reliability or performance. Deferring works to address high or intermediate risks would not be considered socially responsible or consistent with industry benchmarks pertaining to safety, gas measurement or gas quality. This option is therefore not sustainably cost efficient.

1.5.1.3 Cost assessment

Adopting this option would curtail more than $10 million of planned works in AA6 to artificially match AA5 expenditure. The potential outcomes of this approach are summarised below.

- Sub-optimal solutions, with all replacement programs and initiatives partially completed to phase into AA6
- Splitting works can cause project execution inefficiencies and rework
- Increase reliability risks as critical works are delayed
- Potential for ongoing non-compliance with legislated gas quality standards
- Metering practices for certification and calibration not aligned with industry good practice

- Reduced scoping of the cathodic protection program challenges the intent of the Safety Case and our licence with resulting expensive reactive repairs. By way of example, the cost for a hot tap to remove a small corrosion defect costs around $300,000

The meter station programs relate to reliability and performance of each station, which is critical to the accurate measurement and billing on behalf of shippers. These are engineering solutions that provide assurance to the integrity of the assets as well as billing information. Deferral of critical works that are required to secure the meter station design life and measure energy flow accurately may result in the inaccurate allocation of costs to shippers and customers.

1.5.1.4 Risk assessment

The following table shows the residual integrity and performance/reliability risk associated with meter stations if the meter stations capital works program is simply maintained at the current historical level.

Table 1.14: Risk assessment – Option 1

Risk category	Integrity		Performance/Reliability	
	Untreated	Treated	Untreated	Treated
People	High	Intermediate	Negligible	Negligible
Environmental	Low	Negligible	Negligible	Negligible
Supply	Intermediate	Intermediate	Intermediate	Intermediate
DBP	High	Intermediate	Intermediate	Intermediate
Reputation	Intermediate	Intermediate	Low	Low
Loss	Intermediate	Intermediate	Intermediate	Intermediate

While Option 1 would reduce the integrity risk to intermediate, this does not reduce the risk to as low as reasonably practicable (ALARP), which is a requirement of our risk management framework. Option 1 does not address the performance/reliability risk.

1.5.2 Option 2 – Move to a replacement on failure policy

With this option, the volume of replacement undertaken in AA6 would be directly driven by the number of breakages/outages experienced on these meter assets, with a reactive rather than proactive approach to the investment in assets. The rate of required repairs would increase as the volume of activity and failures increase.

This option assumes no preventative or performance improvement investment occurs.

1.5.2.1 Advantages and disadvantages

An advantage of Option 2 is that it has the lowest upfront capital cost. It also has the potential to be the lowest overall cost across the AA6 period, depending on how many and what type of assets fail.

The major disadvantage of this reactive approach is unpredictability. It is not possible to predict with accuracy the number of failures that will occur over the next five years. This means it is extremely challenging to budget time and resources for the period, as well as manage inventory costs. The reactive nature of the work also means uncertainty for our customers in terms of cost and potential supply impact.

Given the typically higher cost of reactive replacement compared with proactive replacement (potentially two to five times higher per asset depending on asset type and location), the potential cost of works during AA6 is significantly greater than the proposed works program if widespread asset failure arises.

Should asset failure be lower than expected, while the overall cost of reactive works may be less than forecast, the ongoing meter station works program identified in the AMP would not be delivered in full. The works program identified in the AMP is the prudent level of activity required to manage the integrity and reliability/performance risk associated with meter stations. Therefore, all the high and intermediate risks identified would not be addressed until reactive replacement of capital assets was completed.

Neither of these outcomes are tolerable for DBP or customers. An entirely reactive 'replace on failure' approach to managing meter sets is not consistent with good asset management practice, and therefore not consistent with NGR 79(1)(a).

A replace on failure strategy is also not prudent for our customers, who value current levels of safety and reliability, as well as the accuracy and timeliness with which DBP provides data for billing. Therefore, as a prudent asset manager, DBP would not recommend moving to a replacement on failure policy for the DBNGP meter station assets.

1.5.2.2 Achievement of objectives

Table 1.15 summarises how moving to a reactive meter stations capital works program will support the achievement of our vision objectives in AA6.

Table 1.15: Alignment with vision – Option 2

Vision objective	Alignment
Delivering for Customers – Public Safety	N
Delivering for Customers - Reliability	N
Delivering for Customers – Customer Service	N
A Good Employer – Health and Safety	N
A Good Employer – Employee Engagement	-
A Good Employer – Skills Development	-
Sustainably Cost Efficient – Working within Industry Benchmarks	N
Sustainably Cost Efficient – Delivering Profitable Growth	-
Sustainably Cost Efficient – Environmentally and Socially Responsible	N

Metering assets are critical to the safe, reliable and accurate delivery of gas from producers into the DBNGP at inlet points, to customer outlet points as well as other pipelines and the gas distribution network in Perth.

The option to move to a replacement on failure policy for all metering assets would significantly impact supply, billing, our compliance with its contractual and regulatory obligations, and would

negatively impact our transmission operations workforce (in terms of health and safety and efficient utilisation). It would therefore not meet our objectives of delivering for customers, being a good employer and being sustainably cost efficient.

This approach will also cause non-compliance to the required standards AS60079, AS3000 and AS2885. Failure of pipework and other pressure containing equipment (heaters, filters) could lead to catastrophic failures, potential major asset damage and serious harm.

1.5.2.3 Cost assessment

With this option, the costs incurred for meter station assets would likely be significantly higher than a proactive work program. In addition, allowing the assets to fail prior to replacement would potentially lead to the following outcomes (and associated costs):

- Potential manning of delivery points
- Penalties where breaches associated with Gas Standards Act and Regulations as a gas supplier not meeting its obligation to supply gas at the right standards of pressure, temperature and smell (odorant)
- Inaccurate billing data leading to errors in invoicing for gas supplied
- Breaches of the gas specification due to inaccurate gas analysis by defective or gas chromatographs or gas quality measurement equipment that do not measure the full requirements of the standard
- Contractual breaches due to supply interruption, resulting in substantial penalties;
- Increased likelihood of overtime and shift penalties (planned activities allow us and our contractors to optimise staff rostering)
- Increased unit costs including additional costs for expediated freight
- Additional costs for pulling crews off other planned work to address a corrective maintenance requirement, and then remobilising to complete the planned work they were doing

While it is not possible to estimate the exact degree of asset failure that will occur during the AA6 period, a broad cost estimate can be developed based by escalating the cost of the proposed works program if delivered reactively. It is a generally accepted asset management principle that delivery of works reactively is significantly more expensive than undertaking proactive or preventative works. Various sources cite the increase in reactive costs compared with proactive can be between two and five times[1] more than undertaking the same works proactively. The escalation amount for the DBNGP would vary depending on the type (and scarcity) of asset being replaced, as well as the remoteness of the asset from the Perth Metropolitan area.

To develop a conservative estimate of what a reactive approach may cost, we have assumed an average increase of only 1.5 times the material and labour/contractor costs if projects were to be undertaken reactively (i.e. where assets fail or untenable risks arise). Applying this x1.5

[1] Marshall Institute, Omega engineering, ARMS reliability.

escalation factor to the entire program results in a cost of $44 million if all works were delivered reactively.

However, the above estimate assumes the meter stations works program would still be delivered in full. Under a purely reactive-only program, we would not conduct proactive activities such as painting facilities, earthing, meter calibration/recertification, and hazardous area rectification. We would also exclude costs to install gas quality measurement devices at inlet sites. Work would be constrained to reactive end-of-life replacements only, meaning assets such as odorant systems, heater gas fuel trains, pipework, valves, and various meter types would only be replaced once they have failed.

If we exclude proactive works from the meter stations program, a reactive-only program would still cost approximately $26.6 million, and would deliver only a fraction of the proposed AMP requirements (see Table 1.16).

Table 1.16: Estimated cost of reactive program, $'000 2024

Project	AA6 proposed works program	Reactive program, escalation x1.5
Metering replacement and refurbishment	4,762	7,151
Heater fuel gas train replacement	3,850	5,775
Valve certification	4,490	6,735
Pipework corrosion*	3,915	3,420
Odorant systems	2,360	3,540
Meter certification and recalibration*	1,965	0
Hazardous areas*	325	0
Gas quality measurement*	10,682	0
Total	**32,349**	**26,613**

* Proactive works excluded for forecasting purposes. Totals may not sum due to rounding.

Consideration is also not made as to the impact of future costs by taking a reactive maintenance approach for a five-year period, with future costs expected to escalate in remediated issues from poor asset management practices.

In any event, costs associated with a predominantly replace on failure works program would not *be such as 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.*[2]

Table 1.17: Comparison of reactive cost options, $'000 2024

Program category	AA6 proposed works program	100% reactive program Escalation x 1.5	Reactive program, excluding meter certification/recalibration, hazardous areas, and proactive CP activities Escalation x1.5
Meter stations	32,349	48,524	26,613

[2] NGR 79(1)(a)

1.5.2.4 Risk assessment

The following table shows the residual integrity and performance/reliability risk associated with meter stations if the meter stations capital works program is delivered on a replace on failure approach.

Table 1.18: Risk assessment – Option 2

Risk category	Integrity		Performance/Reliability	
	Untreated	Treated	Untreated	Treated
People	High	High	Negligible	Negligible
Environmental	Low	Low	Negligible	Negligible
Supply	Intermediate	Intermediate	Intermediate	Intermediate
DBP	High	High	Intermediate	Intermediate
Reputation	Intermediate	Intermediate	Low	Low
Loss	Intermediate	Intermediate	Intermediate	Intermediate

Essentially, Option 2 would not address the current risk effectively and therefore the overall treated risk rating would stay the same as if the risk was to remain untreated.

1.5.3 Option 3 – Deliver a prioritised capex program based on the most recent assessment of asset replacement schedules, performance and risk

This approach assumes that all identified works are undertaken, both preventative and corrective, to properly maintain and operate meter stations. The program of work identified under Option 3 is based on contemporary asset performance and age data, as well as delivery capacity and a risk prioritisation. The entire portfolio of project works for a minimum 5-10 year period is assessed as part of project portfolio risk ranking, which includes all undelivered projects from AA5. The portfolio is reassessed with new asset information and performance, along with consideration of new technologies or other delivery options to address the risks.

This option also adopts a balanced approach to preventative and corrective activities consistent with the Safety Case and good industry practice. Option 3 considers deliverability and projects that have been deferred from AA5.

With this option, the volume of work undertaken in AA6 would be based on the criteria identified in the AMP, guided by the manufacturers' specifications for optimised maintenance of the asset and based on our operational requirements and billing cycles. We will apply good asset management practice and adopting emerging techniques/technologies where appropriate

A small number of replacements and refurbishments would be undertaken utilising new or emerging techniques and technologies in line with the continuous improvement objectives in our asset management framework.

1.5.3.1 Advantage and disadvantages

The major advantage with this approach is that it will enable all identified high and intermediate risks be addressed by the end of the AA6 period. Importantly, it reflects a works program based on the latest information, and affords opportunity to re-evaluate projects that were not delivered during the AA5 period.

While the overall cost is higher than that incurred during the AA5 period, the whole-of-portfolio approach under Option 3 provides sufficient flexibility to accommodate unforeseen projects (for example due to failure or third party impacts) within the overall forecast capex allowance.

The main disadvantage of this approach is the increase in costs compared with AA6.

1.5.3.2 Achievement of objectives

Table 1.19 summarises how Option 3 aligns with AGIG's vision objectives.

Table 1.19: Alignment with our vision – Option 3

Vision objective	Alignment
Delivering for Customers – Public Safety	Y
Delivering for Customers - Reliability	Y
Delivering for Customers – Customer Service	Y
A Good Employer – Health and Safety	Y
A Good Employer – Employee Engagement	-
A Good Employer – Skills Development	-
Sustainably Cost Efficient – Working within Industry Benchmarks	Y
Sustainably Cost Efficient – Delivering Profitable Growth	-
Sustainably Cost Efficient – Environmentally and Socially Responsible	Y

Option 3 would address the assets which need to be replaced in the period as they reach the end of their technical design life through age, performance or obsolescence, thereby minimising risk associated with a potential failure and any subsequent potential impact on the quality (accuracy and timeliness) of data available to support decisions relating to asset integrity, gas quality and billing.

This option delivers for customers in terms of safety, reliability and service, supports a good employer in terms of health and safety, and skills development and is sustainably cost efficient.

1.5.3.3 Cost assessment

The estimated cost of this option is $32.3 million (see Table 1.4). By adopting a proactive, planned approach to the management of these assets, we can best manage the efficient delivery of the program, minimising the need for unplanned and disruptive repair work on the network, which might otherwise result in a failure, incorrect gas measurement or production loss.

1.5.3.4 Risk assessment

The following table shows the residual integrity and performance/reliability risk associated with meter stations if the meter stations capital works program is delivered as per the prioritised capex program outlined in Option 3.

Table 1.20 : Risk Assessment – Option 3

Risk category	Integrity		Performance/Reliability	
	Untreated	Treated	Untreated	Treated
People	High	Intermediate	Negligible	Negligible
Environmental	Low	Negligible	Negligible	Negligible
Supply	Intermediate	Low	Intermediate	Low
DBP	High	Low	Intermediate	Low
Reputation	Intermediate	Low	Low	Negligible
Loss	Intermediate	Low	Intermediate	Low

This option represents the lowest treated risk, as it is targeting the issues and associated risks identified in the AMP. It is therefore consistent with DBP's risk management framework and the only option whereby we can maintain supply and achieve a 98% reliability contractual obligation at an efficient cost.

1.6 Summary of options assessment

To assess the options, the costs, objectives and risk are considered for each option. A summary of the options assessment is shown in Table 1.21.

Table 1.21: Summary of options

Option	Achievement of objectives	Cost	Treated risk (integrity/reliability)
Option 1	Does not deliver for customers, fails to achieve reliability standards	$19.3 million	High / Intermediate This option does not adequately address the identified risks
Option 2	Does not deliver for customers, fails to achieve reliability standards	$26 million - $44 million	High / Intermediate This option does not adequately address the identified risks
Option 3	Achieves all relevant aspects of vision to deliver for customers, be a good employer and be sustainably cost efficient	$32.3 million	Intermediate / Low This option appropriately addresses the identified risks is considered ALARP

1.7 Proposed solution

1.7.1 Why is the recommended option prudent?

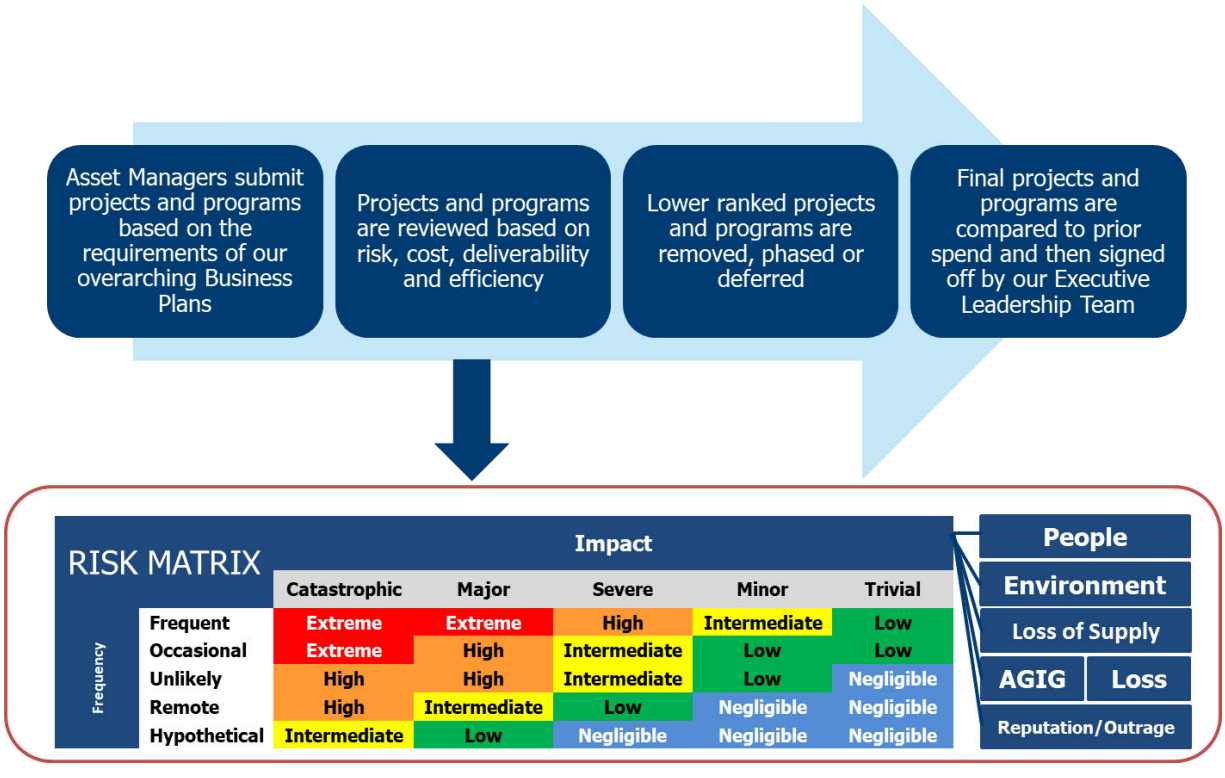
Option 3 is the recommended solution due to its alignment with our risk management framework, asset management principles and the relevant manufacturers' specification. It also follows good industry practice in relation to metering across the utility sector and supports continuous improvement, whilst adhering to standards as required by the pipeline licence, and Safety Case requirements.

Most significantly, Option 3 will achieve the necessary risk and customer outcomes for the lowest sustainable cost and without materially impacting haulage tariffs.

This option is also preferred as an appropriate approach to maintaining compliance with Australian Standards and site-specific compliance requirements whilst also ensuring the accuracy of customer billing, and overall safety and quality of supply.

Figure 1.4 summarises how we develop our capital expenditure plans, and highlights that risks identified as intermediate or higher are prioritised, with lower risks removed or deferred from the capital program. Option 3 is consistent with this approach as it focuses on treating all intermediate or higher risks as soon as is reasonably practicable (by the end of the AA6 period). Option 1 and 2 would not address the identified risks within the AA6 period and would increase the overall risk associated with the DBNGP as projects get pushed into AA7, leading to an even larger capital works program in the future.

Figure 1.4: Our capex plan development process



Failure to proactively plan for the management and maintenance of the meter station assets could result in catastrophic failure of an asset which would result in an undesired safety impact

on people, loss of gas to customers, site metering and quality control, excessive operating expenditure and impact on reliability as well as the ability to meet contractual obligations.

1.7.2 Estimating the efficient costs

Unit rates used for all projects managed within this program of include the internal labour, external labour and materials/other costs forecast. Where possible, the unit rate used to determine the cost of the program in AA6 is based on a three-year average actual cost incurred by us in AA5. Where this has not been possible, due to infrequent or new activities identified for AA6, these activities have been estimated based on the historical cost of the same or similar program of work.

One-off activities, such as a major asset replacement or pipeline refiguration project, are usually determined through market testing and where practicable, a competitive tender process. Where a competitive tender has not yet occurred, the associated cost is estimated in two ways:

1 Where the work is sufficiently comparable to other work – the most recent historical average unit rate or actual cost and matched to similar locations where the program is delivered externally

2 Where the work is unique or greater than $5 million – an estimate is developed based on internal estimates from different engineering disciplines or from external engineering specialists

Specialist engineering disciplines, procurement and construction management activities are provided utilising internal resources, supplemented by external specialist input as required.

Key assumptions in the cost estimation for the meter stations program include:

- Costs are based on historical expenditure noting that these works are not new
- Estimates derived from contractual rates of vendors to be utilised
- Resource costs based on other similar projects ongoing at present or in previous AA periods
- Original equipment manufacturer contractual rates for spares and labour that are part of our services agreements

1.7.3 Consistency with the National Gas Rules

NGR 79(1)

The proactive replacement and refurbishment of meter stations assets is consistent with the requirements of NGR 79(1)(a). Specifically, we consider that the capital expenditure is:

- **Prudent** – the expenditure is necessary in order to deliver gas safely and reliably to customer outlet points, as well as to ensure accurate measurement, gas quality and billing of services occurs. The proposed expenditure can therefore be seen to be of a nature that would be incurred by a prudent service provider
- **Efficient** – the forecast expenditure is based on historical average actuals and tender contract values. The proposed expenditure can therefore be considered consistent with the expenditure that a prudent service provider acting efficiently would incur

- **Consistent with accepted and good industry practice** – the proposed expenditure follows good industry practice by ensuring that critical infrastructure is maintained within its useful life and to current technological standards, continuous improvement in metering and gas quality will align us with good asset management and measurement practices and therefore the proposed capital expenditure is such as would be incurred by a prudent service provider acting efficiently, in accordance with accepted good industry practice
- To achieve **the lowest sustainable cost of delivering pipeline services** – The sustainable delivery of services includes reducing risks to as low as reasonably practicable and maintaining reliability of supply, whilst achieving the lowest sustainable costs by undertaking the works in line with the relevant useful life and adopting proven new and emerging technologies and techniques that reduce long-term costs

NGR 79(2)

Undertaking proactive replacement and upgrades at meter stations is necessary to maintain the safety of services (e.g. pressure regulating and over-pressure protection equipment), maintain the integrity of services (e.g. earthing and telemetry replacements, piping repairs) and to comply with regulatory obligations (e.g. gas chromatographs, meter replacements and refurbishments). Therefore, this capex is consistent with NGR 79(2)(c)(i) to (iii).

NGR 74

The forecast costs in this business case are based on the latest market rate testing, and project options consider the asset management requirements as per the latest AMP. Cost assessments have been conducted for each option based on the best information available at the time of developing this business case. The estimate has therefore been arrived at on a reasonable basis and represents the best estimate possible in the circumstances.

1.8 Comparison to previous periods

1.8.1 AA6 forecast compared to AA5

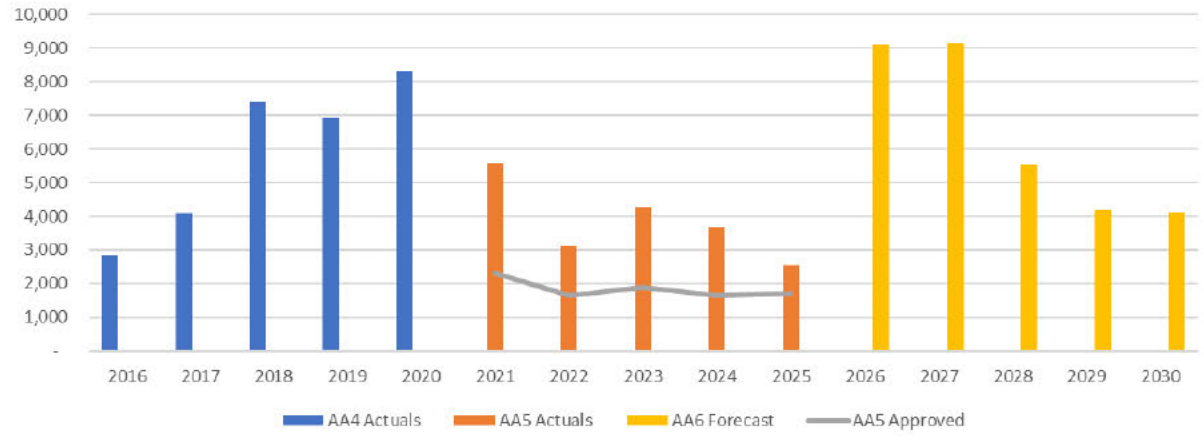
In AA6, capital expenditure of $32.3 million is forecast for the meter station program. Table 1.22 shows the forecast AA6 expenditure compared with actual expenditure in AA5.

Table 1.22: AA5 forecast capital expenditure, compared with AA5 actual, $'000 2024

Forecast spend ($'000)	2026	2027	2028	2029	2030	AA6	AA5 total	Variance
Capital expenditure	9,089	9,169	5,787	4,191	4,111	32,349	**19,178**	13,170

The increase in capital expenditure reflects the cyclical peak in age-based end of life replacement and metering projects during AA6 that did not occur during the current period, as well as incremental increases in projects that have already commenced during AA5, but with larger scopes or volumes to reflect the increasing asset risk. The cyclical nature of investment in meter stations can be seen in Figure 1.5.

Figure 1.5: Comparison of meter stations forecast and historical capital expenditure



Investment in equipment, such as gas quality measurement devices (chromatographs and moisture and sulphur analysers) are also driving a significant portion of the increase ($10.5 million). These are new assets, required to ensure DBP can deliver against its safety and contractual obligations, and therefore do not feature in historical expenditure.

1.8.2 AA5 variance

Actual expenditure by the end of the AA5 period is estimated to $9.8 million higher than the amount determined in the AA5 Final Decision.

Table 1.23: AA5 actual expenditure compared with budget, , $'000 2024

Actual v budget ($'000)	2021	2022	2023	2024	2025	AA5
AA5 actual	5,569	3,123	4,260	3,672	2,555	19,178
AA5 approved	2,326	1,658	1,903	1,660	1,875	9,423
Variance						**9,756**

The key projects that resulted in the overspend to allowance were:

- Alcoa metering station inlet and outlet valve replacements and pipeline modifications, which were unforeseen and required the investment of $3.6 million to rectify
- Odorant facility upgrades were identified during the AA5 period and works had to commence immediately to address the risk, therefore $1.4 million has been spent to date and the program is continuing into AA6
- Corrosion under insulation was an emerging challenge during the period and required inspection and rectification at insulation points as well as air to ground interface areas that would also be obscured from visual inspection - $1.4 million
- Turbine meters became uncertifiable during the period and therefore we had to change our strategy and units had to be replaced in order for us to remain compliant with fit for purpose meters, this added an incremental $1.1 million to the program
- Cockburn Power Station required the installation of an ultrasonic meter to replace the underperforming in-situ meter, which cost a one off unforeseen $700,000k during the period

Appendix A Risk assessment

Summary of meter stations risk assessment - integrity

Project Ref No	Description	Primary Risk Event	Proposed Action		People	Environmental	Supply	DBP	Reputation	Loss
DBP15	Meter stations	Corrosion in meter station pipework and equipement is undetected causing failure and a loss of containement event. This is a a Major Accident Event and can severely harm DBP staff and/or the public, or prevents operation of the effected meter station for a prolonged period affecting supply to one or more major customers.	Untreated Risk	Likelihood	Remote	Unlikely	Unlikely	Unlikely	Unlikely	Unlikely
				Consequence	Catastrophic	Minor	Severe	Major	Severe	Severe
				Risk Level	HIGH	LOW	INTERMEDIATE	HIGH	INTERMEDIATE	INTERMEDIATE
			Option 1 – Maintain historical (AA5) levels of annual investment for meter station assets	Likelihood	Hypothetical	Remote	Unlikely	Unlikely	Unlikely	Unlikely
				Consequence	Catastrophic	Minor	Severe	Severe	Severe	Severe
				Risk Level	INTERMEDIATE	NEGLIGIBLE	INTERMEDIATE	INTERMEDIATE	INTERMEDIATE	INTERMEDIATE
			Option 2 – Move to a replacement on failure policy for all meter station assets	Likelihood	Remote	Unlikely	Unlikely	Unlikely	Unlikely	Unlikely
				Consequence	Catastrophic	Minor	Severe	Major	Severe	Severe
				Risk Level	HIGH	LOW	INTERMEDIATE	HIGH	INTERMEDIATE	INTERMEDIATE
			Option 3 – Deliver a prioritised capex program based on the most recent assessment of asset replacement schedules, performance and risk	Likelihood	Hypothetical	Remote	Remote	Remote	Remote	Remote
				Consequence	Catastrophic	Minor	Severe	Severe	Severe	Severe
				Risk Level	INTERMEDIATE	NEGLIGIBLE	LOW	LOW	LOW	LOW

Summary of meter stations risk assessment – reliability & performance

Project Ref No	Description	Primary Risk Event	Proposed Action		People	Environmental	Supply	DBP	Outrage	Asset
DBP15	Meter stations	Obsolete assets at meter stations prevent effective operation of the meter station causing innacruate billing, gas quality issues, or localised supply issues.	Untreated Risk	Likelihood	Hypothetical	Hypothetical	Occasional	Occasional	Occasional	Occasional
				Consequence	Severe	Trivial	Severe	Severe	Minor	Severe
				Risk Level	NEGLIGIBLE	NEGLIGIBLE	INTERMEDIATE	INTERMEDIATE	LOW	INTERMEDIATE
			Option 1 – Maintain historical (AA5) levels of annual investment for meter station assets	Likelihood	Hypothetical	Hypothetical	Unlikely	Unlikely	Unlikely	Unlikely
				Consequence	Severe	Trivial	Severe	Severe	Minor	Severe
				Risk Level	NEGLIGIBLE	NEGLIGIBLE	INTERMEDIATE	INTERMEDIATE	LOW	INTERMEDIATE
			Option 2 – Move to a replacement on failure policy for all meter station assets	Likelihood	Hypothetical	Hypothetical	Occasional	Occasional	Occasional	Occasional
				Consequence	Severe	Trivial	Severe	Severe	Minor	Severe
				Risk Level	NEGLIGIBLE	NEGLIGIBLE	INTERMEDIATE	INTERMEDIATE	LOW	INTERMEDIATE
			Option 3 – Deliver a prioritised capex program based on the most recent assessment of asset replacement schedules, performance and risk	Likelihood	Hypothetical	Hypothetical	Remote	Remote	Remote	Remote
				Consequence	Trivial	Trivial	Severe	Severe	Minor	Severe
				Risk Level	NEGLIGIBLE	NEGLIGIBLE	LOW	LOW	NEGLIGIBLE	LOW

Appendix B Project details

B.1 Metering equipment replacement and refurbishment

Metering assets have a useful working life which is managed by performance and age. As gas meters age they trend to become less accurately than the gas metering standards allow, and prior to breaching allowable levels of accuracy, we replace or refurbish meters such that they remain within the tolerance standard.

This same asset management principle applies to Coriolis, ultrasonic and turbine meters, with an ongoing and established program of replacement that stays ahead of metering inaccuracies that would be outside of tolerance levels, and would therefore not be meeting our customer expectations.

Table Appendix B.1: Metering equipment replacement and refurb program

Metering equipment type	Strategy	2026	2027	2028	2029	2030	Total
Coriolis meter	Replace	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Turbine meter	Replace	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Ultrasonic meter	Replace	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

Costs have been developed using actual unit rates during the AA5 period for Coriolis, turbine and ultrasonic meters.

As an example of our ageing fleet, the following table summarises our turbine meter population and age. Asset life extension is no longer feasible for these assets.

Table Appendix B.2: Turbine meter ages

LOCATION	RUN	MODEL	SIZE	CLASS	DATE INSTALLED
ALCOA KWINANA	3	G2500	300	600	3/21/1997
ALCOA KWINANA	1	G2500	300	600	2/24/1994
ALCOA PINJARRA	1	G2500	300	600	10/13/1998
ALCOA WAGERUP	3	G2500	300	600	2/11/1991
ALCOA WAGERUP	1	G2500	300	600	1/19/1995
ALCOA WAGERUP	2	G2500	300	600	1/20/1992
CAVERSHAM	1	G400	150	600	7/6/2000
CAVERSHAM	2	G650	150	600	9/26/1986
CS01	UNIT 1	G100	80	600	4/16/1996
CS01	UTILITIES	G250	100	600	4/11/1996
CS03	UNIT 1	G100	80	300	8/23/1990
CS05	UNIT 1	G100	80	300	7/25/1990

LOCATION	RUN	MODEL	SIZE	CLASS	DATE INSTALLED
FORRESTDALE	2	G1000	200	600	3/7/1984
FORRESTDALE	1	G1000	200	600	11/21/1984
HARROW ST	2	G1000	200	600	9/4/1994
HARROW ST	1	G1000	200	600	9/12/1990
KEMERTON SCM	2	G250	80	150	6/22/1993
KPS	1	G2500	300	600	1/19/1995
KPS	2	G2500	300	600	1/20/1992
KPS	3	G2500	300	600	11/29/1984
M2A	2	G2500	300	600	3/26/1998
M2A	3	G2500	300	600	9/2/1993
M2B		G2500	300	600	12/3/1986
PINJAR	1	G650	150	600	10/5/1989
PINJAR	2	G650	150	600	10/5/1989
PINJAR	3	G650	150	600	10/3/1989
PINJAR	4	G650	150	600	9/25/1989
PINJAR	6	G650	150	600	1/19/1990
PINJAR	5	G650	150	600	5/21/1990
PINJAR	7	G650	150	600	6/18/1991
WORSLEY	2	G1000	200	600	5/13/1991

B.2 Heater fuel gas train replacement

Gas heaters play an essential role in maintaining gas temperatures above the minimum allowance temperature of zero degrees centigrade, by warming the gas prior to a pressure cut. Warming the gas prior to a significant pressure cut mitigates the risk of the Joule-Thompson effect reducing the gas temperature too low, such that components may be subject to freezing conditions and damage.

Gas trains play a critical role in gas heaters by ensuring a safe and efficient fuel supply. These systems serve as intermediaries between the fuel source and the burner. Their function is to regulate gas pressure and flow, in addition to providing essential safety mechanisms.

The replacement of heater fuel gas trains is an ongoing and established program of works that aims to average two replacement per year over a ten-year period. During the AA5 program of work two units were replaced at Welshpool, however, the project scope required at each site increased, resulting in an increased unit rate and a temporary stop on the project to ensure scope changes can be accommodated.

The project recommenced with an objective to upgrade the corroded piping and valves. Subsequently, and in order to have sufficient remote visibility, the design has been modified to electrically actuated systems, replacing obsolete pneumatic actuated models. Other major changes are summarised below:

- Process engineering works involving updated hydraulic checks, AS 3814 design compliance check, consequence analysis of heater failure
- E&I engineering works involving design of burner management system, battery consumption, hazardous area updates and calculations
- E&I engineering design has undergone changes compared to the Solomon Heater Control Panel, the basis that was used at project initiation
- Procurement of new control valves, regulators, flowmeters and ESD valves
- Fabrication and installation costs have increased due to the resource constraints for all the contractors

As a result the revised program is outlined in the table below, with seven replacements due during the AA6 period.

Table Appendix B.3: Heater fuel gas train replacement

Site location	Units to be replaced	Year
Harrow Rd	1	2026
Alcoa Wagerup	2	2027
Alcoa Kwinana	2	2028
Pinjar Power station	2	2029

The forecast cost are based on actual experienced whilst re-scoping and delivering units at Welshpool in 2024 and 2025.

B.3 Valve certification

B.3.1 Meter station valves and control valves overhauls

Valves are one of the most crucial pressured system components and often the last device to prevent catastrophic failures in high-pressured systems. It is essential that valves are upkept and should work at all times to ensure they provide the required level of protection in keeping the operating conditions within the design envelop, as well as to provide isolation from the source of energy when required limit the consequences of in the event of an incident and for safe performance of required work.

DBP has control valves and isolation valves that require overhaul or replacement as part of its operational asset base. Valve overhaul or replacement is to ensure its safety, performance, and reliability. This is an established and ongoing program for DBP with a balanced portfolio of overhauls/replacements over the AA5 period that is based on historical averages. The forecast is to replace 65 valves over the period at a rate of 13 per year. The table below identifies the valves due for overhaul/replacement and their forecast year of overhaul/replacement.

Table Appendix B.4: Valves program, $'000 2024

Scope	Volume/yr	Unit cost ($ 000)	Total cost/year ($,000)
Removal, testing and overhaul of control valves	6	70	420
Replacement large-bore ball valves	3	80	240
Replacement of small-bore ball valves	4	15	60
Engineering and project management	1	178	178
Total	**13**		**898**

B.4 Pipework corrosion

DBP has established pipeline corrosion prevention measures at meter stations, however there are still occurrences of pipeline corrosion both aboveground and belowground that need to be addressed. When corrosion is detected through ongoing inspections it is important that we both replace or repair the affected pipework, as well as investigate cathodic protection measures to ensure asset integrity in future. For the next five years, four key projects have been identified as summarised below.

B.4.1 Aboveground pipework repairs

Repair or replacement of aboveground piping at meter stations due to corrosion defects, the estimate is based on historic actuals and the known escalating issue of corrosion on our assets.

B.4.2 Below ground pipework repairs

Repair or replacement of belowground piping at meter stations due to corrosion defects. The estimate is based on historical actuals as well as a small uplift that is required to address the recent escalating issue regarding corrosion under insulation and integrity issues at pipeline ground to air transitions.

B.4.3 Earthing Replacement and AC mitigation of facilities

Where buried pipelines run parallel to overhead power lines, AC voltages appear along the pipeline that can cause corrosion and shock hazards to personnel. This is mitigated using specialised "Type J" test point along the affected pipeline.

The Type J test points each have a buried anode that may need replacing. Many of the existing Type J test points use MOVs, which mitigate the shock hazard but do not prevent corrosion.

The scope of this project is to refurbish the Type J test point buried anodes as required, and replace MOVs with electronic polarisation cells such as DC decouplers so as to mitigate the corrosion risk.

B.4.4 Painting above ground facilities

Aboveground meter station pipework is also exposed to corrosion. We apply protective paint coatings to exposed pipework to help mitigate oxidisation and inhibit corrosion. Painting aboveground facilities is an ongoing program across our meter stations, compressor stations and pipeline and MLV assets.

Depending on age, location and other climactic factors, meter stations experience varying degrees of corrosion. Our ongoing program seeks to paint 20 meter stations over the next five years at a rate of four per year.

Where practicable we will seek to optimise the painting program by aligning the meter stations program with the compressor station and pipeline and MLV painting program.

Table Appendix B.5: Above ground facilities painting program, $'000 2024

Meter stations	2026	2027	2028	2029	2030	Total
Number of meter stations	4	4	4	4	4	20
Cost per facility ($'000)	57	57	57	57	57	-
Total cost ($'000)	**229**	**229**	**229**	**229**	**229**	**1,145**

B.5 Odorant systems

Odorant systems play a crucial role in gas transmission by ensuring that gas leaks are detectable downstream of our metering facilities. Odorant systems ensure gas leaks are detectable before the gas concentration in air reaches dangerous levels. Detecting gas leaks early enhances safety, prevents accidents, and protects both people and property. Odorant itself, Mercaptan, is a non-toxic substance however it is a flammable liquid and accordingly, the odorant storage vessels must be installed in concrete bunds as per AS1940. Several of our storage bunds are deteriorating, are no longer fit for purpose and in order to comply with the standard we are proposing to replace them.

In addition, during AA5 an [redacted]

The photos below demonstrate the difference between a structurally sound unit and the structurally compromised unit at Pinjarra.





The project is to upgrade pressure equipment in DBNGP odorant facilities at four sites over AA6. The solution will be constructed to ensure compliance with Australian Standard 1210 carbon steel pressure vessels, thereby mitigating the risks identified at Pinjarra.

It is operationally and cost efficient to simultaneously improve the overall design during the upgrade to overcome several operational practices that currently expose personnel to unnecessary and potentially hazardous contact with the odorant and its fumes. Therefore, the associated valves, regulators, safety valves and instruments will be replaced at the same time.

B.6 Meter certification and calibration

Measuring the volume of gas delivered is an essential and critical service we provide to ensure fair and accurate allocation of gas and billing information on behalf of our shippers. Certification is an official confirmation that a meter meets specific standards and regulatory requirements. It's a comprehensive evaluation that typically includes calibration and additional tests to ensure the meter's overall performance and compliance with industry standards.

Calibration is the process of adjusting a meter to align its readings with a known standard. It involves comparing the meter's measurements to a reference standard and making necessary adjustments to correct any inaccuracies.

In essence, calibration is a part of the certification process, but certification encompasses a broader evaluation to ensure that the meter is fit for use and meets all required standards. Therefore, as part of continuous improvement and good asset management we are always aiming to achieve industry good practice for the maintenance and practices associated with our metering equipment.

As Coriolis and ultrasonic meters are our primary metering types at our stations, we are investing in a balance of certification and calibration to ensure they are fit for purpose and continue to meet customer expectations and industry standards.

To enable calibration, DBP requires three sizes of Coriolis meter and four sizes of ultrasonic meter as the following table, so that these pre-certified meters can be installed in place while the operational meters are taken out of service and sent away either domestically or overseas for calibration and certification.

Table Appendix B.6: Coriolis and ultrasonic calibration requirements

Meter type and size	1″	3″	4″	6″	8″	10″
Coriolis	1	1	1	-	-	-
Ultrasonic	-	-	1	1	1	1

The allowance for the following 5 years is to ensure DBP has a fleet of meters that enable calibrations to be conducted in a timely and accurate manner for identified meters based on their performance and diagnostic reports. Certification costs are based on historical averages and the scope of work is dictated by AGA11 / API MPMS 14.9 for Coriolis Meters and AGA 9 for ultrasonic meters.

B.7 Hazardous area inspection and rectification

Inspection of hazardous areas is a mandatory requirement, performed in line with AS60079. The Standard states inspections of hazardous areas and equipment should be four-yearly, with repairs of non-conformances implemented based on degree of risk. This activity is monitored as part of the DBNGP's process safety dashboard.

A review of DBP's facilities in AA4 identified a need for an allowance to rectify issues as part of routine activities, thereby complying with AS/NZS 60079, which is series of standards that covers the design, selection, and installation of electrical equipment in hazardous areas to prevent fire and explosion risks.

DBP has been undertaking rectification projects during AA5 and has developed a good understanding of scope and costs. The hazardous area rectification program includes compressor stations, meter stations and pipeline and MLV sites. For the purpose of our inspection and rectification program, we split the DBNGP into two sections, north and south:

- CS1 to CS5 (north)
- CS6 to CS10 (south)

We cycle though inspection and rectification every five years, conducting inspections in one year and then conducting/completing rectification by the end of the following year (depending on how much rectification needs to occur based on the inspection). The rolling inspection and rectification program covers all compressor stations, meter stations and pipeline and MLV sites. Note this business case covers meter stations only, the costs for compressors stations and pipeline and MLVs are summarised in their respective business cases.

During the AA5 period, we delivered the inspection and rectification cycle as per the table below.

Table Appendix B.7: AA5 inspection program

Focus area	2021	2022	2023	2024	2025
Inspection	CS6 to 10			CS1 to 5	CS6 to 10
Rectification	CS1 to 5	CS6 to 10			CS1 to 5

For the AA6 period, the cycle of inspection and rectification continues as per the table below.

Table Appendix B.8: AA6 inspection program

Focus area	2026	2027	2028	2029	2030
Inspection			CS1 to 5	CS6 to 10	
Rectification	CS6 to 10			CS1 to CS	CS6 to 10

The costs for inspecting and rectifying meter stations will vary depending on the extent of damage found, location, and addition/mothballing of assets. We cannot accurately forecast rectification costs for AA6 until the next cycle of inspections have been completed. However, it is reasonable to assume that as assets age and environments change, the cost of rectifications may increase,

even if the volume of issues declines (i.e. we see a smaller number of issues but the issues we find are larger and cost more to address).

To develop the AA6 forecast, we have looked at historical actuals and assumed a slight increase across the period to account for the potential for larger/more challenging issues given the asset age. We will budget $65,000 per year for meter stations, totalling $325,000 over the period.

B.8 Gas quality measurement

B.8.1 Moisture and sulphur analysers

The Gas Supply (Gas Quality Specifications) Regulations 2010 place an obligation on DBP and producers to deliver gas within a strict set of specifications. These specifications are listed in the table below.

Table Appendix B.9: Gas Supply (Gas Quality Specifications) Regulations 2010

Item	Component	Amount or range
1.	Maximum total inert gasses	7.0 mol%
2.	Maximum carbon dioxide	4.0 mol%
3.	Minimum higher heating value	37.0 MJ/m ^{3}
4.	Maximum higher heating value	42.3 MJ/m ^{3}
5.	Minimum Wobbe Index	46.5
6.	Maximum Wobbe Index	51
7.	Maximum total sulphur: • unodorised gas • odorised gas	 10 mg/m ^{3} 20 mg/m ^{3}
8.	Maximum hydrogen sulphide	2 mg/m ^{3}
9.	Maximum oxygen	0.2 mol%
10.	Maximum water	48 mg/m ^{3}
11.	Hydrocarbon dewpoint over the pressure range 2.50 to 8.72 MPa (absolute)	below 0°C

Three critical specifications are moisture content, sulphur in odorised and unodorised gas, and total hydrogen sulphide (H_2S) content (items 7, 8 and 10 in the above table). We currently test for sulphide, H_2S and moisture via spot testing at or near the gas producers' inlet points.

Over the past decade, as multiple new gas supplies have entered the pipeline, the potential for non-specification gas has increased. Too much sulphur or H_2S in the gas can accelerate wear on pipe fittings and cause issues with customer's equipment, while high moisture levels can corrode burners, burn less efficiently, and in extreme cases, freeze and block the flow of gas.

Other than via spot testing, we have no way of monitoring the moisture and sulphur levels of gas entering our pipeline. Given the significant risks associated with high moisture and sulphur levels, it is important we have a way of continuously monitoring these elements so we can notify producers and address gas quality issues before they become a problem downstream.

We therefore propose to install moisture analysers, and sulphur and H_2S analysers at inlet points from strategic connection points along the pipeline. The following table summarises the proposed program.

Table Appendix B.10: Analyser installation at intake sites, $'000 2024

Site	Proposed year of installation	Moisture analyser	Sulphur & H_2S analyser	Analyser hut	Total cost
KGP	2026	300	250	126	676
Varanus Island	2026	300	250	126	676
Pluto	2026	300	250	126	676
Macedon	2027	300	250	126	676
Kwinana Junction*	2027	-	250	126	376
Gorgon	2027	300	250	126	676
Wheatstone	2028	300	250	126	676
Waitsia*	2028	-	250	-	250
Total		**1,800**	**2,000**	**882**	**4,682**

* Kwinana Junction only requires a sulphur analyser and hut

** Waitsia already has moisture analysing equipment and a hut

The sites at KGP, Varanus Island, Pluto, Macedon, Gorgon and Wheatstone each need a moisture analyser and/or sulphur and H_2S analyser, and a hut to house them in. Kwinana Junction only requires a sulphur analyser and hut. The Waitsia site, which as a newer connection, already has moisture analyser and hut and so only needs a sulphur analyser. Costs are based on the recent historical costs.

B.8.2 Gas chromatographs at inlet points

As discussed previously, we have an obligation to deliver gas within strict quality specifications. The quality of gas entering our pipeline is determined by the gas producers. Gas producers typically have gas chromatographs installed on their side of the inlet points, from which they can provide data to us on the hydrocarbon content of the gas they supply. **Note the GCs do not provide data on moisture or sulphur content, which is a separate safety and pipeline integrity issue.** The GCs monitor the heating value of the gas, which is used for energy calculation and billing purposes.

As the number of gas producers has increased, the variability in gas quality has grown. Though producers are required to provide data to us on hydrocarbon content, this information is not always forthcoming in a timely manner. This can lead to instances where non-compliant gas enters our pipeline without us knowing, resulting in billing concerns and providing insufficient notice for us to address non-specification gas via blending strategies.

To resolve this issue, we propose to install GCs at each of the producers' inlets, on our side of the custody transfer point. This will allow us to monitor the quality and hydrocarbon content of the gas being fed into our pipeline at point of entry.[3]

This issue has been raised during shipper round tables, who have expressed concerns that gas quality data is not forthcoming from all producers. We therefore plan to address this issue on behalf of shippers as soon as practicable by prioritising GC installation early in the AA6 period.

The following table summarises the proposed installation schedule and costs. Cost estimates are based on historical costs of installing GCs.

Table Appendix B.11: GC installation at inlet sites, $'000 2024

	2026	2027	2028	2029	2030	Total
KGP	1,000		-	-	-	1,000
Varanus Island	500		-	-	-	500
Pluto	500	-	-	-	-	500
Macedon	-	1,000	-	-	-	1,000
Gorgon	-	500	-	-	-	500
Wheatstone	-	1,000	-	-	-	1,000
Kwinana Junction	750	750	-	-	-	1,500
	2,750	**3,250**				**6,000**

[3] Note we have GCs at compressor stations, however these devices are located a long way downstream of inlet points and measure the quality of comingled gas rather than entering the pipeline.

Capex DBP16: Tools

1.1 Project approvals

Table 1.1: DBP16 Tools – Project approvals

Prepared by	Nicholas MacDonald, Head of Supply Chain & Administration Dave Martin, Head of Mainline
Reviewed by	Hugo Kuhn, Head of Engineering
Approved by	Tawake Rakai, GM Transmission Asset Management

1.2 Project overview

Table 1.2: DBP16 Tools – Project overview

Description of problem /opportunity	DBP staff conduct planned and reactive maintenance on the DBNGP. This includes monitoring, fault finding, repairs and installation/replacement of new equipment. Our staff require specific tools to do these jobs. The tools have a limited useful life and need to be replaced periodically, consistent with the Asset Management Plan (AMP), the original equipment manufacturer (OEM) specifications, and good industry practice. The useful life varies for different categories of tools. There are two primary categories of recurrent tool expenditure. These are: • Transmission asset management (TAM) tools; and • Transmission operational management (TOM) tools. Both TAM and TOM tool replacements are conducted periodically, with replacement rates relatively consistent between regulatory periods. In addition, there are a number of non-recurrent items that we need to address during the AA6 period. These are: • Obsolete equipment calibration tools; and • Specialised inventory tools. In each case we have identified aged or obsolete tools and equipment that must be replaced if we are to make sure our employees and contractors have access to fit-for-purpose tools and that our inventory management is efficient. Our asset management practices take account of the impact of subsequent costs such as those related to tooling. We will continue to consolidate and standardise assets and technologies where it makes economic and operational sense to do so.
Untreated risk	As per risk matrix = Intermediate
Options considered	• **Option 1** – Replace tools on a like-for-like basis on failure ($1.8 million) • **Option 2** – Proactive replacement of TAM and TOM tools, plus obsolete calibration tools and field equipment ($3.0 million) • **Option 3** – Proactive replacement of TAM and TOM tools, calibration tools and field equipment, plus proactive management of specialised inventory tools ($3.7 million) (this is the recommended option)
Proposed solution	Option 3 is the proposed solution. Over the AA6 period we expect to maintain our TAM and TOM tooling in line with historical requirements – an average of $114,000 per year on TAM tool and $286,000 on TOM tools. We will also replace obsolete HART 475 calibration tools, as well as refreshing field equipment used

	to maintain solar and battery assets. We will also review our inventory management, reviewing and refreshing our stock of specialised equipment such as gas turbine overhaul tools and load bank testing equipment. Option 2 would result in a similar outcome to Option 3, however under Option 2 we would not address our specialised inventory tools. Option 1 may result in lower upfront costs, but could ultimately cost significantly more than proactive replacement of tools depending on the volume and nature of tools that fail. Reactive replacement also places DBP and employees/contractors at risk if the right tools are not available in an emergency, or where short turnaround times are necessary. Option 1 would not reflect prudent asset and inventory management.
Estimated cost	The forecast direct cost (excluding overheads) during the next five-year period (AA6) is $3.8 million.

$'000 real 2024	2026	2027	2028	2029	2030	Total
TAM tools	114	114	114	114	114	**570**
TOM tools	236	236	236	236	236	**1,180**
Equipment calibration tools	200	200	200	200	200	**1,000**
Specialised inventory tools	270	190	190	190	190	**1,030**
Total	**980**	**700**	**700**	**700**	**700**	**3,780**

Basis of costs	All costs in this business case are expressed in real unescalated dollars Dec 2024 unless otherwise stated.
Treated risk	As per risk matrix = **Low**
Variation from AA5	The forecast expenditure for AA6 is $1.5 million more than the forecast expenditure in AA5 of $2.3 million. The increase in AA6 is a result of: • the need to replace the obsolete and outdated equipment calibration tools (HART 475 communicators) at a cost of $1.0 million; and • the need to replace specialised inventory tools at a cost of around $1.0 million.
Alignment to our vision	Proactive replacement of tools and addition of new specialised tools delivers against all relevant vision objectives of delivering for customers, being a good employer and being sustainably cost efficient. This is because it mitigates the significant risks to safety, environment, operations and financial performance caused by having tools that are not fit for purpose.
Consistency with the National Gas Rules (NGR)	**NGR 79(1)** – Replacing obsolete tools and adding new specialised tools is consistent with accepted good industry practice. Several practicable options have been considered, and market/unit rates have been tested to achieve the lowest sustainable cost of providing pipeline services. **NGR 79(2)** – Having fit for purpose tools is necessary to provide a safe working environment for all staff and contractors. Ensuring all tools are in working order is critical to the safety of our staff and the public. The provision of appropriate tools to employees and contractors is also essential to maintain and improve the safety of services, maintain the integrity of services. On this basis the proposed expenditure is conforming capex based on the grounds of NGR 79(2)(c)(i) and (ii).

	NGR 74 – the forecast costs are based on the latest market rate testing, and project options consider the asset management requirements as per the latest Asset Management Plan. Cost assessments have been conducted for each option based on the best information available at the time of developing this business case. The estimate has therefore been arrived at on a reasonable basis and represents the best estimate possible in the circumstances.
Stakeholder engagement	Our shippers told us they highly value current levels of reliability and would be concerned if this were to change. They also expect DBP to maintain a strong focus on operational issues as it is important for reliability and emergency management. DBP's tools program will replace end of life tools and invest in new tools required to maintain a diversifying asset base. The program is necessary to maintain operations and maintenance activities along the pipeline.
Other relevant documents	This Business Case should be read in conjunction with: • Asset Management Plan (TEB-001-0024-07) • Asset Management Plan – Rotating Equipment (TEB-001-0024-03) • Asset Management – Pipeline Mechanical (TEB-011-0024-02) • Asset Management Plan – Electrical Control and Instrumentation (TEB–001–0024-05) • Risk Management Policy and Operational Risk Model (together our Risk Management Framework)

1.3 Background

The technicians, tradespeople and engineers who carry out work on the DBNGP and related assets need reliable, fit for purpose tools to perform their work in a safe and efficient manner. Consistent with the Rotating Equipment and Pipeline Mechanical AMPs, all tools must be inspected on a predetermined frequency to ensure they are in proper, safe working order and any tools deemed unsuitable or unsafe for use shall be tagged as out of service and replaced or repaired as soon as practicable.

As a minimum, the inspection frequency specified in the AMPs is as follows:

- inspection prior to use;
- two-monthly electrical testing and tagging of mobile power tools;
- six-monthly integrity inspection; and
- 12-monthly electrical testing and tagging of fixed power tools.

For the AA6 period, there are five expenditure items proposed:

1. TAM tools
2. TOM tools
3. Equipment calibration tools
4. Field equipment for solar and batteries
5. Specialised inventory tools

These are discussed in the following sections.

1.3.1 TAM tools

TAM tools are those relating to engineering, land management and system development activities. They need to be inspected and replaced in line with the respective AMP, OEM specifications and good industry practice. This means we maintain our tool kit to address normal wear and tear, and replace when tools become obsolete. When replacing tools we do not necessarily replace like-for-like, we assess the market to consider new technologies and ensure our tools remain fit-for purpose, and technologically up to date.

TAM tools typically include:

- Hand tools – these are electrical and mechanical tool kits
- Global positioning system (GPS) trackers for geographic information system (GIS) – units that are used to accurately locate features on the pipeline and transmit to our GIS database
- Portable Cathodic Protection (CP) Transformer Rectifier Unit (TRU) – a CP injection unit that is able to be moved and used in detailed CP investigations
- CP data loggers – units used to collect CP data during surveys and detailed investigations
- Process simulation software – used for modelling and process simulation activities

Forward-looking estimates for TAM tools replacements are based on historical actuals.

1.3.2 TOM tools

TOM tools are used by the mainline, facilities and field technical and services and operations groups. Similar to TAM tools, these need to be inspected and replaced in line with the respective AMP, OEM specifications, and good industry practice. We maintain our tool kit to address normal wear and tear, and replace when tools become obsolete. When replacing tools we do not necessarily replace like-for-like, we assess the market to consider new technologies and ensure our tools remain fit-for purpose, and technologically up to date.

TOM tools typically include:

- A-frames for turbine package removal
- Pallecon transport units
- Pancake type gearboxes
- [redacted] turbine electrical test kits
- Turbine oil kidney filtration cart
- Walkie stackers for CS5 & CS8 bulk sheds
- Manual lifts for CS7 & CS8 aftercoolers
- ZU4-Series hydraulic portable electric pump, hoses and torque cassette
- Hand tools
- Calibration equipment
- Electronic testing equipment
- Vibration measurement equipment

- Rigging equipment
- Test gauges

Forward-looking estimates for TAM tools replacements are based on historical actuals.

1.3.3 Obsolete calibration equipment

DBP uses HART 475 field communicators to configure, test and calibrate field equipment. These devices ensure the field assets are set up correctly when installed and are used regularly by operational staff during inspections and other routine maintenance. Hart communicators are required to configure transmitters, fire detectors, valvelink controllers etc before they can be made active.

Our fleet of HART 475 field communicators are now over 15 years old. They are at the end of their technical life, have become unreliable, and spares and parts are no longer available. HART 475 communicators haven't been available for purchase since 2018 and stopped being supported by the manufacturer in 2020.

We therefore plan to replace them during the AA6 period in line with our AMP, good industry practice and OEM specifications.

After a series of trials with multiple providers, we have decided to replace the old HART 475 devices with the newer mode[redacted] units. We found replacing these devices with newer HART devices is the most prudent and efficient solution.

1.3.4 Specialised inventory tools

We hold a number of more specialised and expensive tools in our inventory. The high costs and specialist nature of these tools means it would not be prudent to include them as part of each of our field technician's tool kits or in the containers. These tools are therefore held at the depot or at strategic operational sites along the pipeline and booked out to work orders and taken to site by field operations staff.

A recent review of our inventory has identified a shortfall in some of our specialised tools; loadbank discharge testing kits, and turbine overhaul tools.

1.3.4.1 Load bank discharge testing kits

We currently have 11 major operational sites powered by solar, and solar and battery arrays (such as spur sites, meter stations and repeater sites). There are also more than 2,000 batteries at compressor station and repeater sites.

As the energy assets have evolved, so too has the range of tools used to support them. While we have incrementally added new tools as required (now around 25 specialised tools), it is now time to update the containers to ensure we have fit-for-purpose, industry standard tools to efficiently maintain our energy assets.

In the AA6 period, we need to invest to replace the three aging toolkits and procure an additional two load bank discharge testing kits to support the increase in reliance on batteries along the pipeline. The additional need is two-fold:

1. We have more sites and the number is increasing with the need to transition to lower-emissions power supplies and the benefit of reducing costs.
2. We have found our tools are not lasting as long as initially anticipated and failing more frequently over their useful life.

1.3.4.2 Turbine overhaul tools

We have 19 [redacted] manufactured gas turbines at compressor stations along the pipeline. To maintain these assets, our field staff must have access to specialised tools. These tools are housed in three containers, which our field staff can access.

These containers were established and fitted with tools more than 15 years ago when we first installed the units. While we have reactively repaired and replaced some tools in these containers over the last 15 years, recent tool maintenance has shown us that the turbine overhaul tools can no longer be economically maintained/repaired. It is now time to do a major update to ensure all our tools remain safe, in good working order and fit-for-purpose.

1.4 Risk assessment

Risk management is a constant cycle of analysis, treatment, monitoring, reporting and then identifying once again, with a commitment to balance outcomes sought with delivery and cost implications considered and assessed.

Our risk assessment approach focuses on understanding the potential severity of failure events associated with each asset and the likelihood that the event will occur.

Figure 1.1: Risk management principles



Based on these two key inputs, the risk assessment and derived risk rating then guides the actions and activities required to ensure safety and compliance are not compromised, while delivery of this outcome is done as efficiently and effectively as possible.

The risk rating assesses the consequence and likelihood of the risk. The risk of an event associated with failure of an asset is rated based on the combined effect of the consequence and likelihood rating to provide an overall risk rating. This risk rating guides the risk management and mitigation activities and facilitates prioritisation.

Our Operational Risk Framework is based on AS/NZS 2885 and requires all identified risks ranked as intermediate or above to be addressed. For risks ranked as high we must *'Modify the threat, the frequency or the consequence to reduce the risk rank to intermediate or lower'.*

Six areas are considered for each type of risk:

1. People – injuries or illness to employees and contractors or members of the public
2. Environmental impact – impact on the surroundings in which the asset operates, including natural, built and Aboriginal cultural heritage, soil, water, vegetation, fauna, air and their interrelationships
3. Supply – disruption in the provision of services/supply, impacting customers
4. Impact on AGIG/DBP – ability of AGIG (DBP) to operate the asset(s) without restrictions due to regulatory enforcement or legal actions
5. Reputation / outrage – impact on stakeholders' views of AGIG (DBP), including personnel, customers, investors, security holders, regulators and the community
6. Loss – financial impact on AGIG (DBP)

The primary risk event relating to tools is that deteriorated and out of support tools/equipment means our field assets cannot be properly checked, inspected, diagnosed, repaired, maintained, calibrated, and work is potential conducted in an unsafe manner. This leads to field assets not functioning as they are supposed to, potentially causing supply disruption and harm to our employees.

The overall untreated risk rating of tools is shown in the figure below. The tools investment program is required as per AMPs and the Safety Case, particularly where specific tools are required for the unique works on the pipeline. The overall risk rating of not investing in tools to ensure we can effectively maintain assets on the pipeline is identified as intermediate.

Figure 1.2: Untreated risk rating – Tools

	Trivial	Minor	Severe	Major	Catastrophic
Frequent		DBP			
Occasional		Reputation	People		
Unlikely		Loss	Supply		
Remote					
Hypothetical	Environmental				

Negligible	Low	Intermediate	High	Extreme

The drivers of the risk rating are discussed below.

- **People –** Untreated, there will be an inability to perform routine and emergency works where and when needed in a safe manner, including undertaking emergency repairs. These are severe consequences of serious injury to our field staff and the public if employees do not have the right tools to perform critical works, or if tools fail. Without the proposed program of work, personnel injury would remain severe and occur occasionally.
- **Supply –** Untreated, there is potential for assets to fail or not function as they are designed. This give rise to the potential for minor supply interruptions as assets at compressor station, meter station or MLV sites need to be temporarily shut down or isolated.
- **DBP –** Untreated, there is the inability to inspect, test and maintain critical assets, including power generation assets and gas turbines resulting in a potential increase in failures, causing inability to operate within reliability targets. The consequence of not being able to maintain our assets in line with the AMP, or not being able to complete emergency works is ranked as intermediate because as it can threaten the effective operation of the DBNGP for a substantial period. Undertaking the proposed capex program will reduce the likelihood of such an event from frequent to occasional.
- **Reputation –** Untreated, there is likely to be an increase in supply interruptions where our field staff so not have fit for purpose tools. This will have the most severe consequences in the short term during emergency works, but over the longer term, if not treated will become problematic in routine works and become pervasive. Inconsistent or unreliable performance due to underinvestment can lead to unplanned outages, which leads to irate customers. Underinvestment in integrity activities may lead to reputational damage and outrage internally as well as externally.

1.5 Options considered

Different options have been considered to ensure we have fit for purpose tools to inspect, test and maintain our assets. The options are:

- **Option 1** – Replace tools on a like-for-like basis on failure
- **Option 2** – Proactive replacement of TAM and TOM tools, plus obsolete calibration tools and specialised field equipment
- **Option 3** – Proactive replacement of TAM and TOM tools, calibration tools and field equipment, plus proactive management of specialised inventory tools

These options are discussed in the following sections.

1.5.1 Option 1 – Replace tools on a like-for-like basis on failure

Under this option, DBP would only replace tools when they fail. We would purchase only like-for-like replacements (where practicable) and would not look to upgrade tools or invest in newer tools.

1.5.1.1 Advantages and disadvantages

The advantage of this option is that the cost of like-for-like replacements is well understood, and subject to obsolescence issues, if we are only replacing existing tools with the same items, tool and equipment supplies should be readily available. Employees and contractors will be familiar with existing tools, therefore limited training would be required.

There is also the potential for the upfront costs of a reactive-only approach to be lower than proactive tool replacement. If fewer tools than expected fail, then costs will be lower. However, there is a reasonable risk that costs will be higher if certain families of tools fail or become obsolete together. Reactive replacement may also impact our emergency response capabilities or turnaround times for urgent jobs. This can lead to financial penalties as well as safety risks.

There are considerable disadvantages to Option 1. As discussed above, a reactive approach means costs will be unpredictable, determined by the volume of tools that fail. More significantly, under Option 1, some tools will be used beyond their identified useful life. This may result in tools that are not in good working order, thereby causing safety and operability issues for our staff.

Further, if we limit ourselves to like-for-like replacements only, we may be foregoing opportunities to work more efficiently. Like all technologies, tools and equipment progress in their sophistication and effectiveness. As prudent asset manager and a good employer, we have a duty of care to assess development in tool technology and invest in the most appropriate and efficient tools for the job.

1.5.1.2 Achievement of objectives

The following table outlines how this option will support the achievement of our vision objectives in AA6.

Table 1.3: Achieving objectives – Option 1

Vision objective	Alignment
Delivering for Customers – Public Safety	N
Delivering for Customers – Reliability	N
Delivering for Customers – Customer Service	N
A Good Employer – Health and Safety	N
A Good Employer – Employee Engagement	-
A Good Employer – Skills Development	N
Sustainably Cost Efficient – Working within Industry Benchmarks	N
Sustainably Cost Efficient – Delivering Profitable Growth	-
Sustainably Cost Efficient – Environmentally and Socially Responsible	N

This option delivers against sustainably cost efficient in the short term but risks medium to long term viability. It does not deliver against customer service as poorly maintained or unsafe tools will likely cause supply interruptions. It does not deliver against being a good employer as the

risks associated with leaving tools in service past their useful life is not mitigated, thereby continuing to pose risks to staff and contractors who work in affected areas.

1.5.1.3 Cost assessment

The likely costs associated with this option will be high, especially where faulty or unsafe tools cause damage to assets or where emergency response repairs cannot be undertaken consistent with the Emergency Management Plan. However, the magnitude of such an impact cannot be accurately forecast.

There could also be additional costs where an incident occurs causes major impact to people, or minor but occasional asset damage or loss of supply which is likely to exceed the forecast $3.7 million under our preferred option.

1.5.1.4 Risk assessment

The following table shows that this option does not moderate the threat, the frequency or the consequence to reduce the risk rating to intermediate or lower, as required by our risk management framework.

Table 1.4: Risk assessment – Option 1

Risk category	Untreated	Treated
People	Intermediate	Intermediate
Environmental	Intermediate	Negligible
Supply	Intermediate	Low
DBP	Intermediate	Low
Reputation / outrage	Low	Low
Asset damage / Loss	Low	Low

This option would mitigate risk in terms of our ability to manage supply, financial, reputational and asset damage risks, as tools would still be available to do our work. However, if we are only replacing on failure, tools may deteriorate to a point where they cannot be used safely by staff, exposing them to additional safety risks. Therefore, the safety risk to our people remains rated intermediate.

1.5.2 Option 2 – Proactive replacement of TAM and TOM tools, plus obsolete calibration tools and field equipment

This approach assumes that safe and effective tools are always readily available to our field staff either as part of the standard tool kit and in storage at operational sites. It requires:

- proactive inspections and repair of tools within their useful life;
- replacement of obsolete tools with contemporary tools reflective of good industry practice; and
- investment in new tools to ensure we can maintain our diversifying asset base.

This ensures all risks associated with inadequate and obsolete tools are reduced to minimal levels, as prescribed in relevant AMPs and OEM manufacturer requirements. It does not address the risk of inadequate and obsolete tools in inventory.

1.5.2.1 Advantages and disadvantages

The advantage of this option that it ensures all risks associated with inadequate and obsolete field tools are reduced to minimal levels, as prescribed in relevant AMPs and OEM manufacturer requirements. Under this option we will ensure all field staff have rapid access to fit-for-purpose tools to do their job quickly and safely.

TAM and TOM tools will be proactively replaced and the obsolete HART 475 field communicators will be replaced with contemporary models. Under this option we will also refresh and re-stock the three field-based containers that house tools and equipment necessary to maintain batteries and solar arrays.

However, Option 2 does not address the risk of inadequate and obsolete tools held in inventory. Recent experience has exposed shortfalls in our inventory holdings and the availability of specialised inventory tools to site. While we hold load bank discharge testing kits in stock, growth in the number of solar, battery and power management assets along our pipeline means there is a significant risk our current stock is insufficient. Similarly, while we hold gas turbine overhaul tools in inventory, many of these tools have become or are becoming obsolete. It is therefore vital we conduct a proactive review of inventory and replace these critical tools. This would not occur under Option 2.

1.5.2.2 Achievement of objectives

The following table outlines how Option 2 will support the achievement of our vision objectives in AA6.

Table 1.5: Achieving objectives – Option 2

Vision objective	Alignment
Delivering for Customers – Public Safety	Y
Delivering for Customers – Reliability	N
Delivering for Customers – Customer Service	Y
A Good Employer – Health and Safety	Y
A Good Employer – Employee Engagement	-
A Good Employer – Skills Development	Y
Sustainably Cost Efficient – Working within Industry Benchmarks	Y
Sustainably Cost Efficient – Delivering Profitable Growth	-
Sustainably Cost Efficient – Environmentally and Socially Responsible	Y

This option delivers against most relevant vision objectives as it mitigates significant risks to safety, environment, operations and financial performance. However, this does not address our emerging risk of having obsolete tools in our inventory which may prevent or delay routine or emergency works on the pipeline.

1.5.2.3 Cost assessment

Under this option the cost would be $3.1 million in AA6.

Table 1.6: Summary of AA6 forecast capex for tools, real $,000 at June 2024

Activity	2026	2027	2028	2029	2030	Total
TAM tools	114	114	114	114	114	**570**
TOM tools	236	236	236	236	236	**1,180**
Equipment calibration tools	200	200	200	200	200	**1,000**
Equipment for solar and batteries	130	50	50	50	50	**330**
Program total	**680**	**600**	**600**	**600**	**600**	**3,080**

1.5.2.4 Risk assessment

Option 2 moderates the threat, the frequency or the consequence to reduce the risk rating to low, as required by our risk management framework.

Table 1.7: Risk assessment – Option 2

Risk category	Untreated	Treated
People	Intermediate	Low
Environmental	Negligible	Negligible
Supply	Intermediate	Negligible
DBP	Intermediate	Negligible
Reputation / outrage	Low	Negligible
Asset damage / Loss	Low	Negligible

This option reduces the risk exposure in several categories as it ensures we are able to inspect, test and maintain our new asset types. The overall risk rating is reduced from Intermediate to Low, but it does not reflect ALARP as there are other options (Option 3) that are only marginally higher in cost, but that help prevent the risk re-emerging.

1.5.3 Option 3 – Proactive replacement of TAM and TOM tools, calibration tools and field equipment, plus proactive management of specialised inventory tools

This approach assumes that safe and effective tools are always readily available to our field staff either as part of the standard tool kit and in storage at operational sites. It requires:

- proactive inspections and repair of tools within their useful life;
- replacement of obsolete tools with contemporary tools reflective of good industry practice; and
- investment in new tools to ensure we can maintain our diversifying asset base.

1.5.3.1 Advantages and disadvantages

The advantage of this option that it ensures all risks associated with inadequate and obsolete field tools are reduced to minimal levels, as prescribed in relevant AMPs and OEM manufacturer requirements. Under this option we will ensure all field staff have rapid access to fit-for-purpose tools to do their job quickly and safely.

Under Option 3, TAM and TOM tools will be proactively replaced, obsolete HART 475 field communicators will be replaced, and field equipment for solar arrays and batteries will be replaced. Most significantly, Option 3 will see us invest in proactive inventory management, addressing identifies issues with load bank testing kits and turbine overhaul tools.

The disadvantage of this option is that it is a higher upfront cost when compared with Option 2. Introducing new tools and equipment may also cause a need for a minor uplift in training and inventory management as our employees and contractors get used to the new equipment. However, we anticipate that any uplift in training and inventory costs would be short term and would ultimately be offset by efficiencies in the longer term as work practices become established and the recurrent costs of any new or specialised equipment are better understood.

1.5.3.2 Achievement of objectives

The following table outlines how option 3 will support the achievement of our vision objectives in AA6.

Table 1.8: Achieving objectives

Vision objective	Alignment
Delivering for Customers – Public Safety	Y
Delivering for Customers – Reliability	Y
Delivering for Customers – Customer Service	Y
A Good Employer – Health and Safety	Y
A Good Employer – Employee Engagement	-
A Good Employer – Skills Development	Y
Sustainably Cost Efficient – Working within Industry Benchmarks	Y
Sustainably Cost Efficient – Delivering Profitable Growth	Y
Sustainably Cost Efficient – Environmentally and Socially Responsible	Y

This option delivers against all relevant vision objectives of delivering for customers, being a good employer and being sustainably cost efficient as it mitigates significant risks to safety, environment, operations and financial performance by leaving tools in service beyond their useful life, and ensures we are able to maintain our diversifying asset base.

It also addresses our emerging risk of having obsolete tools in our inventory which may prevent or delay routine or emergency works on the pipeline.

1.5.3.3 Cost assessment

Under this option the cost would be $3.8 million in AA6.

Table 1.9: Summary of AA6 forecast capex for tools, real $,000 at June 2024

Activity	2026	2027	2028	2029	2030	Total
TAM tools	114	114	114	114	114	**570**
TOM tools	236	236	236	236	236	**1,180**
Equipment calibration tools	200	200	200	200	200	**1,000**
Specialised tooling in inventory	270	190	190	190	190	**1,030**
Total	**980**	**700**	**700**	**700**	**700**	**3,780**

1.5.3.4 Risk assessment

Option 3 moderates the threat, the frequency or the consequence to reduce the risk rating to low, as required by our risk management framework.

Table 1.10: Risk assessment – Option 3

Risk category	Untreated	Treated
People	Intermediate	Low
Environmental	Negligible	Negligible
Supply	Intermediate	Negligible
DBP	Intermediate	Negligible
Reputation / outrage	Low	Negligible
Asset damage / Loss	Low	Negligible

This option reduces the risk exposure in each risk category as it ensures we are able to inspect, test and maintain our new asset types. It will also help ensure all inventory tools are fit-for-purpose and do not become obsolete.

Although the risk rating outcomes are the same as Option 2, by conducting a proactive review of inventory and replacing any obsolete tools, we are helping reduce the likelihood that the current untreated risk will reoccur. This option reduces the risk to ALARP as it addresses the underlying risk to greater extent than option 2, and does so at only a slightly higher cost.

1.6 Summary of cost/benefit assessment

To assess the options, the costs, objectives and risk are considered for each option. A summary of the option assessment is shown in Table 1.11.

Table 1.11: Summary of cost/benefit analysis

Option	Achievement of objectives	Cost	Treated risk (integrity/reliability)
Option 1 – Replace tools on a like-for-like basis on failure	This option does not achieve our objectives of delivering for customers, being a good employer or being sustainably cost efficient	N/A	Intermediate This option does not reduce any of the untreated risks to an acceptable level
Option 2 – Proactive replacement of TAM and TOM tools, plus obsolete calibration tools and field equipment	This option achieves our objectives of delivering for customers, being a good employer and being sustainably cost efficient	$3.1 million	Low This option reduces the untreated risks to an acceptable level
Option 3 – Proactive replacement of TAM and TOM tools, calibration tools and field equipment, plus proactive management of specialised inventory tools	This option achieves our objectives of delivering for customers, being a good employer and being sustainably cost efficient	$3.8 million	Low This option reduces the untreated risks to an acceptable level

1.7 Proposed solution

1.7.1 Why is the recommended option prudent?

Option 3 is the proposed option as it is consistent with the emerging requirements of the business and reflects good industry practice. It allows for the maintenance, rectification and replacement of our traditional tool base in accordance with OEM and AMP requirements. It also provides surety that the inventory, site containers and field staff tool kits have fit for purpose equipment at all times that is safe and in proper working order for business as usual inspection, testing and maintenance as well as rapid deployment emergency situations.

We consider it prudent to manage our tools and equipment kept in inventory in a proactive manner as we do with all other pipeline assets. This will ensure we are able to inspect, test and maintain field assets in a safe, reliable and efficient manner.

Option 1 exposes DBP, its staff and the public to unnecessary risk which can readily be reduced or removed with an appropriate management and replacement policy which is aligned with the AMP and OEM specifications.

Option 2 does reduce the known risk of tooling in the short term, but is insufficient to address the emerging problem of tooling inventory management. As the cost of option 3 is only marginally higher, we consider option 2 is not ALARP.

1.7.2 Estimating the efficient costs

The costs are estimated by identifying the activities to be undertaken given the historical actual volumes and then multiplying by the appropriate unit rate for materials and labour.

The expenditure forecast has been established based on analysis of historical actual expenditure and frequency of replacement.

Procurement of tools is undertaken in a manner which is consistent with the purchasing policy and includes a competitive tender process, where appropriate, such as for large value or volume items.

In limited circumstances where specific tools are produced by a limited amount of competitors, single source supplier/ OEM may be selected due to performance or quality of the tool.

As noted in the 'Final Plan Attachment 8.7 Cost Estimation Methodology', the forecast unit rates for all projects/initiatives managed within this program are inclusive of internal labour, external labour/contractors, materials, travel and other costs.

1.7.3 Consistency with the National Gas Rules

Option 3 is the preferred solution and provides DBP with safe, sufficient and fit for purpose tools to utilise for all work undertaken on the DBNGP, including emergency response works.

NGR 79(2)

The proposed capex is justifiable under NGR 79(2)(c)(i), as it is necessary to maintain and improve the safety of services. The absence of appropriate and reliable tools, plants and equipment would mean that gas services could not be maintained safely, resulting in risk to both maintenance personnel and the general public.

NGR 79(1)

The proposed solution is prudent, efficient, and consistent with accepted and good industry practice and will achieve the lowest sustainable cost of delivering pipeline services:

- **Prudent** – the expenditure is necessary to ensure there are adequate and appropriate tools, plant and equipment necessary to perform the required functions. The expenditure will allow the continued safe and reliable supply of gas to consumers, services to be maintained and improved, and the integrity of the network to be maintained.
- **Efficient** – cost estimates are based on historical spend and will follow robust procurement practices. The estimate allows for maintaining the quantity of plant, equipment and tools at current levels with the expectation that the functionality of some equipment will improve to provide a greater range of applicability and therefore greater risk reduction for the same cost. On that basis, we consider the expenditure to be efficient.

- **Consistent with accepted and good industry practice** – the tools and equipment already in use and planned under this program are an essential part of performing the work. Equipment such as large diameter squeeze off tools are essential for emergency response. Timely replacement and purchase of additional plant, tools and equipment when required and which is fit for purpose is necessary to continue to perform the required operational activities consistent with accepted and good industry practice.
- To achieve the **lowest sustainable cost of delivering pipeline services** – tools, plant and equipment are necessary to deliver pipelines services in a safe and cost effective manner, and there is no suitable alternative to this investment. The chosen option is therefore consistent with the objective of achieving the lowest sustainable cost of service delivery.

NGR 74

The forecast costs are based on the latest market rate testing and project options considering the asset management requirements as per the Asset Management Strategy. The estimate has therefore been arrived at on a reasonable basis and represents the best estimate possible in the circumstances.

1.8 Comparison to previous periods

1.8.1 AA6 forecast compared to AA5

In AA6, capital expenditure of $3.8 million is forecast for the tools program. Table 1.12 shows the forecast AA6 expenditure compared with actual expenditure in AA5.

Table 1.12: AA5 forecast capital expenditure, compared with AA5 actual ($'000)

Forecast spend ($'000)	2026	2027	2028	2029	2030	AA6	AA5 total	Variance
Capital expenditure	980	700	700	700	700	**3,780**	**2,326**	**1,454**

The forecast expenditure for AA6 is $1.5 million more than the forecast expenditure in AA5 of $2.3 million.

The incremental increase in AA6 is primarily a result of:

- the need to replace the obsolete and outdated equipment calibration tools (HART 475 communicators) at a cost of $1.0 million;
- the need to replace obsolete turbine overhaul tools at a cost of around $300,000; and
- a change in power generation assets which need to be maintained with new equipment at a cost of $330,000.

Table 1.13 provides an overview of the forecast tools program.

Table 1.13: AA6 forecast capital works program

Activity	2026	2027	2028	2029	2030	AA6
TAM tools	114	114	114	114	114	**570**
TOM tools	236	236	236	236	236	**1,180**
Equipment calibration tools	200	200	200	200	200	**1,000**
Specialised tooling in inventory	270	190	190	190	190	**1,030**
Total	**980**	**700**	**700**	**700**	**700**	**3,780**

1.8.2 AA5 variance

Actual expenditure during the AA5 period was around $324,000 higher than the amount determined in the AA5 Final Decision.

Table 1.14: AA5 actual expenditure compared with budget

Actual v budget ($'000)	2021	2022	2023	2024	2025	AA5
AA5 actual	135	886	322	587	396	2,326
AA5 approved	550	617	246	206	383	2,002
Variance	**-415**	**269**	**76**	**381**	**13**	**324**

Our investment in tools and equipment was low in 2021 due to the delays and trouble accessing replacement tooling due to the COVID-19 pandemic. However, we increased our spend above historical levels in 2022 to account for the slow start.

The significant increase compared to forecast is reflective of:

- **Sustained increased unit rates:** Over the AA5 period we have seen unit rates re-baselined at pandemic costs, rather than revert to pre-pandemic levels.
- **A new program to replace emergency response equipment:** In 2024, we have taken stock of our emergency response equipment and decided to replace some high-cost items such as the welding machine as well as trailers and containers that were no longer fit for purpose.

Appendix A Comparison of risk assessments

Summary of risk assessment

Project Ref No	Description	Primary Risk Event	Proposed Action		People	Environmental	Supply	DBP	Reputation	Loss
DBP16	Tools	Deteriorated and out of support tools/equipment means our field assets cannot be properly checked, inspected, diagnosed, repaired, maintained, calibrated, and work is potential conducted in an unsafe manner. This leads to field assets not functioning as they are supposed to, potentially causing supply disruption and harm to our employees.	Untreated Risk	Likelihood	Occasional	Hypothetical	Unlikely	Frequent	Occasional	Unlikely
				Consequence	Severe	Trivial	Severe	Minor	Minor	Minor
				Risk Level	INTERMEDIATE	NEGLIGIBLE	INTERMEDIATE	INTERMEDIATE	LOW	LOW
			Option 1 – Replace tools on a like-for-like basis on failure	Likelihood	Occasional	Hypothetical	Unlikely	Occasional	Unlikely	Unlikely
				Consequence	Severe	Trivial	Minor	Minor	Minor	Minor
				Risk Level	INTERMEDIATE	NEGLIGIBLE	LOW	LOW	LOW	LOW
			Option 2 – Proactive replacement of TAM and TOM tools, calibration tools and field equipment	Likelihood	Remote	Hypothetical	Remote	Remote	Remote	Remote
				Consequence	Severe	Trivial	Minor	Minor	Minor	Minor
				Risk Level	LOW	NEGLIGIBLE	NEGLIGIBLE	NEGLIGIBLE	NEGLIGIBLE	NEGLIGIBLE
			Option 3 – Proactive replacement of TAM and TOM tools, calibration tools and field equipment, plus proactive management of specialised inventory tools	Likelihood	Remote	Hypothetical	Remote	Remote	Remote	Remote
				Consequence	Severe	Trivial	Minor	Minor	Minor	Minor
				Risk Level	LOW	NEGLIGIBLE	NEGLIGIBLE	NEGLIGIBLE	NEGLIGIBLE	NEGLIGIBLE

Capex DBP17: Fleet and civil equipment

1.1 Project approvals

Table 0.1: DBP17 Fleet and civil equipment – Project approvals

Prepared by	Nicholas MacDonald, Head of Supply Chain & Administration Grant Ledger, Fleet Management Superintendent
Reviewed by	Jeff Kong, Head of Transmission Asset Strategy
Approved by	James Smith, Head of Transmission Operations

1.2 Project overview

Table 0.2: DBP17 Fleet and civil equipment – Project overview

Description of problem /opportunity	A fit for purpose fleet of vehicles and plant is required at all times to enable our workforce to conduct repair and alteration work on the pipeline and other infrastructure. Fleet must be well maintained and replaced in a timely manner to ensure our staff remain safe. Driving, and in particular remote driving, is one of the highest risk activities that DBP must manage in relation to its workforce. As vehicles, plant and equipment age, they must be replaced before they become unfit (either due to wear or obsolescence). Ongoing proactive investment in new and replacement fleet assets helps create a safe working environment for all employees and contractors by providing plant that is in good working order, fit for purpose and tested/calibrated (as required) to the required standard to enable the business to maintain the integrity of the pipeline. There are two broad categories of fleet assets: • Vehicles – All our vehicles are 4WDs (wagons and single/dual cab tray top utilities) used for driving to remote locations to service assets on the pipeline. • Civil equipment – Equipment includes, trailers, plant, heavy vehicles and equipment, which includes graders, front end loaders, forklifts and generators. This equipment is utilised for both scheduled works and when necessary, for reactive and emergency works. Over the AA5 period we have had to prioritise the purchase of new vehicles to support continued pipeline operations. Ideally, we would have purchased the new 17 vehicles in addition to our usual replacement program, however, we have struggled to keep on top of our replacement program and now are dealing with a backlog because: • the impact of the COVID-19 pandemic affected vehicle stocks, meaning we had to prioritise new, rather than replacement vehicles over the AA5 period; and • the cost of new vehicles, including 4WDs in Western Australia has increased substantially[2] due to increases across the supply chain including production and shipping costs as well as competition for vehicles given the shortage of supply. These circumstances have resulted in DBP falling behind its policy replacement schedule. This business case outlines the management plan for our fleet vehicles

[2] Market Insight: New car price rises compared | GoAuto

	and civil equipment in AA6, to return the business to a sustainable rate of fleet replacement.
Untreated risk	As per risk matrix = High
Options considered	• **Option 1** – Replace fleet and civil equipment on failure (no upfront capex) • **Option 2** – Proactive replacement of fleet and civil equipment, continue to maintain existing Manitou fleet ($11.9 million) • **Option 3** – Proactive replacement of fleet and civil equipment and the replacement of the Manitou fleet ($12.6 million) (recommended option)
Proposed solution	Over the AA6 period we will continue to maintain and replace our fleet in line with current practice, rectifying the backlog. This includes replacement of: • 60 fleet vehicles – Addressing the backlog of vehicles that were not able to be replaced in AA5 due to the prioritisation of new vehicles over replacements in the COVID-19 shortage, and lower volumes due to rising costs. This profile will return us to a more sustainable level of investment in our vehicles. • Six key civil vehicles – Most of our civil vehicles are owned rather than leased due to the remote areas we service. However, where a short-term requirement is identified we would look to lease specific equipment. In the AA6 period we will need to replace two trucks, a water cart, a grader, a drum roller and an excavator. • [redacted] Manitous – In the AA6 period [redacted] of our Manitous are due for a major service. This service costs between $80,000 and $100,000 per asset plus replacement parts which can also be expensive. These assets require a major service every five years once they are 10 years old (along with the normal six-monthly maintenance). Manitous cost around [redacted]0 each, and therefore it is considered prudent at this stage of the asset's life to replace rather than refurbish. In the AA6 period, we also propose to introduce a new program to proactively invest in transport safety equipment. Historically we have invested on a reactive basis only after an issue is identified.
Estimated cost	The forecast direct cost (excluding overheads) during the next five-year period (AA6) is $12.6 million (2024).

$'000 real 2024	2026	2027	2028	2029	2030	Total
Fleet replacement	1,800	1,800	1,800	1,800	1,800	**9,000**
Civil replacement	600	419	306	200	450	**1,975**
Manitou replacement	750	300	150	150	0	**1,350**
Transport safety	50	50	50	50	50	**250**
Total	**3,200**	**2,569**	**2,306**	**2,200**	**2,300**	**12,575**

Basis of costs	All costs in this business case are expressed in real unescalated dollars December 2024 unless otherwise stated.

Treated risk	As per risk matrix = Intermediate
Variation from AA5	The forecast expenditure for AA6 is $5.8 million more than the forecast expenditure in AA5 of $6.8 million. The incremental increase in AA6 is a result of: • An increase in the size of our fleet in AA5 (89 at the start of AA5 to the current 106) • Delays in fleet replacement due to the impact of COVID-19 on the supply chain • Significant increases in the cost of vehicles and plant (on average around 25% since 2020) • The proposed replacement of the Manitou fleet which are all beyond their technical and economic life
Alignment to our vision	The proposed option delivers on the vision objectives of delivering for customers by ensuring the safety and reliability of fleet vehicles and civil equipment assets and is sustainably cost efficient by working within industry benchmarks and being environmentally and socially responsible, as it replaces assets based on expected end of life assumptions, using a commercially negotiated unit rate, reflecting market conditions.
Consistency with the National Gas Rules (NGR)	**NGR 79(1)** – replacing end of life vehicles and plant equipment is consistent with accepted good industry practice. Several practicable options have been considered, and market/unit rates have been tested to achieve the lowest sustainable cost of providing pipeline services. **NGR 79(2)** – having fit for purpose vehicles and plant equipment is necessary to provide a safe working environment for all staff and contractors. Ensuring all vehicles and plant equipment are in working order is critical to the safety of our staff and the public. The provision of appropriate vehicles and plant equipment to employees and contractors is also essential to maintain and improve the safety of services, maintain the integrity of services. On this basis the proposed expenditure is conforming capex based on the grounds of NGR 79(2)(c)(i) and (ii). **NGR 74** – the forecast costs are based on the latest market rate testing, and project options consider the asset management requirements as per the latest Asset Management Plan. Cost assessments have been conducted for each option based on the best information available at the time of developing this business case. The estimate has therefore been arrived at on a reasonable basis and represents the best estimate possible in the circumstances.
Stakeholder engagement	Our shippers told us they highly value current levels of reliability and would be concerned if this were to change. They also expect us to maintain a strong focus on operational issues as it is important for reliability and emergency management. The proposed program of work will allow us to manage our fleet of operations vehicles and civil equipment required to operate and maintain the DBNGP.
Other relevant documents	This Business Case should be read in conjunction with: • Asset Management Plan in 2016 (TEB-001-0024-07) • Property, Plant and Equipment Policy • Specification Guidelines for Vehicle Purchasing (DBP-PM.01.06) • Risk Management Policy and Operational Risk Model (together our Risk Management Framework)

1.3 Background

We have a fleet of vehicles and civil equipment used to inspect, maintain and repair equipment installed on the DBNGP. These vehicles are maintained regularly and replaced on age, distance travelled and/or condition in line with our Property, Plant and Equipment Policy to ensure the safety and reliability of the fleet vehicles, plant and equipment, minimise potential risk to employees and minimise whole of life costs.

1.3.1 Fleet vehicles

Our current vehicle fleet consists of 106 light vehicles deployed across several operational areas (facilities and mainline maintenance, planning, technical and operational services, field technical services, transmission asset management and pigging operations). Travelling by road is categorised as an 'extreme' risk activity, making it one of our highest risks to manage. With long distances and remote locations often the operational norm, maintaining a reliable fleet of vehicles is critical. Our process for identifying which vehicles we need replace involves the following steps:

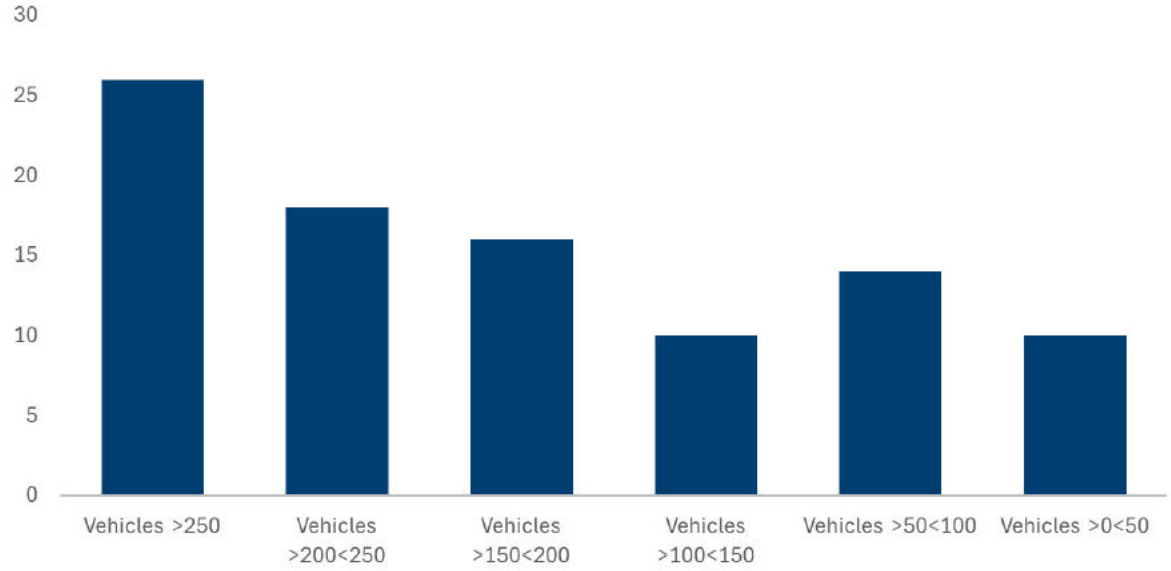
1. Review all vehicles which have a history of safety or reliability concerns;
2. Identify all vehicles with over 150,000 kms or more than five years old;
3. Consider safety, maintenance costs and remote area exposure of these identified higher risk vehicles;
4. Where appropriate, reallocate aging or high kilometre vehicles to locations which are less vulnerable (due to geography or distances covered);
5. Identify vehicles for disposal; and
6. Confirm replacement need.

We have identified a target of 150,000 km for fleet vehicle replacement, which is based on an assessment of escalating maintenance costs and increased risk profile after these milestones. We seek to maximise use and value from each vehicle wherever practicable and safe to do so, with our aim to outperform the typical five-year useful life.
DBP has an ageing fleet of vehicles with correspondingly high mileage, as our replacement schedule has fallen behind during the AA5 period due to a combination of:

- the supply chain impacts of COVID-19;
- the need to prioritise new additional vehicles over replacements with short supply; and
- the cost of vehicles and the necessary modifications increasing by around 25% more than inflation over the last 3 years.

Figure 0.1 shows the extent to which we have fallen behind in our replacement schedule, with a 57% of our light vehicles now operating above 150,000 kms, in many cases almost double our target replacement distance.

Figure 0.1: Number of vehicles in each mileage bracket for DBP light vehicles



Over the AA6 period we will not be able to address the backlog of vehicles above the target distance threshold. Instead, we propose to replace those 60 vehicles that will have already reached 150,000km during 2025. Due to deliverability and the need to smooth the investment cycle of the overall fleet over multiple periods, we do not propose to include the additional 20 vehicles that we forecast (based on individual average per annum km travelled) will reach the 150,000 km target. Instead, we will need to manage these vehicles through increased maintenance, as well as strategic changes of vehicle function and role, to ensure we do not compromise staff safety.

Table 0.3 shows the profile of our current fleet and their forecast kms by 2030. The options we have considered for the light vehicle fleet portfolio are:

- Do not replace;
- Replace vehicles that are over 150,000 kms in 2025; or
- Replace all vehicles currently at 150,000 kms, and those that reach 150,000 kms during AA6.

Table 0.3: Current and forecast distance travelled by light vehicle fleet

000's kms	Vehicles in 2025	Number of vehicles in 2030 based on strategy		
Strategy		**Do not replace**	**Replace 2025 >150,000 km**	**Replace all as they reach 150,000 km**
>250	26	61	5	0
>200 < 250	18	9	9	0
>150 < 200	16	10	14	0
>100 < 150	10	7	21	21
>50 < 100	14	4	27	37
> 0 < 50	22	25	20	48
Vehicles replaced	**NA**	**0**	**60**	**80**
Vehicles over threshold	**60**	**80**	**28**	**0**
Total vehicles	**106**	**106**	**106**	**106**

As shown in the table above, replacing 60 light vehicles during the period will still result in some high mileage vehicles. However, during the AA7 period we will be in a position to return

to a more balanced replacement schedule. Replacing 80 vehicles over the AA6 period would be the most effective risk reduction strategy, however, DBP recognises that a longer term approach is required so as not to put upward pressure on the regulated tariffs. It is also unlikely we would have access to this many available vehicles or be able to complete the required modification works over a period of five years.

We have trialled different 4WD models over time, including vehicles manufactured by [redacted]. Toyota vehicles have consistently proven to be the most cost effective and reliable option for us and the fleet is now almost exclusively a [redacted] light vehicle fleet.

The fleet has performed well during the period, and we maintain vehicles in line with manufacturer requirements by our selected fleet maintenance provider, [redacted] Fleet. We have experienced good reliability and durability in the extreme conditions we experience working in remote locations along the pipeline. [redacted] Fleet has also proven it has the capacity and capability to service our fleet as required, without needing to take the vehicles far from their primary location.

All utility vehicles are modified to accommodate operational requirements. The modifications mainly involve the installation of fit for purpose trays to act as mobile workshops when working in remote locations along the pipeline, with provision for work bench, space for tools and test equipment, fire extinguishers and facilities for handling loads. Historically we reused some of the bodies, transferring them from one vehicle to another. However, we have stopped this process as a number have failed through fatigue cracking. The additional works required to replace the failed body modifications during the life of the asset is not cost efficient.

Modification of our vehicles to install fit for purpose communication and electrical systems also contributes a significant portion of our vehicle costs. Over recent years we have worked with our preferred vendors to improve the design and build quality of these systems to remove the safety risks and allow our vehicles to meet staff expectations for example in relation to connectivity in the field. This will become more important as we roll-out our field mobility program (see business case DBP30: IT Sustaining Infrastructure).

1.3.2 Civil equipment replacement

Our civil equipment includes trucks, trailers, plant, heavy vehicles and equipment, which includes for example graders, front end loaders and forklifts. This equipment is utilised across the entire DBNGP as required for both scheduled works and for reactive and emergency works.

We lease some machinery where that is an option for individual projects. However, most our civil requirements are specialised and required in very remote locations, so outright purchase is often the only practicable option for core civil equipment.

Heavy vehicle civil equipment has a typical life of eight years. This is based on escalating maintenance costs and increased risk profile after this time. Equipment, plant and trailers require ongoing maintenance or major services rather than replacement in order to extend their useful life.

During the upcoming period we are forecasting the replacement of civil equipment as shown in Table 0.4.

Table 0.4: Forecast civil equipment replacement

Civil equipment	Units	Year
Trucks	2	2026
Grader	1	2027
Water cart	1	2028
Drum roller	1	2029
Excavator	1	2030

1.3.2.1 Manitous

Manitous were introduced in 2006 to facilitate materials handling and working at heights at compressor stations. These are versatile, multi-function plant that serve as:

- lifting pallets similar to fork lifts;
- buckets for small civil works;
- clamps for lifting odd shape equipment; and
- jibs and working at height platforms.

We have [redacted] Manitous used along the pipeline. Four of these were purchased in 2006, one in 2007, one in 2012 and two in 2015. They require servicing every six months and major servicing and maintenance once they reach ten years old, and then every five years thereafter. This servicing is highly specialised and includes a complete strip down and non-destructive testing of the boom and welds etc.

During the AA6 period, we plan to replace our Manitou fleet as they are all reaching their end of technical life. We considered extending their technical life through major overhauls but these overhauls are expensive, and are not proving to extend the asset life sufficiently. Moreover, our recent quotes have shown a major service costs between $80,000 and $100,000 plus parts, plus hire of another machine for use during the major service, plus transport to and from site. Manitous cost [redacted] each. On this basis we consider Manitous reach the end of their economic life between 10 and 15 years depending on the level of use and condition.

The forecast replacement schedule for our Manitou fleet is outlined in Table 0.5.

Table 0.5: Manitou location and replacement forecast

Location	Replacement year	Age at replacement
CS1	2026	20 years
CS2	2026	20 years
CS3	2026	20 years
CS4	2026	20 years
CS5	2030	13 years
CS7	2027	20 years
CS8	2029	14 years
Jandakot	2027	15 years

1.3.3 Transport safety

Transporting goods safely is essential due to the remoteness of our operating locations. If goods arrive damaged or no longer fit for purpose, significant expenditure is required to expedite new materials or goods to site, while running the risk of costly delays in maintenance and capital projects. Transport safety expenditure includes items such as:

- Heavy-duty tarps: Protect cargo from weather and debris
- Load binders: Securely fasten heavy loads to prevent shifting
- Straps and ratchet tie-downs: Provide additional security for various cargo types
- Edge protectors: Prevent straps from damaging cargo edges
- Pallets: Facilitate easy loading, unloading, and handling of goods
- Cargo nets: Secure loose or irregularly shaped items
- Dunnage bags: Fill gaps and stabilize cargo during transport
- Safety cones and warning signs: Indicate hazardous loads and ensure road safety
- Lockable storage containers: Secure sensitive equipment and materials

Historically we have invested on a reactive basis only after an issue is identified. However, in the AA6 period, we propose to introduce a new program to proactively invest in transport safety equipment.

1.4 Risk assessment

Risk management is a constant cycle of analysis, treatment, monitoring, reporting and then identifying once again, with a commitment to balance outcomes sought with delivery and cost implications considered and assessed.

Our risk assessment approach focuses on understanding the potential severity of failure events associated with each asset and the likelihood that the event will occur.
Based on these two key inputs, the risk assessment and derived risk rating then guides the actions and activities required to ensure safety and compliance are not compromised, while delivery of this outcome is done as efficiently and effectively as possible.

Figure 0.2: Risk management principles



The risk rating assesses the consequence and likelihood of the risk. The risk of an event associated with failure of an asset is rated based on the combined effect of the consequence and likelihood rating to provide an overall risk rating.
This risk rating guides the risk management and mitigation activities and facilitates prioritisation.

Our Operational Risk Framework is based on AS/NZS 2885 and requires all identified risks

ranked as intermediate or above to be addressed. For risks ranked as high we must *'Modify the threat, the frequency or the consequence to reduce the risk rank to intermediate or lower'.*

Six areas are considered for each type of risk:

7. People – injuries or illness to employees and contractors or members of the public
8. Environmental impact – impact on the surroundings in which the asset operates, including natural, built and Aboriginal cultural heritage, soil, water, vegetation, fauna, air and their interrelationships
9. Supply – disruption in the provision of services/supply, impacting customers
10. Impact on AGIG/DBP – ability of AGIG (DBP) to operate the asset(s) without restrictions due to regulatory enforcement or legal actions
11. Reputation – impact on stakeholders' views of AGIG (DBP), including personnel, customers, investors, security holders, regulators and the community
12. Loss – financial impact on AGIG (DBP)

The primary risk event associated with our fleet and civil equipment is that continued use of ageing light vehicles, trucks and civil equipment leads to frequent failures and breakdowns, with elevated risk while travelling or conducting work in remote locations leading to direct or indirect safety hazards.
The overall risk rating of fleet vehicles and civil equipment assets is presented in Figure 0.3. Three elements of risk are rated as high, one low and two negligible. This results in a high risk ranking for these fleet vehicle and civil equipment assets in an untreated scenario.

Figure 0.3: Untreated risk rating – Fleet and civil equipment

	Trivial	Minor	Severe	Major	Catastrophic
Frequent					
Occasional					
Unlikely	Loss		DBP Reputation	People	
Remote					
Hypothetical	Supply	Environmental			

Negligible	Low	Intermediate	High	Extreme

Unmanaged and unmaintained fleet vehicles and civil equipment assets are high risk and high priority according to our operational risk framework and travelling by road has been identified as 'extreme' risk in our risk register.

The drivers of the risk rating for each area are discussed below.

- **People** – Untreated, a failure of a fleet vehicle or civil equipment asset could result in up to two fatalities; or up to four individuals with life threatening injuries or permanent disabilities; or more than four LTIs or MTIs.
- **DBP** – Untreated, a failure of a fleet vehicle or civil equipment asset would not pose threat to our effective operation, but exposes us to unacceptable cost consequences.
- **Reputation**– Untreated, a failure of a fleet vehicle or civil equipment asset could result in widespread complaints and anger.

1.5 Options considered

Different options have been considered to ensure our fleet and civil equipment continue to function safely, reliably and accurately. The options are:

- Option 1 – Replace fleet on failure
- Option 2 – Proactive replacement of fleet and civil equipment, continue to maintain existing Manitou fleet
- Option 3 – Proactive replacement of fleet and civil equipment and the replacement of the Manitou fleet

The options are discussed in the following sections.

1.5.1 Option 1 – Replace fleet on failure

With this option, the maintenance and management of fleet vehicle and civil equipment would move to a replace on failure policy.

1.5.1.1 Advantages and disadvantages

The advantage of this option is that the short-term costs may be lower. The level of investment incurred during AA6 will be driven by the number of fleet asset failures, therefore if fewer assets than expected fail, the costs will be low. Further, under an entirely reactive approach we would not proactively invest in the transport safety equipment. Again, this could lead to lower overall costs.

However, this option is fraught with disadvantages. Though costs could be lower short term, the condition of our fleet will continue to deteriorate. The assets will fail at some point, meaning all we are doing under Option 1 is deferring expenditure to another day while increasing the amount of risk we are carrying.

More importantly, there are no guarantees costs would be lower. The current condition of our fleet is poorer than we are comfortable with and the recent pandemic pressures means we are already behind our replacement schedule. Too many of our vehicles are approaching or beyond 150,000km, which indicates we can expect several failures in the coming years. If several aged vehicles fail around the same time, we could see a spike in replacement costs as well as project/maintenance delays. As a conservative estimate we believe a replace on failure approach would be at least the same cost as our preferred proactive option, most likely higher.

Another disadvantage is that by not having a scheduled replacement program we will forego the opportunity to secure favourable terms with our fleet suppliers. If our purchases become sporadic and we buy on a piecemeal basis, it is likely to result in higher unit costs.

Finally, there is the safety risk. We do not want to place our staff in a position where their vehicle or plant fails during use. This is particularly risky for field staff driving to remote locations where condition are harsh and communications are poor. Expecting staff to persevere with substandard vehicles does not reflect the actions of a good employer.

1.5.1.2 Achievement of objectives

Table 0.6 outlines how Option 1 will support the achievement of our vision objectives in AA6.

Table 0.6: Achieving objectives – Option 1

Vision objective	Alignment
Delivering for Customers – Public Safety	N
Delivering for Customers – Reliability	-
Delivering for Customers – Customer Service	N
A Good Employer – Health and Safety	N
A Good Employer – Employee Engagement	-
A Good Employer – Skills Development	-
Sustainably Cost Efficient – Working within Industry Benchmarks	N
Sustainably Cost Efficient – Delivering Profitable Growth	-
Sustainably Cost Efficient – Environmentally and Socially Responsible	-

This option does not deliver for customers in terms of public safety and does not deliver for employees in terms of health and safety. It also fails to operate within industry benchmarks and would result in non-compliance with our Safety Case and other workplace related legislative requirements.

1.5.1.3 Cost assessment

This option is assumed to cost at least the same as the proactive replacement program over the long term.
This option could cost significantly more to reflect the higher unit rate cost of replacement, as the current contractual position with [redacted] could not be maintained. We could also be exposed to additional costs as a result of damage to other assets and higher unit and freight costs to expedite delivery for civil equipment.

1.5.1.4 Risk assessment

Option 1 does not change from the untreated risk. The risk does not 'moderate the threat, the frequency or the consequence to reduce the risk rank to intermediate or lower'.

Table 0.7: Risk rating impact - Option 1

Risk category	Untreated	Treated
People	High	High
Environmental	Negligible	Negligible

Supply	Negligible	Negligible
DBP	Intermediate	Intermediate
Reputation	Intermediate	Intermediate
Loss	Negligible	Negligible

With this option, no risks are treated, so it is not aligned with expectations of AS 2885 or our operational risk management framework.

1.5.2 Option 2 – Proactive replacement of fleet and civil equipment, continue to maintain existing Manitou fleet

Under this option, 60 fleet vehicles would be replaced in AA6, allowing DBP to commence its return to compliance with our fleet replacement policy and our assessment of useful life extension potential for existing vehicles.

We would undertake the major inspections and maintenance on the existing Manitou fleet rather than replace them. This would cost between $800,000 and $1 million. We would also introduce a minor program of work to proactively invest in transport safety equipment such as scales and pallets.

1.5.2.1 Advantages and disadvantages

The advantage of this option is that it helps us move towards a sustainable level of fleet replacement. While replacing 60 fleet vehicles in the period won't eliminate all vehicles over 150,000 km, it will allow us to prioritise replacement of the poorest condition vehicles and manage the other aged vehicles through a combination of swapping and maintenance until we can replace them during the AA7 period. This achieves a good balance between reducing risk and managing price impact.

The disadvantage of this option is that we will only be repairing/maintaining our Manitous rather than replacing them with new plant. While we can get by with maintaining our Manitous, the cost of a major service on these vehicles is $80,000 to $100,000 each, plus parts, plus hire of another machine for use during the major service, plus transport to and from site. Given a new Manitou costs [redacted] to buy, servicing our Manitous will likely only cost marginally less than buying new ones outright. As a result, by maintaining our existing aging Manitou fleet we will be incurring only slightly lower costs than if we were to replace them, and we would still be carrying the risk associated with aged plant.

1.5.2.2 Achievement of objectives

Table 0.8 outlines how option 2 will support the achievement of our vision objectives in AA6.

Table 0.8: Achieving objectives – option 2

Vision objective	Alignment
Delivering for Customers – Public Safety	Y
Delivering for Customers – Reliability	-
Delivering for Customers – Customer Service	Y

Vision objective	Alignment
A Good Employer – Health and Safety	Y
A Good Employer – Employee Engagement	-
A Good Employer – Skills Development	-
Sustainably Cost Efficient – Working within Industry Benchmarks	N
Sustainably Cost Efficient – Delivering Profitable Growth	-
Sustainably Cost Efficient – Environmentally and Socially Responsible	-

This option delivers on the vision objectives of delivering for customers by ensuring the safety and reliability of fleet vehicles and civil equipment assets, but is not sustainably cost efficient as it requires us to retain our Manitous beyond their technical and economic lives. The short to medium term costs associated with major overhauls is not cost effective. The combined five and ten-year servicing is expected to be almost as expensive than the procurement of a new Manitou, suggesting an economic life of 10-15 years is appropriate.

1.5.2.3 Cost assessment

Under this option the cost would be $11.9 million in AA6.

Table 0.9: Summary of AA6 forecast capex for tools, real $,000 at June 2024

Activity	2026	2027	2028	2029	2030	Total
Fleet replacement	1,800	1,800	1,800	1,800	1,800	**9,000**
Civil replacement	600	419	306	200	450	**1,975**
Manitou maintenance	320	110	30	60	120	**640**
Transport safety	50	50	50	50	50	**250**
Total	**2,770**	**2,379**	**2,186**	**2,110**	**2,420**	**11,865**

Major servicing cost approximately $80,000, plus an average of $10,000 for parts, plus lease costs of around $15,000 for a temporary replacement unit plus transport costs to and from site for the service as needs to be performed in a workshop.
When inspection and servicing switches to a five-year period (after the first 10 years) it is more cost effective to replace the unit, especially given that with age the units tend to require more maintenance in addition to the major servicing.
Therefore, while the cost of this option is lower than Option 3 over the AA6 period, the cost of maintaining the existing Manitou fleet over the lives of the assets is more expensive than replacing the fleet.

1.5.2.4 Risk assessment

Option 2 moderates the threat, the frequency and/or the consequence to reduce the risk rank to intermediate or lower.

Table 0.10: Risk rating impact - Option 2

Risk category	Untreated	Treated
People	High	Intermediate
Environmental	Negligible	Negligible
Supply	Negligible	Negligible
DBP	Intermediate	Low

Reputation	Intermediate	Negligible
Loss	Negligible	Negligible

Option 2 appropriately address identified (inherent) risks, reducing the risk of these assets by replacing and/or undertaking major services as needed.

1.5.3 Option 3 – Proactive replacement of fleet and civil equipment and the replacement of the Manitou fleet

This option is the same as option 2, but considers the replacement of the Manitou fleet during the 10-15 year period when they have reached their end of technical and economic life.

We have found that the optimum time to replace the equipment is prior to either the first or second major service (i.e. 10-15 years) based on the usage and condition of the asset. However, as our fleet is well past this timeframe, we will need to replace the entire fleet in the AA6 period to avoid substantial inspection and maintenance costs.

1.5.3.1 Advantages and disadvantages

The advantage of this option is that it helps us move towards a sustainable level of fleet replacement. As per Option 2, while replacing 60 fleet vehicles in the period won't eliminate all vehicles over 150,000 km, it will allow us to prioritise replacement of the poorest condition vehicles and manage the other aged vehicles through a combination of swapping and maintenance until we can replace them during the AA7 period. This achieves a good balance between reducing risk and managing price impact.

A further advantage of this option is that we will essentially eliminate the risk associated with our aged Manitou fleet, as we will be replacing the ten Manitous due for major service with new plant. A new Manitou will be in better condition than the old ones and will have a longer useful life. Maintenance costs should also be lower in the early years while the Manitou remains in good condition and under warranty.

The disadvantage of this option is the higher upfront capital cost.

1.5.3.2 Achievement of objectives

Table 0.8 outlines how option 3 will support the achievement of our vision objectives in AA6.

Table 0.11: Achieving objectives – option 3

Vision objective	Alignment
Delivering for Customers – Public Safety	Y
Delivering for Customers – Reliability	-
Delivering for Customers – Customer Service	Y
A Good Employer – Health and Safety	Y
A Good Employer – Employee Engagement	-
A Good Employer – Skills Development	-
Sustainably Cost Efficient – Working within Industry Benchmarks	Y
Sustainably Cost Efficient – Delivering Profitable Growth	-

Vision objective	Alignment
Sustainably Cost Efficient – Environmentally and Socially Responsible	-

This option delivers on the vision objectives of delivering for customers by ensuring the safety and reliability of fleet vehicles and civil equipment assets and is sustainably cost efficient by working within industry benchmarks and being environmentally and socially responsible, as it replaces assets based on expected end of life assumptions, using a commercially negotiated unit rate, reflecting market conditions.
Of most importance is the safety of our staff and contractors. This option ensures we are proactively looking out for the safety and wellbeing of our personnel consistent with our Zero Harm philosophy.
By adopting a proactive, planned approach to fleet vehicle and civil equipment asset management, we can best manage the efficient delivery of the program, minimising the need for unplanned and disruptive repair work on the fleet, which might otherwise result in an incident or other expensive disruption.
The continued maintenance of our existing Manitou fleet does not align with our objective of delivering profitable growth, as the short to medium term costs associated with major overhauls is not cost effective. The combined five and ten-year servicing is expected to be almost as expensive as the procurement of a new Manitou, suggesting an economic life of 10-15 years is appropriate.

1.5.3.3 Cost assessment

Under this option the cost is $12.6 million in AA6.

Table 0.12: Summary of costs – Option 3

Activity	2026	2027	2028	2029	2030	Total
Fleet replacement	1,800	1,800	1,800	1,800	1,800	**9,000**
Civil replacement	600	419	306	200	450	**1,975**
Manitou purchases	750	300	150	150	-	**1,350**
Transport safety	50	50	50	50	50	**250**
Total	**3,200**	**2,569**	**2,306**	**2,200**	**2,300**	**12,575**

While the cost of this option is higher than option 2 over the AA6 period, the cost of maintaining the existing Manitou fleet over the next 10 years is more expensive, and lower risk, than replacing the fleet.

1.5.3.4 Risk assessment

Option 3 moderates the threat, the frequency and/or the consequence to reduce the risk rating to ALARP. Option 3 appropriately address identified inherent risks, reducing the risk of these assets by replacing and/or undertaking major services as needed.

Table 0.13: Risk rating impact - Option 3

Risk category	Untreated	Treated
People	High	Intermediate
Environmental	Negligible	Negligible
Supply	Negligible	Negligible
DBP	Intermediate	Negligible

Reputation	Intermediate	Negligible
Loss	Negligible	Negligible

While both Option 2 and Option 3 reduce the overall risk to ALARP, Option 3 has a slightly greater risk reduction in terms of impact on DBP, as failure of one or more Manitous could result in significant reactive replacement costs and potential penalties if unavailability of these important fleet assets causes disruption to works. By replacing the old Manitous with new ones, we are reducing this risk to negligible levels.

1.6 Summary of cost/benefit assessment

To assess the options, the costs, objectives and risk are considered for each option. A summary of the option assessment is shown in Table 0.14.

Table 0.14: Summary of cost/benefit analysis

Option	Achievement of objectives	Cost	Treated risk (integrity/reliability)
Option 1 – Adopt a replacement on failure policy	This option does not achieve our objective of delivering for customers and working within industry benchmarks	No upfront capex	This option does not treat the identified risk
Option 2 – Proactive replacement of fleet and civil equipment, continue to maintain existing Manitou fleet	This option achieves all objectives, except for sustainably cost efficient, as it is likely more expensive over the longer term	$11.9 million	This option moderates high and intermediate risks to ALARP
Option 3 – Proactive replacement of fleet and civil equipment and the replacement of the Manitou fleet	This option achieves all our objectives	$12.6 million	This option moderates high and intermediate risks to ALARP

1.7 Proposed solution

1.7.1 Why is the recommended option prudent?

The recommended option is option 3 – replace 60 fleet vehicles, six critical pieces of civil equipment, [redacted] Manitou's and allow provision for equipment to support safe transport storage. Combined this investment appropriately mitigates the risk identified under our Operational Risk Framework to ALARP, and manages the asset consistent with asset management principles.

Running vehicles and operational equipment to failure as per option 1 is likely to result in a serious incident to staff or the public, or catastrophic failure of an asset , which gives rise to significant reputational damage, additional costs and have a significant impact on the service provided to customers. It could also give rise to penalties and further reputational impact should a failure result in an inability to meet customer capacity demands.

1.7.2 Estimating the efficient costs

For all replacements and major services, recent historical actuals are used as the basis for future forecasts. These have all been achieved based on commercially negotiated rates secured in line with our Procurement Policy and Purchasing Procedure.

[redacted] is our preferred supplier, representing the best value for money against criteria for fleet vehicle procurement.
The basis of the light fleet cost estimation can be found in Appendix B.

1.7.3 Consistency with the National Gas Rules

Option 3 is the preferred solution and provides DBP with safe, sufficient and fit for purpose vehicles and civil equipment to utilise for all work undertaken on the DBNGP, including emergency response works.

NGR 79(2)

- The option is consistent with Rule 79(2)(c)(ii) as the capex is necessary to maintain the integrity of services, specifically by:
- Maintaining good industry practice in relation to fleet replacement, thereby ensuring that our field crews can rely on safe and fit for purpose vehicles, plant and equipment.

NGR 79(1)

The option is consistent with the requirements of Rule 79 of the National Gas Rules, we consider that the capital expenditure is:

- **Prudent** – The expenditure is necessary in order to address the identified ongoing operational requirements. The program is also broadly consistent with the approach adopted in AA5. The proposed expenditure can therefore be seen to be of a nature that would be incurred by a prudent service provider.
- **Efficient** – The forecast expenditure is based on current market forecast costs and vehicle values. The highest priority vehicles are being addressed first, therefore the proposed expenditure can therefore be considered consistent with the expenditure that a prudent service provider acting efficiently would incur.
- **Consistent with accepted and good industry practice** – The proposed expenditure relates to work broadly consistent with prior AA periods. It also follows good industry practice by ensuring that critical infrastructure is maintained within its useful life and to current technological standards, therefore the proposed capital expenditure is such as would be incurred by a prudent service provider acting efficiently, in accordance with accepted good industry practice.
- To achieve the **lowest sustainable cost of delivering pipeline services** – The sustainable delivery of services includes reducing risks to as low as reasonably practicable and maintaining reliability of supply, whilst achieving the lowest sustainable costs by undertaking the works in line with the relevant useful life. This includes a change in approach for our Manitou fleet, which will see lower costs over the longer term.

NGR 74

The forecast costs are based on the latest market rate testing and project options considering the asset management requirements as per the Asset Management Strategy. The estimate has therefore been arrived at on a reasonable basis and represents the best estimate possible in the circumstances.

1.8 Comparison to previous periods

1.8.1 AA6 forecast compared to AA5

In AA6, capital expenditure of $12.6 million is forecast for the vehicles and civil equipment program. Table 0.15 shows the forecast AA6 expenditure compared with actual expenditure in AA5.

Table 0.15: AA6 forecast capital expenditure, compared with AA5 actual ($'000)

Forecast spend ($'000)	2026	2027	2028	2029	2030	AA6	AA5 total	Variance
Capital expenditure	3,200	2,569	2,306	2,200	2,300	**12,575**	**6,760**	**5,815**

The incremental increase in AA6 is a result of:

- An increase in the size of our fleet in AA5 (89 at the start of AA5 to the current 106)
- Delays in fleet replacement due to the impact of COVID-19 on the supply chain
- Significant increases in the cost of vehicles and plant (on average around 25% since 2020)
- The proposed replacement of the Manitou fleet which are all beyond their technical and economic life

1.8.2 AA5 variance

Actual expenditure during the AA5 period was $1.1 million higher than the amount determined in the AA5 Final Decision.

Table 0.16: AA5 actual expenditure compared with budget

Actual v budget ($'000)	2021	2022	2023	2024	2025	AA5
AA5 actual	1,506	1,775	1,431	1,037	1,010	6,760
AA5 approved	1,231	988	1,232	989	1,234	5,673
Variance	**275**	**788**	**199**	**48**	**-224**	**1,087**

The primary reason for the variance is that the cost of vehicles has increased above rates of inflation.

Appendix A Cost estimates

Hilux unit estimate	Cost	Source
Vehicle	[redacted]	[redacted]
Body fit out	$ 26,173.00	Actuals from PO
Electrics	$ 42,988.00	Actuals from PO
Unit cost - 2023 costs escalated 4% CPI	$ 148,432.96	
Number of vehicles	41	
Replaced in AA6	25	
AA6 cost	$ 3,710,824	

LC/Prado	Cost	Source
Vehicle	[redacted]	[redacted]
Body etc	$ 26,173.00	Actuals from PO
Electrics	$ 42,988.00	Actuals from PO
Unit cost - 2023 costs escalated 4% CPI	$ 160,327.44	
Number of vehicles	65	
Replaced in AA6	33	
AA6 cost	$ 5,290,806	

Total AA6	$ 9,001,630
AA6/year	$ 1,800,325.90
Overall average unit rate	$ 152,569.99

Appendix B Comparison of risk assessments

Summary of risk assessment

Project Ref No	Description	Primary Risk Event	Proposed Action		People	Environmental	Supply	DBP	Reputation	Loss
DBP17	Fleet and civil equipment	Contiued use of ageing light vehicles, trucks and civil equipment could lead to frequent failures and breakdowns, with elevated risk while travelling or conducting work in remote locations leading to direct or indirect safety hazards.	Untreated Risk	Likelihood	Unlikely	Hypothetical	Hypothetical	Unlikely	Unlikely	Unlikely
				Consequence	Major	Minor	Trivial	Severe	Severe	Trivial
				Risk Level	HIGH	NEGLIGIBLE	NEGLIGIBLE	INTERMEDIATE	INTERMEDIATE	NEGLIGIBLE
			Option 1 – Replace fleet on failure (no upfront capex)	Likelihood	Unlikely	Hypothetical	Hypothetical	Unlikely	Unlikely	Unlikely
				Consequence	Major	Minor	Trivial	Severe	Severe	Trivial
				Risk Level	HIGH	NEGLIGIBLE	NEGLIGIBLE	INTERMEDIATE	INTERMEDIATE	NEGLIGIBLE
			Option 2 – Proactive replacement of fleet and civil equipment, continue to maintain existing Manitou fleet	Likelihood	Remote	Hypothetical	Hypothetical	Occasional	Unlikely	Unlikely
				Consequence	Major	Minor	Trivial	Minor	Trivial	Trivial
				Risk Level	INTERMEDIATE	NEGLIGIBLE	NEGLIGIBLE	LOW	NEGLIGIBLE	NEGLIGIBLE
			Option 3 – Proactive replacement of fleet and civil equipment and the replacement of the Manitou fleet	Likelihood	Remote	Hypothetical	Hypothetical	Remote	Unlikely	Remote
				Consequence	Major	Minor	Trivial	Minor	Trivial	Trivial
				Risk Level	INTERMEDIATE	NEGLIGIBLE	NEGLIGIBLE	NEGLIGIBLE	NEGLIGIBLE	NEGLIGIBLE

Capex DBP18: Turbine exhaust replacement

1.1 Project approvals

Table 1.1: DBP18 Turbine exhaust replacement – Project approvals

Prepared by	Andrew Stanwix, Principal Engineer – Mechanical C&P RE
Reviewed by	Jeff Kong, Head of Transmission Asset Strategy
Approved by	Tawake Rakai, EGM Transmission Asset Management

1.2 Project overview

Table 1.2: DBP18 Turbine exhaust replacement – Project overview

Description of problem /opportunity	This business case covers the replacement of five turbine exhaust systems that have reached end-of-life. The turbine exhaust system directs exhaust gases safely to protect the compressor station and pipeline assets from excessive heat and/or pressure. The condition of the turbine exhaust system impacts the performance of the compressor unit. As the exhaust ages it can be susceptible to thermal stress corrosion and cracking resulting in failure. Failure of the exhaust system can expose the compressor station and pipeline to excessive heat or pressure. A turbine unit cannot be safely operated without an effective exhaust system. In AA5 we commenced a program to proactively replace our ageing turbine exhaust systems over ten years. The exhaust system, and useful life, differs among turbine units installed during the different stages of expansion of the DBNGP. The stainless steel systems installed during ACS have a useful life of 35 years, which may be extended a further two years by patching. The stainless steel lined (plain steel outer) systems installed during Stages 2 and 4 have a useful life of 17 years. The newer stainless steel exhausts installed during Stages 3 and 5 have a forecast useful life of 20 years. We have extended the lives of the exhaust systems installed during ACS to the extent possible using method such as patching. However, attempts to repair the ACS units in particular have been ineffective, with each unit failing shortly after.
Untreated risk	As per risk matrix = High
Options considered	• **Option 1** – Replace four turbine exhausts on condition once they have reached end-of-life [redacted]) (this is the recommended option) • **Option 2** – Replace seven turbine exhausts on condition once they have reached end-of-life [redacted]) • **Option 3** – Move to a replacement on failure policy ($6.7 million)
Proposed solution	The proposed solution is Option 1, to replace four turbine exhausts over the next 5-year period. Although replacing seven would remove more operational risk, replacing four achieves a better balance between risk reduction and deliverability. Turbine exhaust replacement is a complex activity and there is competition for resources across our work program. While replacing seven is feasible, we feel we can replace four exhausts and mitigate the residual risk over the short term with patching until we can replace the balance. The three deferred units will be completed in AA7, however should the risk escalate, we will bring forward replacements as required. Replacement on failure is not

	recommended due to the inherent safety and reliability risks of the asset failing during operations.
Estimated cost	The forecast direct cost (excluding overheads) during the next five-year period (AA6) is [redacted] (2024). | $'000 real 2024 | 2026 | 2027 | 2028 | 2029 | 2030 | Total | | --- | --- | --- | --- | --- | --- | --- | | **Total** | [redacted] | [redacted] | [redacted] | [redacted] | [redacted] | [redacted] |
Basis of costs	All costs in this business case are expressed in real unescalated dollars December 2024 unless otherwise stated.
Treated risk	As per risk matrix = Negligible
Variation from AA5	The forecast expenditure for AA6 is $3 million more than the forecast expenditure in AA5 of $2.7 million. The incremental increase in AA6 is a result of: • We are replacing 4 units in AA6, as opposed to 3 units completed in AA5 • The ACS turbine exhausts units in AA6 are significantly more complex than those delivered in AA5, which has been a contributing factor to the underspend in AA5.
Alignment to our vision	Delivering the ongoing turbine exhaust replacement capex program aligns with AGIG's vision in relation to: • *Delivering for Customers* – the proposed investment is necessary to ensure integrity of supply and ensure shippers have operational compressors to deliver required pressures and volumes • *Sustainably Cost Efficient* – the proposed investment in 4 exhausts prevents damage to compressors and surrounding facilities at considerably lower cost than allowing failure and reactive remediations.
Consistency with the National Gas Rules (NGR)	This project complies with the following National Gas Rules (NGR): NGR 79(1) - the proposed asset replacement is consistent with accepted good industry practice, several practicable options have been considered, and market/unit rates have been tested to achieve the lowest sustainable cost of providing pipeline services. NGR 79(2) - turbine exhaust systems are critical to performance and safe operation of compressor units at compressor stations. Proactively repairing, upgrading and/or replacing turbine exhaust systems is required to ensure the integrity and availability of these assets to deliver the gas requirements of our customers. Therefore, the proposed replacement of end-of-life exhaust systems is consistent with NGR 79(2)(c)(i) and (iii). NGR 74 - the forecast costs are based on the latest market rate testing, and project options consider the asset management requirements as per the latest Asset Management Plan. Cost assessments have been conducted for each option based on the best information available at the time of developing this business case. The estimate has therefore been arrived at on a reasonable basis and represents the best estimate possible in the circumstances.
Stakeholder engagement	Our Shippers told us they highly value current levels of reliability and would be concerned if this were to change. They also expect us to maintain a strong focus on operational issues as it is important for reliability and emergency management. Our turbine exhaust replacement program will replace end of life/failing turbine exhausts which are critical to the safe and efficient operation of turbine units.

Other relevant documents	This Business Case should be read in conjunction with: • Asset Management Plan (TEB-001-0024-07) • AMP TEB-001-0024-03 (Rotating Equipment) • Risk Management Policy and Operational Risk Model (together our Risk Management Framework)

1.3 Background

All physical DBNGP assets are managed in accordance with the policies and principles set out in our asset management system framework. A key principle of the asset management system framework is effective management of asset risks which includes identification of risks and evaluation of the adequacy of controls in terms of physical safeguards and asset maintenance requirements. These controls are sometimes supported by the relevant manufacturer's warranty and/or maintenance guidelines.

Gas turbines are heat engines in which energy is generated by combustion and then converted into mechanical energy. A key component of the gas turbine engines is the turbine exhaust, which includes collectors, expansion joints, transition pieces, ducts and attenuators. The purpose of a turbine exhaust is to direct exhaust gases safely thereby protecting people from hot exhaust gases, the compressor station, pipeline assets and surrounding environment from excessive heat.

Turbine exhausts used on the DBNGP vary as a result of differing designs and materials used during the various stages of the DBNGP expansion. A summary of the turbine exhaust equipment and proposed replacement schedule is outlined in Table 1.3.

Table 1.3: Summary of turbine exhausts

Stage	Equipment type	# units	ID	Useful life	Install date	AA5 Complete	AA6 Option1	AA6 Option2
ACS	Stainless steel	6	CS1/1 CS3/1 CS5/1 CS5/2 CS8/1 CS8/2	35 years	1991	-	CS3/1 CS5/1 CS8/1 CS8/2	CS1/1 CS3/1 CS5/1 CS5/2 CS8/1 CS8/2
Stage 2	Stainless steel liner, Plain Steel outer	1	CS6/2	17 years	1997	CS6/2	-	-
		1	CS9/1	17 years	1996 & 2008	-	-	-
Stage 3	Stainless steel	3	CS2/2 CS4/2 CS7/2	20 years	2000	CS2/2 CS4/2	-	-
Stage 4	Stainless steel	2	CS1/2 CS2/3	20 years	2004	-	-	-
Stage 4	Stainless steel liner, Plain Steel outer	6	CS3/3 CS4/3 CS6/3 CS7/3 CS9/2 CS10/3	17 years	2006	-	-	CS9/2

Stage	Equipment type	# units	ID	Useful life	Install date	AA5 Complete	AA6 Option1	AA6 Option2
Stage 5	Stainless steel	1	CS10/4	20 years	2010	-	-	-

It is important we replace the exhausts as these assets are subject to extreme conditions and fail over time. During 2018 we experienced a catastrophic failure of the turbine exhaust at CS7/2, which was caused by cracks that arose as a result of excessive operations and exhaust expansion typical with thermal fatigue. Asset cracking and failures for our exhausts can be seen in the photographs below.

Figures 1.1 and 1.2 – cracking failure identified on turbine exhaust units





Following the incident, DBP undertook a comprehensive review of its turbine exhaust fleet and determined a program of works that began during AA5 to replace units that have reached end of life, using condition, age and criticality as mechanisms to prioritise the replacement schedule.

For the upcoming period seven units have been identified for prioritised replacement, these are identified in the following table.

Table 1.4: Summary of exhaust replacement schedule

Unit	Forecast asset life (years)	Current age (year)	Criticality	Condition
CS3/1	35	34	High	Poor/degrading
CS5/1	35	34	High	Poor/degrading
CS8/1	35	34	High	Poor/degrading
CS8/2	35	34	High	Poor/degrading
CS1/1,	35	34	High/Medium	Poor/degrading
CS5/2	35	34	High/Medium	Poor/degrading
CS9/2	17	22	High/Medium	Poor/degrading

The four high criticality exhausts have been identified for priority replacement during the AA6 period, with the three high/medium criticality considered as part of options analysis.

Asset life extension strategies have allowed us to lengthen the original design life, however recent attempts to repair rather than replace the exhausts have been unsuccessful. The repaired units failed again within a few years due to the extreme effect of heating and cooling on the materials.

All four of the high criticality exhausts that have been identified for completion during AA6 are on ACS packages and are of the same age and similar poor condition. CS8 and CS3 are critical sites and are therefore prioritised. CS5 has two ACS units and therefore one unit is ranked high/medium due to the site redundancy, which allows us to consider the other unit to be prudently deferred.

1.4 Risk assessment

Risk management is a constant cycle of analysis, treatment, monitoring, reporting and then identifying once again, with a commitment to balance outcomes sought with delivery and cost implications considered and assessed.

Figure 1.1: Risk management principles



Our risk assessment approach focuses on understanding the potential severity of failure events associated with each asset and the likelihood that the event will occur.

Based on these two key inputs, the risk assessment and derived risk rating then guides the actions and activities

required to ensure safety and compliance are not compromised, while delivery of this outcome is done as efficiently and effectively as possible.

The risk rating assesses the consequence and likelihood of the risk. The risk of an event associated with failure of an asset is rated based on the combined effect of the consequence and likelihood rating to provide an overall risk rating. This risk rating guides the risk management and mitigation activities and facilitates prioritisation.

DBP's operational risk framework is based on AS/NZS 2885 and requires all identified risks ranked as intermediate or above to be addressed. For risks ranked as high DBP must 'Modify the threat, the frequency or the consequence to reduce the risk rank to intermediate or lower'.

Six areas are considered for each type of risk:

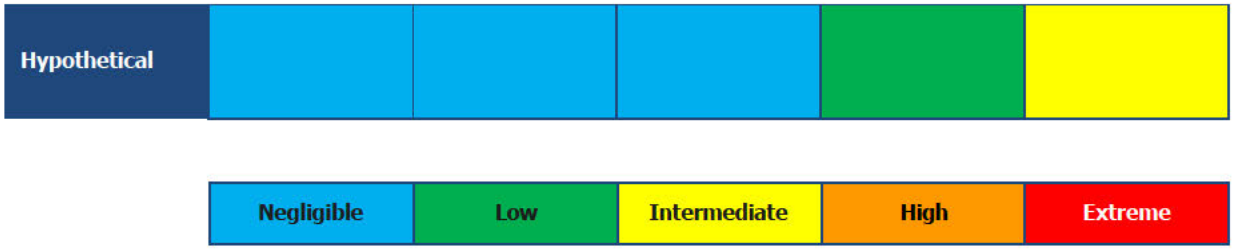
1. People – injuries or illness to employees and contractors or members of the public
2. Environmental impact – impact on the surroundings in which the asset operates, including natural, built and Aboriginal cultural heritage, soil, water, vegetation, fauna, air and their interrelationships
3. Supply – disruption in the provision of services/supply, impacting customers
4. Impact on AGIG/DBP – ability of AGIG (DBP) to operate the asset(s) without restrictions due to regulatory enforcement or legal actions
5. Reputation – impact on stakeholders' views of AGIG (DBP), including personnel, customers, investors, security holders, regulators and the community
6. Loss – financial impact on AGIG (DBP)

The primary risk even is that one of the ageing turbine exhaust system fails, including the exhaust stack, resulting in unsafe operation leading to unavailability of the compressor unit, with significant down time.

The overall risk rating of turbine exhausts is presented below. This results in a high risk ranking for these assets in an untreated scenario.

Figure 1.2: Untreated risk rating – Turbine exhausts

	Trivial	Minor	Severe	Major	Catastrophic
Frequent					
Occasional		Environment	DBP Loss		
Unlikely		Reputation	Supply	People	
Remote					



Specifically, major risks associated with deferment of replacement of turbine exhausts include:

- **People** – injuries or illness to employees and contractors or members of the public
- **Environment** – impact on the surroundings in which the asset operates, including natural, built and Aboriginal cultural heritage, soil, water, vegetation, fauna, air and their interrelationships
- **Supply** – disruption in the provision of services/supply, impacting customers
- **DBP** – ability of AGIG (DBP) to operate the asset(s) without restrictions due to regulatory enforcement or legal actions
- **Reputation** – impact on stakeholders' views of AGIG (DBP), including personnel, customers, investors, security holders, regulators and the community
- **Loss** – financial impact on AGIG (DBP)

1.5 Options considered

Different options have been considered to ensure our turbines continue to function safely, reliably and accurately. The options are:

- **Option 1** – Proactively replace four turbine exhausts that have reached end-of-life
- **Option 2** – Proactively replace seven turbine exhausts that have reached end-of-life
- **Option 3** – Move to a replacement on failure policy

The options are discussed in the following sections.

1.5.1 Option 1 – Proactively replace four turbine exhausts on condition once they have reached end-of-life

This approach assumes turbine exhaust systems are assessed for proactive replacement at their deemed end of life (ranging from 17-35 years depending on the equipment), with life extension applied where condition allows. The approach is consistent with good industry practice in comparable industries, where fit for purpose exhaust systems are required to discharge combustion exhaust gases safely into atmosphere to allow uninterrupted operation of the gas turbine powered compressors. It is also consistent with the approved AMP and manufacturer requirements.

1.5.1.1 Advantages and disadvantages

The advantage of this option is that it addresses the risk associated with the most critical and poorest condition turbine exhausts. It is also a well-balanced program, that is deliverable within the AA6 period. It is also a lower cost option than Option 2 and avoids the higher replacement costs and penalties associated with Option 3 if we were to replace on failure.

The disadvantage of Option 1 is that we would still have three high risk exhausts in operation, which would need to be patched until such a time they can be replaced. Note that if these three high risk exhausts deteriorated significantly during the period, they would be prioritised for replacement anyway.

1.5.1.2 Achievement of objectives

Table 1.9 below outlines how this option will support the achievement of our vision objectives in AA6.

Table 1.9: Achieving Objectives

Vision objective	Alignment
Delivering for Customers – Public Safety	Y
Delivering for Customers – Reliability	Y
Delivering for Customers – Customer Service	-
A Good Employer – Health and Safety	Y
A Good Employer – Employee Engagement	-
A Good Employer – Skills Development	-
Sustainably Cost Efficient – Working within Industry Benchmarks	Y
Sustainably Cost Efficient – Delivering Profitable Growth	-
Sustainably Cost Efficient – Environmentally and Socially Responsible	-

This option aligns with our vision objectives of delivering for customers, being a good employer and being sustainably cost efficient. By replacing end-of-life exhausts before they fail, we can mitigate the risk of safety incidents and supply disruption. By limiting our replacement plan for the AA6 period to four turbines, we are helping keep costs lower than they otherwise would be while mitigating the likelihood of costly reactive replacements if the exhausts were to fail.

1.5.1.3 Cost assessment

The forecast capex for replacing the four highest priority turbines is shown in the table below.

Table 1.10: Summary of costs - Option 1

($'000)	2026	2027	2028	2029	2030	Total
Replace four exhausts	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Total	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

1.5.1.4 Risk assessment

The following table shows that proactively replacing turbine exhausts in AA6 modifies the threat, the frequency or the consequence to reduce the risk rank to intermediate or lower, as required by our risk management framework.

Table 1.5: Risk rating – Option 1

Risk category	Untreated	Treated
People	High	Low
Environmental	Low	Negligible
Supply	Intermediate	Low
DBP	Intermediate	Low
Reputation	Low	Negligible
Loss	Intermediate	Low

Replacing the four turbines exhausts addresses the major risks to DBP, People, Reputation, Asset Damage and Supply associated with turbine exhausts by proactively replacing turbine exhausts on condition once they have reached end-of-life. The risk association with the three remaining poor condition exhausts can be managed in the short term by patching.

1.5.2 Option 2 – Proactively replace seven turbine exhausts on condition once they have reached end-of-life

This approach assumes that all seven of the turbine exhausts which have been identified as needing replacement are done so during AA6.

1.5.2.1 Advantages and disadvantages

The advantage of this option is that it address the risk associated with all end-of-life turbine exhausts and means we don't need to rely on temporary fixes such as patching. By replacing all seven identified exhausts, we are effectively eliminating the risk of failure and avoiding the higher replacement unit costs and penalties associated with Option 3 if we were to replace on failure.

The disadvantage of Option 2 is that it is a much more expensive and labour intensive program than Option 1. While we could feasibly replace all seven in the period, this would be a stretch due to the complexity of the projects and the remoteness of the sites. We would need to draw resources away from other programs, and run the risk of having to defer other projects.

1.5.2.2 Achievement of objectives

The following table outlines how this option will support the achievement of our vision objectives in AA6.

Table 1.12: Achieving objectives - Option 2

Vision objective	Alignment
Delivering for Customers – Public Safety	Y
Delivering for Customers – Reliability	Y
Delivering for Customers – Customer Service	-
A Good Employer – Health and Safety	Y
A Good Employer – Employee Engagement	-
A Good Employer – Skills Development	-
Sustainably Cost Efficient – Working within Industry Benchmarks	Y
Sustainably Cost Efficient – Delivering Profitable Growth	-
Sustainably Cost Efficient – Environmentally and Socially Responsible	-

This option aligns with our vision objectives of delivering for customers, being a good employer and being sustainably cost efficient. By replacing end-of-life exhausts before they fail, we can mitigate the risk of safety incidents and supply disruption. As such, Option 2 aligns with our objectives in the same manner as Option 1, albeit at a higher cost.

Despite the higher cost Option 2, we consider replacing all seven exhausts would still be sustainably cost efficient, and certainly lower cost than if we were to replace on failure.

1.5.2.3 Cost assessment

As outlined in Table 1.13, the estimated costs associated with this option total [redacted] in AA6.

Table 1.14: Summary of turbine exhaust replacements that have reached 20 years by the end of AA6

($'000)	2026	2027	2028	2029	2030	Total
Replace seven exhausts	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]4

Note these replacements are likely to come at a cost premium as we would need to get in additional external resources to allow for this level of replacement activity over a five year period.

1.5.2.4 Risk assessment

The following table shows that proactively replacing all seven turbine exhausts in AA6 modifies the threat, the frequency or the consequence to reduce the risk rank to intermediate or lower, as required by our risk management framework.

Table 1.6: Risk rating – Option 2

Risk category	Untreated	Treated
People	High	Low
Environmental	Low	Negligible
Supply	Intermediate	Low
DBP	Intermediate	Low
Reputation	Low	Negligible
Loss	Intermediate	Low

Replacing the seven turbines exhausts achieves a similar level of risk reduction to Option 1 (replacing the four highest priority exhausts), but does so at a higher overall cost.

Option 2 also means we would not have to rely on patch repairs. Permanent repairs rather than patching would, in theory, reduce the risk further than Option 1 (noting that the risk frameworks does not have sufficient granularity to capture this). However, we consider the additional cost impact during the period is not commensurate with the additional risk reduction achieved at this time.

1.5.3 Option 3 – Move to a replacement on failure policy

Under this option turbine exhausts would only be replaced when they can no longer be repaired, essentially adopting a 'run to fail' approach. The cost of required repairs is expected to increase as the number of failures increases where turbine exhausts are operated beyond their useful life.

Based on our experience with Stage 2 and Stage 3 turbine exhausts, we have assumed three of turbine exhausts due for replacement in AA6 will fail and require reactive replacement, and one will fail and require repairs. A repair typically lasts two years so we have also assumed this applies for a second failure of repaired exhausts in AA7.

1.5.3.1 Advantages and disadvantages

The advantage of this option is that it may result in no upfront capital costs if the exhausts do not fail. However, we would still expect to incur high maintenance costs given the age of the assets.

The disadvantages of this option are considerable. The age and poor condition of the four highest priority exhausts means they are likely to fail during the period unless we take action to replace them. This could lead to supply interruption and associated penalties, as well as causing us to incur the higher cost of reactive replacement.

Allowing the exhausts to fail would also likely cause damage to the turbine itself, as well as other equipment in proximity, increasing the repair bill further.

1.5.3.2 Achievement of objectives

The following table outlines how this option will support the achievement of our vision objectives in AA6.

Table 1.12: Achieving objectives - Option 3

Vision objective	Alignment
Delivering for Customers – Public Safety	N
Delivering for Customers – Reliability	N
Delivering for Customers – Customer Service	-
A Good Employer – Health and Safety	N
A Good Employer – Employee Engagement	-
A Good Employer – Skills Development	-
Sustainably Cost Efficient – Working within Industry Benchmarks	N
Sustainably Cost Efficient – Delivering Profitable Growth	-
Sustainably Cost Efficient – Environmentally and Socially Responsible	-

By allowing exhausts to fail we are potentially causing an avoidable safety event, as well as almost certainly impacting supply to our customers. This option does not deliver against any of our vision objectives.

1.5.3.3 Cost assessment

Reactive replacement is difficult to cost, as there is always the possibility that the exhausts do not fail. For the purpose of estimating the cost of a replace on failure option, we have made allowance for three reactive replacements and one repair. Reactive replacement of turbine exhausts is assumed to be 150% of planned replacement costs, which accounts for premia such as urgent freight costs, emergency response mobilisation. Note this is a conservative assumption.

The forecast unit rate for a turbine exhaust planned replacement during the AA5 period is [redacted] A temporary repair is ~$400,000 per exhaust.

The forecast unit rate for a turbine exhaust reactive replacement, is $[redacted]

The estimated cost of Option 3 is therefore ~$6.7 million. However, this does not include the cost of any penalties incurred or damage to other assets in the vicinity of the failed exhausts.

In addition to the capex costs outlined, we would also expect increasing maintenance and operating costs associated with the maintenance requirements and deteriorating compressor unit performance related to the turbine exhaust assets which have reached end-of-life in AA7, but have not been replaced under a replacement on failure approach.

1.5.3.4 Risk assessment

The following table shows that moving to a replace on failure approach would not reduce the risk to low or ALARP.

Table 1.7: Risk rating – Option 3

Risk category	Untreated	Treated
People	High	High
Environmental	Low	Low
Supply	Intermediate	Intermediate
DBP	Intermediate	Intermediate
Reputation	Low	Low
Loss	Intermediate	Intermediate

A reactive program does little to address the likelihood of the primary risk event occurring and therefore does not reduce the already high rated risk. Option 3 is therefore not consistent without risk management framework and would not reflect the actions of a prudent asset manager.

1.6 Summary of cost/benefit assessment

To assess the options, the costs, objectives and risk are considered for each option. A summary of the option assessment is shown in Table 1.8.

Table 1.8: Summary of cost/benefit analysis

Option	Achievement of objectives	Cost	Treated risk (integrity/reliability)
Option 1. Proactively replace four turbine exhausts on condition once they have reached end-of-life	Aligns with our objectives of delivering for customers, being a good employer and being sustainably cost efficient	[redacted]	Adequately addresses identified high and intermediate risks to DBP, People, Reputation, Asset Damage and Supply reducing them to ALARP
Option 2. Proactively replace seven turbine exhausts on condition once they have reached end-of-life	Aligns with our objectives of delivering for customers, being a good employer and being sustainably cost efficient	[redacted]	Adequately addresses identified high and intermediate risks to DBP, People, Reputation, Asset Damage and Supply reducing them to ALARP
Option 3. Move to a replacement on failure policy	Does not align with any of our objectives of delivering for customers, being a good employer or being sustainably cost efficient	[redacted]	Does not adequately address identified high and intermediate risks to DBP, People, Reputation, Asset Damage and Supply

1.7 Proposed solution

1.7.1 Why is the recommended option prudent?

Option 1 is the preferred option as it is consistent with our risk management framework and balances risk and deliverability, reflecting good industry practice.

Option 2 is not preferred. Even though it removes more risk is a shorter timeframe, we can continue to closely monitor the additional three identified exhausts and prudently defer their replacement until AA7.

Option 3 is not considered viable due to the high risks related to the safety of personnel working on or near compressor stations in the event that the failed turbine exhausts cause uncontrolled release of hot exhaust gasses, or secondary damage should the exhaust collapse onto other assets. Further, the potential to interrupt supply, thereby being non-compliant with the SSC obligations, and the high likelihood of further damage to other turbine components renders this option unviable.

1.7.2 Estimating the efficient costs

As noted in the 'Final Plan Attachment 8.7_Cost Estimation Methodology 2025-2030', the unit rates used for all projects managed within this program include the forecast internal labour, external labour/contractors, materials, travel and other costs.

Where possible, the unit rate used to determine the cost of the program in AA6 is based on a three year average actual cost incurred in AA5.

Where this has not been possible, due to infrequent or new activities identified for AA6, these activities have been estimated based on the historical cost of the same or similar program of work.

1.7.3 Consistency with the National Gas Rules

NGR 79(2)

Turbine exhausts are critical for the required temperature and pressure controls at our compressor stations to ensure safe and reliable supply. The proactive replacement of turbine exhaust systems based on their age and condition, as outlined in our AMP and dictated by good industry practice, is necessary to maintain the integrity of services and is therefore consistent with NGR 79(2)(c)(ii).

NGR 79(1)

The proposed turbine exhaust replacements are also consistent with the requirements of NGR 79(1)(a), specifically we consider that the capital expenditure is:

- **Prudent** – The expenditure is necessary in order to address the identified ongoing operational requirements of our compressor units and includes consideration of age and condition before replacement. The proposed expenditure can therefore be seen to be of a nature that would be incurred by a prudent service provider.
- **Efficient** – The forecast expenditure is based historical average actuals and tender contract values. The proposed expenditure can therefore be considered consistent with the expenditure that a prudent service provider acting efficiently would incur.

- **Consistent with accepted and good industry practice** – The proposed expenditure relates to a two pronged approach to asset replacement at end of life. It also follows good industry practice by ensuring that critical infrastructure is maintained within its useful life and continues to perform as required, therefore the proposed capital expenditure is such as would be incurred by a prudent service provider acting efficiently, in accordance with accepted good industry practice.

- To achieve the **lowest sustainable cost of delivering pipeline services** – The sustainable delivery of services includes reducing risks to as low as reasonably practicable and maintaining reliability of supply, whilst achieving the lowest sustainable costs by undertaking the works in line with the relevant useful life and condition.

NGR 74

NGR74(2) requires that a forecast of estimate:

a) must be arrived at on a reasonable basis; and
b) must represent the best forecast or estimate possible in the circumstances.

The forecast costs in this business case are based on the latest market rate testing, and project options consider the asset management requirements as per the latest AMP. Cost assessments have been conducted for each option based on the best information available at the time of developing this business case. The estimate has therefore been arrived at on a reasonable basis and represents the best estimate possible in the circumstances.

1.8 Comparison to previous periods

1.8.1 AA6 forecast compared to AA5

In AA6, capital expenditure of [redacted] is forecast for the turbine exhaust replacement program. Table 1.3 shows the forecast AA6 expenditure compared with actual expenditure in AA5.

Table 1.9: AA5 forecast capital expenditure, compared with AA5 actual ($'000)

Forecast spend ($'000)	2026	2027	2028	2029	2030	AA6	AA5 total	Variance
Capital expenditure	1,000	1,380	1,380	1,320	630	**5,710**	**2,651**	**3,059**

Actual expenditure during the AA5 period was $3.1 million lower than the amount determined in the AA5 Final Decision.

Table 1.10: AA5 actual expenditure compared with budget

Actual v budget ($'000)	2021	2022	2023	2024	2025	AA5
AA5 actual	372	1,210	782	287	-	**2,651**
AA5 approved	1,340	1,341	1,037	1,038	1,038	**5,794**
Variance	**-968**	**-131**	**-255**	**-751**	**-1,038**	**-3,143**

In summary, we delivered the more straightforward exhaust replacements, but needed to step back for the harder more technical ones.

After a deferred start to the project in AA5, expenditure in 2022 and 2023 averaged just over $1 million dollars per year, which was the rate required to achieve our forecast investment, as well as aligning to the forecast for AA6. However, the project was temporarily put on hold in 2024 and 2025 as other priorities materialised, and resources had to be allocated to other high risk projects.

Existing design documents for the CS6 Unit 2 exhaust were also insufficient to fabricate a new exhaust, therefore reverse engineering was required to re-produce drawings. This required more project engineering and design hours than original estimate. This will occur for the more complex designs that are forecast in AA6, which will require higher fabrication and construction costs

However, the project planning is already underway to address the more technical replacements, so that the project can commence again in the upcoming regulatory period at the same forecast rates achieved in 2023/24.

Appendix A Comparison of risk assessments

Summary of risk assessment

Project Ref No	Description	Primary Risk Event	Proposed Action		People	Environmental	Supply	DBP	Reputation	Loss
DBP18	Turbine exhausts	The primary risk even is that one of the ageing turbine exhaust system fails, including the exhaust stack, resulting in unsafe operation leading to unavailability of the compressor unit, with significant down time.	Untreated Risk	Likelihood	Unlikely	Occasional	Unlikely	Occasional	Unlikely	Occasional
				Consequence	Major	Minor	Severe	Severe	Minor	Severe
				Risk Level	HIGH	LOW	INTERMEDIATE	INTERMEDIATE	LOW	INTERMEDIATE
			Option 1 Replace four turbine exhausts	Likelihood	Hypothetical	Remote	Remote	Remote	Remote	Remote
				Consequence	Major	Minor	Severe	Severe	Minor	Severe
				Risk Level	LOW	NEGLIGIBLE	LOW	LOW	NEGLIGIBLE	LOW
			Option 2 - Replace seven turbine exhausts	Likelihood	Hypothetical	Remote	Remote	Remote	Remote	Remote
				Consequence	Major	Minor	Severe	Severe	Minor	Severe
				Risk Level	LOW	NEGLIGIBLE	LOW	LOW	NEGLIGIBLE	LOW
			Option 3 Move to a replacement on failure policy	Likelihood	Unlikely	Occasional	Unlikely	Occasional	Unlikely	Occasional
				Consequence	Major	Minor	Severe	Severe	Minor	Severe
				Risk Level	HIGH	LOW	INTERMEDIATE	INTERMEDIATE	LOW	INTERMEDIATE

Capex DBP21: IT sustaining applications

1.1 Project approvals

Table 1.1: DBP21 IT sustaining applications – Project approvals

Prepared by	Kalpna Shukla, Head of Architecture & Applications Simon Burke, Head of OneERP
Reviewed by	Martin Dickson, Head of IT Business Engagement
Approved by	Brett Miller, Chief Information Officer

1.2 Project overview

Table 1.2: DBP21 IT sustaining applications – Project overview

Description of problem /opportunity	Dampier Bunbury Pipeline (DBP) maintains and operates a suite of Information Technology (IT) applications (apps) that are integral to the efficient and effective management of the gas pipeline business. We have a recurrent capital program of work to systematically upgrade or enhance our applications. This business cases covers the program of work required for the AA6 period (2026-2031). The IT sustaining apps program typically scales up and down across access arrangement (AA) periods, depending on the suite of applications falling due for investment and the changing needs of the business. The capex program proposed for the AA6 period is substantially lower than incurred during the AA5 period (2021-25), due to the completion of the SAP S/4HANA implementation for DBP. However, there remains a significant volume of applications that need to be sustained during the next AA period, including the new SAP S/4HANA enterprise resource planning (ERP) system. The IT sustaining apps program falls into two broad categories: • Application upgrades – periodic major and minor upgrades to applications and existing business processes, necessary to maintain app performance or improve fragmented business processes • Application enhancements – improvements or additions in app functionality to meet changing business requirements Ongoing investment in IT apps is necessary to: • Continue to maintain reliable, secure, compliant and efficient business processes and systems • Continue to maintain vendor support for software and applications that enable DBP business operations • Preserve the ongoing integrity of DBP's data and services • Enable DBP to continue to comply with a range of regulatory and other obligations This business case proposes continuing with our risk-based approach to managing our applications through a prudent and timely upgrade and refresh regime. This involves prioritising upgrades based on business need, and identifying the optimal time to apply minor and major upgrades, rather than relying solely on the vendor-driven upgrading/patching schedule. The proposed IT sustaining apps program also involves business-driven enhancements to existing IT applications.
Untreated risk	As per risk matrix = High

Options considered

- **Option 1** – Upgrade all systems based on vendor recommended cycles ($25.3 million)
- **Option 2** – Deliver upgrades and application enhancements on a risk-based assessment of business need ($21.1 million)
- **Option 3** – Deliver the upgrades program only, with no application enhancements ($13.8 million)

Proposed solution

Option 2 is the proposed solution and is recommended as the most cost-effective way of mitigating the risks posed by outdated and unsupported applications. It also ensures we are utilising our existing applications suite to its full potential, delivering application enhancements to keep pace with business and customer needs. Option 2 involves implementing a lifecycle management plan for all applications to maintain a modern, fit-for-purpose suite of applications that support DBP business operations. This is consistent with good industry practice and manufacturer's recommendations.

Option 1 is not recommended as it would increase the frequency of upgrades, thereby increasing costs. While delivering upgrades purely based on vendor recommendations would mitigate all app security, compatibility and obsolescence risks, it would not represent a prudent level of expenditure.

Option 3 is not recommended as it only addresses the application obsolescence risk. It does not provide for amending/enhancing this application suite to reflect business needs and promote better ways of working.

Estimated cost

The forecast direct capital cost during the next five-year period (AA6) is shown below.

Total capex	4,783	3,309	2,886	7,558	2,601	**21,137**

This option would also require an $8.3 million increase in operating expenditure (opex) across the AA6 period. Several apps are being replaced by newer/alternative apps, which are being hosted on the SAP RISE cloud platform and/or offered on a software as a service (SaaS) basis and therefore result in a new recurrent opex cost.

Basis of costs

All costs in this business case are expressed in real unescalated dollars December 2024 unless otherwise stated.

Treated risk

As per risk matrix = Intermediate

Variation from AA5

The forecast capex for AA6 is around $16.7 million less than the forecast expenditure in AA5 of $37.8 million.

The decrease compared with AA5 is due to the DBP phase of AGIG's OneERP program being completed during the AA5 period. The new SAP S/4HANA ERP system has been established and its ongoing program of minor and major upgrades now forms part of the recurrent sustaining apps capex program.

The treatment of SaaS solutions as opex has also moved some of our (otherwise capital) expenditure from capex to opex.

Alignment to our vision

This project aligns with the *Delivering for Customers* aspect of our vision by ensuring DBP technology systems supporting customer services are adequately maintained and available to meet their needs.

This project aligns with our vision objective of being *A Good Employer*, as it aims to provide employees and third-party users of DBP systems with current, reliable, accurate and fit-for-purpose technology solutions that allow the business and its contractors to operate effectively.

This project aligns to our vision to be *Sustainably Cost Efficient* as the project will execute a lifecycle management plan that follows good industry practice and manufacturer's recommendations, mitigates risks, optimise capital and operational expenditure and minimise application support costs.

Consistency with the National Gas Rules (NGR)	**NGR 79(1) –** Maintaining a stable IT set of Information Technology (IT) applications that is current and fit for purpose is critical to our business (it informs business decisions and helps us to efficiently manage our business processes). The proposed proactive IT sustaining applications initiatives are consistent with accepted good industry practice, several alternative options and have been considered and unit rates and timing of refreshes have been tested to achieve the lowest sustainable cost of delivering pipeline services. **NGR 79(2) –** The proposed expenditure on our IT sustaining applications project is required to maintain the integrity of services through current, supported and for purpose IT applications, managing technology risks and preventing material outages that impact the ability of the business to function (including tracking and reporting of business information to meet our regulatory obligations and requirements). **NGR 74 –** The forecast costs are based on the latest market rate testing, and project options consider the requirements of our application environment. Application minor and major upgrades are scheduled and costed as per the software providers' recommendations. Cost assessments have been conducted for each option based on the best information available at the time of developing this business case. The estimate has therefore been arrived at on a reasonable basis and represents the best estimate possible in the circumstances.
Stakeholder engagement	We are committed to operating our networks in a manner that is consistent with the long-term interests of our Shippers. To facilitate this, we conduct regular stakeholder engagement to understand and respond to the priorities of our Shippers and stakeholders. Feedback from stakeholders is built into our asset management considerations and is an important input when developing and reviewing our expenditure programs. Our Shippers have told us their priority is reliability of supply and maintaining a strong focus on operational issues as it is important for reliability and emergency management. This program is designed to ensure the network operates in line with good industry practice and standards, and enables compliance, thereby helping to maintain a safe and reliable service to our Shippers. The proposed solution to maintain our assets in good working order will also help to maintain reliability ensuring the ongoing stability of IT applications our operations depend on and create the opportunity for Shippers to interact with our information in new ways.
Other relevant documents	This business case should be read in conjunction with: • Asset Management Plan (TEB-001-0024-07) • DBP IT Investment Plan • Other business cases including DBP23 Cybersecurity, DBP22 IT sustaining infrastructure, and DBP03 Operational Technology

1.3 Background

Our business processes and customer services rely on reliable access to information. That information is stored, accessed and analysed through our IT applications. These IT applications help sustain our businesses by enabling a range of activities including (but not limited to):

- Finance and accounting
- Asset management and work planning
- Resource management
- Procurement and inventory management
- Customer service and billing
- Customers data management
- Archiving and document management
- Data security and analysis
- Payroll and HR

1.3.1 Our IT asset management approach

We have a proven and effective application management regime governed by our IT Investment Plan. Our approach is to ensure our business-critical systems remains available and secure for our staff and our shippers, minimising system interruption risks. We apply upgrades, patches and application enhancements based on consideration of business purpose, system criticality, and vendor recommendations on upgrade patches and version support.

An important part of our IT asset management approach is timing and priority. Software patches and version upgrades are provided by manufacturers, who recommend their technology be upgraded to ensure continued provision of support and that any potential security vulnerabilities can be addressed. These upgrades enable transition to improved versions of the technology, correct defects in the technology (which includes how a technology type interacts with other technology types), and offer additional functionality.

Typically, a vendor will issue major and minor upgrade patches on a two or three-year cycle. Patching will often involve the application upgrade itself and upgrades to the underlying associated technology platform components. This includes assessment, design and implementation of configuration changes, customisations and integrations, and complete testing of all impacted end to-end processes.

While the vendor timetable for patching is an important factor, the associated costs and resource requirements of major or minor upgrade can be significant. We therefore take a more conservative approach to upgrades, giving careful consideration to business need and risk tolerances before committing to investment.

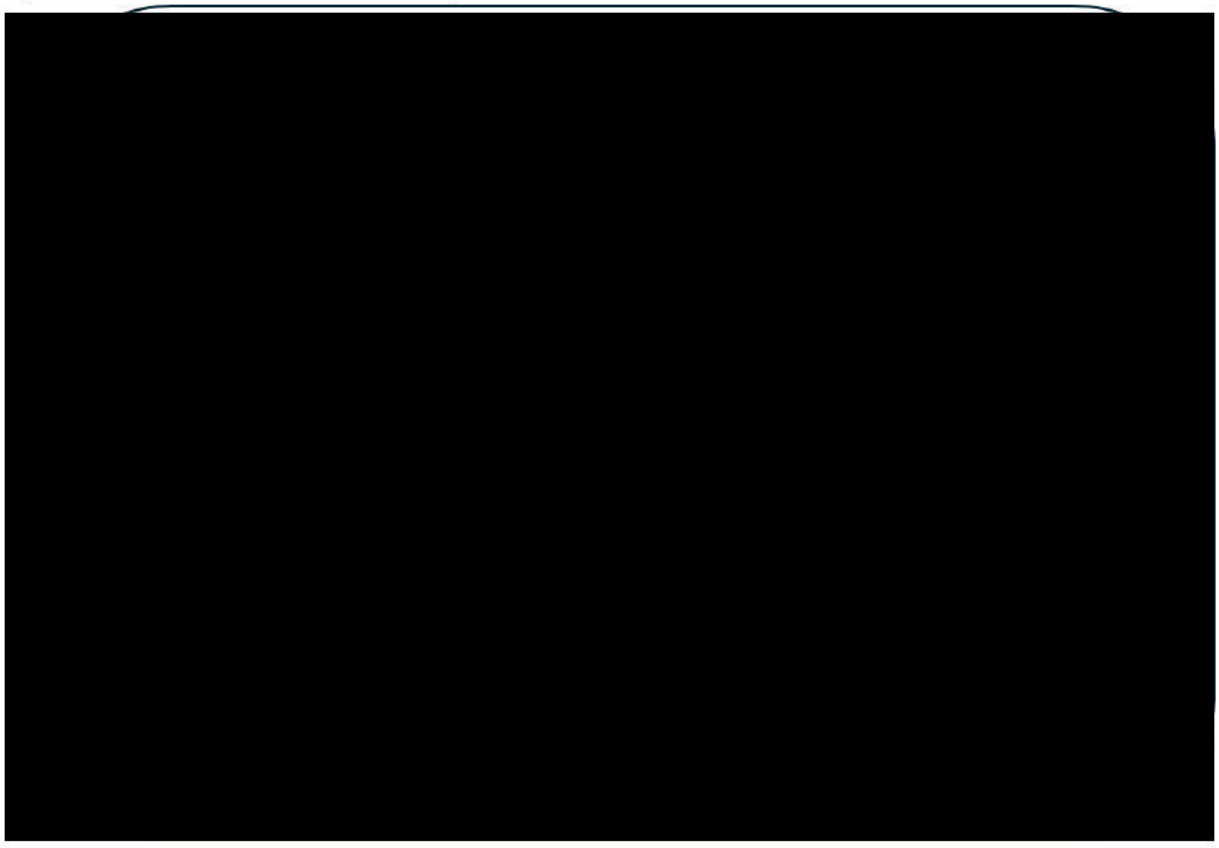
Rather than adhere strictly to vendor-driven upgrade cycles, we use an application lifecycle management methodology to determine upgrade timelines and priorities. This enables appropriate levels of operation, data integrity and inter-operability between various vendor provided technologies. [redacted]

AGIG IT is a national function and as such DBP applications are managed under the AGIG application lifecycle management methodology provided in Appendix C.

1.3.2 Overview of our IT sustaining apps program for AA6

The relationships between our information, business processes and IT applications is defined in Appendix B and a high-level summary of our core applications is shown in Figure 1.1.

[redacted]



Notes:
1. Operational Technology investment (red dashed line) is not covered by this business case.
2. PayGlobal will be retired and replaced by expanded functionality from SuccessFactors prior to 2026.

The IT sustaining apps program falls into two broad categories:

1. **Application upgrades** – These are periodic major and minor upgrades to applications and existing business processes, necessary to maintain app performance or improve fragmented business processes. This typically comprises the vast majority of our recurrent sustaining apps capex program.

2. **Application enhancements** – These are improvements or additions in app functionality to meet changing business requirements.

Combined, these two workstreams ensure our apps are maintained appropriately, mitigate the risk of obsolescence or downtime, and provide opportunity to improve work practices by enhancing our application suite. This is a continuing program of work that may scale up or down across AA periods, depending on the suite of applications falling due for upgrade or the changing needs of the DBP business.

Our suite of core applications is well established and embedded across our businesses. One of the most recent additions is the new SAP S/4HANA ERP application. SAP S/4HANA was implemented in DBP during the AA5 period as part of the AGIG-wide OneERP project. It is one of our most critical business applications, enabling a range of new functionality to our business (such as mobility, user management and security groups).

Completion of the OneERP project means the DBP sustaining apps capital expenditure for the AA6 period is expected to be considerably lower than that incurred during the implementation phase in AA5. While ongoing investment in SAP S/4HANA is necessary to maintain the system and facilitate a range of process improvements, this now forms part of the ongoing upgrades program and is well below the initial implementation cost.

1.3.2.1 Capex estimate

Table 1.3 provides a summary of the proposed IT sustaining apps capex program for AA6.

Table 1.3: IT sustaining apps capex program 2026-30, $'000 2024

Project scope	2026	2027	2028	2029	2030	Total
Application upgrades						
SAP S4/HANA	-	-	-	3,250	-	**3,250**
HSE capability - INX	[redacted]					
Data archiving	[redacted]					
Transmission billing system refresh	248	348	446	248	446	**1,736**
Maximo version 9 upgrade	1,600	-	-	1,400	-	**3,000**
Protecht GRC	[redacted]					
SAP SuccessFactors	130	130	130	130	130	**650**
Public websites	[redacted]					
Application architecture tool	[redacted]					
Centralised GIS database	[redacted]					
Other core systems	200	200	200	200	200	**1,000**
Total application upgrades	**3,333**	**1,859**	**1,436**	**5,908**	**1,251**	**13,787**
Application enhancements						
SAP S/4HANA incremental functionality	650	650	650	650	650	3,250
Maximo incremental functionality	200	200	200	200	200	1,000
Contract management system	-	-	-	[redacted]		
Other system enhancements	600	600	600	500	500	2,800

Project scope	2026	2027	2028	2029	2030	Total
Total application enhancements	1,450	1,450	1,450	1,650	1,350	7,350
Total	**4,783**	**3,309**	**2,886**	**7,558**	**2,601**	**21,137**

1.3.2.2 Opex impact

Over the AA6 period we expect a forecast opex uplift of $8.3 million (base costs, unescalated). The majority of this increase is associated with the recent move from the Microsoft Azure cloud service to the SAP RISE platform as a service (PaaS) solution.[1] Several of our core applications, including S/4 HANA and Maximo will move from Azure to SAP RISE during the AA6 period. As a result, we will incur SAP RISE subscription costs throughout the AA6 period, offset by a reduction in Azure subscription costs. These increments and decrements are shown in the table below.

We will also incur additional opex related to the provision of Maximo as it will only be provided as Software as a Service (SaaS). Where historically we would have capitalised Maximo applications costs against the asset, we will now need to expense them in accordance with Australian accounting standards. More information on the capitalisation of SaaS costs is provided in the IT Investment Plan.

Our forecast opex uplift associated with IT sustaining applications is provided in Table 1.5. These opex costs are the same under each option considered in this business case.

Table 1.4: Sustaining apps AA6 opex uplift, $'000 2024

Driver	Description	2026	2027	2028	2029	2030
Recurrent opex						
Application replacements and renewals						
PayGlobal	In 2025 we are replacing PayGlobal with SuccessFactors as our human capital management solution.	-21	-21	-21	-21	-21
SuccessFactors	The implementation costs will be incurred in AA5, but there will be additional ongoing licence costs that are not included in the 2024 base year.	249	249	249	249	249
Customer reporting system (CRS)	In 2024/25 we will replace the existing CRS with a new billing system, the Transmission Billing System. We have offset the license costs associated with the CRS with the forecast license costs associated with the new system.	-170	-170	-170	-170	-170
Transmission billing system		519	519	519	519	519
SAP RISE	We have recently moved from Azure cloud services to SAP RISE. This is a platform as a service (PaaS) solution, subject to ongoing subscription costs. Core applications such as S/4 HANA and Maximo will be hosted on SAP RISE, instead of Azure. The SAP RISE subscription cost $1,283,000 in 2026 and another $28,000 on top of that in 2027 repeated in forward years.	1,283	1,311	1,311	1,311	1,311

[1] The rationale for the switch from Microsoft Azure to SAP RISE is discussed in the IT Investment Plan.

Driver	Description	2026	2027	2028	2029	2030
	The negative adjustment for no longer incurring Azure costs for S/4 HANA and Maximo are captured in the following two line items.					
Azure (S/4 HANA)	S/4 HANA will be provided on the RISE with SAP cloud service, which means we will no longer incur costs for the current Microsoft Azure service	-423	-423	-423	-423	-423
Azure (Maximo IaaS)	When MAS 9 is implemented in 2027, the AGIG reporting database will migrate from the current Microsoft Azure IaaS solution to RISE with SAP. This results in a negative recurrent step change as we will no longer incur the Azure IaaS costs.	-	-200	-200	-200	-200
Signavio	In 2025 we implemented Signavio, which is being provided as SaaS. This results in an ongoing recurrent operating cost	80	80	80	80	80
Capex to opex						
Maximo application	In 2027 we are migrating from Maximo 7 to the Maximo 9 Application Suite (MAS 9). While previous versions of Maximo were able to be purchased and therefore capitalised, MAS 9 is provided as a SaaS product only. This results in an opex step change in 2027.		280	280	280	280
Total recurrent IT opex step changes		**1,517**	**108**			
Non-recurrent project opex						
Maximo implementation	In 2027 we will incur a one-off opex project implementation cost. This is not recurrent.		264			
Total non-recurrent IT apps project opex			**264**			
Total additional IT applications opex		**1,517**	**1,889**	**1,625**	**1,625**	**1,625**

The estimated impact on opex resulting from the relevant application upgrades is discussed in Appendix A.

1.4 Risk assessment

Risk management is a constant cycle of analysis, treatment, monitoring, reporting and then identifying once again, with a commitment to balance outcomes sought with delivery and cost implications considered and assessed.

When considering risk and determining the appropriate mitigation activities, we seek to balance the risk outcome with our delivery capabilities and cost implications. Consistent with stakeholder expectations, safety and reliability of supply are our highest priorities.

Our risk assessment approach focuses on understanding the potential severity of failure events associated with each asset and the likelihood that the event will occur.

Figure 1.2: Risk management principles



Based on these two key inputs, the risk assessment and derived risk rating then guides the actions and activities required to ensure safety and compliance are not compromised, while delivery of this outcome is done as efficiently and effectively as possible.

The risk rating assesses the consequence and likelihood of the risk. The risk of an event associated with failure of an asset is rated based on the combined effect of the consequence and likelihood rating to provide an overall risk rating. This risk rating guides the risk management and mitigation activities and facilitates prioritisation.

Our Operational Risk Framework is based on AS/NZS 2885 and requires all identified risks ranked as intermediate or above to be addressed. For risks ranked as high we must *'Modify the threat, the frequency or the consequence to reduce the risk rank to intermediate or lower'.*

Six areas are considered for each type of risk:

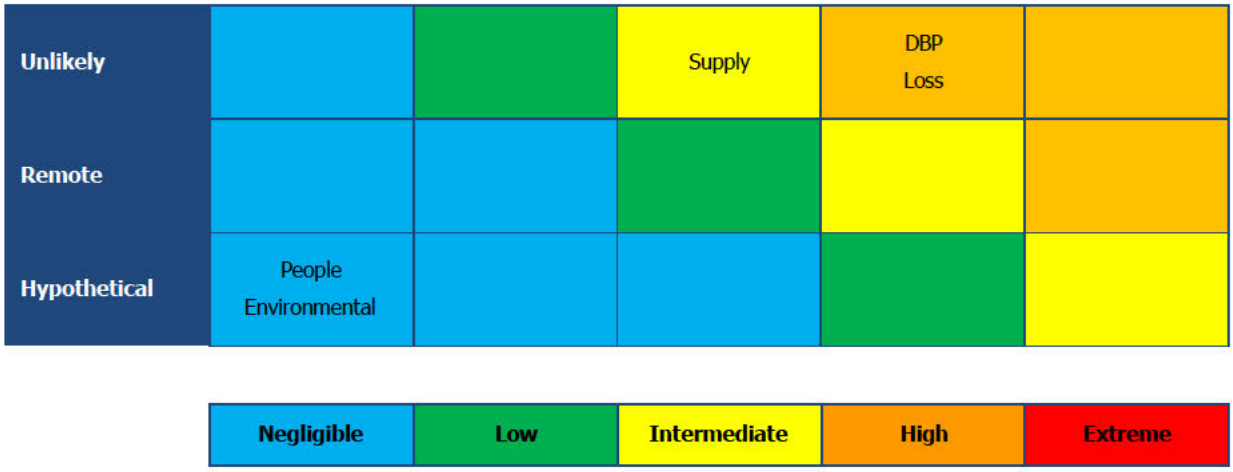
1. People – injuries or illness to employees and contractors or members of the public
2. Environmental impact – impact on the surroundings in which the asset operates, including natural, built and Aboriginal cultural heritage, soil, water, vegetation, fauna, air and their interrelationships
3. Supply – disruption in the provision of services/supply, impacting customers
4. Impact on AGIG/DBP – ability of AGIG (DBP) to operate the asset(s) without restrictions due to regulatory enforcement or legal actions
5. Reputation / outrage – impact on stakeholders' views of AGIG (DBP), including personnel, customers, investors, security holders, regulators and the community
6. Loss – financial impact on AGIG (DBP)

The primary risk event being assessed for our IT sustaining applications program is that as IT applications age, it becomes increasingly difficult to address security weaknesses and implement the remedial actions required to resolve a system failure. In a worst case scenario, the application or technology platform may have a catastrophic failure and cannot be recovered, resulting in an urgent need to implement either an upgrade or replacement of that system to restore network operations. The likelihood of this risk event occurring will increase with time if a suitable ongoing upgrade program is not completed.

The overall risk rating of IT sustaining applications is presented in Figure 1.3. Two elements of risk are rated as high, two intermediate and one low. This results in a high risk ranking for these assets in an untreated scenario.

Figure 1.4: Untreated risk rating

	Trivial	Minor	Severe	Major	Catastrophic
Frequent					
Occasional			Reputation		



Security breaches, and unavailability of operational and corporate systems give rise to people, supply, customer/reputational, compliance and financial consequences, as described below.

- **DBP** – Our core IT applications are integrated and reliant on each other to allow transactions to flow from one application to another. Any IT application failure, or failure of the integration between them would have a significant impact on effective operations for an extended period of time while the remediation work was completed. Without the continuation of IT vendor support which requires movement to a recent version of the software, DBP will be forced to find and hire expensive IT specialists with detailed knowledge of the outdated systems' inner workings and the programming language used. Financial penalties may also be imposed for not complying with regulatory obligations
- **Supply** – Unaddressed deficiencies and poor integration between systems may result in inefficient work order processing, an inability to make spatial and logical queries, an inability to carry out timely repairs and maintenance, longer outages and operational risks of errors in manual data processes compared to electronic communications and confidential information being compromised
- **Reputation** – The current IT Applications present a risk to the ability of staff and Shippers to access information. DBP's reputation could be damaged significantly in the event of health and safety incidents, supply disruptions, delayed repairs and maintenance, compromised corporate, staff and customer information and resultant litigation
- **Loss** – Additionally, not implementing upgrades makes applications more vulnerable to cyber-attacks and increases the likelihood of security breaches. Security breaches compromise the confidentiality and integrity of corporate and customer data, and availability of operational and corporate systems giving rise to risks severe penalties and loss of asset value

1.5 Options considered

The options considered are:

- **Option 1** – Upgrade all systems based on vendor recommended cycles
- **Option 2** – Deliver upgrades and application enhancements based on a risk-based assessment of business need (the recommended option)

- **Option 3** – Deliver the upgrades program only, with no application enhancements

These options are discussed in the following sections. An option to not upgrade or enhance our application suite, only replacing apps on failure was initially considered but dismissed due to the criticality of our app suite. For example, it is not practicable to run enterprise wide applications such as SAP S/4HANA or Maximo to failure or to not install any patches, as too many of our business and operational functions depend on these applications working correctly. To run these to failure would impact our ability to schedule works, manage our assets, interact with shippers, and bill customers. A run to fail or 'do nothing' option has therefore not been explored further in this business case.

1.5.1 Option 1 – Upgrade all systems based on vendor recommended cycles

This option provides a state where all systems would be patched, upgraded and supported according to the release schedules provided by vendors, irrespective of business criticality. Under this option, all major and minor upgrades are applied promptly when these become available from vendors. In addition, this option provides an allowance for some application enhancements based on an identified business need.

1.5.1.1 Advantages and disadvantages

An advantage of this approach is that it provides greater certainty that all DBP's systems are fully supported, operational, and are subject to the latest cyber security patches/measures. It would reduce the likelihood of application downtime, and by constantly adopting the latest versions, it would help ensure compatibility with emerging hardware and device technologies.

Under this option we would also utilise an allowance for business-driven enhancements to existing systems. This would allow us to make planned (and ad-hoc) investments in applications to maximise any new functionality offered by new patches, as well as getting the most value out of our existing suite of apps rather than buying new ones.

The major disadvantage of the vendor-driven approach is the cost. Vendors typically release major upgrades every 3-5 years, often with several minor updates in between. The cost of an upgrade varies by application, but each upgrade can cost anywhere between $300,000 to $500,000. Further, the frequency of upgrades would likely affect deliverability, requiring an uplift in internal or external resources to keep on top of the rolling upgrade program.

Another disadvantage of adopting all vendor-driven upgrades is under-utilisation. Typically, an application upgrade may offer new app functionality or 'add-ons'. These tend to be general in nature and incorporated into the application package. Not all add-ons are essential or necessarily desirable by the business. If all vendor-driven upgrades are adopted, DBP may end up with a suite of apps that are over-specified for its business needs, with functions that are either not required or under-utilised. This approach does not represent an efficient approach to managing our application suite.

Our preference is to only invest in applications where the upgrade is either essential (for example for cyber security or business continuity reasons) or we can see value in the new functionality (the functionality will be used and will improve our business operations).

1.5.1.2 Achievement of objectives

Table 1.5 outlines how Option 1 will support achievement of our vision objectives.

Table 1.5: Achieving objectives – Option 1

Vision objective	Alignment
Delivering for Customers – Public Safety	-
Delivering for Customers – Reliability	Y
Delivering for Customers – Customer Service	Y
A Good Employer – Health and Safety	-
A Good Employer – Employee Engagement	Y
A Good Employer – Skills Development	-
Sustainably Cost Efficient – Working within Industry Benchmarks	N
Sustainably Cost Efficient – Delivering Profitable Growth	-
Sustainably Cost Efficient – Environmentally and Socially Responsible	-

Option 1 would align with our objectives of Delivering for Customers and being A Good Employer, as it would help ensure our application suite is fully functional, meaning we can provide a high quality and reliable service to customers, as well as ensuring our employees have the applications they need to be able to do their jobs.

However, Option 1 would not align with our objective of being Sustainably Cost Efficient. Adopting all vendor-driven upgrades may result in over-investment in our application suite, which does not represent efficient expenditure. Option 1 does not allow for a more strategic approach to upgrading IT applications, whereby we would make sure our application suite grows and changes in line with our business growth and changes to work practices.

1.5.1.3 Cost assessment

The estimated capital cost of this option is around $25 million. This estimate is based on DBP upgrading all applications as per vendor-recommended upgrades, at the cost specified by the vendor. This means we would incur costs for the minor upgrade of S/4 HANA in 2027, additional Maximo minor releases, and additional public website platform releases. We would also increase the budget for ad-hoc upgrades to other core systems.

Note this option does not allow for any synergies with upgrades in similar or shared applications across the AGIG businesses.

Table 1.6: Estimated capex cost – Option 1

Project scope	2026	2027	2028	2029	2030	Total
Application upgrades						
SAP S4/HANA	-	1,650	-	3,250	-	**4,900**
HSE capability - INX	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Data archiving	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Transmission billing system refresh	248	348	446	248	446	**1,736**
Maximo version 9 upgrade	1,600	400	400	1,400	400	**4,200**

Project scope	2026	2027	2028	2029	2030	Total
Protecht GRC	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
SAP SuccessFactors	130	130	130	130	130	**650**
Public websites	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Application architecture tool	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Centralised GIS database	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Other core systems	400	400	400	400	400	**2,000**
Total application upgrades	3,533	4,214	2,036	6,213	1,956	**17,952**
Application enhancements						
SAP S/4HANA incremental functionality	650	650	650	650	650	**3,250**
Maximo incremental functionality	200	200	200	200	200	**1,000**
Contract management system	-	-	-	[redacted]	[redacted]	[redacted]
Information management and other system enhancements	600	600	600	500	500	**2,800**
Total application enhancements	**1,750**	**1,450**	**1,450**	**1,350**	**1,350**	**7,350**
Total	**4,983**	**5,664**	**3,486**	**7,863**	**3,306**	**25,302**

This option would also require a $8.3 million increase in operating expenditure (opex) across the AA6 period associated with:

- Applications upgrades
- SAP S/4 HANA and Maximo being offered on a SaaS basis and moving to the SAP RISE cloud platform

The uplift in opex is shown in Table 1.5.

1.5.1.4 Risk assessment

This option reduces the likelihood of system(s) failure, the integration between systems not operating as required and the risk of staff and customer data being compromised. This is consistent with our operational risk framework, as it reduces the residual risk outcome from high to intermediate or lower.

Table 1.7: Risk rating impact - Option 1

Risk Area	Untreated	Treated
People	Negligible	Negligible
Environmental	Negligible	Negligible
Supply	Intermediate	Low
DBP	High	Intermediate
Reputation	Intermediate	Low
Loss	High	Intermediate

The risk with Option 1 relates to potential vendor support or compatibility issues. Where we choose not to install an upgrade immediately, there may be a window where maintenance costs are potentially higher if there was to be an issue.

1.5.2 Option 2 – Deliver upgrades and application enhancements on a risk-based assessment of business need

As a prudent operator, DBP has undertaken appropriate risk assessments of the criticality of its IT systems. In accordance with these assessments, and good industry practice, we consider that continuing to maintain systems to current version minus one (n-1) is the most efficient and effective means of ensuring continued compliance.

Option 2 involves a plan to systematically upgrade DBP applications in accordance with this approach and our technology lifecycle management plan to ensure software currency, vendor support, security risk mitigation, and maintenance of features and functionality for business users. We take a pragmatic approach to upgrading our applications, applying patches when the business sees value in the upgrade or the risk of not upgrading is beyond our risk tolerances. Unlike the approach outlined in Option 1 of this business case, in Option 2 we don't apply patches as soon as they are released (unless there is an identified cyber security vulnerability that means we have to).

Option 2 also includes allowance for application enhancements based on an identified business need.

1.5.2.1 Advantages and disadvantages

The advantage of this risk-based approach is that we can ensure our applications are fully supported and secure from the latest cyber threats, but can do so at our own pace and at a lower cost. It also allows us to be systematic in our approach, aligning upgrades with enterprise-wide requirements and ensuring maximum benefit across the organisation.

The disadvantage of this option is that it may require DBP to carry some risk with regard to vendor support or compatibility issues. Where we choose not to install an upgrade immediately, there may be a window where maintenance costs are potentially higher if there was to be an issue. However, we will consider this risk on a case-by-case basis.

1.5.2.2 Achieving objectives

The following table outlines how Option 2 will support achievement of our vision objectives.

Table 1.8: Achieving objectives – Option 2

Vision objective	Alignment
Delivering for Customers – Public Safety	-
Delivering for Customers – Reliability	Y
Delivering for Customers – Customer Service	Y
A Good Employer – Health and Safety	-
A Good Employer – Employee Engagement	Y

Vision objective	Alignment
A Good Employer – Skills Development	-
Sustainably Cost Efficient – Working within Industry Benchmarks	Y
Sustainably Cost Efficient – Delivering Profitable Growth	-
Sustainably Cost Efficient – Environmentally and Socially Responsible	-

This option delivers against all of our vision objectives of delivering for customers, being a good employer and being sustainably cost efficient as it proactively maintains a stable IT applications environment to support business processes, in line with good industry practice at a sustainable cost over the medium to longer term.

Option 2 aligns with our objectives of Delivering for Customers, as it would deliver the appropriate risk mitigation to ensure availability and reliability of core DBP applications used in the delivery and management of the gas network for customers.

Option 2 will continue the approach under the current AA period of maintaining applications in accordance with a lifecycle management plan to ensure supportability, fit-for-purpose functionality and confidentiality of data. This complies with our objective to provide employees with a good technology experience using modern tools designed to optimise efficiency and deliver employee engagement, consistent with being A Good Employer.

This option also aligns with best industry practice to maintain current and supported business applications under a lifecycle management plan. This approach delivers lower support costs than would otherwise be the case. Therefore, this option aligns with our objective to be Sustainably Cost Efficient.

1.5.2.3 Cost assessment

The capital cost of Option 2 is shown in the following table. This estimate is based on estimated costs of upgrading and maintaining the existing application suite as well as anticipated changes to the overall application landscape.

Table 1.9: Estimated cost – Option 2

Project scope	2026	2027	2028	2029	2030	Total
Application upgrades						
SAP S4/HANA	-	-	-	3,250	-	**3,250**
HSE capability - INX	[redacted]					
Data archiving	[redacted]					
Transmission billing system refresh	248	348	446	248	446	**1,736**
Maximo version 9 upgrade	1,600	-	-	1,400	-	**3,000**
Protecht GRC	[redacted]					
SAP SuccessFactors	130	130	130	130	130	**650**
Public websites	[redacted]					
Application architecture tool	[redacted]					
Centralised GIS database	[redacted]					

Project scope	2026	2027	2028	2029	2030	Total
Other core systems	200	200	200	200	200	**1,000**
Total application upgrades	3,333	1,859	1,436	5,908	1,251	**13,787**
Application enhancements						
SAP S/4HANA incremental functionality	650	650	650	650	650	**3,250**
Maximo incremental functionality	200	200	200	200	200	**1,000**
Contract management system		-	-	[redacted]	[redacted]	[redacted]
Other system enhancements	600	600	600	500	500	**2,800**
Total application enhancements	**1,450**	**1,450**	**1,450**	**1,350**	**1,350**	**7,350**
Total	**4,783**	**3,309**	**2,886**	**7,558**	**2,601**	**21,137**

This option would also require a $8.3 million increase in operating expenditure (opex) across the AA6 period associated with:

- Applications upgrades
- SAP S/4 HANA and Maximo being offered on a SaaS basis and moving to the SAP RISE cloud platform

The uplift in opex is shown in Table 1.5.

Cost estimates are based on the latest market rate testing, considering the requirements of our application environment, using the best information available at the time of developing this business case. A formal procurement process will be undertaken for each of the initiatives to the works are delivered at an efficient cost.

1.5.2.4 Risk assessment

This option reduces the likelihood of system(s) failure, the integration between systems not operating as required and the risk of staff and customer data being compromised. This is consistent with our operational risk framework, as it reduces the residual risk outcome from 'High' to 'Intermediate' or lower.

Table 1.10: Risk rating impact - Option 2

Risk Area	Untreated	Treated
People	Negligible	Negligible
Environmental	Negligible	Negligible
Supply	Intermediate	Low
DBP	High	Intermediate
Reputation	Intermediate	Low
Loss	High	Intermediate

This option appropriately addresses the identified risks, achieving a similar risk outcome as Option 1, but it does so at a lower overall cost.

1.5.3 Option 3 – Deliver the upgrades program only, with no application enhancements

Under this option, we would undertake the upgrades program as per Option 2, however, we would not invest in application enhancements.

1.5.3.1 Advantages and disadvantages

The advantage of this approach is the lower overall cost. By installing upgrades only, we would be minimising cost while still maintaining currency of applications.

A major disadvantage of this approach is that we would not be getting full use of applications. Most applications require some form of customisation and incremental functionality enhancements in order to ensure the business is getting what it needs from the software. For example, following the recent implementation of SAP S/4HANA, we have been making incremental improvements to the ERP solution to improve the user experience and release new functionality. This process of incremental improvement should continue throughout the life of the application to ensure we are maximising the value of the solution to our business, adding features such as mobility and analytics, which can improve business processes and drive efficiency. The same is true for other core applications such as Maximo, which is central to our asset management processes. If we were to stop investing in application enhancements and relied on version upgrades only, we would be foregoing the opportunity to improve and standardise our business processes.

1.5.3.2 Achieving objectives

The following table outlines how Option 3 will support achievement of our vision objectives.

Table 1.11: Achieving objectives – Option 3

Vision objective	Alignment
Delivering for Customers – Public Safety	-
Delivering for Customers – Reliability	N
Delivering for Customers – Customer Service	Y
A Good Employer – Health and Safety	-
A Good Employer – Employee Engagement	N
A Good Employer – Skills Development	-
Sustainably Cost Efficient – Working within Industry Benchmarks	Y
Sustainably Cost Efficient – Delivering Profitable Growth	-
Sustainably Cost Efficient – Environmentally and Socially Responsible	-

Investing in new versions of applications but failing to then build on that through incremental improvement does not reflect the actions of a good employer. While this option would be relatively low cost and therefore arguably cost efficient, it may result in applications becoming

less reliable or unsuited to business needs. Essentially, we would not be giving our employees the tools they need, leading to dissatisfaction and inefficiency.

1.5.3.3 Cost assessment

The estimated capital cost of this option is $12.4 million. We would not make any proactive investment in enhancing applications.

Table 1.12: Estimated cost – Option 3

Project scope	2026	2027	2028	2029	2030	Total
Application upgrades						
SAP S4/HANA	-	-	-	3,250	-	**3,250**
HSE capability - INX	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Data archiving	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Transmission billing system refresh	248	348	446	248	446	**1,736**
Maximo version 9 upgrade	1,600	-	-	1,400	-	**3,000**
Protecht GRC	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
SAP SuccessFactors	130	130	130	130	130	**650**
Public websites	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Application architecture tool	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Centralised GIS database	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Other core systems	200	200	200	200	200	**1,000**
Total application upgrades	3,333	1,859	1,436	5,908	1,251	**13,787**
Application enhancements						
SAP S/4HANA incremental functionality	-	-	-	-	-	-
Maximo incremental functionality	-	-	-	-	-	-
Contract management system	-	-	-	-	-	-
Other system enhancements	-	-	-	-	-	-
Total application enhancements	-	-	-	-	-	-
Total	**3,333**	**1,859**	**1,436**	**5,908**	**1,251**	**13,787**

This option would also require a $8.3 million increase in operating expenditure (opex) across the AA6 period associated with:

- Applications upgrades
- SAP S/4 HANA and Maximo being offered on a SaaS basis and moving to the SAP RISE cloud platform

The uplift in opex is shown in Table 1.5.

1.5.3.4 Risk assessment

This option reduces the likelihood of system(s) failure, the integration between systems not operating as required and the risk of staff and customer data being compromised. This is

consistent with our operational risk framework, as it reduces the residual risk outcome from high to intermediate or lower.

Table 1.13: Risk rating impact - Option 2

Risk Area	Untreated	Treated
People	Negligible	Negligible
Environmental	Negligible	Negligible
Supply	Intermediate	Low
DBP	High	Intermediate
Reputation	Intermediate	Low
Loss	High	Intermediate

Option 3 will still deliver an upgrades program, therefore it addresses the obsolescence risk associated with unsupported apps. As a result, Option 3 achieves the same overall risk rating as Options 2 and 3. However, it does not allow for any system enhancements requested by the business, which could place business operations at risk if the enhancement is required to address a material issue. Unfortunately, the risk matrix does not provide sufficient granularity to be able to discern a higher risk rating for this option.

1.6 Summary of options assessment

Table 1.18 presents a summary of how each option compares in terms of the estimated cost, the residual risk rating, and alignment with our vision objectives.

Table 1.14: Summary of options analysis

Option	Objectives	Capex	Risks
1. Upgrade based on vendor recommended cycles	Does not align with Delivering for Customers, A Good Employer or Sustainably Cost Efficient	$25.3 million	This option moderates all high and intermediate risks to ALARP
2. Deliver upgrades and enhancements on a risk-based assessment of business needs	This option achieves our objectives of delivering for customers, being a good employer and being sustainably cost efficient	$21.1 million	This option moderates all high and intermediate risks to ALARP
3. Deliver the upgrades program only, with no application enhancements	Does not align with Delivering for Customers, A Good Employer or Sustainably Cost Efficient	$13.8 million	This option moderates all high and intermediate risks to ALARP, but may compromise ability to address risks that emerge during the period

1.7 Proposed solution

Option 2 is the proposed solution. This solution involves execution of a defined application lifecycle management plan to systematically upgrade software and applications, maintaining business applications to a supported level to deliver greater reliability, functionality, security and inter-operability and preserve the ongoing integrity of our services.

1.7.1 Why is the recommended option prudent?

Option 2 is the most prudent option because it is most the cost-effective way of dealing with the risks posed by outdated and unsupported applications. It is also consistent with good industry practice.

The proposed solution mitigates risk by ensuring the software currency, vendor support, security and integrity of the technology environment via a prudent cycle of application upgrades. The increased risk of system failure and the related impacts associated with these options are unacceptable.

Option 2 ensures than DBP not only meets minimum expected legislative obligations, but also minimises business disruption caused by unplanned system outages, under-performing applications or lack of appropriate vendor support. It also allows DBP to optimise business processes by ensuring appropriate and fit-for-purpose application functionality exists.

This option is consistent with our vision of being a good employer and will support lower overall costs of delivering services which is sustainably cost efficient and in the long term in the interests of customers.

It would be negligent not to maintain our IT applications effectively across their lifecycle particularly where they are integral in management and long-term decision making in our business.

1.7.1.1 Implementation of the initiatives

This business case spans a wide range of systems each with their own implementation context. Some are under maintenance agreements where the upgrade projects are only reflecting the Contractors/Consultants costs, some require product decisions that have to line up with the Group architectures and plans.

Each initiative in this business case will be managed using our project management methodology which requirements are guided by the characteristics of the project including the risk, complexity, cost and other unique factors.

Where the project involves system acquisition or outsourcing of a service, these activities will be undertaken in line with our Procurement Policy and Purchasing Procedure. Business requirements will be defined in more detail based on the needs and market capabilities at the time of delivery. This will help ensure optimal value and efficient outcomes at the time of purchase.

The project management processes will also define the organisational change process requirements and will reflect the final solution and approach.

As a general rule of thumb each initiative that introduces new capabilities will:

- Have an internal business case developed commensurate with the initiative's, cost, risk and complexity
- Management will review the business case based on the organisations over-arching priorities, risks and benefits of the initiative

- IT Management will project manage the initiative and organisational change management according to the schedule and outcomes defined in the agreed business case
- Involvement of business users will be managed to maximise their input whilst minimising the impact on their operational activities
- Organisational changes will be designed to manage the risk of change commensurate with the initiatives benefits and organisational priorities

1.7.2 Estimating the efficient costs

The unit rates used for all projects managed within this program include the forecast internal labour, external labour/contractors, materials, travel and other costs.

For all of the systems identified for change in the AA6 period, estimates have been developed based on historical costs of similar projects, quotes from vendors based on products identified by the AGIG IT Architects as being reasonable to base a budgeting process on. Vendors provided indicative pricing on their systems and maintenance costs and provided recommendations on ballpark implementation costs.

IT initiatives will be implemented by three potential groups of resources. Internal staff generally undertake IT project management, the management and finance aspects of IT, and all of the business user involvement (e.g. business requirements, testing, and training). An internal rate card has been agreed that defines the unit costs associated with all of the internal resources.

IT support is currently outsourced with these resources generally involved in all IT initiatives to implement products into the environment and support processes (e.g. installing an application on a server). A rate card for these resources is defined as part of the ongoing management of that contract.

Product or service specific skills are often required in IT initiatives to implement products (e.g. Vendor contractors configuring their systems). These rates are negotiated during the procurement phase using DBP's Purchasing Policy.

All procurement processes for IT applications will comply with our Procurement Policy and Purchasing Procedure and will follow transparent, competitive tendering processes to select the best value for money solution.

Overall, there does not appear to be many factors affecting the sensitivity of these estimations, however a small amount is costed in USD and therefore susceptible to foreign exchange fluctuations.

1.7.3 Consistency with the National Gas Rules

NGR 79(1)

The proposed expenditure on our IT Sustaining Applications is also consistent with Rule 79(1)(a), specifically we consider the capital expenditure is:

- **Prudent** – The expenditure is necessary in order to address the identified risks. The proposed initiatives also ensure that IT application assets are maintained and replaced before they arrive at the end of their useful economic life. The proposed expenditure can therefore be seen to be of a nature that would be incurred by a prudent service provider
- **Efficient** – The forecast expenditure is based on historic costs for similar work as well as estimates from relevant vendors of likely solutions. A formal procurement process will be undertaken once the project enters its delivery phase to ensure efficient prices are achieved through a competitive tender process.
- **Consistent with accepted and good industry practice** – The proposed initiatives will ensure that IT applications are maintained to industry standard version levels consistent with accepted and good industry practice. This will result in all critical systems being up to date, secure and supported by vendors, consistent with good industry practice
- **Achieves the lowest sustainable cost of delivering pipeline services** – Upgrading our DBP IT systems is the lowest sustainable cost for suitable long-term mitigation of the risks discussed. The only other viable option for risk mitigation would be full replacement of existing IT systems with new systems which would be completely cost prohibitive and would also result in significant burden on staff. The chosen option is therefore consistent with the objective of achieving the highest quality and lowest sustainable cost of service delivery

NGR 79(2)(c)

The proposed expenditure on our IT sustaining applications project is required to maintain the integrity of services through current, supported and fit for purpose IT applications, managing technology risks and preventing material outages that impact the ability of the business to function (including tracking and reporting of business information to meet our regulatory obligations and requirements). This expenditure is therefore consistent with NGR 79(2)(c)(ii) and (iii).

NGR 74

The forecast costs in this business case are based on the latest market rate testing, and project options consider the asset management requirements as per the IT Investment Plan. Cost assessments have been conducted for each option based on the best information available at the time of developing this business case. The estimate has therefore been arrived at on a reasonable basis and represents the best estimate possible in the circumstances.

1.8 Comparison to previous periods

1.8.1 AA6 forecast compared to AA5

Table 1.15 shows the forecast AA6 expenditure compared with actual expenditure in AA5.

Table 1.15: AA6 forecast capital expenditure, compared with AA5 actual, $'000 2024

Forecast spend	2026	2027	2028	2029	2030	AA6	AA5 total	Variance
Capital expenditure	5,083	3,309	2,886	7,258	2,601	21,137	**37,754**	**-16,617**

The main driver of the ~$17 million decrease compared with AA5 is completion of the SAP S/4HANA implementation at DBP. Delivery of the million SAP S/4HANA project comprised the overwhelming majority of DBP's IT application spend during the AA5 period, as we replaced our poorly performing Microsoft Dynamics ERP application with a fit-for-purpose alternative.

While ongoing investment in SAP S/4HANA is necessary to maintain the system and facilitate a range of process improvements, it now forms part of the ongoing application upgrades program and is well below the initial implementation cost. As such our sustaining apps investment now reflects a more sustainable level, with our work program primarily consisting of periodic upgrades to newer versions of existing applications, and relatively minor investments to enhance functionality or improve existing business processes.

The upgrade from version 7 to version 9 of Maximo is one of the more significant projects scheduled for the AA6 period ($3 million), as we move to the latest version of our core asset management application. However, this is a relatively straightforward upgrade to an application already in place, and a much smaller scale than the enterprise-wide OneERP (SAP S/4 HANA) project. We are therefore confident that the AA6 IT sustaining applications program is deliverable and represents an expenditure level that will be maintained into the future.

1.8.2 AA5 variance

Actual expenditure during the AA5 period was substantially higher than the amount determined in the AA5 Final Decision.

Table 1.16: AA5 actual expenditure compared with budget, $'000 2024

Actual v budget	2021	2022	2023	2024	2025	AA5
AA5 actual	11,051	3,057	14,898	3,725	5,023	37,754
AA5 approved	12,150	391	201	122	202	13,067
Variance	**1,099**	**-2,665**	**-14,697**	**-3,603**	**-4,821**	**-24,687**

The driver of the AA5 overspend was OneERP, the enterprise-wide project to implement SAP S/4HANA at AGIG's businesses. Stage 1 of OneERP was to implement SAP S/4 HANA at DBP and AGN Victoria, a project that was approved in DBP's AA5 determination.



[redacted]

[redacted]

[redacted]



Appendix A Overview of IT sustaining apps activities

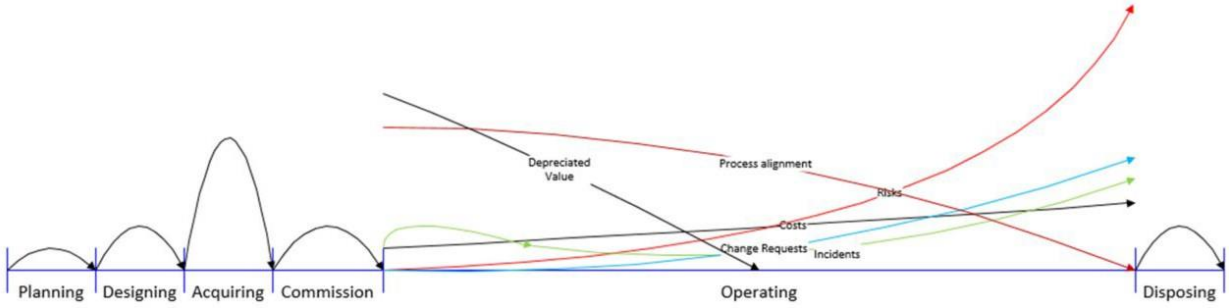
A.1 Application upgrades

All IT applications have a lifecycle. Just like pipeline assets, IT applications and associated assets need a certain level of ongoing maintenance to maximise their effective lifecycle. An important difference for IT assets is the rapid rate of change and the highly interconnected nature of technology. This creates an environment where user interfaces, network infrastructure and other IT applications can all move such that an ageing IT Application may lose functionality because infrastructure it is dependent on no longer works with that application.

The reality of IT applications is that regardless of how good the planning, design, acquisition and commissioning stages are, not all business process needs can be met by systems from day one of their use. This is compounded by business needs that change over time and results in either manual process workarounds or changes to the IT applications over time.

All of these lifecycle factors are highlighted in the figure below. This type of conceptual model is used to determine the overall lifespan of an application, the cost vs benefits of how long to operate an IT application and some of the key factors to consider when determining their replacement is due.

Figure Appendix A.1: IT Application lifecycle concepts



The following sections describe the proposed application upgrades for the AA6 period.

A.1.1 SAP S/4HANA

AGIG has recently begun implementing SAP S/4HANA as its enterprise-wide enterprise resource planning (ERP) system. DBP commenced use of SAP S/4HANA in October 2023, with AGN and MGN to follow suit by end of 2026. The 'OneERP' program is an enterprise-wide initiative, with costs allocated to the three AGIG entities based on user count.

As with all applications, SAP S/4HANA is subject to periodic major (new S/4HANA version) and minor (new feature pack stack) upgrades. These upgrades are specified by the vendor (SAP) and roll out the latest version and functionality each time. Traditionally, every S/4HANA version was released annually with mainstream maintenance support from SAP for five years. Once the period of mainstream maintenance has elapsed, the version falls out of support, potentially incurring higher maintenance costs if something was to go wrong. With S/4HANA version 2023, SAP has changed its support model to provide seven years of mainstream maintenance and a new S/4HANA version every two years, with regular releases of new functionality for the latest version delivered by regular feature pack stacks. While there is no requirement to adopt every

major and minor upgrade available, it is prudent to maintain an up-to-date version of the ERP system where practicable.

The version of SAP S/4HANA that went live at DBP was S/4HANA 2021, which will be out of support in 2026. A later version, S/4HANA 2023, is available now and as such the OneERP Phase 2 program, which will see implementation the new ERP at MGN, will upgrade OneERP S/4HANA to version 2023 in conjunction with a move to SAP's RISE cloud platform. DBP will incur no costs for this shift to S/4HANA 2023.

Rather than incur the cost of minor upgrades earlier (approximately $1.65 million), DBP has chosen to defer the next S/4HANA upgrade until 2029, when a major upgrade will be available and before the end of mainstream maintenance of S/4HANA 2023 in 2030.

By 2026, all three AGIG entities (AGN, DBP and MGN) will be operating on the same version of S/4HANA. The 2023 version falls out of support in 2030 after which all three businesses will share the costs of the major upgrade in 2029. DBP is comfortable carrying the maintenance risk on its current version of SAP S/4HANA until then.

A.1.1.1 SAP S/4HANA upgrades cost assessment

SAP S/4HANA is an enterprise-wide application, with the costs allocated between the three business entities. Costs for SAP S/4HANA are split based on user count. The current user count allocation is:

- AGN = 15%
- DBP = 65%
- MGN = 20%

The cost estimate provided by SAP for the 2029 major upgrade is $4.95 million. DBP's allocation based on users is 65%, or $3.25 million.

The following tables show the proposed capex uplift over the AA6 period.

Table Appendix A.1: SAP S/4HANA upgrades, $'000 2024

AA6 forecast	2026	2027	2028	2029	2030	Total
Capex (project delivery)	-	-	-	3,250	-	**3,250**

Capex includes the review of release changes, activating new features as required by the business, thoroughly testing the changes prior to release, change management, training, and coordination within IT to ensure compatibility with other systems.

There will be an ongoing operating cost associated with maintaining SAP S/4HANA. Historically, our ERP solution (Microsoft Dynamics and the current version of SAP S/4 HANA) was hosted on Microsoft Azure services. When the new version of SAP S/4 HANA is implemented, it will shift to the SAP RISE PaaS solution.

The overall subscription cost for SAP RISE, which will host S/4 HANA and Maximo (among other applications) is $1,283,000 in 2026 and another $28,000 on top of that in 2027 repeated in

forward years. However, this is offset by a $432,000 reduction in annual Microsoft Azure costs for hosting S/4 HANA.

A.1.2 HSE capability – INX InControl upgrade

AGIG's HSE team collaborates across the business to support the safe planning and implementation of all AGIG work. Their focus is on occupational health and safety, which includes mental and physical health both in the office and on site, and well as environment issues such as waste minimisation, spill response and emissions reduction.

Currently, the HSE teams at the three businesses, DBP, MGN and AGN, all use different systems to gather and record HSE data. The DBP team uses INX InControl, an application that helps organisations record incidents, manage risks, and assign corrective actions. Data for this tool comes directly from employees in the field. The INX tool has been adequate for DBP until now, but the software is old and implemented on-prem. This in contrast to the vendor's current offering which is web-based. INX's business functionality has been deteriorating, it hasn't been upgraded for a while and AGIG's current focus is simply keeping it operational. The INX system needs an update or replacement to be able to support the business needs.

MGN and AGN use spreadsheets to keep record of incidents. MGN and AGN currently operate in an outsourced business model and the OH&S component is the responsibility of their service provider partners. MGN's providers include [redacted]

[redacted]

We therefore need to upgrade our HSE data collection and management practices, and make the shift to a single enterprise-wide solution.

A.1.2.1 HSE capability – options

The proposed expenditure during the AA6 period is to conduct the detailed analysis of AGIG's requirements and the fully scope **and implement** a suitable HSE application.

The process of technology selection will include a comprehensive assessment of the business needs, vendor solutions and [redacted] study would assess the options for migrating to a latest version of INX (Option 1 outlined below), [redacted] and implementing a new, fit-for-purpose vendor solution (Option 3). Key considerations will also include assessing if a single enterprise solution could be achievable and if not what alternative combination would work.

We are considering several options to upgrade our HSE systems:

- Option 1 – Continue using existing HSE solutions

[redacted]

- Option 3 – Implement a fit-for-purpose HSE solution

Current thinking is that Option 3 is the most likely solution, however, this will be further refined once we have completed our system analysis. Discussion on the proposed options is provided below.

While maintaining the current combination of INX and spreadsheets is practicable in the short term, these fragmented practices will become increasingly inefficient and difficult to manage once APA operations are integrated into the AGIG businesses. From DBP's perspective, upgrading to the latest version of INX would require substantial effort, including decommissioning the legacy on-premises implementation and migrating to a modern web-based solution. Maintaining INX would also only be prudent if the solution could be used by the other businesses (MGN and AGN), however, we consider there are better applications more suited to distribution and transmission operations that could be implemented enterprise-wide at a comparable cost. We therefore consider Option 1 to be the weakest option.

[redacted]

Adopting a solution without sufficient understanding poses significant risks, including misalignment with business needs, inefficiencies, and unmet objectives. Unknown technical constraints issues could lead to delays, increased costs, or project failure, and non-compliance.

Without a thorough evaluation, we would risk wasting resources and introducing more delays to solving the bigger picture of AGIG HSE needs. A viable alternative would be to adopt a new, fit-for-purpose HSE solution, as per Option 3.

Option 3 is currently considered the most prudent option. We would upgrade to a new, fit for purpose HSE tool from a different software provider. There are several alternative solutions to INX InControl that address issues of usability, performance, integration, data management, and compliance. These alternatives typically include: Cority and Enablon (both are comprehensive environmental health and safety management software), SAP EHS (part of the SAP suite), Intelex and Sphera (both cloud-based HSE platforms).

Each alternative provides enhanced user interfaces, improved data handling, better integration options, and strong compliance features, making them well-suited for modern enterprise needs. AGIG may also consider migrating the InControl to a current platform.

This project will involve costs for conducting a comprehensive assessment of AGIG's broader enterprise needs, developing a HSE tool strategy, and then carrying out a tool selection process guided by that strategy and the identified needs. Key steps include defining requirements, evaluating vendors, configuring the tool to support business processes, migrating data, and

training users. The project will also include system integration and testing to ensure it meets regulatory and operational needs.

We expect to commence this project in 2026, with the aim of implementing an upgraded HSE tool during 2027/28.

A.1.2.2 HSE capability – cost assessment

The HSE tool is an enterprise-wide project, with /the costs allocated between the three business entities; Australian Gas Networks (AGN), DBP and Multinet Gas Network (MGN). Costs are split based on proportion of revenue. The current revenue-based allocation is:

- AGN = 45%
- DBP = 35%
- MGN = 20%

The total project capex across the three entities is estimated at [redacted]. Estimated costs of the HSE solution is provided in the table below.

Table A.2: HSE capability tool capex estimate, $'000 2024

AA6 forecast	2026	2027	2028	2029	2030	Total
Capex (project delivery)	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

Capex includes software, infrastructure, licencing fees, customisation and labour costs to implement the new system. Cost estimates have been developed based on historical precedent and advice from potential vendors. We have identified a lower and upper estimate for the following project elements:

- Initial assessment and requirements gathering
- Software selection
- Implementation and customisation
- Testing and QA
- Data migration
- Training and change management
- Go-live and support
- Software licensing
- Ongoing maintenance and compliance updates

For the purposes of this AA6 forecast, we have used the mid-point for each project element. These costs will be refined further as we commence the assessment and software selection process.

A.1.3 Data archiving

AGIG is currently undergoing a digital transformation to modernise and consolidate its IT systems to better support business needs. As a result of this process, certain business systems

are being phased out to reduce technical debt. However, these systems still house important business data that must remain accessible to the business, regulators and customers.

AGIG currently does not have data archiving capability in place. The aim of this project is to establish this capability within AGIG. Data archiving will be leveraged by downstream projects to securely archive data from business systems in preparation for their decommissioning. The goal is to implement a secure, compliant, and cost-effective data archiving solution that will enable AGIG to decommission multiple business systems scheduled for retirement between 2026 and 2031.

Data archiving is a critical enabler for decommissioning, as it ensures the preservation of essential data, allowing systems to be retired safely. Decommissioning these systems will relieve AGIG from the burden of maintaining outdated, potentially vulnerable legacy systems, which are susceptible to cybersecurity and compliance risks.

The DBP systems that will require data archiving in 2026-2031 include:

- Dynamics AX
- SAP Business One
- ProMaster
- CRS billing and contract management
- QDMS

If the phased-out systems cannot be decommissioned several key issues of concern arise:

- Security risk - unsupported databases and O/S, inability to apply security patches
- Compliance risk – difficult to meet regulatory requirements, protect data integrity over mandate periods, and respond effectively to audits or legal inquiries
- Financial risk – need to support and maintain licensing and infrastructure, retain organizational resources, training and knowledge transfer to provide support
- Operational risk - solutions no longer supported by vendors, loss of knowledge and capability of supporting applications, obsolete hardware that can no longer be maintained
- Business access risk - data is inaccessible from other production systems, complicates data retention management, uncertainty if application can be recovered from outages

Establishing this data archiving capability is crucial for maintaining regulatory compliance, reducing costs, and ensuring the security and integrity of long-term data. The successful delivery of this project will also lay the foundation for a robust data archiving strategy that supports AGIG's ongoing operational, regulatory, and business needs.

A.1.3.1 Data archiving - options

We considered several options for implementing a data archiving capability across AGIG. In summary, the credible options are:

- Option 1 – Develop custom DIY data archiving solution
- Option 2 – Implement an off-the-shelf data archiving product

- Option 3 – No change to existing situation (do not decommission the redundant applications)

Option 3 not preferred as it will not address the technical debt issue. It is important that we can decommission the redundant applications and ensure continuity and security of data.

Option 1 is viable for organisations where specific needs cannot be fully addressed by off-the-shelf products, however a custom solution requires specialist in-house expertise, which AGIG does not currently have. We consider there are off-the-shelf solutions that can fully address AGIG's requirements and would not require substantial in-house customisations. We therefore propose to pursue Option 2.

An off-the-shelf product is considered as the best option by AGIG for several reasons:

- Focus on core business – AGIG can focus the resources on strategic initiatives rather than dedicating significant time and effort to developing and maintaining a custom solution
- Speed of implementation – off-the-shelf products are ready to deploy with minimal customization, allowing organisations to start archiving data much faster
- Lower risk – off-the-shelf solutions reduce project risks related to scope creep, delays, and unforeseen technical challenges that are common in custom development projects. The predictable nature of these products leads to more successful outcomes
- Lower total cost – off-the-shelf products typically have lower overall costs when considering long-term maintenance, updates, and the need for specialised resources
- Built-in compliance and security – these solutions are designed with industry standards and regulations in mind, offering built-in compliance features and security measures
- Currency – vendors enhance their products, providing updates, new features, and security patches, evolving the systems with changing technology and regulatory landscapes
- Proven reliability – these products are tried and tested in the market, ensuring a high level of reliability and performance. They come with established best practices
- Vendor support – they come with support, including troubleshooting, training, and regular updates, ensuring that your system remains up-to-date and secure
- Scalability and flexibility – off-the-shelf solutions are built to scale and can handle growing data volumes and offer flexible options for expansion
- Ease of integration – they are often equipped with pre-built connectors and APIs for seamless integration with existing systems, saving time and reducing complexity

In summary, an off-the-shelf data archiving product is better because it offers quick deployment, proven reliability, and lower total costs.

A.1.3.2 Data archiving cost estimate

The data archiving project is an enterprise-wide project, with /the costs allocated between the three business entities; AGN, DBP and MGN. Costs are split based on proportion of revenue. The current revenue-based allocation is:

- AGN = 45%
- DBP = 35%

- MGN = 20%

The total project capex across the three entities is estimated at [redacted] The DBP allocation is provided in the table below.

Table A.3: Data archiving solution capex estimate, $'000 2024

AA6 forecast	2026	2027	2028	2029	2030	Total
Capex (project delivery)	[redacted]					

Capex includes software, infrastructure, licencing fees, customisation and labour costs to implement the new system. Costs are derived from advice from potential vendors, and includes consideration of cloud vs on premises costs, with an on-premises solution currently the preferred option.

A.1.4 Transmission billing system refresh

Across 2024 and 2025, DBP has implemented a new transmission billing system (TBS), which replaces the outdated and highly manual customer reporting system (CRS). The new TBS stores confidential customer and contract details and is used to generate and issue monthly invoices.

The new TBS is provided as a platform as a service (PaaS) solution, hosted on Energysys' cloud platform, on which we have configured and continue to upgrade the TBS. The ongoing cost of the solution has two components:

- PaaS costs – ongoing cost for use of the Energysys platform, support and quarterly releases
- Upgrades – costs for ongoing upgrades or improvements to the TBS, to ensure it is providing the right level of functionality for our business, deploying additional functionality where required

Both of these costs are treated as capex for regulatory accounting purposes. The following table summarises forecast capex relating to TBS for the AA6 period. Note the TBS is a DBP application, therefore there is no allocation of costs between the AGIG entities.

Table A.4: Transmission billing system AA6 forecast, $'000 2024

AA6 forecast	2026	2027	2028	2029	2030	Total
TBS PaaS and upgrades	248	348	446	248	446	1,736
Recurrent opex uplift (net)	359					**1,795**

Cost estimates are based on advice from the vendor for PaaS services and historical averages of upgrades and enhancements made to the old CRS system. The capex forecast allows for one major upgrade every two years. We expect the first major upgrade would occur in 2028 and then in 2030.

There will be an ongoing operating cost associated with the maintaining the new TBS solution. Opex includes the software subscription, support contracts, training and maintenance. The additional $529,000 per annum in opex is offset by the retirement of the Customer Reporting System and reduction in associated opex of $170,000 per annum.

A.1.5 Maximo version 9 upgrade

Maximo is a critical asset management system that supports DBP's operations. To ensure Maximo's continued effectiveness and compliance with industry standards, regular maintenance and upgrades are essential. By investing in regular maintenance and upgrades, DBP can ensure Maximo remains a reliable and efficient tool for managing its assets and minimising operational risks.

Maximo currently operates on a 3+1+3 support model with a 12-month release schedule. This model necessitates upgrades approximately every three years to maintain optimal performance and security. DBP is currently on Maximo 7.6.1.2 which is out of support in September 2025. IBM does not provide extended support on this version past this date. To be eligible for extended support, we would need to be on Maximo 7.6.1.3.

Continuing to operate Maximo under extended support, which is estimated to cost around $200,000 annually, poses several risks and limitations:

- Increased operational costs: Extended support incurs significant additional costs
- Reduced product support: Limited support under extended support may result in delayed issue resolution, increased system downtime, and potential operational disruptions
- Security vulnerabilities: Extended support often lacks comprehensive security patches and updates, exposing the system to cyber threats
- Inhibited innovation: The absence of new features and functionalities under extended support hinders the ability to drive operational efficiencies and support future growth initiatives

To mitigate these risks and capitalise on the benefits of a modern asset management solution, an upgrade to a contemporary version of Maximo is vital.

A.1.5.1 Maximo upgrade - options

The following options have been considered for the Maximo upgrade:

- Option 1: Update to Maximo 7.6.1.3 and stay on extended support
- Option 2: Self-managed upgrade to Maximo Application Suite (MAS 9) in AGIG Azure
- Option 3: Vendor-managed upgrade to MAS 9 in AGIG Azure
- Option 4: Transition to MAS 9 SaaS on SQL DB
- Option 5: Transition to MAS 9 SaaS on DB2 DB

Option 1 will need to be completed by September 2025 to remain supported, which is prior to the AA6 period.

Options 2 and 3 are not preferred due to: additional AGIG infrastructure requirements and skillsets to support the additional requirements for the latest Maximo version; overheads of managing multiple support vendors; higher costs and timeframe to upgrade to MAS 9 than other options considered; and high projected costs to upgrade in the future.

Option 4 is not preferred to transition to MAS 9 SaaS remaining on SQL DB because SQL is not the preferred database for Maximo and higher ongoing maintenance fees as compared to IBM DB2.

Option 5 is the preferred approach for the following reasons:

- Fastest timeline to MAS 9
- Support, licensing, and infrastructure savings and efficiencies included in subscription
- Future technical upgrade activities included in subscription
- Streamlined vendor support model
- Preferred database improving support and reliability of Maximo
- Improved performance and scalability
- Fastest timeline to upgrade to MAS 9 and access to the latest Maximo features
- Lowest cost to upgrade of all options considered

A.1.5.2 Maximo upgrade – cost assessment

The project costs of the Transition to MAS 9 SaaS on DB2 DB will be capitalised. Note DB2 is currently only being used by DBP, therefore there is no cost allocation for this project between the entities.

The following table shows the proposed expenditure profile over the AA6 period.

Table A.5: Maximo upgrade cost estimate, $'000 2024

AA6 forecast	2026	2027	2028	2029	2030	Total
Capex (project delivery)	1,600	-	-	1,400	-	**3,000**
Implementation project opex (one-off)	-	264	-	-	-	**264**
Recurrent opex uplift	-	300				**1,200**

Capex includes the initial SaaS subscription costs including software, infrastructure, licensing fees, and external and internal labour costs to upgrade to MAS 9 and transition to the SaaS model. Due to the 3-year base support model with Maximo, a second upgrade and capex component has been included in 2029.

There will be an ongoing operating cost associated with maintaining MAS 9. Opex includes the ongoing Maximo SaaS subscription costs.

There are also costs associated with the DBP reporting database that is currently on Microsoft Azure, but will move to the SAP RISE platform. The overall subscription cost for SAP RISE, which will host Maximo and S/4 HANA (among other applications) is $1,283,000 in 2026 and another $28,000 on top of that in 2027 repeated in forward years. However, this is offset by a $200,000 reduction Microsoft Azure costs for hosting the Maximo database.

A.1.6 Protecht GRC application

Currently at AGIG, several teams use Protecht, a legacy web-based governance, risk and compliance (GRC) tool. Our Assurance and Risk and others, find the tool not fit for purpose and difficult to use, while some teams, such as IT Commercial and IT Service Desk, have already stopped using it for related reasons.

Over time, the tool has been heavily customised and AGIG has lost the internal technical expertise needed to maintain it effectively. While the vendor provides stop-gap technical support, this arrangement does not allow for functionality enhancements and additional use cases. The business is increasingly concerned about the risk of the tool becoming inoperable.

[redacted] The aim of this project is to implement a suitable upgrade or replacement to the current Protecht GRC tool that can be used right across AGIG.

A.1.6.1 Protecht GRC – options

We considered several options to for addressing the issues with our GRC system, including maintaining Protecht as is, or upgrading to a newer version of the same application. However, it is clear there is limited value in maintaining use of a system that our users have made clear is no longer fit for purpose.

We therefore consider the most prudent option is to upgrade to a new, fit for purpose GRC tool from a different software provider. There are several options on the market, which we are currently looking into. The application will most likely be cloud-based, as there are very few on-premises solutions offered by vendors.

A.1.6.2 Protecht GRC – cost assessment

The new GRC tool will be an enterprise-wide application, with the costs allocated between the three business entities. Costs are split based on proportion of revenue. The current revenue-based allocation is:

- AGN = 45%
- DBP = 35%
- MGN = 20%

The estimated cost of the new GRC solution is [redacted]. The DBP allocation provided in the following table.

Table A.6: GRC tool estimate, $'000 2024

AA6 forecast	2026	2027	2028	2029	2030	Total
Project capex	[redacted]					

Capex includes software, infrastructure, licencing fees, customisation and labour costs to implement the new system. Opex includes the software subscription, support contracts, training and maintenance. It is assumed implementation will take three years, commencing in 2026.

Cost estimates have been developed based on historical precedent and advice from potential vendors.

A.1.7 SAP SuccessFactors

SuccessFactors is a strategic HR tool that supports AGIG's human capital management needs. Regular maintenance and upgrades are crucial to ensure its effectiveness and compliance with evolving HR regulations.

SuccessFactors, as a SaaS solution, operates on a regular release cycle. This model ensures that customers benefit from continuous innovation, enhanced security, and improved functionality. Failure to adopt timely updates can lead to several negative consequences:

- Security risks: Outdated systems, including SuccessFactors, are more vulnerable to cyber threats
- Compliance issues: Regular Updates include regulatory changes. Not adhering to regulatory changes can result in legal and possible financial penalties
- Functional limitations: Missing out on new features and enhancements can hinder operational efficiency and strategic initiatives
- Vendor support: Delayed upgrades may impact vendor support

SuccessFactors typically releases two major updates per year. These updates introduce new features, enhancements, and bug fixes. The release cycle is designed to balance the need for innovation with the stability and reliability of the platform.

Each release includes a mix of mandatory and optional changes:

- Mandatory changes: These changes are essential for maintaining the security and compliance of the platform. They are automatically applied to all customer instances
- Optional changes: These changes offer additional features and functionalities that can be selectively implemented based on specific AGIG needs

By proactively managing SuccessFactors updates, AGIG can ensure optimal performance, security, and compliance, while reaping the benefits of continuous innovation.

A.1.7.1 SAP SuccessFactors - options

The following options have been considered for the SuccessFactors upgrades

- Option 1: Do not upgrade
- Option 2: Proactive half yearly release management

Option 1 is not preferred because the half yearly releases, under a SaaS model, are automatically applied to the AGIG SuccessFactors environments. Mandatory changes will be applied during the SAP SuccessFactors release schedule and not proactively managing these releases is likely to have adverse impact to AGIG employees and HR processes, as well as the risks associated with outdated software.

The preferred approach is Option 2, which is to proactively manage the half yearly releases to ensure they are managed without adverse impact to AGIG and that new features and enhancements are adopted to streamline processes and improve user experience.

A.1.7.2 SAP SuccessFactors – cost assessment

SuccessFactors is an enterprise-wide application, with the costs allocated between the three business entities. Costs for SuccessFactors are split based on user count. The current user count allocation is:

- AGN = 15%
- DBP = 65%
- MGN = 20%

The project costs of proactively managing SuccessFactors Half Yearly Release is a capital cost. Capex includes the review of release changes, activating new features as required by the business, thoroughly testing the changes prior to release, change management, training, and coordination within IT to ensure compatibility with other systems.

The estimate from similar practices at other companies is $100,000 per release, or $200,000 each year. DBP's allocation based on users is 65%, or $130,000.

There will also be an ongoing opex cost associated with maintaining SAP SuccessFactors. Opex includes the software subscription, support contracts, training and maintenance. The increase of $529,000 per annum is partially offset by the reduction in costs associated with the retiring PayGlobal app.

The following table shows the proposed expenditures over the AA6 period.

Table A.7: SuccessFactors upgrades, $'000 2024

AA6 forecast	2025	2026	2027	2028	2029	2030	AA6
Capex (project delivery)		130	130	130	130	130	**650**
Recurrent opex uplift (net)	228						**1,140**

A.1.8 Public websites

The three AGIG business entities; AGN, MGN and DBP, all currently have disparate websites hosted on individual platforms. During the AA6 period we propose to re-platform the sites, consolidating them onto a single platform that will support all three businesses. This will allow us to reduce hosting costs and allow us to make ongoing changes to our web content and functionality without having to replicate it three times.

A.1.8.1 Public websites – cost assessment

This is an enterprise-wide project, with costs allocated between the three business entities; AGN, DBP and MGN. Costs are split based on proportion of revenue. The current revenue-based allocation is:

- AGN = 45%

- DBP = 35%
- MGN = 20%

The following table shows the DBP allocation. The initial website replatforming is scheduled for 2026, with budget allocated for an upgrade/refresh in 2028. There will be an ongoing operating cost associated with maintaining the public websites.

Cost estimates have been developed based on historical precedent and advice from potential vendors.

Table A.8: Public websites cost estimate, $'000 2024

AA6 forecast	2026	2027	2028	2029	2030	Total
Capex (project delivery)	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

A.1.9 Application architecture management system

The objective of this project is to upgrade our enterprise application management practices by implementing an application architecture management system within AGIG. This strategic initiative aims to align our IT infrastructure with business goals, optimise operational efficiency, strengthen our compliance and IT security posture, and enhance our ability to quickly adapt to market changes and regulatory demands.

The current AGIG IT landscape is characterised by fragmented systems and a need for more cohesive alignment with our business strategies. This leads to inefficiencies and missed opportunities for innovation and improvement. Implementing an application architecture tool will enable us to construct a single-source-of-truth blueprint of our IT architecture, ensuring that it supports and drives our business objectives efficiently.

AGIG, as a utility organisation, faces a unique set of IT challenges due to the critical nature of its services, regulatory demands, and the need for constant availability and reliability. Key IT challenges include:

- Cybersecurity threats – Utilities are high-value targets for cyberattacks due to the critical infrastructure they control, which includes transmission and distribution systems. Ensuring the security of IT and operational technology (OT) systems against threats is a paramount concern. This involves protecting against both external attacks and internal vulnerabilities
- Regulatory compliance – Utility companies are among the heavily regulated industries. They must comply with regulations concerning data protection, operational security, and reporting standards. Managing compliance, particularly across different states with varying requirements, adds complexity to IT management
- Customer service and engagement – Modern customers expect digital, seamless, and personalized service interactions. Utilities must provide reliable online services for billing, outage reporting, and real-time customer support, which demands high IT system availability and integration
- Ageing IT (and other) infrastructure – Utilities must manage outdated IT systems and infrastructure that are vulnerable to failures and security breaches. Upgrading these systems while maintaining continuous service availability presents a significant challenge

- Integration of renewable energy sources – As the energy sector moves towards renewable sources, like increasing use of hydrogen, utilities need to integrate these new technologies into their grids. This integration requires advanced IT solutions to manage variable factors like flows and pressure and maintain grid stability
- Smart grid technologies – Implementing smart grid technologies involves the deployment of advanced metering infrastructure , smart sensors, and IoT devices. Managing the data from these devices, ensuring their security, and integrating them into existing systems poses significant IT challenges
- Data management and analytics – Utilities generate vast amounts of data from sensors, meters, and customers. Effectively managing, storing, and analysing this data to improve operational efficiency and customer service requires robust IT infrastructure and advanced analytics capabilities
- Operational efficiency – There is a constant pressure to improve operational efficiency and reduce costs. IT systems must support process optimization, resource management, and automation, all while minimizing downtime and service disruptions
- Disaster recovery and business continuity – Given their critical role in infrastructure, utility companies must have strong disaster recovery and business continuity plans. This involves maintaining IT systems that can withstand or quickly recover from disruptions caused by natural disasters, system failures, or cyberattacks
- Talent acquisition and retention – The rapid pace of technological advancements requires skilled IT professionals, and partners who are proficient in the latest technologies and security practices. Finding and retaining this talent is an ongoing challenge

Addressing these challenges requires a strategic approach to IT management, investment in modern technology solutions, and continuous improvement of cybersecurity practices.

[redacted] Application architecture can also provide continuous insights into how IT architectures can adapt to changing business needs. A summary of benefits for AGIG is provided below:

- Enhanced decision-making – By providing comprehensive insights into the IT environment, application architecture tools enable better decision-making at both strategic and operational levels. Stakeholders can assess the impact of proposed changes, evaluate alternatives, and prioritize initiatives based on their alignment with business goals
- Risk management and compliance – Application architecture tools provide a framework for assessing and managing risks associated with IT systems and processes, including Cyber Security and regulatory compliance. By identifying vulnerabilities, ensuring compliance with regulations and standards, and implementing robust governance practices, organizations can mitigate risks and enhance security posture
- Improved visibility and transparency – Application architecture tools provide a centralized platform for documenting and visualising the entire IT landscape, including applications, infrastructure, data, and processes. This enhanced visibility allows stakeholders to understand the relationships between different components and make informed decisions

- Support for digital transformation – As AGIG is driving ERP, CRM and other digital transformation, application architecture tools will play a crucial role in modernizing IT infrastructure, integrating new technologies, and aligning IT with business strategy. EAM tools provide the visibility and governance needed to drive successful digital initiatives
- Efficient use of IT resources – Application architecture tools help identify redundant systems, overlaps, and opportunities for consolidation. This can lead to cost savings and more efficient use of IT resources
- Facilitated communication and collaboration – Application architecture tools promote collaboration among different stakeholders, including IT teams, business units, and external partners. By providing a common platform for architecture communication, surveys and documentation, these tools foster cross-functional collaboration and engagement
- Restructuring and expansion – Application architecture tools can offer scalability and flexibility to [redacted]

A.1.9.1 Application architecture management system - options

We considered several options for implementing an application architecture solution. In summary, the credible options are:

- Option 1 – Develop custom in-house solution
- Option 2 – Implement a commercial tool
- Option 3 – No change to existing manual processes

We eliminated Option 3, as it is clear that the existing manual processes should not continue, particularly given the ongoing AGIG-wide implementation of a single enterprise resource planning application (SAP S/4HANA). The SAP S/4HANA implementation offers a window of opportunity to standardise other applications across AGIG, therefore it makes sense to implement an enterprise-wide application architecture tool that is compatible with SAP S/4HANA.

With this in mind, we have selected Option 2 as the most viable solution. There are a number of 'off-the-shelf' tools that could be adopted at a lower cost than developing a custom in-house solution. [redacted]

A.1.9.2 Application architecture management system – cost assessment

The Application architecture tool is an enterprise-wide project, with the costs allocated between the three business entities AGN, DBP and MGN. Costs are spit based on proportion of revenue. The current revenue-based allocation is:

- AGN = 45%
- DBP = 35%
- MGN = 20%

The total cost across the three entities is estimated at [redacted] DBP's allocation is shown in the table below

Table A.9: Application architecture capex estimate, $'000 2024

AA6 forecast	2026	2027	2028	2029	2030	Total
Capex	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

Costs are derived from quotes provided by the potential vendors. [redacted] The preferred solution will be implemented by a third-party contractor, who has provided cost estimates for onboarding, development and support costs for [redacted].

A.1.10 Centralised GIS database

Geospatial information is a vital component in the management and operation of the pipeline. It enables us to effectively plan, design, construct, and maintain our extensive network of gas transmission assets, ensuring the safe and reliable delivery of natural gas to our customers

Currently, geospatial data is stored across multiple fragmented sources, primarily as shapefiles. While this has been manageable to date, as our data grows in volume and complexity, this fragmented approach is proving problematic.

Data fragmentation makes it difficult to maintain a comprehensive and accurate view of our entire gas pipeline network. With each shapefile representing a different aspect of the network, such as pipelines, valves, or compressor stations, it becomes challenging to ensure data consistency and integrity across all sources. Updates or corrections made to one shapefile may not always propagate to others, leading to discrepancies and inaccuracies in our records.

For example, a pipeline material might be entered as "ST", "STL" or "STEEL in different files, making it difficult to query and summarise the data reliably. Users are also constrained to the basic querying and analysis functions available in our current GIS systems. Shapefiles are a valuable format for storing and exchanging geospatial data, however, supporting DBP's assets solely through individual shapefiles without a centralised database and overarching database schema is inefficient and ultimately unsustainable.

To address these challenges and position ourselves for future success, we need to transition to a more centralised and integrated approach to managing our geospatial data. By consolidating our data into a central database or platform, we can improve data consistency, accessibility, and accuracy across our entire gas transmission network.

A.1.10.1 Centralised GIS database – proposed solution

There are two viable options to resolve the GIS data issues; develop a custom built database designed for DBP's specific needs, or purchase an off-the-shelf geospatial database that can be customised where necessary.

We have opted for an off-the-shelf solution, as it is likely to be lower cost than a custom-built database, and carries less delivery risk. While a custom built database may ultimately offer a higher quality solution that better meets the needs of a transmission pipeline, too great a level of customisation may also inhibit any future ability to add non-transmission GIS to the database. It is therefore more prudent to use an off the shelf solution that can be modified as required to suit AGIG's changing needs.

A.1.10.2 Centralised GIS database – cost assessment

Several off-the-shelf options are available on the market. We are currently in the process of identifying viable applications, with the aim of commencing development in 2026 and implementing the new database by the end of 2027. [redacted].

[redacted]. For the purpose of this AA6 forecast, we have budgeted [redacted], which is based on a high level estimate of software, infrastructure and labour costs to implement the new system, and incremental functionality improvements towards the end of the AA6 period. These high level estimates have been informed by [redacted] These costs will be refined further as we commence the assessment and software selection process during 2025/26.

The expenditure forecast for the AA6 period is presented in the table below. Note the GIS application will be used by DBP only, therefore there is no allocation across the AGIG entities.

Table A.10: GIS database capex estimate, $'000 2024

AA6 forecast	2026	2027	2028	2029	2030	Total
Capex (project delivery)	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

A.1.11 Other core systems

While the majority of application upgrades are scheduled, during an AA period there are often requirements to ad-hoc upgrades to applications. These may be vendor driven or to access new functionalities in existing applications.

These ad-hoc upgrades are difficult to forecast, therefore historically we have budgeted an annual allowance to accommodate them. For the AA6 period we have budgeted $200,000 of capex per year for ad-hoc upgrades to DBP applications. This is based on historical actuals.

A.1.12 Signavio

Signavio is a business process management application, provided by SAP. Signavio offers a suite of tools that help organisations understand and improve their business processes, identifying opportunities to reduce duplication, identify roadblocks, and enable greater collaboration. Signavio was implemented at AGIG in 2025, as a complement to the OneERP program. Signavio integrates seamlessly with SAP S/4HANA to enhance business process management and transformation. Signavio supports the migration from legacy ERP systems to S/4HANA by providing tools to manage the transition smoothly. This includes minimising migration efforts and reducing the risk of project failure.

Signavio is provided as a SaaS solution, and therefore results in an ongoing operating cost increase of around $80,000 per year, to cover the cost of the SaaS subscription.

A.2 Application enhancements

In addition to periodic upgrades, most applications offer additional functionality that can be activated as and when the business requires. For example, products such as Maximo or SAP

S4/HANA have an application suite whereby value-adding components such as mobility, analytics or improved user interfaces can be turned on (or off) depending on what the organisation needs. These incremental improvements to functionality are categorised as application enhancements.

Investing in incremental enhancements is a fundamental part of IT application management. When an application is adopted by the business, ongoing investment is necessary to ensure the business is deriving maximum value from the software and ensuring the user experience is efficient. These application enhancements can be either the result of a new functionality being offered by the vendor (which the business sees value in) or the result of an identified need by users to fill a process gap or to improve current practice.

The following sections describe the proposed application enhancements for the AA6 period.

A.2.1 SAP S/4HANA incremental functionality enhancements

Following the recent implementation of SAP S/4HANA at DBP, we have been making incremental improvements to the ERP solution to improve the user experience and release new functionality. This process of incremental improvement should continue throughout the life of the application to ensure we are maximising the value of the solution to our business, adding features such as mobility and analytics, which can improve business processes and drive efficiency.

Post the initial implementation we incurred approximately $1.3 million during 2024 to enhance SAP S/4HANA and address minor issues from the phase one go-live. Moving forward, we expect the level of required enhancements to reduce to a more sustainable level and have therefore budgeted $1 million per year to unlock future S/4HANA functionality. As SAP S/4HANA is an enterprise-wide application, enhancement costs are shared across the AGIG entities, with DBP being allocated 65% of costs based on user count. DBP's share is therefore $650,000.

SAP has provided an early indication of its enhancement pathway for the application, which includes release of mobility, user experience, new applications, artificial intelligence, automation and analytics. We will consider each functionality enhancement on a case-by-case basis and invest only in enhancements that will offer value to the AGIG businesses.

A.2.2 Maximo incremental functionality enhancements

In 2026 we will be upgrading from our current Maximo on-premise application to Maximo Application Suite 9 SaaS. Maximo is DBP's core asset lifecycle management solution.

Following the initial implementation, we will continue to refine and invest in Maximo to improve the user experience and ensure we are getting the most from the additional functionality Maximo v9 offers. This includes enhanced mobility, analytics, AI capabilities and enhanced integration capabilities.

Historically, we have spent $150,000 to $200,000 per year on enhancements to our current Maximo application, incurring $172,000 in 2024. We have therefore budgeted $200,000 per year to accommodate future functionality upgrades.

A.2.3 Contract management system

AGIG's Contracts and Procurements business unit currently manage contracts using email, Excel spreadsheets, Adobe Sign, and network drives. This fragmented approach is inefficient, increases risk of errors and does not provide centralised oversight of all contracts. A 2023 internal audit identified weaknesses in controls over procurement and contractor/vendor management, and flagged the lack of a robust contract management system to be a significant risk. The audit found that controls on procurement for operating expenditure are acceptable, but with major improvements required in the following areas:

- Compliances with procurement procedures
- Performance of formal price comparison before renewal of contracts
- Review of dollar threshold on the requirements of tender process and request for proposal
- Inspection of insurance policies from contractors
- Maintenance of document execution checklists
- Managing existing vendors and new vendor registration process
- Reconciliation of unit costs in purchase order against the schedule of rates in contracts

A key recommendation resulting from the audit is to implement an end-to-end digitised contract management system, for use across the AGIG entities. Such a system is expected to provide the following benefits:

- Reduce risk by digitising the contract management process
- Provide end-to-end visibility of all contracts in a single system
- Strengthen controls and governance over procurement and vendor management
- Improve the effectiveness of the review and approval processes
- Effective management through ability to monitor vendor and contract performance
- Improved decision making through improved data and reporting

A range of off-the-shelf contract management applications are available, such as SAP Ariba, Coupa, Oracle, Zycus and several others. Many of these applications offer similar core features, with a range of functionalities that can be tailored to suite an organisations' needs. This can make it challenging to identify the most appropriate solution, particularly for a large multi-faceted business such as AGIG.

A key consideration for AGIG is integration with SAP S/4HANA. The enterprise is currently in the process of moving all its business entities onto this single ERP application, with MGN, AGN and DBP all expected to be operating on the same platform by the end of 2026. To ensure any new contract management system is optimised for AGIG's requirements and can be integrated with SAP S/4HANA, we propose to undertake a detailed analysis of our IT environment, technical requirements and business needs before committing to a contract management solution. We consider the optimal time for this assessment is 2026/27, once the business has fully transitioned to SAP S/4HANA. We would then use this analysis to identify the most suitable contract management system and develop the full scope and costings, with a view to implementing a new system around 2030.

We therefore propose to include in this AA6 proposal costs to undertake this analysis. The scope of the analysis will include:

- Analysis of the market landscape for a best-fit solution by defining and prioritising use cases
- Prioritising organisational must-haves over nice-to-haves, formalising scope such as contract digitisation, storage, AI and data handling
- Reviewing organisational application and infrastructure architecture to identify opportunities for efficiencies, as well as potential barriers
- Ensuring AGIG's contract management processes can evolve by reviewing vendors' future roadmaps
- Workflow mapping and maturity assessment of departments that will use the new system
- Change management requirements and decommissioning effort
- Cost comparison and high level benefits analysis

This analysis will then directly inform the application design and installation of the new contract management asset. Based on similar analyses performed by third party experts, we estimate a capital cost of $[redacted]

A.2.4 Information management and other system enhancements

DBP typically reserves budget for ad-hoc enhancements to existing applications. These may be in response to requests by the business to activate a certain functionality within an application, or to procure an application for a specific DBP requirements.

These ad-hoc enhancements are difficult to forecast, therefore historically we have budgeted an annual allowance to accommodate them (historically around $300,000 per year). However, for the AA6 period, we have identified that some enhancements are likely to be required to our enterprise information management applications.

The current state of reporting at DBP is at a low maturity and involves consolidation of data from multiple systems into excel and manual manipulations to produce regulatory and business critical reporting. DBP does not have a central data repository that would enable the automation of these reports, enable DBP to derive analytics and insights from the data as well as leverage emerging capabilities such as artificial intelligence and machine learning.

In 2024, AGIG implemented a new data analytic and visualisation (DAV) tool, as part of an enterprise-wide data architecture, reporting and governance program. DAV tools are software applications that help in analysing and interpreting complex datasets to extract meaningful insights. These tools also enable users to create visual representations of data, such as graphs, charts, and dashboards, to make the data easier to understand and communicate. Until recently, AGIG had an abundance of data, but scarce information and analysis. The DAV tool has been rolled out to the businesses and has begun to be used by DBP.

The value of the AGIG DAV platform is to drive a common language for data (as well as the understanding of data flows) across AGIG. Centrally accessible, secure, and reliable data sets can be for:

- Compliance and business critical reporting - fragmented, disparate and inconsistent reporting due to unreliable information and manual manipulation, making it difficult to be transparent with our regulators, customers and internal business stakeholders
- Better decision making – ensuring simple access to quality information in a timely manner (i.e. the right information in the right format at the right time to the right person) supports good decision making
- Efficiency through streamlining business processes – standardising and centralising analytics from systems (i.e. OneERP) and improving and automating more of our reporting and analytics, will create synergies across AGIG. It will reduce duplication of effort and allow less time to be spent collecting, collating and manually calculating information to support business decisions, and enable more time undertaking value-add analysis activities
- Cyber risk management – cyber controls, such as identity and access controls, are only effective when the controlled data is appropriately governed and managed

The DAV offers user the ability to connect various data sources, customise visualisations, create dashboards and stories, and share analysis in a meaningful way. Its uses are versatile, and it can be applied to a range of DBP data such as regulatory information notice (RIN) reporting, asset condition information, and financial reporting. Given the system is new, there is scope for significant enhancements as the business gets used to using the tool and identifies where it can be applied. Already within the first month of operation, the IT department has received quite a number of requests from DBP users to enhance the DAV tool and enquiries on alternative use cases.

While we will not necessarily adopt every enhancement requested by the business, there are opportunities to incorporate additional functionality into the DAV tool such as artificial intelligence and machine learning. We therefore consider it prudent to allocate an amount of capex for these DAV enhancements and other minor changes to our information management systems where they can benefit DBP users.

For the AA6 period we have therefore budgeted $300,000 per year (declining to $200,000 in 2029 and 2030 for information management/DAV applications. This is in addition to the regular historical allocation for other ad-hoc app enhancements of $300,000 per year.

This cost estimate is based on historical actuals for ad-hoc enhancements and an early assessment of the DAV user requests already received.

Table A.11: Information management and other system enhancements, $'000 2024

AA6 forecast	2026	2027	2028	2029	2030	Total
DAV/Information management enhancements	300	300	300	200	200	**1,300**
Other applications	300	300	300	300	300	**1,500**
Total	**600**	**600**	**600**	**500**	**500**	**2,800**

Appendix B Comparison of risk assessments

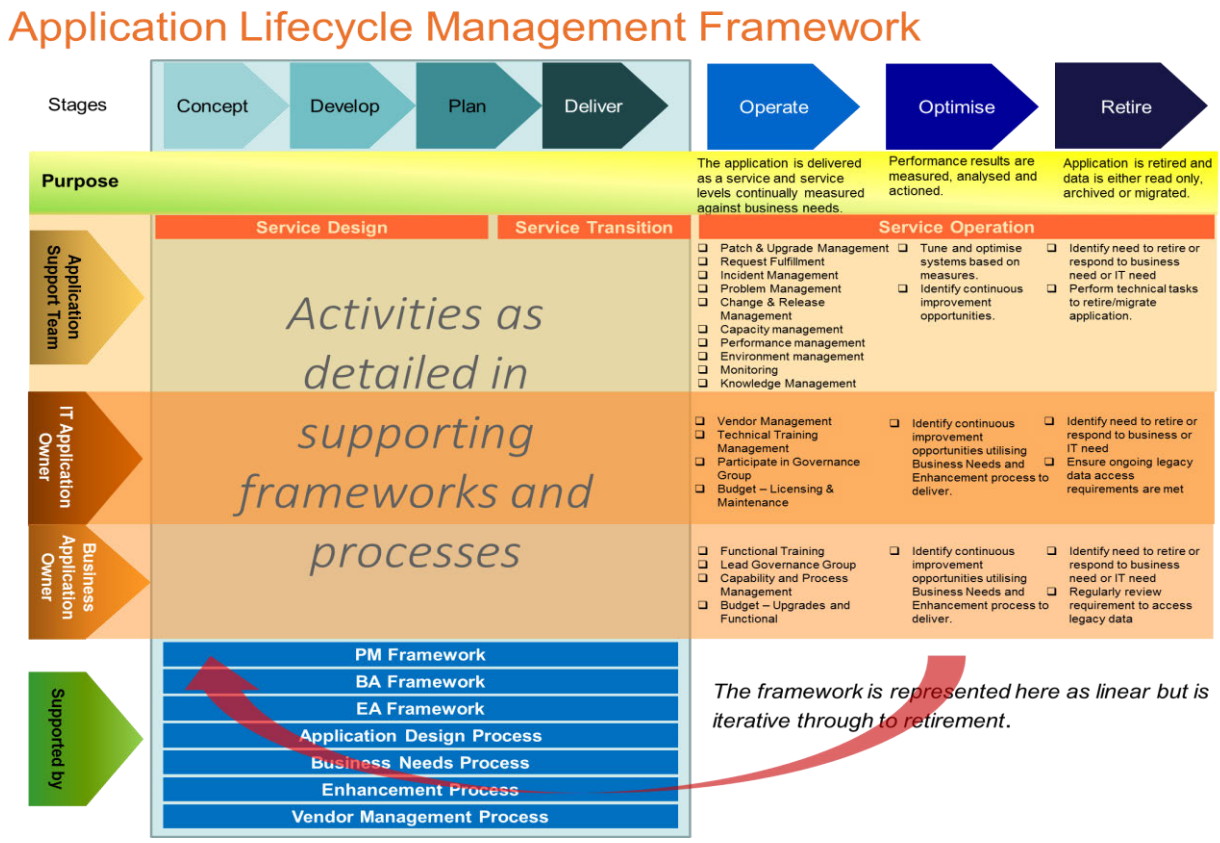
Summary of Risk Assessment for IT sustaining applications

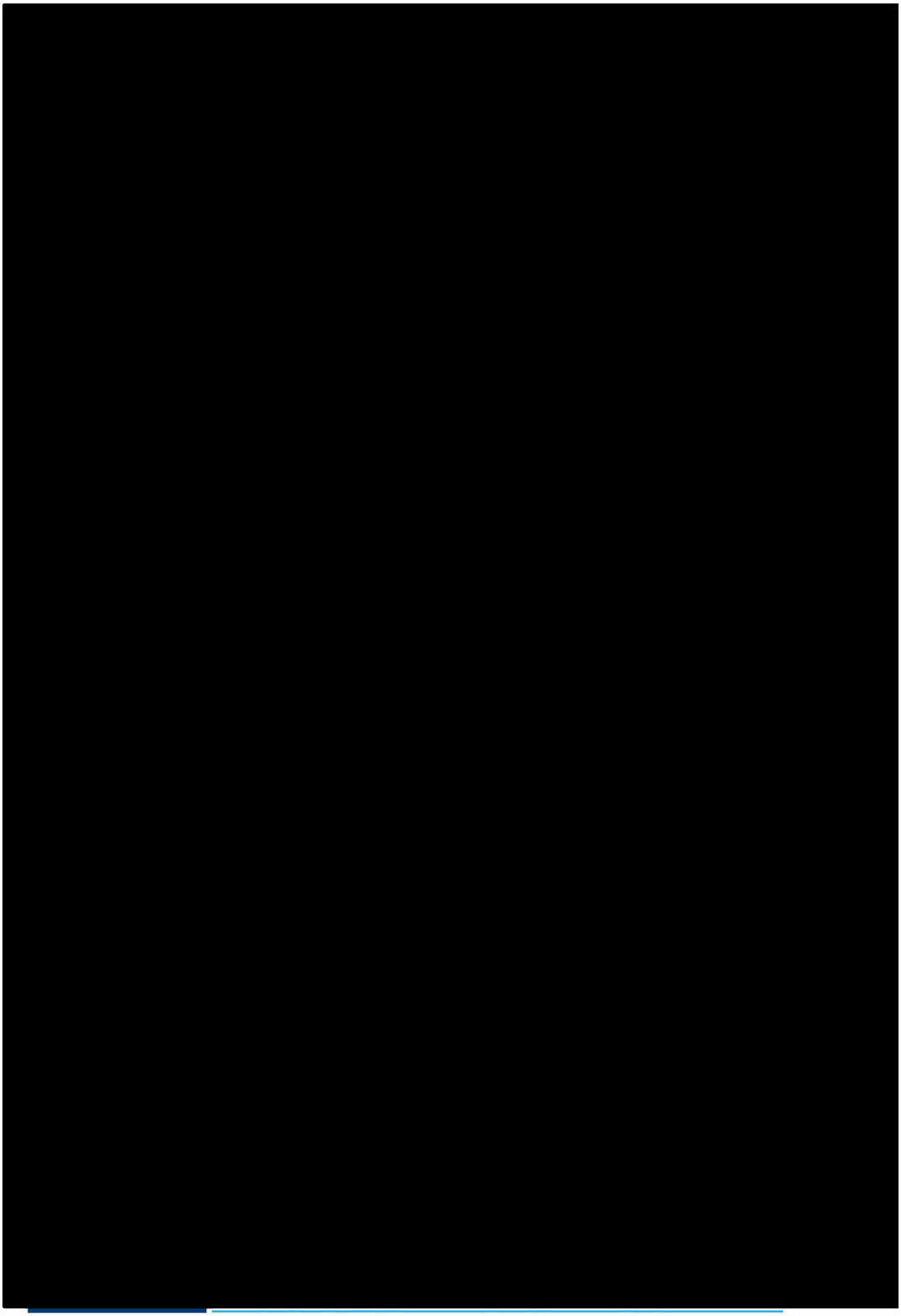
Project Ref No	Description	Primary Risk Event	Proposed Action		People	Environmental	Supply	DBP	Reputation	Loss
DBP21	Sustaining applications	The primary risk event being assessed is that as IT applications age, it becomes increasingly difficult to address security weaknesses and implement the remedial actions required to resolve a system failure. In a worst-case scenario, the application or technology platform may have a catastrophic failure and cannot be recovered, resulting in an urgent need to implement either an upgrade or replacement of that system to restore network operations. The likelihood of this risk event occurring will increase with time if a suitable ongoing upgrade program is not completed.	Untreated Risk	Likelihood	Hypothetical	Hypothetical	Unlikely	Unlikely	Occasional	Unlikely
				Consequence	Trivial	Trivial	Severe	Major	Severe	Major
				Risk Level	NEGLIGIBLE	NEGLIGIBLE	INTERMEDIATE	HIGH	INTERMEDIATE	HIGH
			Option 1 – Upgrade all systems based on vendor recommended cycles	Likelihood	Hypothetical	Hypothetical	Remote	Remote	Remote	Remote
				Consequence	Trivial	Trivial	Severe	Major	Severe	Major
				Risk Level	NEGLIGIBLE	NEGLIGIBLE	LOW	INTERMEDIATE	LOW	INTERMEDIATE
			Option 2 – Deliver upgrades and application enhancements based on a risk-based assessment of business need	Likelihood	Hypothetical	Hypothetical	Remote	Remote	Remote	Remote
				Consequence	Trivial	Trivial	Severe	Major	Severe	Major
				Risk Level	NEGLIGIBLE	NEGLIGIBLE	LOW	INTERMEDIATE	LOW	INTERMEDIATE
			Option 3 – Deliver the upgrades program only, with no application enhancements	Likelihood	Hypothetical	Hypothetical	Remote	Remote	Remote	Remote
				Consequence	Trivial	Trivial	Severe	Major	Severe	Major
				Risk Level	NEGLIGIBLE	NEGLIGIBLE	LOW	INTERMEDIATE	LOW	INTERMEDIATE

Appendix C Application lifecycle management

We follow an industry standard application lifecycle framework to manage applications through the implementation, operations, optimisation and retirement phases of their lifecycle to determine upgrade timelines and priorities. This framework provides an efficient and effective approach to maintaining the security and stability of our applications while optimising lifecycle stages. This framework includes the project management methodologies to implement the applications, and ongoing lifecycle activities to operate and optimise the applications - including upgrade cycles.

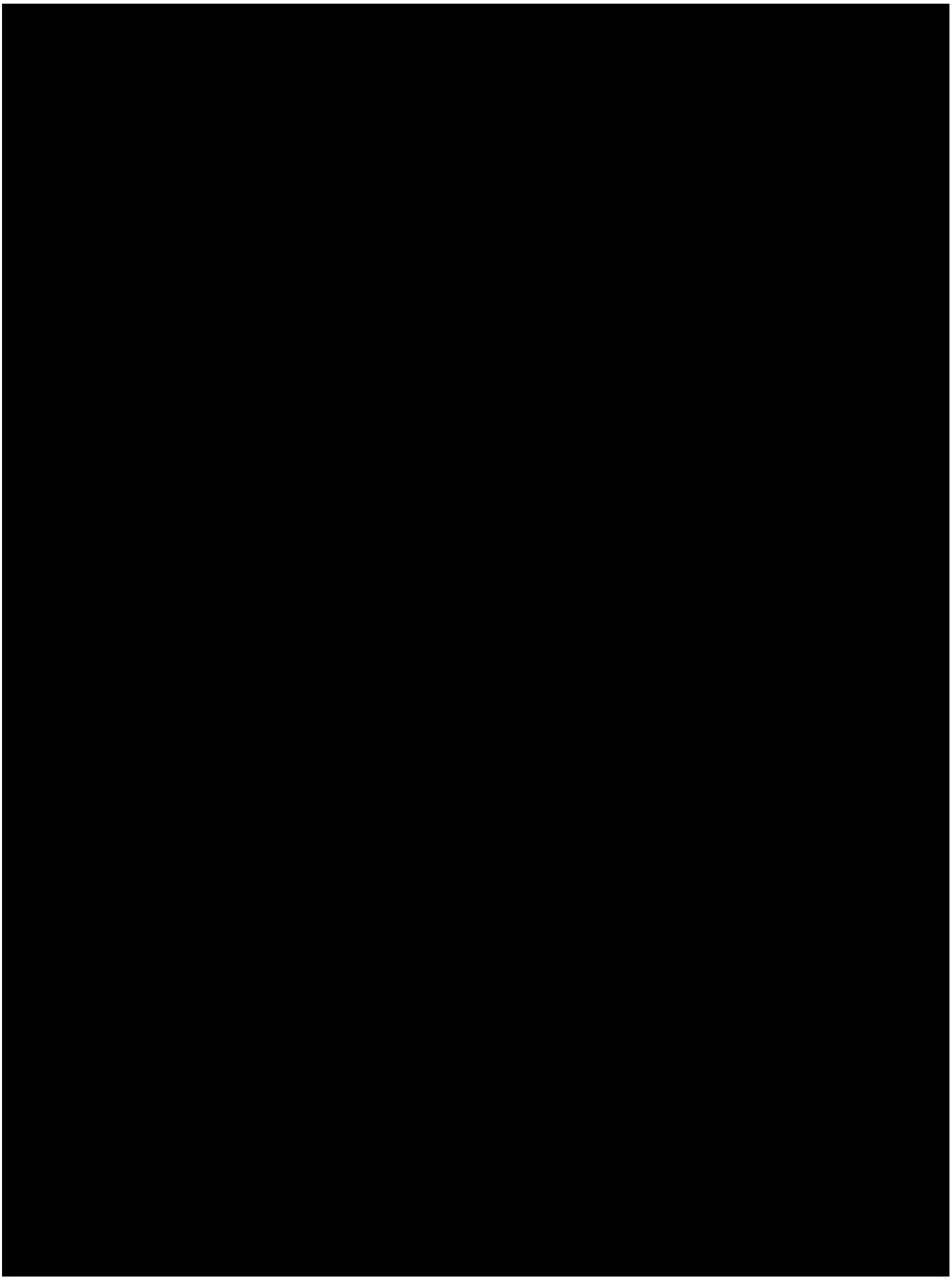
The diagram below outlines the key aspects of this framework.

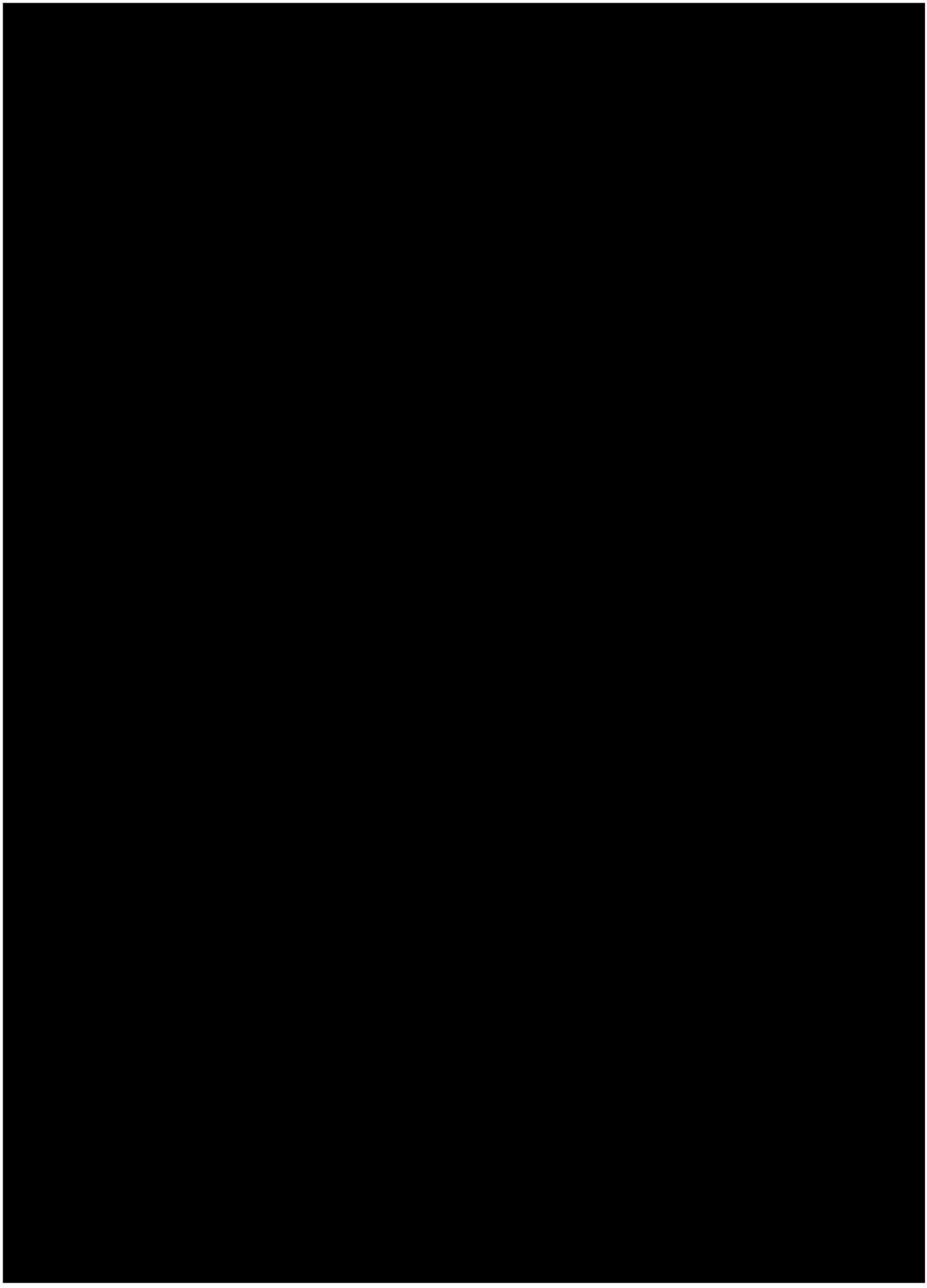




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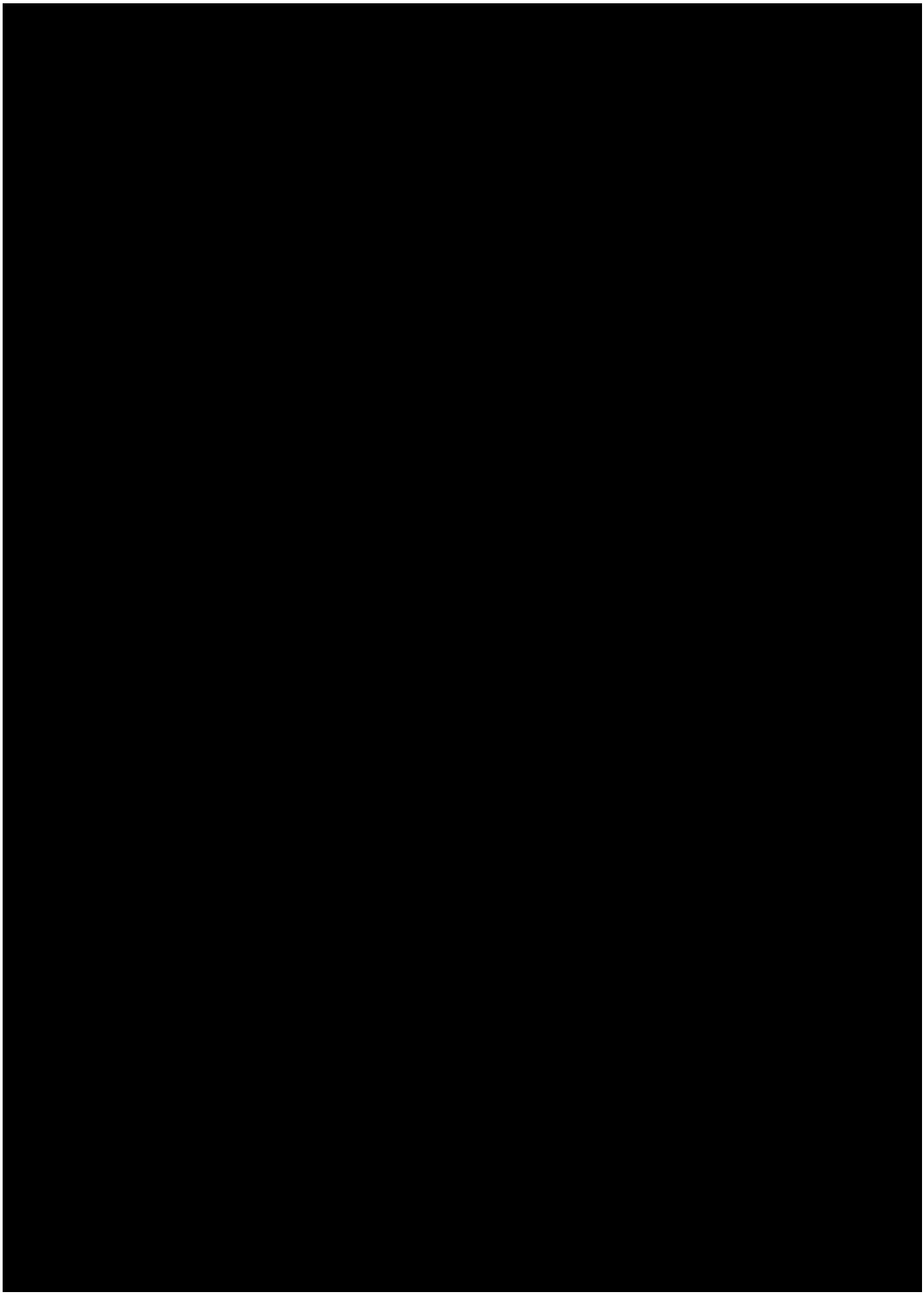


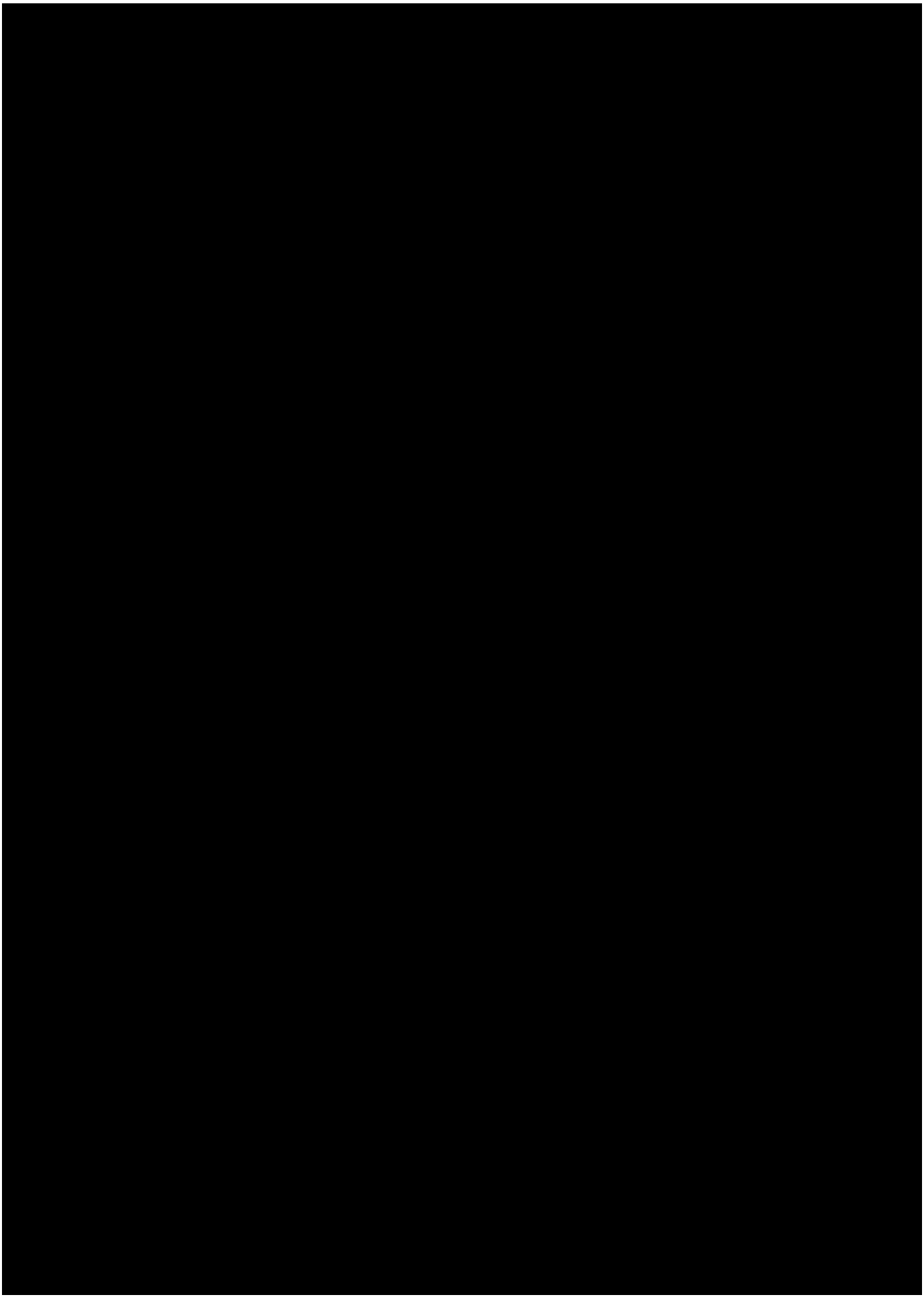


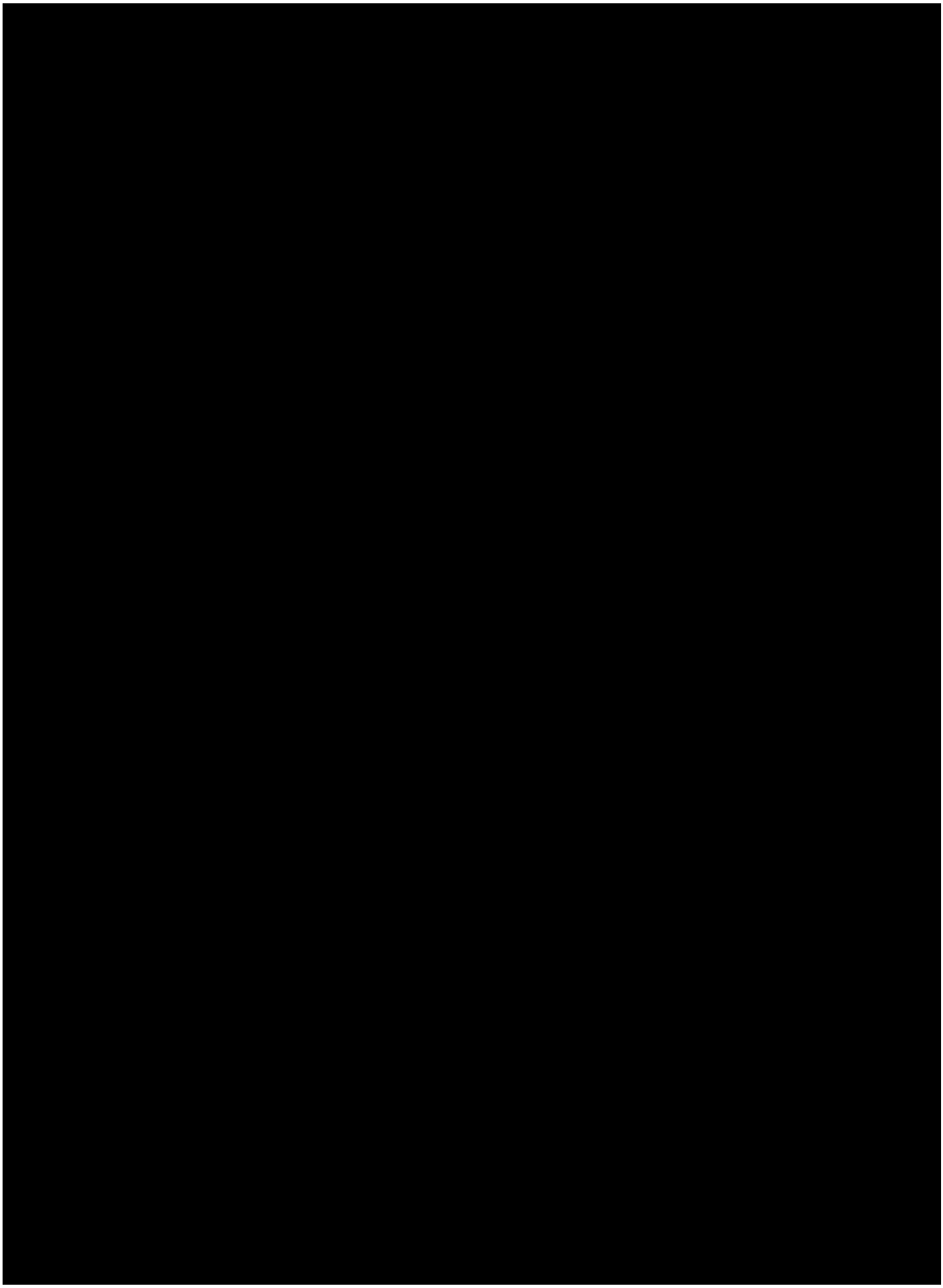


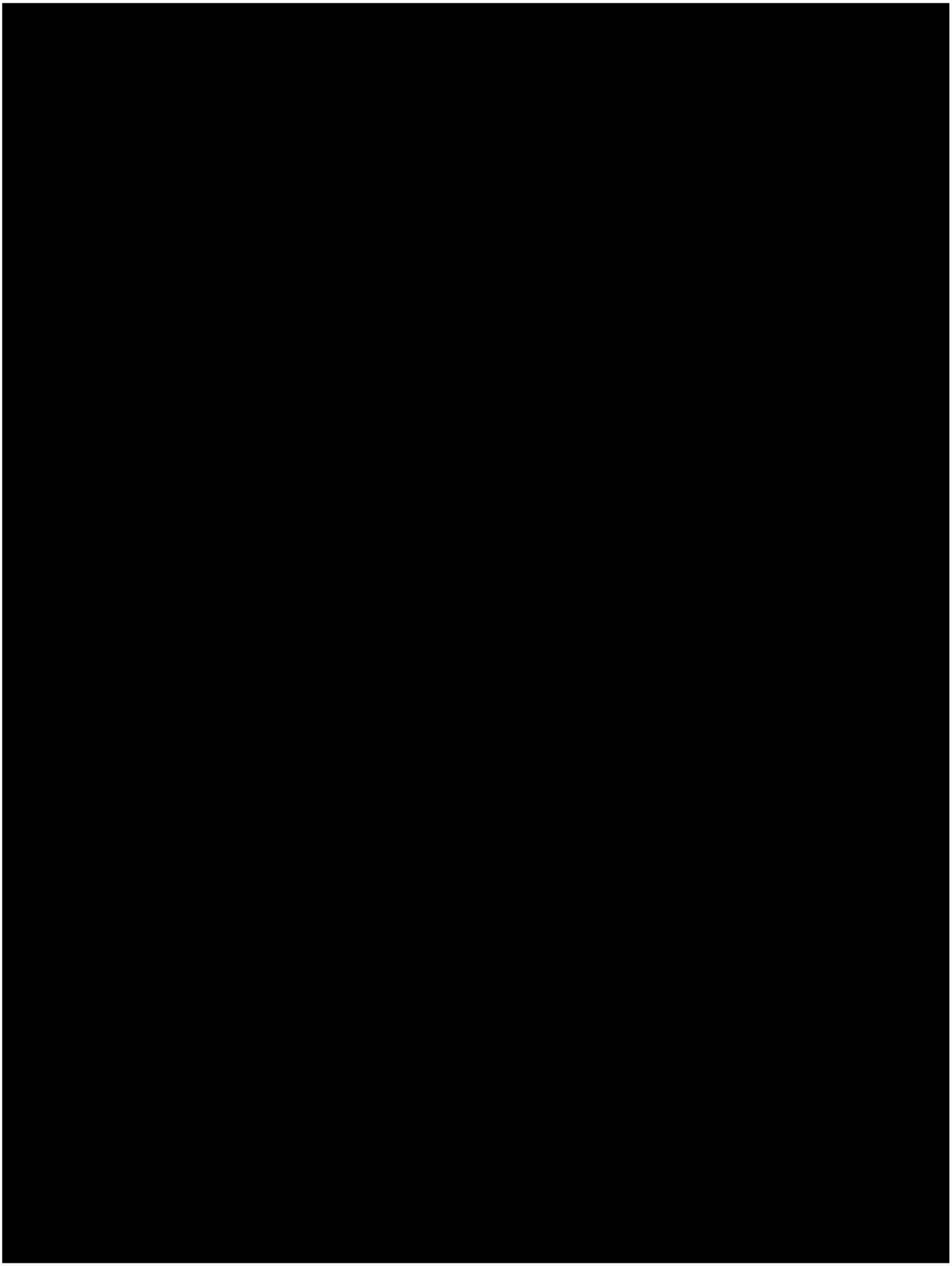
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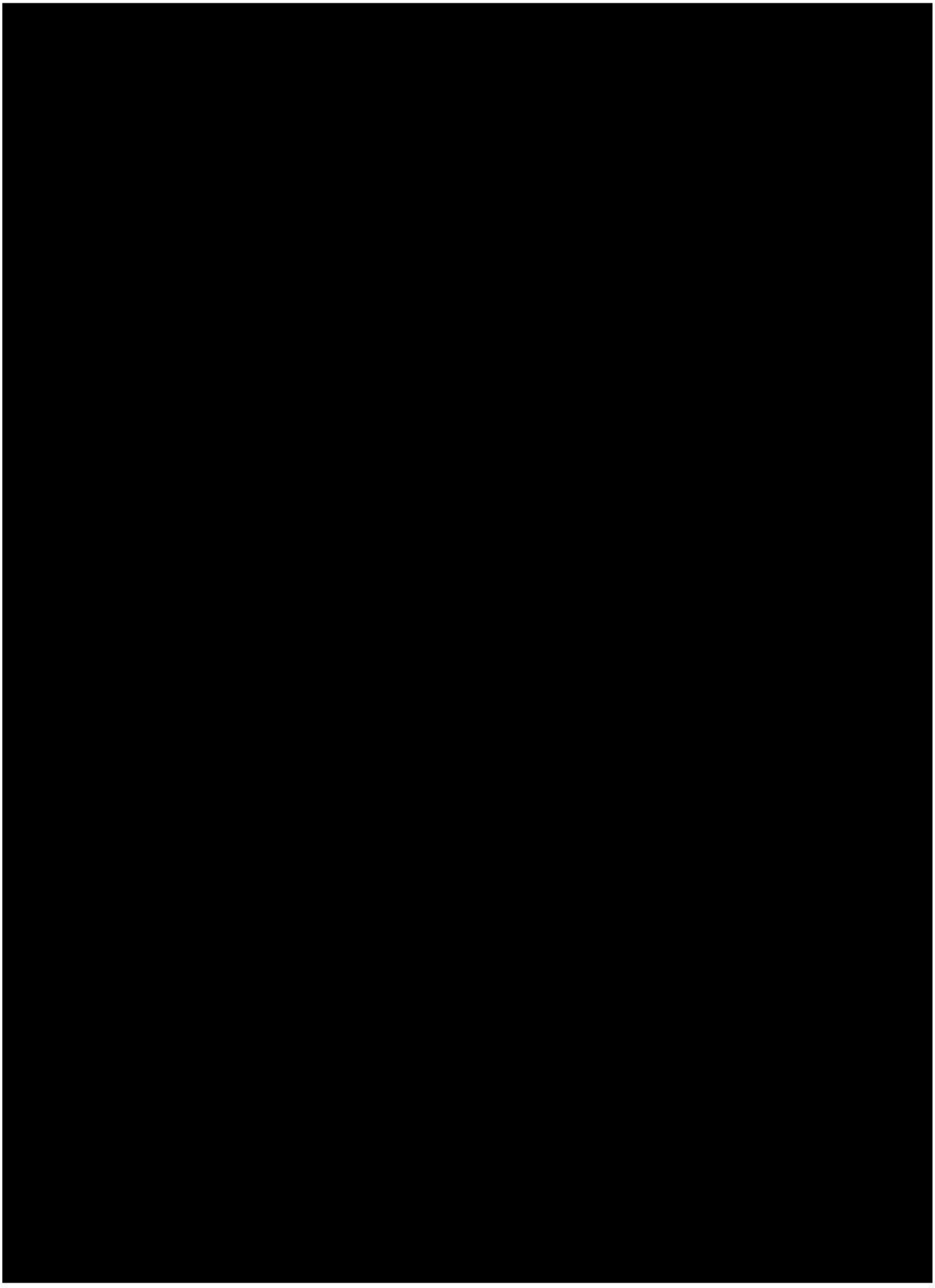




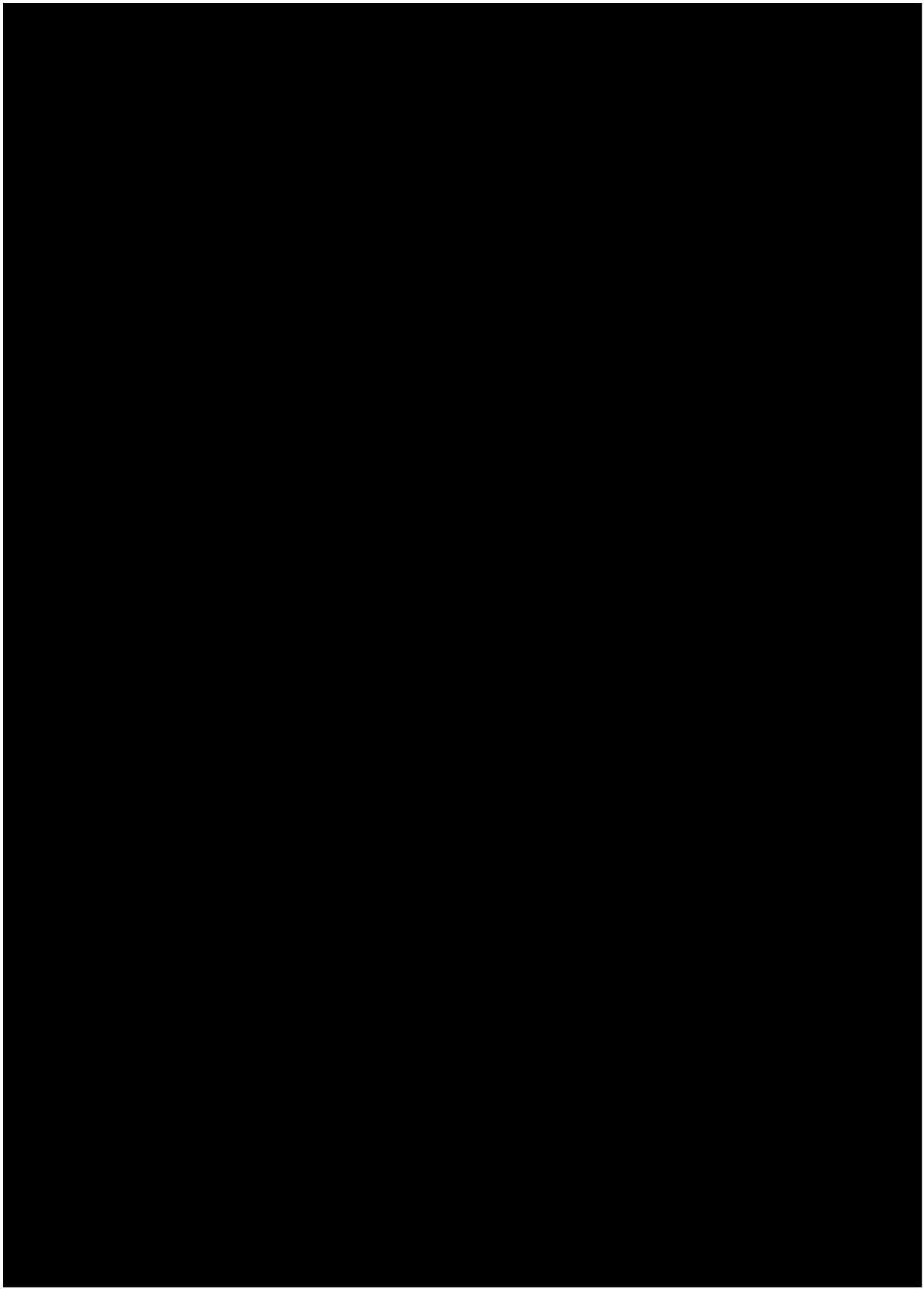


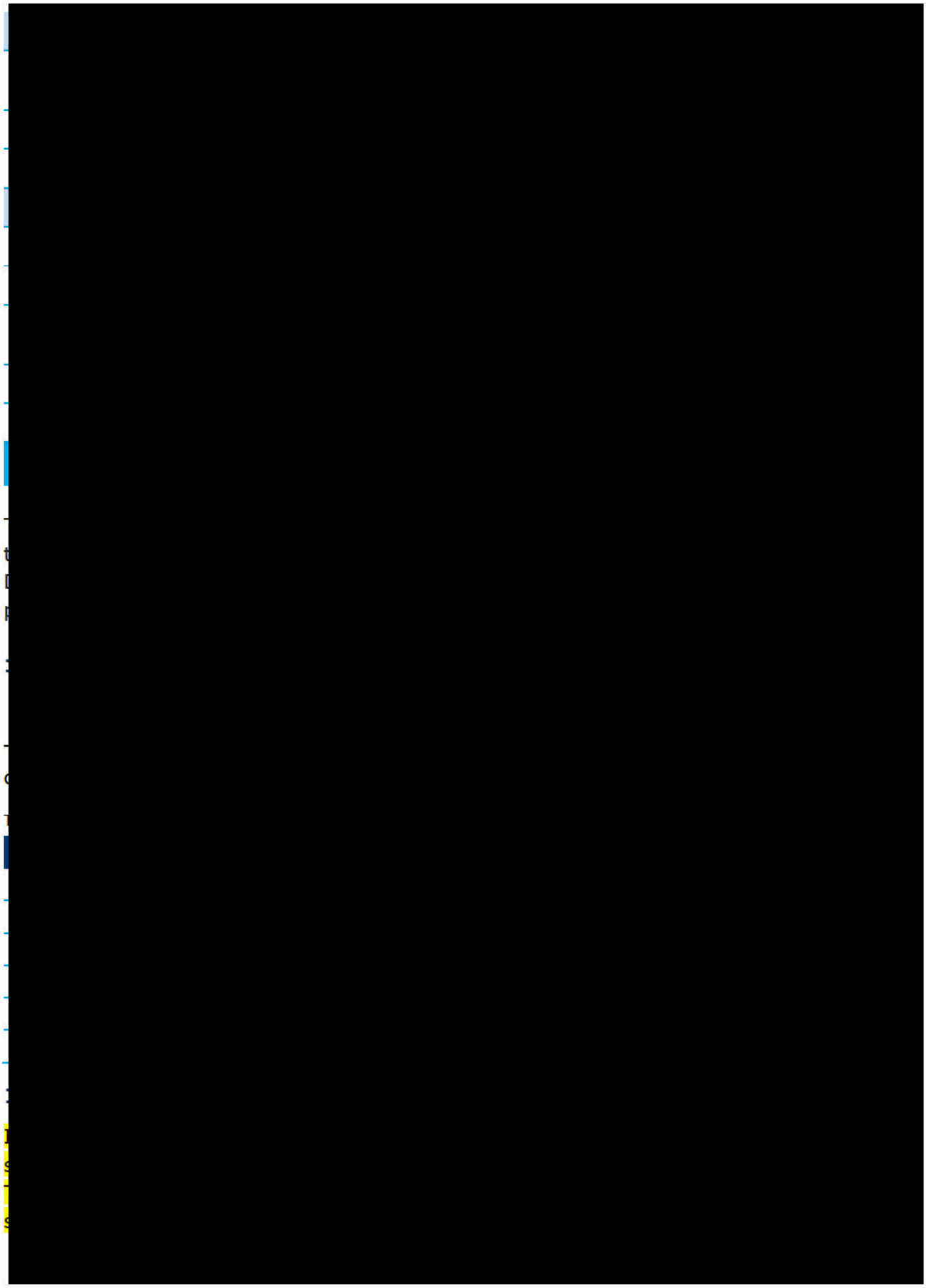


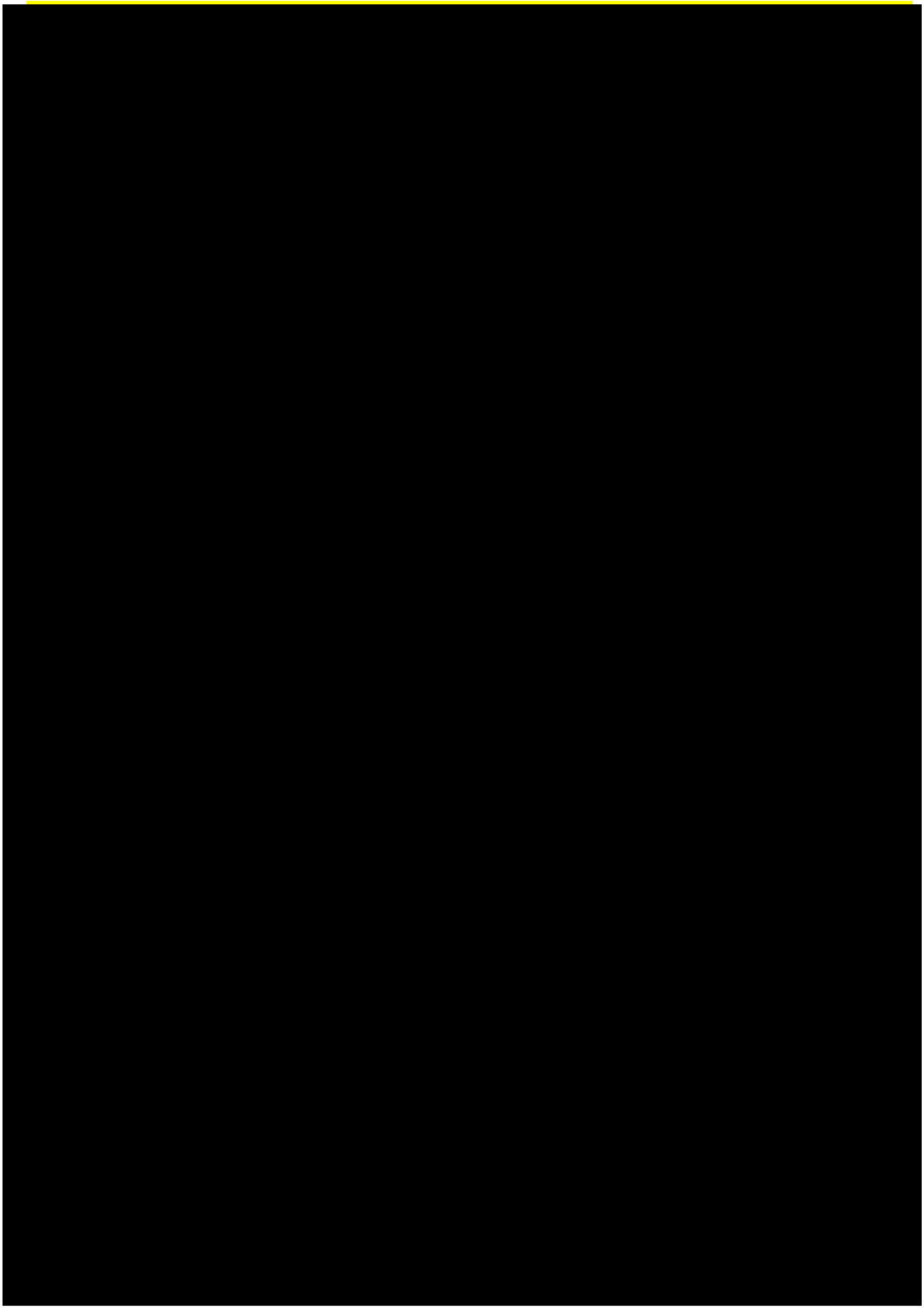


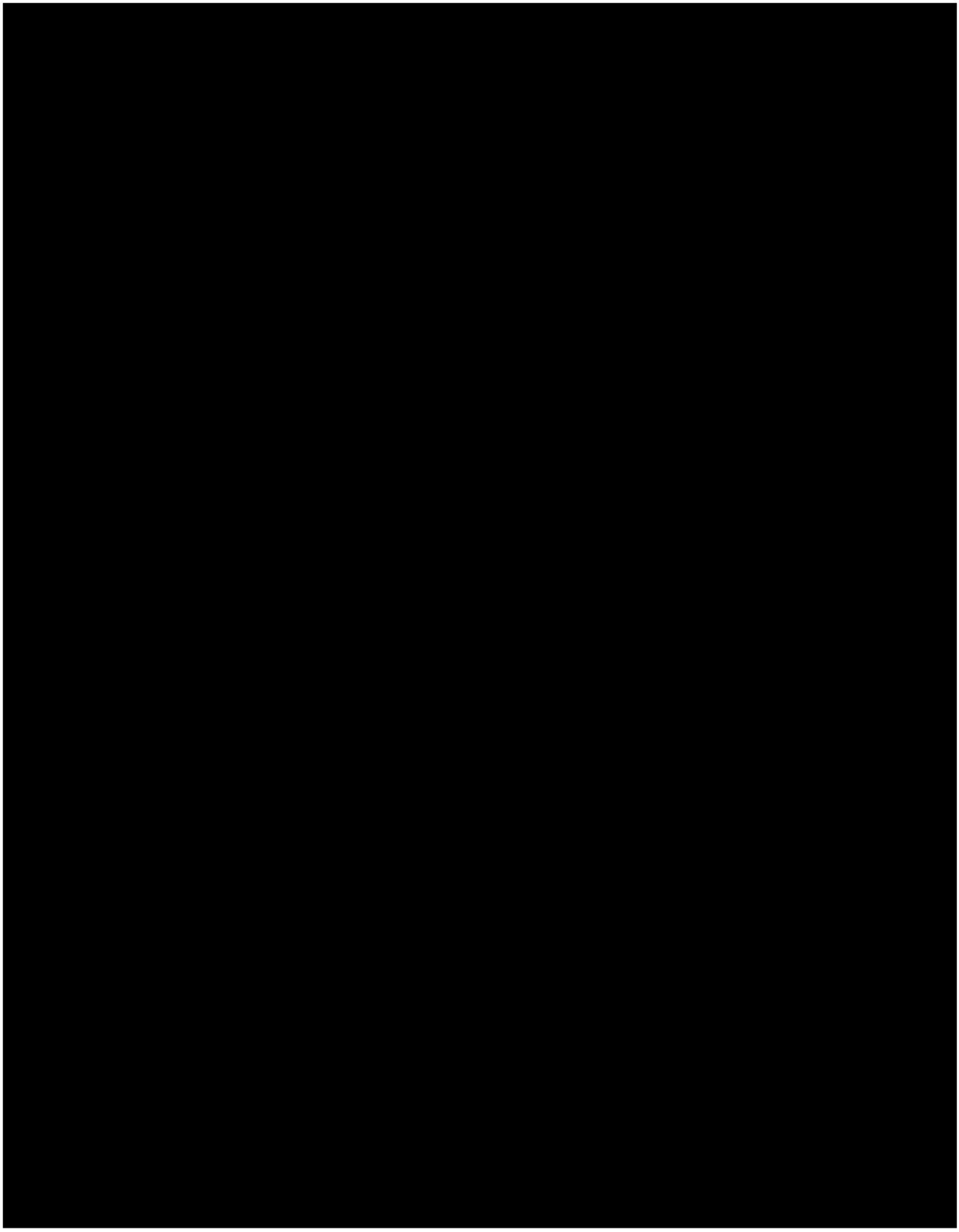


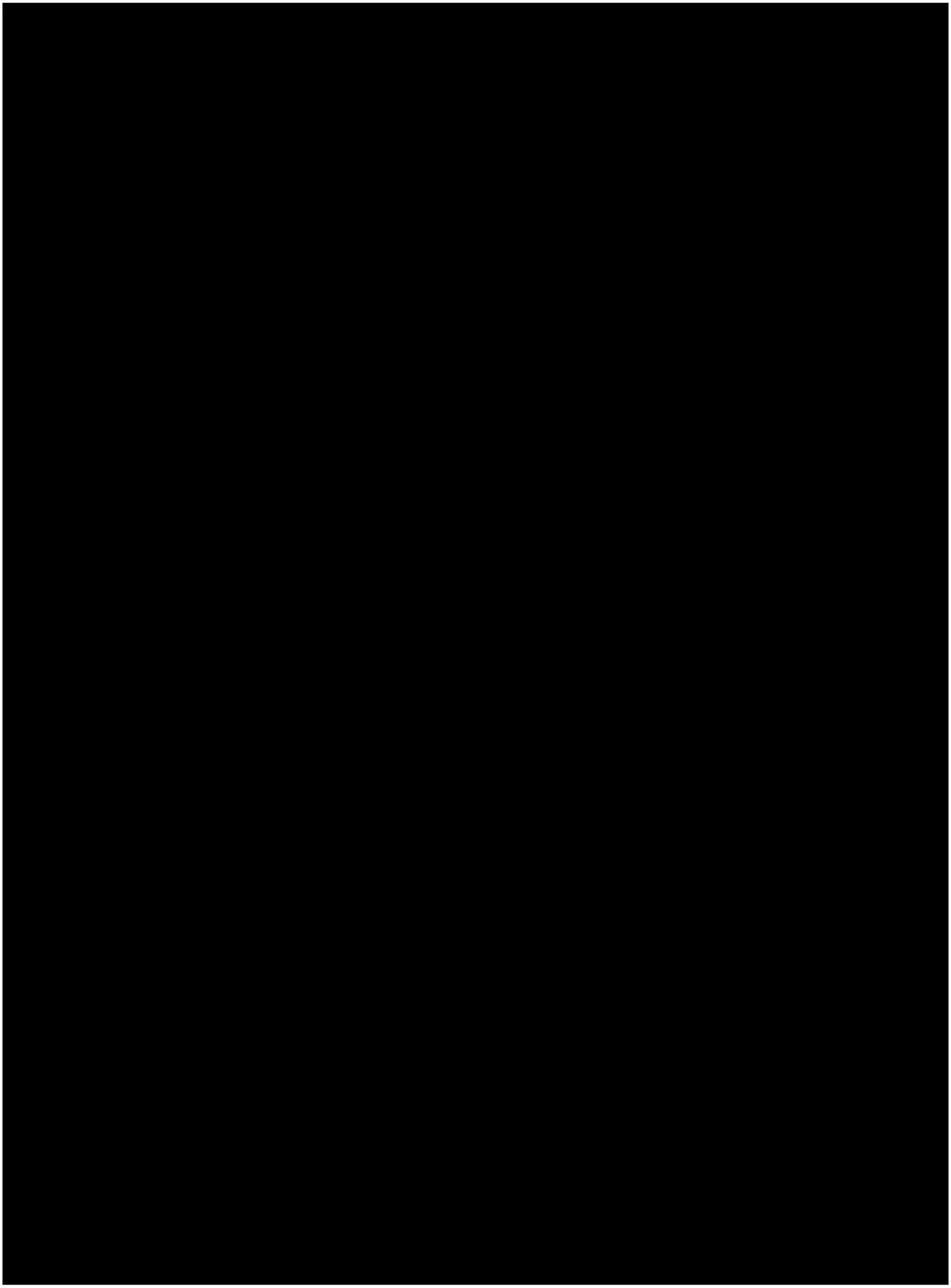
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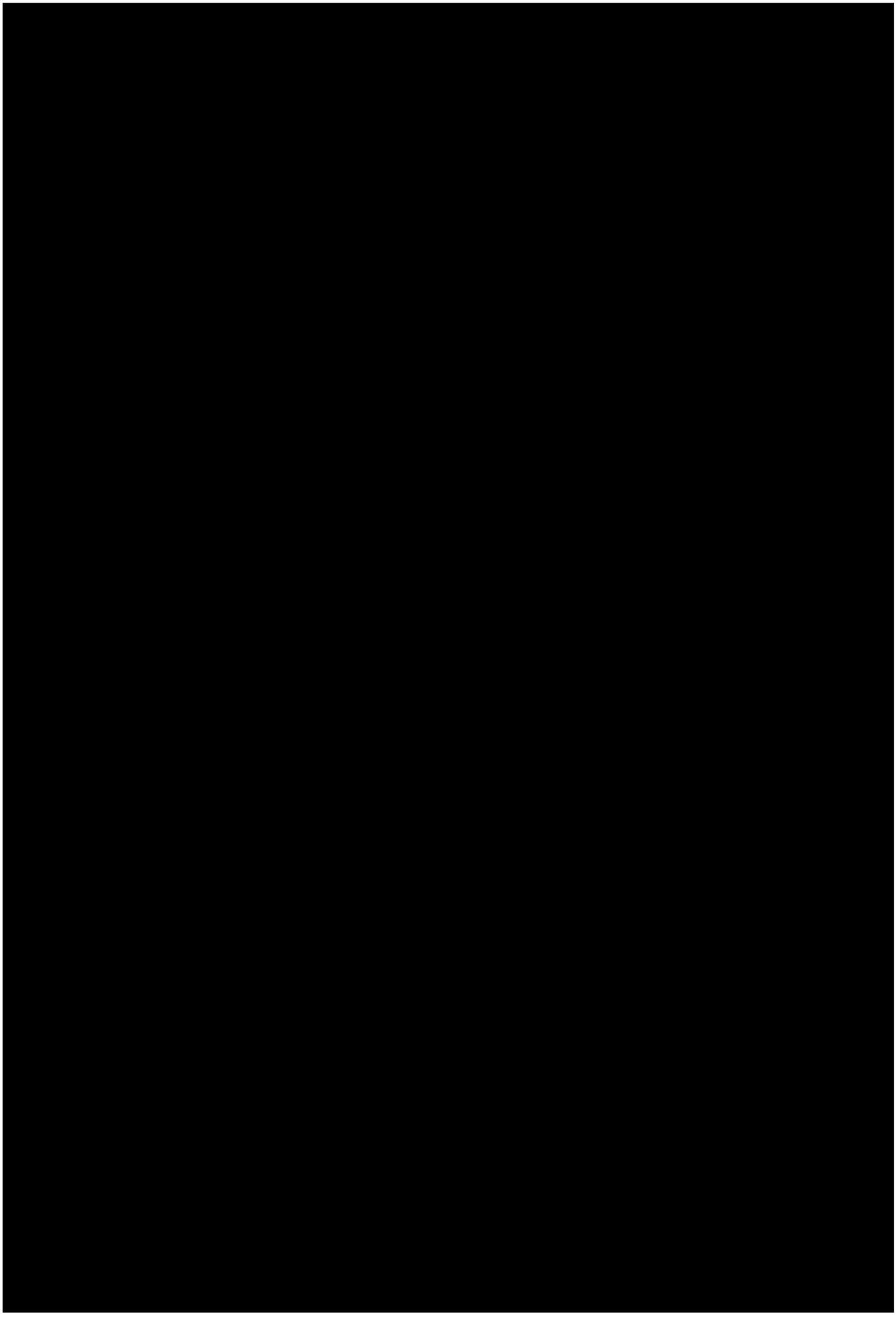


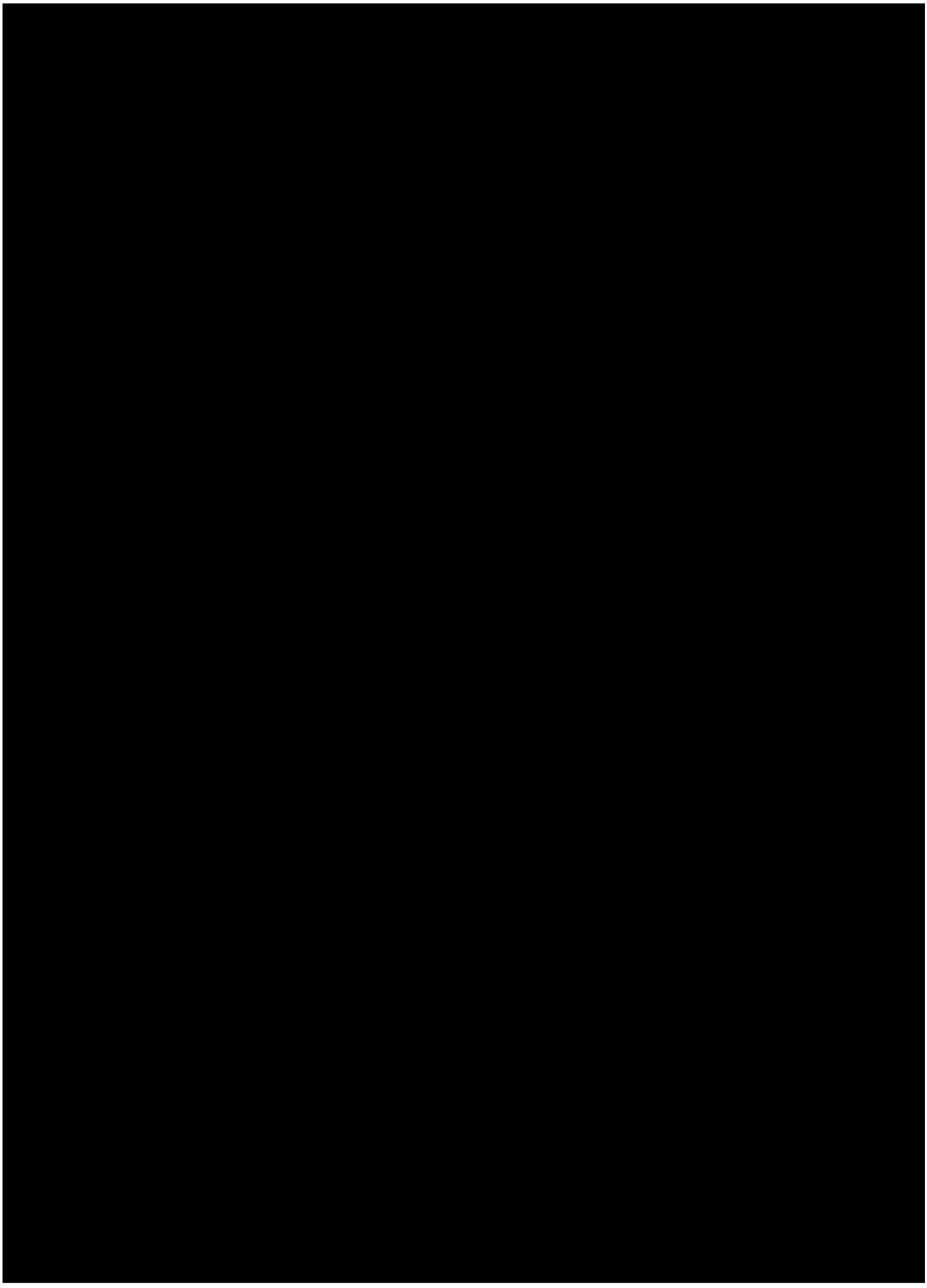


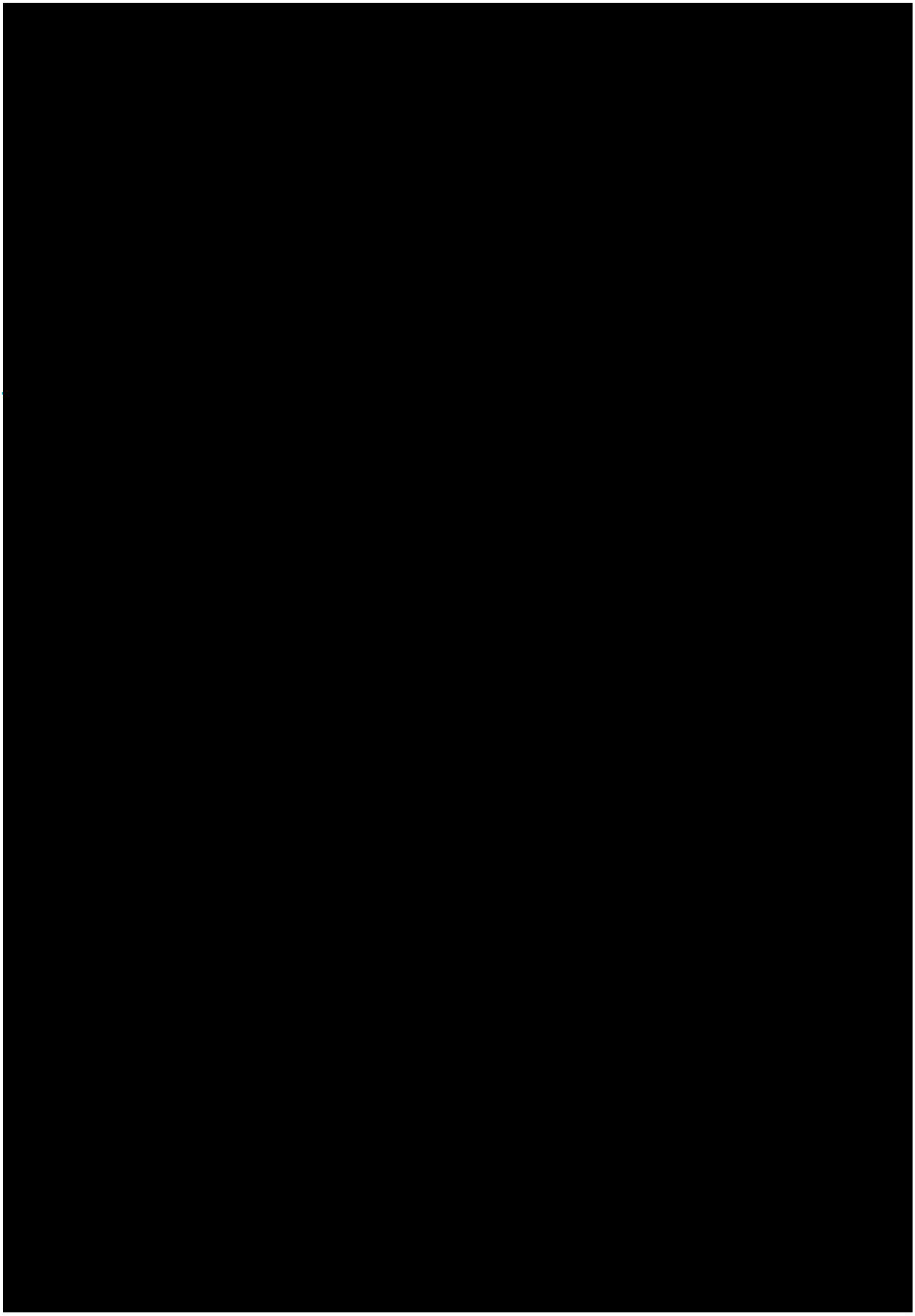




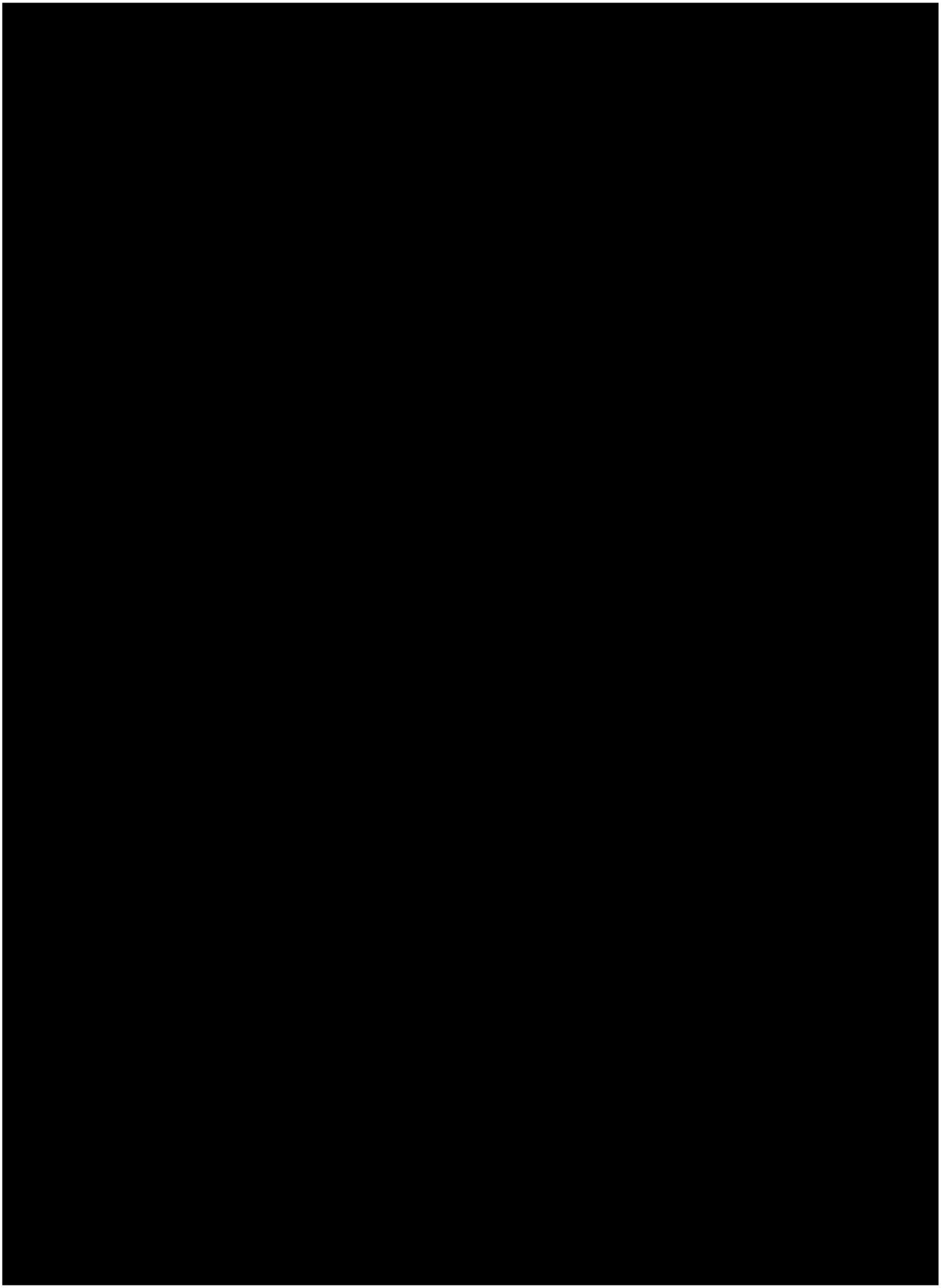


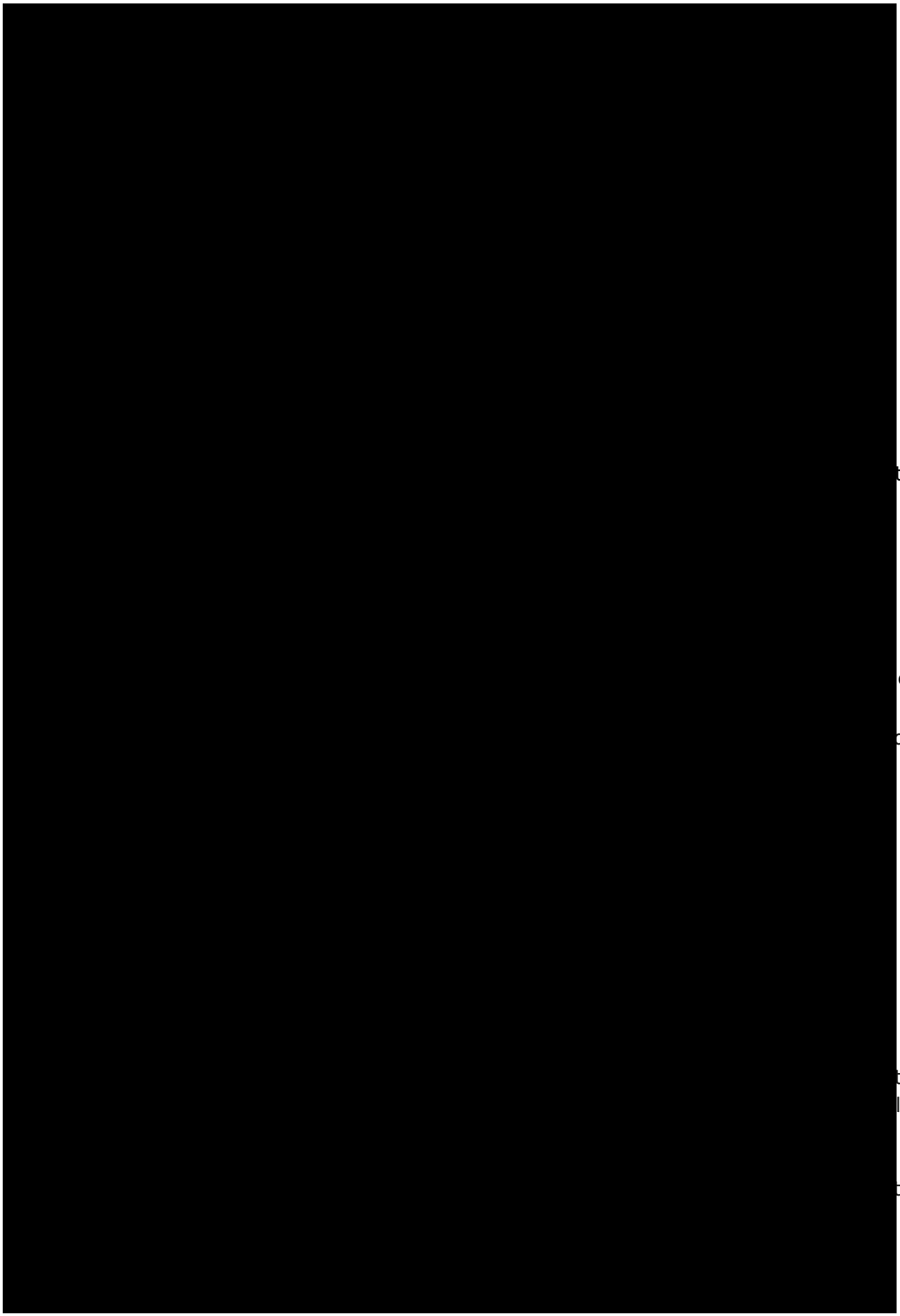


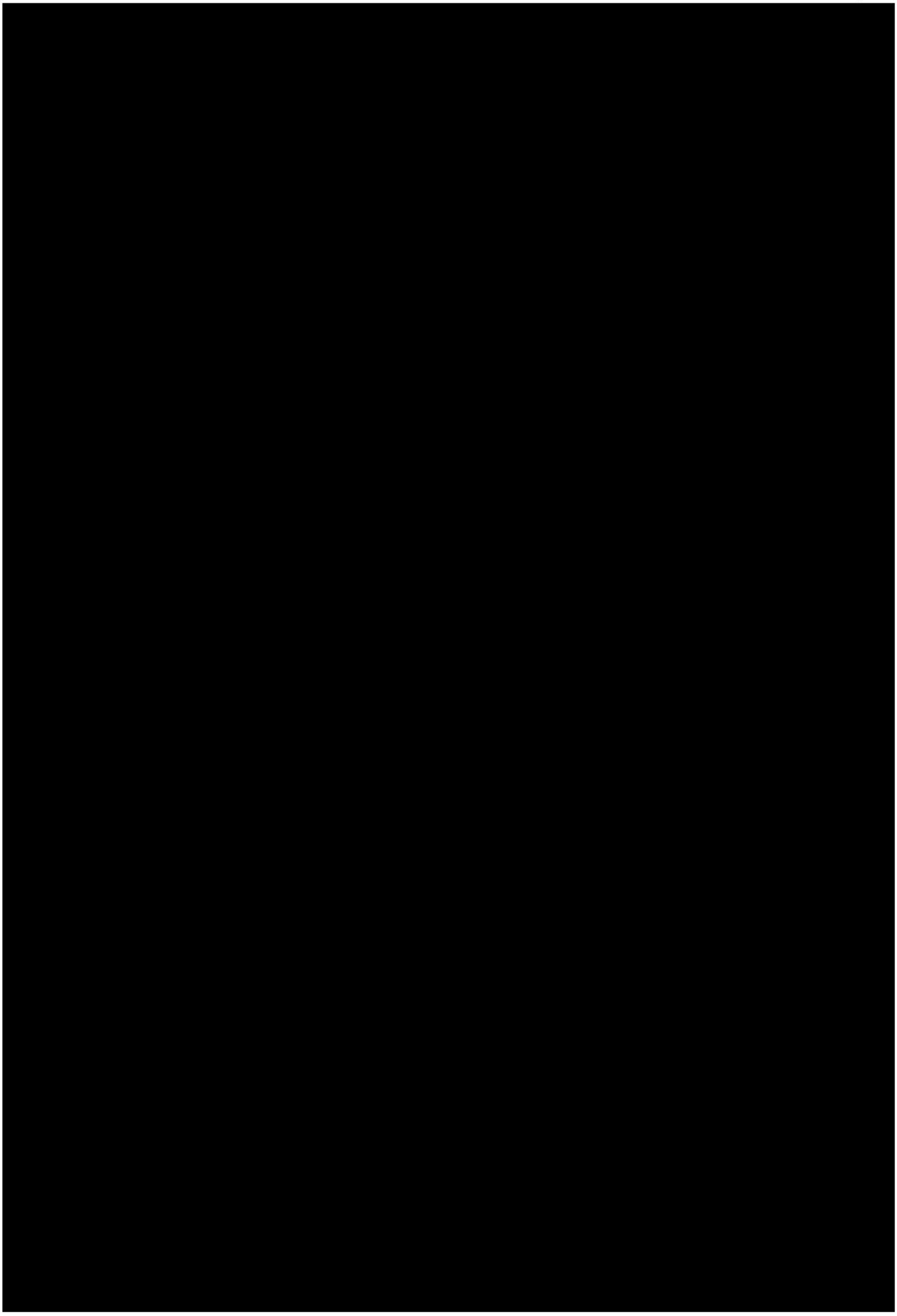




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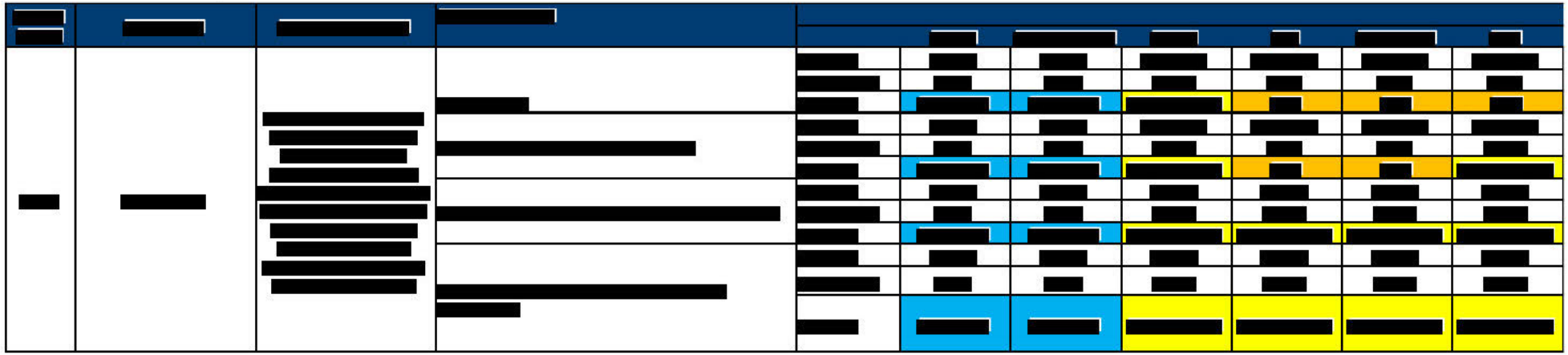






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Capex DBP30: IT sustaining infrastructure

1.1 Project approvals

Table 1.1: DBP30 IT sustaining infrastructure – Project approvals

Prepared by	Dan Hayward, Head of Infrastructure & Support
Reviewed by	Martin Dickson, Head of IT Business Engagement
Approved by	Brett Miller, Chief Information Officer

1.2 Project overview

Table 1.2: DBP30 IT sustaining infrastructure – Project overview

Description of problem /opportunity	The investment proposed in this business case is driven by the ongoing need to maintain the existing levels of service to our customers while mitigating the risks of service interruptions, cyber security breaches and degraded performance due to the use of Information Technology (IT) infrastructure beyond its useful life. Our key objective is to ensure that Dampier Bunbury Pipeline (DBP) continues to maintain reliable, secure, compliant and efficient business processes, systems and services while keeping the risk of service interruptions, cyber breaches and degraded performance at an acceptable level. Our IT infrastructure underpins the delivery of all DBP services; it enables our staff to connect to our systems, data and communication networks; it also allows us to securely store, search, and process the large volumes of data we need to service our customers and to meet a range of legal and regulatory obligations, including those prescribed in the National Gas Rules (NGR). Most of our IT infrastructure components will reach the end of their useful life during the next Access Arrangement (AA) period from 2026 to 2030 (the AA6 period). This business case considers the upgrade or replacement of these components over the AA6 period. There is also a need to ensure that our infrastructure is hosted in a way that is cost efficient and fit for purpose in the long term. There is an opportunity to leverage the industry trend of moving from company-owned infrastructure to cloud-based infrastructure hosting, which is assessed in this business case against the base-case of maintaining the existing on-premise data centre solution. If this project is not carried out, DBP's critical business systems will be exposed to high risks of cyber security breaches, compromised customer, employee or corporate data, prolonged outages and poor performance. This would adversely affect the safety and integrity of our services and could result in DBP failing to fulfil its customer and regulatory obligations under the NGR and other legislative and regulatory instruments.
Scope of this business case	The scope of this business case encompasses four broad categories, or workstreams: 1. **End user devices.** DBP has full ownership of its end user devices, and their replacement is driven by the DBP's asset management plan that reflects earlier IT hardware degradation in the field compared to that in the office environment, the need for remote device management, and the importance of Health, Safety and Environment (HSE) considerations for our largely remote workforce.

	2. **Network and currency.** Due to the interconnected nature of the assets in this category and the shared support arrangements provided by the Australian Gas Infrastructure Group (AGIG), the program of ongoing refresh of these assets is driven by the AGIG-wide ('AGIG-One') roadmap with the costs being apportioned to each individual AGIG entity. 3. **Data centre.** Having consolidated our data centres during the AA5 period, we are now considering the options for evolving them in line with industry practices, to deliver the best value for money in the long term. 4. **Field connectivity.** Support the Field connectivity initiative[1] by procuring hardware devices and infrastructure/network services to enable our field staff to download asset data, order parts, and log safety incidents in the field, thus increasing the efficiency of our operations and reducing the amount of paper we print.
Untreated risk	As per risk matrix = High
Options considered	Options were considered separately for each workstream: **End user devices**: • **Option 1: Vendor-recommended refresh** – Proactively replace the end user devices in line with vendor-recommended lifecycles ($4.9 million capex) • **Option 2 (recommended): Conservative refresh** – Refresh the end user devices on a schedule that has been extended compared to the vendor-recommended lifecycles where it is prudent to do so ($4.5 million capex) **Network and currency:** • **Option 1**: **DBP-centric approach to infrastructure refresh** – Do nothing more to consolidate the DBP infrastructure into the shared AGIG environment and only upgrade those DBP infrastructure components that are running out of support in the AA6 period ($7.5 million capex) • **Option 2 (recommended): 'AGIG One IT' approach to infrastructure refresh** – Finalise the transition to the shared AGIG infrastructure environment and upgrade the DBP part of the shared infrastructure in accordance with the 'AGIG One IT' Strategy & Roadmap, taking advantage of the economies of scale brought about by the shared services model ($7.4 million capex) **Data centre:** • **Option 1: BAU** – continue with the on-premise data centre infrastructure arrangements ($3.5 million capex) • **Option 2 (recommended): 'Organic' transition to cloud** – ($1.0 million capex plus $1.8 million opex uplift) • **Option 3: 'Big Bang' transition to cloud** – ($1.8 million capex plus $1.1 million opex uplift) **Field connectivity:** No options were considered for this initiative, as it is a supporting initiative for the IT Sustaining Applications business case (DBP21).

[1] Field connectivity is a new, non-recurrent IT initiative detailed in the IT Sustaining Applications business case (DBP21). Since this is a new initiative, there was no corresponding IT infrastructure expenditure in AA5. However, once the Field connectivity initiative is implemented, the IT infrastructure expenditure required to support the new capability will become recurrent and will be included in the End user devices workstream.

Options assessment

1. **End user devices.** Option 2 is recommended as the most cost-effective way to refresh our end user devices while keeping the risks associated with outdated or unsupported devices at an acceptable level. While Option 1 would reduce these risks even further, following vendor-recommended approach without attempting to extend the life of devices via good management practices does not represent a prudent level of expenditure.
2. **Network and currency.** Option 2 is recommended as it represents the most cost-effective option of maintaining the current levels of service enabled by our networking infrastructure and software. Option 1 is more expensive than Option 2 because it does not invest into any further consolidation of the DBP infrastructure after AA5 and therefore isn't able to take advantage of the consolidation, most notably the consolidation of our Active Directory (AD) that is part of the 'AGIG One IT' roadmap.
3. **Data Centre.** Option 2 is recommended as the most cost-effective long-term solution for our data centre, when assessed on the total expenditure (totex) basis.
4. **Field connectivity.** It is recommended to proceed with the initiative based on the justification provided in the IT Sustaining Applications business case (DBP21).

Proposed solution

We propose to proceed with the program of work that entails implementing the recommended options for each of the workstreams. The proposed solution addresses the identified need and is also the most cost-effective solution in the long-term.

Estimated cost

The forecast direct **capex** (excluding overheads) during the next five-year period (AA6) is $14.3 million (Dec 2024).

$'000 Dec 2024	2026	2027	2028	2029	2030	Total
End User Devices	1,405	765	765	765	765	**4,465**
Network and currency	2,229	1,995	864	602	1,663	**7,353**
Data Centre	397	126	125	125	231	**1,004**
Field Connectivity	750	750	-	-	-	**1,500**
Grand Total	**4,780**	**3,636**	**1,753**	**1,491**	**2,660**	**14,321**

The forecast **opex uplift** (excluding overheads) during the next five-year period (AA6) is $1.8 million (December 2024).

$'000 Dec 2024	2026	2027	2028	2029	2030	Total
Data Centre	147	275	382	469	536	**1,809**

Basis of costs

All costs in this business case are expressed in real unescalated dollars December 2024 unless otherwise stated.

Treated risk

As per risk matrix = Intermediate

Variation from AA5

The forecast capex for AA6 is $7.1 million more than the forecast capex in AA5 of $5.8 million.

The increase in AA6 is primarily a result of:

	• increased demand for transmission services and centralisation of services (National Gas Control centre, C+P), which has driven a significant (circa 28%) increase in the user base (comprising the DBP employees and the contractors requiring DBP's end user equipment) of our IT environment during the AA5 period; • this resulted in the budgets allocated to periodic refresh of the existing infrastructure being partially diverted to the acquisition of new equipment, which, in turn, resulted in deferring some of the refreshes planned for the AA5 into the AA6 period; • increased staff mobility necessitating additional equipment purchases, supporting infrastructure set up and faster refresh cycles of laptops and other personal computing equipment; • working from home (WFH) and hybrid working arrangements requiring additional equipment and infrastructure set up; • the need to complete the consolidation of our DBP IT infrastructure environment into the AGIG shared infrastructure arrangements, to ensure that DBP can benefit from these arrangements in the long term; and • the need to support the non-recurrent Field connectivity initiative, which aims to solve our longstanding field communication issues and improve the efficiency of our field operations.
Alignment to our vision	This project aligns with the *Delivering for Customers* aspect of our vision by ensuring that our technology platforms and office equipment are adequately maintained and available to meet the needs of our customers. This project aligns with our vision objective of being *A Good Employer*, as it aims to provide employees with current, reliable, high performing and fit-for-purpose technology solutions that allow the business to operate effectively. This project aligns with our vision to be *Sustainably Cost Efficient* as it is driven by a lifecycle management framework that follows good industry practice, mitigates risks, optimises capital and operational expenditure, and minimises infrastructure support costs.
Consistency with the National Gas Rules (NGR)	This project complies with the following National Gas Rules (NGR): **NGR 79(1)** – The proposed proactive IT sustaining infrastructure initiatives are consistent with accepted good industry practice in terms of the timing of asset renewals, several alternative options have been considered and unit rates and timing of refreshes have been tested to achieve the lowest sustainable cost of delivering pipeline services. **NGR 79(2)** – The proposed expenditure on our IT sustaining infrastructure project is required to maintain the integrity of services through current, supported and fit for purpose IT infrastructure, managing technology risks and preventing material outages or deteriorating performance which can come from ageing infrastructure. The proposed capex is justifiable under NGR 79(2)(c) as it is necessary to: • maintain and improve the safety of services (rule 79(2)(c)(i)) - making this investment reduces the risk of failure of the critical systems and the risk of security breaches, which could adversely affect the safety of services; • maintain the integrity of services (rule 79(2)(c)(ii)) - proactive lifecycle management of IT infrastructure reduces the risk that the integrity of network services will be adversely affected by a failure of IT infrastructure; and

	• comply with a regulatory obligation or requirement (rule 79(2)(c)(iii)) - the proactive lifecycle management of IT infrastructure mitigates the risk of a breach of regulatory obligations (Critical Infrastructure Act, Privacy Act and gas market reporting that need timely access to information for regulatory reporting), which may eventuate if the systems residing on IT infrastructure were not available or are compromised. **NGR 74 –** The forecast costs are based on the latest market rate testing, and project options consider the requirements of our IT infrastructure environment. Cost assessments have been conducted for each option based on the best information available at the time of developing this business case. The infrastructure renewal options have been based on service provider recommendations and assessed by AGIG's IT specialists. The estimate has therefore been arrived at on a reasonable basis and represents the best estimate possible in the circumstances.
Stakeholder engagement	Our Shippers told us they highly value the current levels of reliability and would be concerned if these were to change. They also expect us to maintain a strong focus on operational issues as it is important for reliability and emergency management. Our IT sustaining infrastructure program is necessary to ensure the ongoing stability, integrity and security of our technology environment which, in turn, is critical for the safety and reliability of our services and our ability to provide the levels of customer service that our Shippers expect and value.
Other relevant documents	This business case should be read in conjunction with: • DBP IT Investment Plan • Asset Management Plan (TEB-001-0024-07) • Other technology Business Cases: IT Sustaining Applications, Cybersecurity

1.3 Background

At Dampier Bunbury Pipeline (DBP), we operate Western Australia's (WA's) most significant gas transmission asset, Dampier to Bunbury Natural Gas Pipeline (DBNGP). DBNGP supplies natural gas directly to mining, industrial, commercial and power generation customers, and to distribution networks in metropolitan and regional WA to provide energy to homes and businesses.

Our staff perform their work across large, geographically dispersed area, covering approximately 1,600 km and 10 compressor station sites.



Figure 1.1: The Dampier to Bunbury Pipeline

Information Technology (IT) infrastructure is critical to ensuring our staff can be connected to our systems, data and communication networks reliably, efficiently and securely, irrespective of whether they are working in a corporate office, from home, at one of our remote locations, or while travelling from one site to another. It also allows us to securely store, search, and process the large volumes of data we need to service our customers and to meet a range of legal and regulatory obligations, including those prescribed in the NGR.

Our IT infrastructure assets include end user devices such as laptops, mobile phones and office computer equipment as well as the networking and data centre equipment that underpin all our communications, information storage and processing.

1.3.1 DBP's IT infrastructure environment

DBP is part of the Australian Gas Infrastructure Group (AGIG), which also includes the Australian Gas Networks (AGN) and Multinet Gas Networks (MGN).

Figure 1.2 outlines the AGIG technology infrastructure environment and network layout that connects all AGIG offices, including the DBP locations.

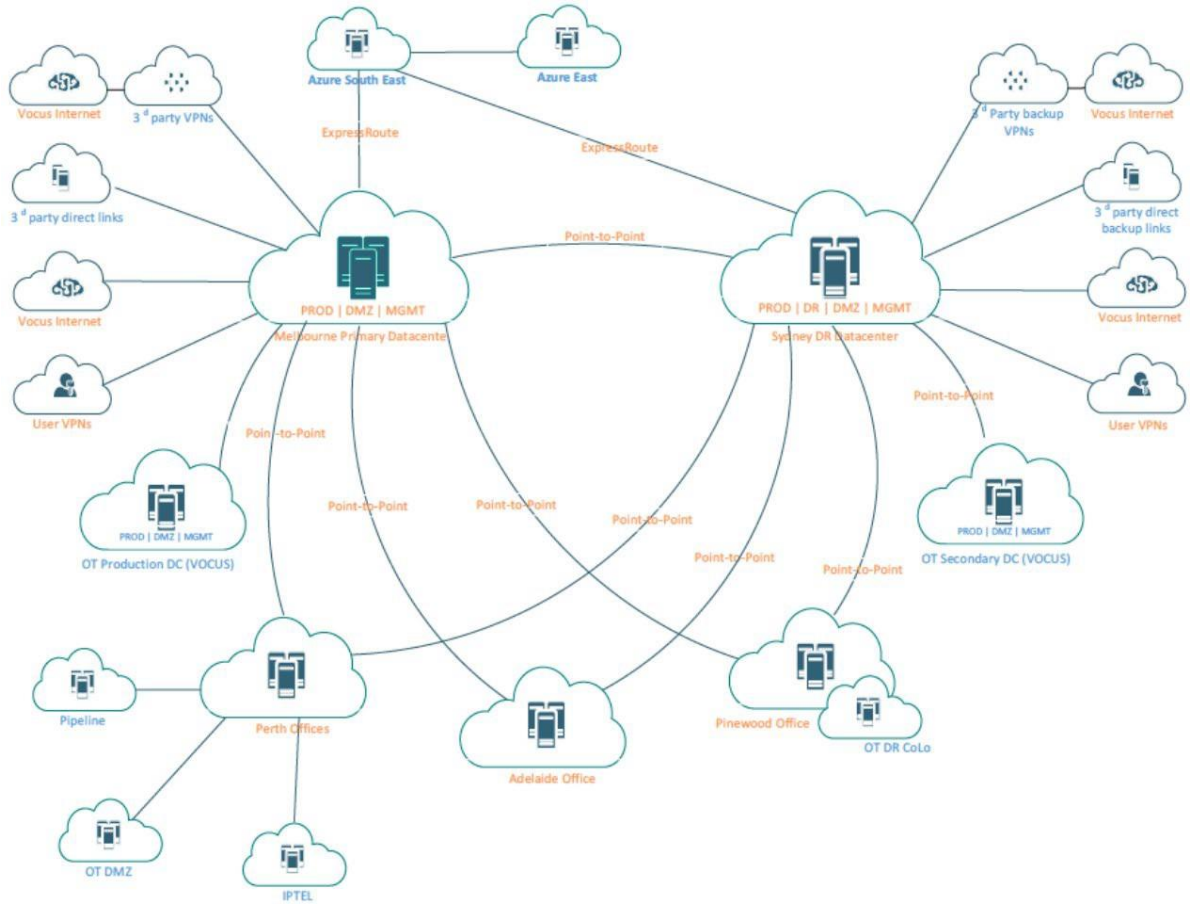


Figure 1.2: AGIG Technology Infrastructure environment

1.3.1.1 Transition to shared AGIG IT infrastructure

In late 2019, AGIG launched its 'AGIG One IT' Strategy & Roadmap[2] with the aim of consolidating disparate technology environments and leveraging economies of scale across the group. One of the challenges of implementing a group-wide strategy for AGIG has been that its business entities operate across multiple Australian jurisdictions and have overlapping access arrangement (AA) periods (Figure 1.3), with AGN and MGN regulated by the Australian Energy Regulator (AER) and DBP regulated by the Economic Regulation Authority (ERA).

[2] AGN: SA Final Plan July 2021 – June 2026, Attachment 8.8: Capex business cases – South Australia, SA138 – AGIG IT Strategy & Roadmap, July 2020



Figure 1.3: Access arrangement periods for AGIG entities

The 'AGIG One IT' Strategy & Roadmap served as a supporting document for the AGN South Australia AA 2021/22-2025/2026, AGN Victoria and Albury AA 2023/24-2027/28 and MGN AA 2023/24-2027/28 submissions. The Australian Energy Regulator (AER) favourably assessed the proposed program and included the requested capex allowances in its final determinations noting that:

- "*The scope of the proposed work, and the approach of using an independent expert to develop cost estimates, supported by market and vendor quotes, industry norms and historical costing to determine project cost, is considered to be a reasonable approach*"[3];
- *"We consider AGIG's strategy of moving to a common enterprise-wide platform across its networks to be a prudent approach that is likely to minimise risks and enable economies of scale in operational planning as well as the costs of procuring and supporting IT."*[4]; *and*
- *"We consider AGN's approach to infrastructure renewal [as part of a broader program to deliver AGIG's single national consolidated platform] is in line with good industry practice and the scope and methodology to determine costs is considered reasonable."*[5]

Due to DBP's AA cycles preceding the rest of the AGIG entities (Figure 1.3), our AA5 IT Investment Plan was developed prior to AGIG's approach to technology being finalised[6].

While the Group Services Introduction Program was included in our AA5 proposal "to realise greater integration of AGIG group-wide services potentially enabling whole-of-group services to be introduced realising economies of scale"[7], we were not able to provide the supporting 'AGIG One IT' Strategy & Roadmap or a cost benefit analysis as these artefacts were not finalised at the time of the DBP submission. Consequently, the program was not allowed by

[3] AER: Attachment 5: Capital expenditure | Draft decision – Australian Gas Networks (SA) Access Arrangement 2021-26, November 2020, p.32
[4] AER: Attachment 5: Capital expenditure | Draft decision – Australian Gas Networks (VIC & Albury) Access Arrangement 2023–28, December 2022 p.13
[5] AER: Attachment 5: Capital expenditure | Draft decision – Australian Gas Networks (VIC & Albury) Access Arrangement 2023–28, December 2022 p.12
[6] DBP IT Investment Plan 2021-25, Attachment 8.4, January 2020, p.8
[7] AGIG: DBNGP Final Plan, IT Sustaining Infrastructure Business Case – Capex [DBP30], December 2020, p.6

the ERA on the basis that there was insufficient evidence "that there would be sufficient net benefit to DBP and the DBNGP's customers to justify undertaking this work" [8].

Although funding was not available for DBP, the consolidation program initiated in AA 2021/22-2025/2026 for AGN SA continued into AA 2023/24-2027/28 for AGN (Victoria & Albury) and MGN, as approved by the AER. Given the interconnected nature of infrastructure services and the associated business benefits of consolidation, DBP engaged in key initiatives. However, we only undertook what was absolutely necessary and prudently deferred the rest of DBP's share of the program until AA6.

In AA5, we have completed data centre consolidation and rationalisation of our IT managed service providers, while also initiating the consolidation of our user identity management services (i.e. Active Directory) across the group.

Additionally, we conducted a detailed inventory of all shared AGIG infrastructure assets used by DBP, confirming the percentage allocation to DBP of the total maintenance or refresh costs for each asset. This ensures fair cost distribution and prevents WA customers from bearing the expenses associated with IT infrastructure used by other AGIG entities. Moreover, we engaged independent experts to confirm the costs and frequency of lifecycle upgrades of our infrastructure assets, helping us to balance costs and risks effectively. Our shared infrastructure is now maintained according to a unified roadmap, with costs allocated to each AGIG entity based on a defined allocation model.

1.3.1.2 Infrastructure asset categories

Table 1.3 summarizes the categories of DBP's IT Infrastructure assets and their approximate lifecycles. For the shared AGIG assets, the table outlines the basis for allocating costs to DBP, using the following methods:

- **FTE-based:** Costs are allocated based on the number of full time equivalent (FTE) users in DBP divided by the total number of FTE users across all AGIG entities.
- **Server-based:** Costs are allocated based on the proportion of servers assigned to DBP compared to the total number of servers across AGIG.
- **Revenue-based:** If the above methods cannot be reliably applied due to multiple cost drivers affecting each entity's total cost, costs are allocated based on DBP's revenue relative to the total AGIG revenue.

Detailed description of each of the asset categories is provided in Appendix B.

[8] ERA: Final decision on proposed revisions to the Dampier to Bunbury Natural Gas Pipeline access arrangement 2021 to 2025 – Submitted by DBNGP (WA) Transmission Pty Ltd, 1 April 2021, p.293

Table 1.3: DBP and AGIG IT infrastructure assets and their lifecycles

IT Asset Category	Description	Allocation basis	Asset lifecycle
DBP-owned infrastructure			
End User Devices[9]	End user devices (e.g. laptops, desktops, tablets, mobile devices, intrinsically safe devices), office and meeting room equipment (e.g. audio video equipment, projectors, printers) and telephony devices.	N/A – 100% DBP owned	2-5 years
Meeting Room Equipment	Audio visual (AV) and meeting room equipment including video conferencing, presentation and digital signage technology.	N/A – 100% DBP owned	5 years
Shared infrastructure			
Network and currency			
Standard Operating Environment (SOE)	Windows operating system, preferred web browsers, embedded end-point client software such as Adobe Reader, SAP GUI, Citrix Workspace, file compression software, etc.,	FTE	5 years
Optimisation and Collaboration Tools	SharePoint platform and sites, Office365 platform and features, Citrix farms and Microsoft Teams services	Revenue	5 years
Office Networking Equipment	Office based network routing and switching equipment.	Revenue	2-5 years
Operating Systems	Windows and Linux based operating systems	Revenue	3-5 years
Databases	Relational databases - SQL, Oracle, Postgress	Revenue	3-4 years
Authentication & Identity Management	Active Directory, group policy, security groups, distribution lists, etc.	FTE	3-4 years
IT Service Management (ITSM)	ITSM tool (ServiceNow) that provides digital workflows and procedures to support standard IT processes, including: • Incident Management • Request Management • Change Management • Knowledge Management • IT Purchasing	Revenue	1 year

[9] Refer to Section 1.5.1 for detailed information on the types of devices included in this category and their lifecycles

IT Asset Category	Description	Allocation basis	Asset lifecycle
Data Centre			
Data Centre Platform	Nutanix hyperconverged hardware incorporating compute, memory, storage and networking used to host corporate server workloads.	Number of servers allocated to DBP	5 years
Data Centre Core Network	Data centre-based network routing and switching hardware.	Number of servers allocated to DBP	5 years
Data Centre Appliances	Firewalls, Citrix Netscalers, Wireless LAN Controllers, etc.	Number of servers allocated to DBP	5 years
Infrastructure Management Tools	Monitoring, backup, orchestration, software distribution software, etc.	Number of servers allocated to DBP	3-4 years

1.3.2 Scope and structure of this business case

As the scope of this business case encompasses three different types of infrastructure, with different ownership structures and support arrangements, options for keeping this infrastructure current were considered separately for each of the associated recurrent workstreams:

1. **End user devices.** The replacement / upgrade options for physical end user and office equipment are usually considered separately from those for the infrastructure software and services. In addition, DBP has 100% ownership of this asset category and as such the replacement of these devices is driven by the DBP-specific asset management plan and roadmap.
2. **Network and currency.** Due to their interconnected nature and shared support arrangements, the program of ongoing refresh for the assets in this category is driven by the AGIG-wide roadmap. DBP must take part in the roadmap initiatives, to enable economies of scale and adequate risk mitigation.
3. **Data centre.** In AA5, we consolidated the disparate data centres and vendor service arrangements into two AGIG-wide data centres. This brought our data centre infrastructure in line with industry practice and mitigated security risks that existed due to multiple provider arrangements. Having consolidated our data centres, we are now considering the options for evolving them in line with good industry practices, to deliver the best value for money in the long term.

In addition, the scope of this business case also includes the acquisition of new infrastructure to support a non-recurrent Field connectivity initiative:

4. **Field connectivity**[10]. The Field Connectivity initiative looks to take advantage of mobility functions now available in the current (or soon to be upgraded) business systems including our asset management system [redacted]

[10] Once the Field connectivity initiative is implemented, the IT infrastructure expenditure required to support the new capability will become recurrent and will be included in the End user devices workstream.

[redacted] by procuring appropriate hardware devices and infrastructure/network services which will be rolled out to field staff. With these new devices and connectivity, field staff will be able to download asset data, order parts, and log safety incidents in the field, increasing the efficiency of our operations and reducing the amount of paper we print. The field connectivity initiative is detailed in the IT Sustaining Applications business case (DBP21).

To contextualise the relative share of the proposed expenditure, Figure 1.4 depicts the forecast total expenditure (capex plus incremental opex) for the recommended options across each of these workstreams.

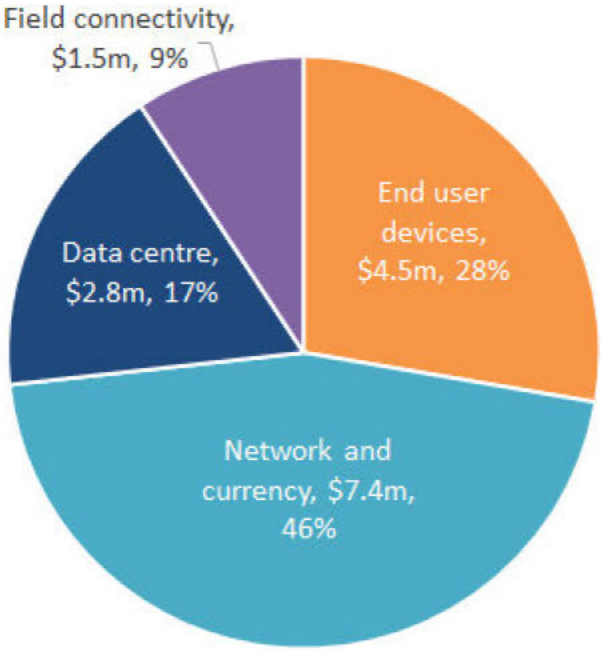


Figure 1.4: Relative share of the proposed infrastructure total expenditure (capex plus new opex) between the four workstreams

1.3.3 Description of problem /opportunity

The underlying driver for investment described in this business case is the ongoing need to cost-efficiently maintain our existing levels of service to our customers while mitigating the risk of failure, cyber incidents or degraded performance due to the use of IT infrastructure beyond its useful life. Our IT infrastructure underpins the delivery of all IT services, which, in turn, are critical to the delivery of core DBP services and to our ability to securely store and access customer data.

As the IT infrastructure equipment approaches the end of its useful life, the risk of it failing increases and vendors no longer provide support or replacement parts for such equipment. It also becomes increasingly difficult to quickly implement the remedial actions required to resolve platform or system failures. In a worst-case scenario (which becomes increasingly probable as the infrastructure ages), the platform or system may experience a catastrophic failure and cannot be recovered, resulting in an urgent need to either upgrade or replace it to restore operations.

Aged IT infrastructure is also associated with increased cyber security risks. Vendors prescribe a regime of periodic security patches that must be applied with each upgrade. Deviating from the vendor-prescribed regime can void vendor warranty support arrangements and result in increased vulnerability to cyberattacks.

Finally, if IT infrastructure is not regularly refreshed its performance degrades due to insufficient capacity to support required storage, network bandwidth or computing resources.

Our IT infrastructure assets must therefore be renewed or replaced before they reach the end of their useful life. The useful lives of IT assets vary depending on their type, how heavily they are used and if they are used in the corporate offices, at home or in the field. Data centre, networking equipment and data centre appliances typically have a longer useful lifetime than end user devices such as laptops, mobile phones and tablets, resulting in a different frequency of upgrades or replacements as different types of equipment age and no longer perform at the standard required.

There is also an opportunity to leverage the industry trend of moving from company-owned infrastructure to cloud-based hosting. Cloud hosting technologies are becoming increasingly prevalent across all industry sectors, including utilities. The benefits of cloud hosting include greater scalability and flexibility, increased agility, and reduced operational risks. Increasingly, many vendors are offering only cloud-based versions of their products or services, which further accelerates the adoption of cloud technologies. On the other hand, cloud adoption comes with its own set of risks including vendor lock-ins, increased complexity of IT operations, and cyber security threats. This business case considers the opportunities, benefits and risks associated with cloud hosting when selecting a preferred option for our data centre roadmap.

1.4 Risk assessment – untreated risk

A summary of our risk management framework is provided in Appendix C.

The primary risks of not renewing IT infrastructure include significant outages and cybersecurity breaches. As infrastructure ages and approaches the end of its useful life, its reliability decreases. Vendors may discontinue support or impose high fees for extended assistance. Additionally, security updates and patches may become unavailable, leaving the infrastructure vulnerable to cyberattacks. If these risks materialise, they would adversely affect our customers and various aspects of our business, giving rise to people, supply, reputational, organisational and financial consequences, as described below.

- *People* - Failure of IT infrastructure and the resulting outages to key applications may lead to major safety incidents, for example:
    - When technology becomes outdated (reaching end of support / end of life status), the IT infrastructure becomes more vulnerable to security incidents due to lack of security updates and vendor support. Security breaches of the infrastructure may cause outages in operational systems that would adversely affect the safety and integrity of DBP services. This may result in insufficient safety information being available in real time to field crews and a lack of visual representation of an asset, thereby increasing the likelihood of a safety incident.
- *Supply* - As described above, outdated or unsupported IT infrastructure could result in unplanned production outages or degraded performance of our IT applications and network, resulting in the following supply consequences:
    - Unreliable or underperforming infrastructure can result in inefficient work order processing, which may hinder the ability to make spatial and logical queries, delay timely repairs and maintenance, and increase the duration of outages.
    - Degraded IT infrastructure performance may result in slower, less efficient responses to customer calls.
    - Outdated IT infrastructure can result in inefficient processes, leading to delays in monitoring and managing the transmission network, which could impact the reliability and safety of gas delivery.
    - Inadequate IT infrastructure could hamper the company's ability to collect, analyse, and utilise data effectively for decision-making, leading to missed opportunities for optimisation and improvement of gas transport.
- *Reputation / Outrage* - DBP's reputation could be damaged significantly in the event of health and safety incidents, supply disruptions, delayed repairs and maintenance, compromised corporate, staff and customer information and resultant litigation.
- *Impact on AGIG* - Catastrophic failure in underlying infrastructure may result in outages of DBP's core IT systems which, in turn, may lead to non-compliance with the DBP's regulatory and customer obligations. For example:

- A failure in infrastructure supporting the ERP application could result in public leak reports or requests to turn meters on or off needing to be manually entered rather than being electronically transferred.
- Security breaches may result in confidential customer data being compromised.
- Failure of the infrastructure supporting IT systems or data required to meet regulatory compliance requirements can lead to fines and penalties for the company, as well as damage to its reputation with regulatory bodies and customers.
- Failure to renew data centre's backup and recovery solutions may put DBP at risk of losing critical data in the event of a disaster, resulting in prolonged downtime and significant compliance, reputational, financial and critical infrastructure impact.

- *Loss* - The consequences identified above may result in sizeable additional costs. Furthermore, without ongoing vendor support for upgrades or replacements to keep the infrastructure current, DBP will be forced to hire expensive consultants with detailed knowledge of outdated systems and infrastructure components.

A summary of the untreated risk assessment is provided in Table 1.4. The table shows the overall untreated risk rating as high because the organisational impact, reputational and financial risks are high.

Table 1.4: Risk assessment - untreated risk

Risk area	Untreated risk rating		
	End user devices	**Network and currency**	**Data Centre**
People	Low	Intermediate	Intermediate
Environmental impact	Low	Intermediate	Intermediate
Supply	Intermediate	Intermediate	Intermediate
Impact on AGIG	High	High	High
Reputation / Outrage	High	High	High
Loss	High	High	High
Overall Rating	**High**	High	High

1.5 Options considered

1.5.1 End user devices

The scope of this workstream comprises the ongoing refresh or replacement of DBP's end user devices, including personal equipment such as laptops and mobile phones, office equipment, WFH equipment, and field devices.

All devices are built with intrinsic obsolescence factors that include limited battery life, failing connector ports and declining performance. The useful life of end user devices also depends on a variety of factors related to their usage, for example, whether they are frequently moved around, or used to access high-performance and memory-intensive applications. In the case of DBP, approximately 50% of end user devices operate in remote (red dust) environments, which decreases their lifespan and necessitates additional maintenance. As illustrated in a recent Gartner research paper[11] (Figure 1.5), while the individual lifecycles vary depending on device type and its usage patterns, the device failures follow a common pattern when the failure rates dramatically increase past a certain inflection point. Gartner recommends that "the goal should be to replace devices before the probability of failures increases significantly".

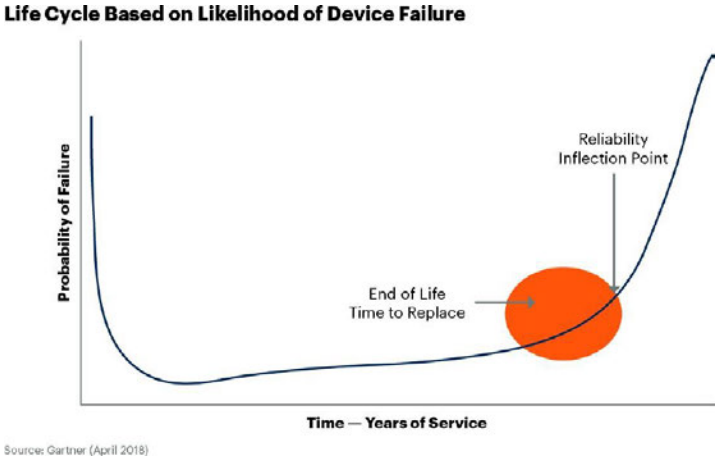


Figure 1.5: Device life cycle and optimal replacement point based on likelihood of device failure. Source: Gartner[12]

To determine the feasible refresh options to consider, we reviewed vendor recommendations and specific warranty periods for our devices, as well as compatible industry practices and benchmarks.

The options considered are:

- **Option 1: Vendor-recommended refresh –** Proactively replace the end user devices in line with vendor-recommended lifecycles.

11 Gartner, Inc.: *Recommended Life Spans to Guide PC, Mobile and Other Device Replacement Strategies*, 31 March 2021, p. 2

12 Source: Gartner, Inc.: *Recommended Life Spans to Guide PC, Mobile and Other Device Replacement Strategies*, 31 March 2021, p. 3

- **Option 2: Conservative refresh –** Refresh the end user devices on a schedule that has been extended compared to the vendor-recommended lifecycles where it is prudent to do so.

Table 1.5 lists the types of devices in scope, their quantities and the refresh rates for each of the options considered.

Table 1.5: Quantities different types of end user devices and lifespans considered in each of the options

Project / Device type	Quantity	Lifespan per option (years)	
		Option 1	Option 2
End user devices refresh			
Laptops	345	3	3.5
WFH hardware	50	5	5
Monitors and docks	393	5	5
Desktops	28	5	5
MFPs	22	5	5
Satellite phones	24	3	3
Mobile phones	195	2	2.5
Tablets	21	3	3.5
Desk phones	238	5	5
Meeting room refresh			
Audio visual (AV) and meeting room equipment	15	5	5

The options are discussed in the following sections.

1.5.1.1 Option 1 – Vendor-recommended refresh

Under this option, the refresh rate of our end user devices follows the vendor-recommended lifecycles.

1.5.1.1.1 Achieving objectives

This option aligns with most of our vision objectives except for the goal of being sustainably cost efficient. Refreshing the end-user equipment according to vendor-recommended cycles ensures that it is safe, reliable, secure, and user-friendly. Providing our staff with the latest models of laptops, mobile phones, tablets, and other work-related equipment can enhance productivity, boost morale, and create additional learning opportunities.

However, this approach does not align with our vision of being sustainably cost-efficient, given its high cost and the environmental impact of replacing devices more frequently than may be necessary based on their condition, rather than on the general vendor recommendations.

Table 1.6: Achieving objectives – End User Devices Option 1

Vision objective	Alignment
Delivering for Customers – Public Safety	Y
Delivering for Customers - Reliability	Y

Delivering for Customers – Customer Service	Y
A Good Employer – Health and Safety	Y
A Good Employer – Employee Engagement	Y
A Good Employer – Skills Development	Y
Sustainably Cost Efficient – Working within Industry Benchmarks	N
Sustainably Cost Efficient – Delivering Profitable Growth	N
Sustainably Cost Efficient – Environmentally and Socially Responsible	N

1.5.1.1.2 Cost assessment

Table 1.7 shows the capex/opex split for Option 1.

Table 1.7: Capex/Opex split – End User Devices Option 1

($'000)	2026	2027	2028	2029	2030	Total
Capex	1,499	859	859	859	859	4,936
Opex	-	-	-	-	-	-
Total	**1,499**	**859**	**859**	**859**	**859**	**4,936**

Table 1.8 provides details of Option 1 capex forecast.

Table 1.8: Forecast AA6 capex – End User Devices Option 1

($'000)	2026	2027	2028	2029	2030	Total
End User Devices Refresh	859	859	859	859	859	4,296
Meeting Room Refresh	640	-	-	-	-	640
Total	**1,499**	**859**	**859**	**859**	**859**	**4,936**

1.5.1.1.3 Risk assessment[13]

Table 1.9 summarises the risk assessment for Option 1.

Table 1.9: Risk Rating - End User Devices Option 1

Risk Area	Untreated	Treated
People	Low	Negligible
Environmental impact	Low	Negligible
Supply	Intermediate	Negligible
Impact on AGIG	High	Negligible
Reputation / Outrage	High	Negligible
Loss	High	Negligible
Overall Rating	**High**	Negligible

[13] Unless stated otherwise, only the risks relevant to the specific workstream discussed in each section are being assessed.

1.5.1.2 Option 2 – Conservative refresh

In this option, we considered extending the lifecycles of our end user device types compared to the vendor-recommended lifecycles.

1.5.1.2.1 Achieving objectives

Table 1.10 shows that Option 2 is fully aligned with our vision objectives.

Table 1.10: Achieving Objectives – End User Devices Option 2

Vision objective	Alignment
Delivering for Customers – Public Safety	Y
Delivering for Customers - Reliability	Y
Delivering for Customers – Customer Service	Y
A Good Employer – Health and Safety	Y
A Good Employer – Employee Engagement	Y
A Good Employer – Skills Development	Y
Sustainably Cost Efficient – Working within Industry Benchmarks	Y
Sustainably Cost Efficient – Delivering Profitable Growth	Y
Sustainably Cost Efficient – Environmentally and Socially Responsible	Y

1.5.1.2.2 Cost assessment

Table 1.11 shows the capex/opex split for Option 2.

Table 1.11: Capex/Opex split – End User Devices Option 2

($'000)	2026	2027	2028	2029	2030	Total
Capex	1,405	765	765	765	765	4,465
Opex	-	-	-	-	-	-
Total	**1,405**	**765**	**765**	**765**	**765**	**4,465**

Table 1.12 provides details of the Option 2 capex forecast.

Table 1.12: Forecast AA6 capex – End User Devices Option 2

($'000)	2026	2027	2028	2029	2030	Total
End User Devices	765	765	765	765	765	3,825
Meeting Room Refresh	640	-	-	-	-	640
Total	**1,405**	**765**	**765**	**765**	**765**	**4,465**

1.5.1.2.3 Risk assessment

Table 1.13 summarises the risk assessment for Option 2.

Table 1.13: Risk Rating - End User Devices Option 2

Risk Area	Untreated	Treated
People	Low	Negligible
Environmental impact	Low	Negligible
Supply	Intermediate	Negligible
Impact on AGIG	High	Negligible
Reputation / Outrage	High	Negligible
Loss	High	Negligible
Overall Rating	**High**	**Negligible**

1.5.1.3 Options assessment – end user devices

Option 2 is recommended as the most cost-effective way to refresh our end user devices while keeping the risks associated with outdated or unsupported devices at an acceptable level. While Option 1 would reduce these risks even further, following vendor-recommended approach without attempting to extend the life of devices via good management practices does not represent a prudent level of expenditure.

Table 1.14: Options assessment – End User Devices

Option	Capex	Opex	Totex	NPV[14]	Risk rating	Rank
Option 1 - Vendor-recommended refresh	4,936	-	4,936	(4,511)	Negligible	2
Option 2 - Conservative refresh	4,465	-	4,465	(4,083)	Negligible	1

[14] NPV is calculated at the discount rate of 3.39% over the 5-year period from 1 January 2026 to 31 December 2030 and discounted to 1 January 2026. Assumes cashflow at year end.

1.5.2 Network and currency

The scope of this workstream includes the following asset categories[15]:

- Office networking equipment
- Operating systems
- Authentication and identity management
- End user compute software

The AGIG-wide program of work to refresh these infrastructure assets is depicted in Figure 1.6.

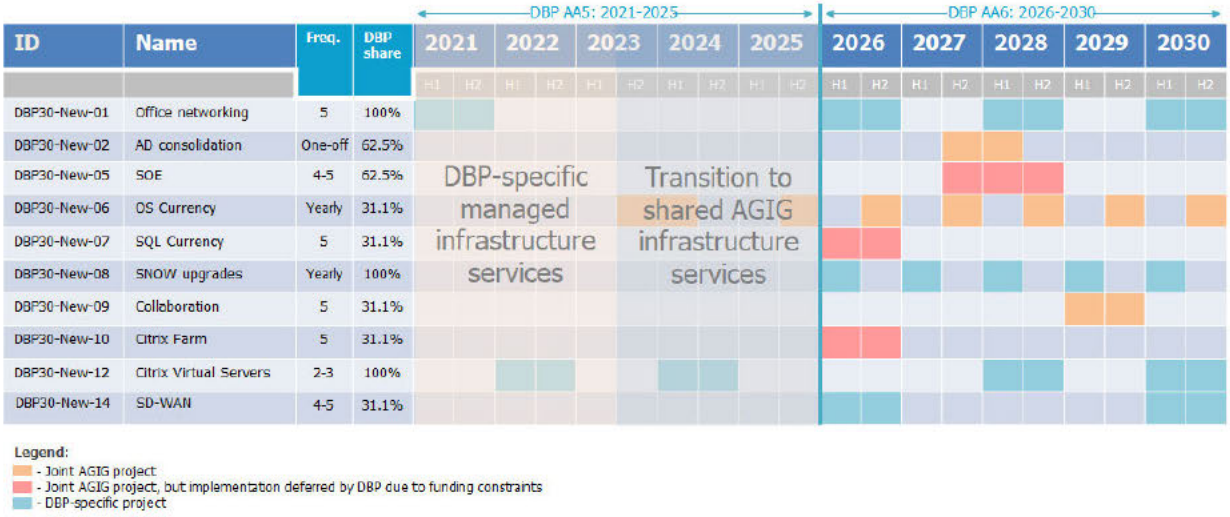


Figure 1.6: Roadmap for the Network and Currency workstream

In AA5, most of the assets in this workstream except for the Citrix virtual servers were managed as part of an outsourcing arrangement with [redacted], the WA-based provider of managed IT infrastructure services, and the associated costs were funded from the DBP opex budget. As part of the transition to the shared AGIG infrastructure, the arrangement with [redacted] was terminated in 2023 and DBP was allocated a share of the AGIG-owned infrastructure. Some of that infrastructure was due for a refresh in the AA5 period, but it was deferred for DBP due to funding constraints as was explained in Section 1.3.1.1. For that reason, the refresh cycles for the infrastructure in this workstream in AA6 differ from those in AA5, and the deferred projects are highlighted in red in Figure 1.6.

The options considered for this workstream are:

- **Option 1: DBP-centric approach to infrastructure refresh** – Do nothing more to consolidate the DBP infrastructure into the shared AGIG environment and only upgrade those DBP infrastructure components that are running out of support in the AA6 period.

[15] Refer Appendix B for detailed description of assets in each of these categories

- **Option 2 (recommended): 'AGIG One IT' approach to infrastructure refresh** – Finalise the transition to the shared AGIG infrastructure environment and upgrade the DBP part of the shared infrastructure in accordance with the 'AGIG One IT' Strategy & Roadmap.

Table 1.15 describes the projects included in this workstream.

Table 1.15: Projects included in the Network and Currency workstream options

Project	Refresh freq.	% alloc. to DBP	Description	Included in:	
				Opt 1	Opt 2
Office Networking Equipment	5 yrs	100%	Lifecycle refresh of wired and wireless office networking equipment including Wireless Application Protocols (WAP) and switches at DBP offices and compressor stations. The equipment included in this project is 100% allocated to DBP. While the lifespan of this equipment is 5 years, it will gradually reach end of life in AA6 due to different installation dates, necessitating rolling replacements in 2026, 2028 and 2030.	Y	Y
Active Directory (AD) consolidation	One-off	62.5%	Consolidate three ADs into one as part of the 'AGIG One IT' Strategy implementation.	N	Y
SOE	4-5 yrs	62.5%	Virtualised server (Windows and Linux) and workstation (Windows) operating system (OS) upgrade and group policies refresh.	Y	Y
OS Currency	Yearly	31.1%	Decommissioning of the older virtual servers and deployment of new OS for the server environment	Y	Y
SQL Currency	5 yrs	31.1%	Database version upgrades encompass nine sub-projects, some of which were deferred from AA5 due to funding constraints. The initial six sub-projects must be completed by 2027, as support for the associated databases will expire at that time. The remaining databases are to be migrated to their new versions before the conclusion of extended support in 2030.	Y	Y
ServiceNow (SNOW) upgrades	Yearly	100%	The upgrades for our ITSM tool, which must be conducted annually to retain vendor support.	Y	Y
Collaboration	5 yrs	31.1%	Migration from aged and soon to be EOL Telephony platform along with majority physical desk phones to Teams calling including SIP integration and phone number migration	Y	Y
Citrix Farm	5 yrs	31.1%	The refresh has been deferred from AA5 due to funding constraints and is now planned for 2026. The 2026 refresh will include both Citrix Farm and Citrix Virtual Servers, which is more cost efficient than running these two projects separately.	Y	Y
Citrix Virtual Servers	2-3 yrs	100%	Citrix Virtual Servers is one of the few recurrent projects capital projects that were allocated an ERA approved capex in AA5. The gap in the refresh schedule in 2026 is due to the Citrix Farm and Citrix Virtual Servers being bundled together for efficiency reasons.	Y	Y
SD-WAN	4-5 yrs	31.1%	Migrating from point to point wide area network (WAN) data communication links to software-defined WAN (SD-WAN) technology to provide greater WAN	Y	Y

	capabilities such as greater resiliency options, greater bandwidth to meet business needs, reduce time and cost to deliver new sites, and more cost efficient WAN communications.

These options are discussed in the following sections.

1.5.2.1 Option 1 – DBP-centric approach to infrastructure refresh

This option constitutes the base-case for the Networking and Currency workstream, against which we assess other credible options. Under this option, DBP will not participate in further consolidation of the AGIG infrastructure and only undertake necessary refreshes to maintain currency of DBP's part of the infrastructure environment.

Most notably, under this option DBP will not participate in the Active Directory (AD) consolidation project that is scheduled for 2026-27 in the 'AGIG One IT' Roadmap. While not undertaking the AD consolidation project saves on capex, it also fails to unlock the economies of scale and other benefits associated with AD consolidation. As a result, the other projects in this workstream become more costly.

1.5.2.1.1 Achieving objectives

Table 1.16: Achieving objectives – Network and Currency Option 1

Vision objective	Alignment
Delivering for Customers – Public Safety	Y
Delivering for Customers – Reliability	Y
Delivering for Customers – Customer Service	Y
A Good Employer – Health and Safety	Y
A Good Employer – Employee Engagement	N
A Good Employer – Skills Development	Y
Sustainably Cost Efficient – Working within Industry Benchmarks	N
Sustainably Cost Efficient – Delivering Profitable Growth	N
Sustainably Cost Efficient – Environmentally and Socially Responsible	Y

1.5.2.1.2 Cost assessment

Table 1.17: Capex/Opex split – Network and Currency Option 1

	2026	2027	2028	2029	2030	Total
Capex	2,511	1,935	730	624	1,746	7,545
Opex	-	-	-	-	-	-
Total	**2,511**	**1,935**	**730**	**624**	**1,746**	**7,545**

Table 1.18: Forecast AA6 capex – Network and Currency Option 1

($'000)	2026	2027	2028	2029	2030	Total
Office networking	470	-	154	-	1,059	1,684
AD consolidation	-	-	-	-	-	-
SOE	-	1,031	128	-	-	1,160
OS currency	295	296	297	295	295	1,478
SQL currency	471	508	-	29	-	1,007
SNOW upgrades	101	101	101	101	101	503
Collaboration	-	-	-	200	-	200
Citrix Farm (incl. netscalers)	342	-	-	-	-	342
Citrix Virtual Servers	-	-	50	-	50	100
SD-WAN	832	-	-	-	241	1,073
Total	**2,511**	**1,935**	**730**	**624**	**1,746**	**7,545**

1.5.2.1.3 Risk assessment

Table 1.7 provides a risk assessment for Option 1.

Table 1.19: Risk Rating - Network and Currency Option 1

Risk Area	Untreated	Treated
People	Intermediate	Negligible
Environmental impact	Intermediate	Negligible
Supply	Intermediate	Negligible
Impact on AGIG	High	Low
Reputation / Outrage	High	Low
Loss	High	Low
Overall Rating	**High**	**Low**

1.5.2.2 Option 2 – 'AGIG One IT' approach to infrastructure refresh

In addition to the recurrent projects described in Option 1, this option also includes the consolidation of the DBP AD into the shared AD that is will be set up for all AGIG entities.

AGIG currently has three corporate AD domains, one for each entity, that manage user authentication and authorisation to network resources. Each AD structure is fragmented, resulting in a disjoined user experience, security risks, and inefficient maintenance and support.

Each AD has evolved separately from the others, resulting in inconsistent design & configuration. This necessitates extra effort to audit, manage and protect each of them and increases risk of compromise due to wider attack surface.

Consolidating the DBP AD into the AGIG AD will:

- improve security and efficiency and to align with AD best practices
- align user access, authentication, and auditing controls in line with AGIG cyber policies and standard.
- simplify user login experience for staff.
- improve efficiency of the IT management and maintenance of the DBP infrastructure environment.

As part of the 'AGIG One IT' Roadmap, we plan to execute the AD migration and SOE upgrade simultaneously. This approach minimises user disruption by consolidating change management activities into a single project timeline.

1.5.2.2.1 Achieving objectives

The AD consolidation will contribute to the AGIG vision objectives in the following ways:

Delivering for customers:

- Reduced attack surface and opportunities for breach, contributing positively to critical infrastructure continuity.
- Deliver more efficient/effective support for customers.
- Provide a seamless IT experience across AGIG thus promoting One AGIG.

A Good Employer:

- A centralised AD will improve employee access to IT resources.

Sustainably Cost Efficient:

- By undertaking the AD consolidation first, the costs of other projects in this workstream will be reduced compared to those in Option 1.
- Reduce support overheads.

Table 1.20: Achieving Objectives - Network and Currency Option 2

Vision objective	Alignment
Delivering for Customers – Public Safety	Y
Delivering for Customers - Reliability	Y
Delivering for Customers – Customer Service	Y
A Good Employer – Health and Safety	Y
A Good Employer – Employee Engagement	Y
A Good Employer – Skills Development	Y
Sustainably Cost Efficient – Working within Industry Benchmarks	Y
Sustainably Cost Efficient – Delivering Profitable Growth	Y
Sustainably Cost Efficient – Environmentally and Socially Responsible	Y

1.5.2.2.2 Cost assessment

Table 1.21: Capex/Opex split – Network and Currency Option 2

($'000)	2026	2027	2028	2029	2030	Total
Capex	2,229	1,995	864	602	1,663	7,353
Opex	-	-	-	-	-	-
Total	**2,229**	**1,995**	**864**	**602**	**1,663**	**7,353**

Table 1.22: Forecast AA6 capex – Network and Currency Option 2

($'000)	2026	2027	2028	2029	2030	Total
Office networking	410	-	154	-	999	1,564
AD consolidation	-	256	150	-	-	406
SOE	-	969	128	-	-	1,097
OS currency	279	280	281	280	280	1,400
SQL currency	362	390	-	22	-	775
SNOW upgrades	100	100	100	100	100	500
Collaboration	-	-	-	200	-	200
Citrix Farm (incl. netscalers)	251	-	-	-	-	251
Citrix Virtual Servers	-	-	50	-	50	100
SD-WAN	826	-	-	-	235	1,060
Total	**2,229**	**1,995**	**864**	**602**	**1,663**	**7,353**

1.5.2.2.3 Risk assessment

Table 1.11 summarises the risk assessment for Option 2.

Table 1.23: Risk Rating - Network and Currency Option 2

Risk Area	Untreated	Treated
People	Intermediate	Negligible
Environmental impact	Intermediate	Negligible
Supply	Intermediate	Negligible
Impact on AGIG	High	Negligible
Reputation / Outrage	High	Negligible
Loss	High	Negligible
Overall Rating	**High**	**Negligible**

1.5.2.3 Options assessment – network and currency

Option	Capex	Opex	Totex	5-yr NPV[16]	Treated risk rating	Rank
Option 1 - DBP-centric approach	7,545	-	7,545	(6,922)	Low	2
Option 2 - 'AGIG One IT' approach	7,353	-	7,353	(6,738)	Negligible	1

Option 2 is recommended as it represents the most cost-effective option of maintaining the current levels of service enabled by our networking infrastructure and software. Option 1 is more expensive than Option 2 because it does not invest into any further consolidation of the DBP infrastructure after AA5 and therefore isn't able to take advantage of the consolidation, most notably the consolidation of DBP's AD that is part of the 'AGIG One IT' roadmap.

1.5.3 Data centre

During the AA5, we consolidated and rationalised our data centre platform and equipment as part of the 'AGIG One IT' roadmap, with the key objectives to[17]:

- support feedback from our stakeholders, regulators, and customers that they value reliable and safe delivery of energy to our customers backed by timely support when they need help
- address specific issues and risks common to all AGIG businesses, including cyber security
- achieve economies of scale in purchasing and support costs.

As part of the data centre consolidation, DBP moved away from its previous infrastructure as a service (IAAS) arrangements and was allocated a share of the physical infrastructure in the newly established AGIG data centres, thus benefitting from the enhanced security, improved resource utilisation, better scalability, and stabilised and improved performance.

In considering the options for our data centre evolution in AA6 and beyond, our primary objective is to ensure that our infrastructure is both cost-effective and fit for purpose in the long term. One option that is increasingly popular among our industry peers and similar size businesses is moving from the on-premise data centre infrastructure to a cloud-based infrastructure hosting. Cloud-based infrastructure hosting offers several significant advantages, including:

[16] NPV is calculated at the discount rate of 3.39% over the 5-year period from 1 January 2026 to 31 December 2030 and discounted to 1 January 2026. Assumes cashflow at year end.

[17] AGN: SA Final Plan July 2021 – June 2026, Attachment 8.8: Capex business cases – South Australia, SA138 – AGIG IT Strategy & Roadmap, July 2020, p. 444

- *Scalability and flexibility:* The cloud allows for easily scalable resources to meet fluctuating demands. Businesses can quickly adjust their IT resources during peak periods or in response to changing regulatory requirements without the need for significant upfront investments.
- *Enhanced disaster recovery:* Cloud providers typically offer robust disaster recovery and backup solutions, ensuring that critical data and applications are protected and can be restored rapidly in the event of a disaster.
- *Improved reliability and performance:* Cloud services often come with guaranteed uptime and service-level agreements, which can offer greater reliability compared to on-premise infrastructure.
- *Access to latest technologies:* Increasingly, many vendors are offering only cloud-based versions of their products or services, which further accelerates the adoption of cloud technologies.

Moving to cloud, however, is also associated with disadvantages and risks, including vendor lock-ins, increased complexity of IT operations, and cyber security threats.

The options are:

- **Option 1: BAU** – continue with the on-premise data centre infrastructure arrangements.
- **Option 2: 'Organic' transition to cloud –** Transition to cloud in an orderly manner as our existing on-premise data centre components run out of support.
- **Option 3: 'Big Bang' transition to cloud –** Migrate all of our IT infrastructure to the cloud at once.

It is assumed that under both Option 2 and Option 3, all DBP servers will move to Azure cloud by 2030, but the move to cloud would be more gradual under Option 2 (Table 1.24).

Table 1.24: On-premise vs Azure cloud servers under each option. Note that there is an assumed 30% reduction in the total number servers by 2029 due to SaaS and RISE migrations

Number of servers	2024	2025	2026	2027	2028	2029	2030
BAU (on-premise)							
BAU - AGIG total	368	346	324	302	280	258	236
BAU - DBP	126	118	110	103	95	88	88
Option 2 Organic							
% Azure Servers	-	-	20%	40%	60%	80%	100%
Total number of Azure Servers	-	-	65	121	168	206	236
DBP number of Azure Servers	-	-	18	35	53	70	88

Number of servers	2024	2025	2026	2027	2028	2029	2030
DBP number of On-Prem Servers	126	118	93	68	43	18	-
Option 3 Big Bang							
% Azure Servers	-	-	-	-	25%	75%	100%
Total number of Azure Servers	-	-	-	-	70	193	236
DBP number of Azure Servers	-	-	-	-	22	66	88
DBP number of On-Prem Servers	126	118	110	103	73	22	-

The opex estimates for Options 2 and 3 are for the Azure server licences, backup, disaster recovery and necessary bandwidth provisions. Under all three options, there is an ongoing capex for the System Center Configuration Manager (SCCM) and Mobile Device Management (MDM), the Microsoft tools that are necessary for remote management of the data centre infrastructure.

The options are discussed in the following sections.

1.5.3.1 Option 1 – BAU

This option continues the BAU operations utilising our existing on-premises data centres.

1.5.3.1.1 Achieving objectives

This option aligns with most of our vision objectives except for the goal of being sustainably cost efficient, because it has a higher cost than Options 2 and 3.

Table 1.25: Achieving Objectives – Data Centre Option 1

Vision objective	Alignment
Delivering for Customers – Public Safety	Y
Delivering for Customers - Reliability	Y
Delivering for Customers – Customer Service	Y
A Good Employer – Health and Safety	Y
A Good Employer – Employee Engagement	Y
A Good Employer – Skills Development	Y
Sustainably Cost Efficient – Working within Industry Benchmarks	N
Sustainably Cost Efficient – Delivering Profitable Growth	N
Sustainably Cost Efficient – Environmentally and Socially Responsible	Y

1.5.3.1.2 Cost assessment

Table 1.26: Capex/Opex split – Data Centre Option 1

($'000)	2026	2027	2028	2029	2030	Total
Capex	382	1,201	380	1,201	380	3,544
Opex	-	-	-	-	-	-
Total	**382**	**1,201**	**380**	**1,201**	**380**	**3,544**

Table 1.27: Forecast AA6 capex – Data Centre Option 1

($'000)	2026	2027	2028	2029	2030	Total
Data Centre Appliances	324	324	324	324	324	1,621
Data Centre Platform	40	860	39	860	39	1,838
Infrastructure tools	17	17	17	17	17	85
Total	**382**	**1,201**	**380**	**1,201**	**380**	**3,544**

1.5.3.1.3 Risk assessment

Table 1.7 summarises the risk assessment for Option 1.

Table 1.28: Risk Rating - Data Centre Option 1

Risk Area	Untreated	Treated
People	Intermediate	Negligible
Environmental impact	Intermediate	Negligible
Supply	Intermediate	Negligible
Impact on AGIG	High	Negligible
Reputation / Outrage	High	Negligible
Loss	High	Negligible
Overall Rating	**High**	Negligible

1.5.3.2 Option 2 – Organic' transition to cloud

This option considers an 'orderly' transition to cloud that involves a gradual and planned move of IT infrastructure resources to the cloud as the existing on-premise resources approach the end of their useful life or are due for a major refresh.

1.5.3.2.1 Achieving objectives

This option aligns with all our vision objectives (Table 1.28), specifically:

Delivering for customers:

- Focuses on minimising disruption to operations

- Poses less risk to reliability of services compared to Option 3

A good employer:

- Promotes training and adaptation: Employees can receive training and become familiar with the new system progressively, leading to smoother adoption and less resistance to change

Sustainably cost efficient:

- Allows spreading out investments over time rather than incurring substantial expenses all at once.

Table 1.29: Achieving Objectives - Data Centre Option 2

Vision objective	Alignment
Delivering for Customers – Public Safety	Y
Delivering for Customers - Reliability	Y
Delivering for Customers – Customer Service	Y
A Good Employer – Health and Safety	Y
A Good Employer – Employee Engagement	Y
A Good Employer – Skills Development	Y
Sustainably Cost Efficient – Working within Industry Benchmarks	Y
Sustainably Cost Efficient – Delivering Profitable Growth	Y
Sustainably Cost Efficient – Environmentally and Socially Responsible	Y

1.5.3.2.2 Cost assessment

Table 1.30: Capex/Opex split – Data Centre Option 2

($'000)	2026	2027	2028	2029	2030	Total
Capex	397	126	125	125	231	1,004
Opex	147	275	382	469	536	1,809
Total	**544**	**401**	**507**	**594**	**767**	**2,813**

1.31: Forecast AA6 capex – Data Centre Option 2

($'000)	2026	2027	2028	2029	2030	Total
Data Centre Appliances	-	-	-	-	-	-
Data Centre Platform	380	109	108	108	214	919
Infrastructure tools	17	17	17	17	17	85
Total	**397**	**126**	**125**	**125**	**231**	**1,004**

1.5.3.2.3 Risk assessment

Due to its phased approach, risks can be better managed. Each migration can be evaluated for performance and security before moving on to the next component.

Table 1.32: Risk Rating - Data Centre Option 2

Risk Area	Untreated	Treated
People	Intermediate	Negligible
Environmental impact	Intermediate	Negligible
Supply	Intermediate	Negligible
Impact on AGIG	High	Negligible
Reputation / Outrage	High	Negligible
Loss	High	Negligible
Overall Rating	**High**	Negligible

1.5.3.3 Option 3 – 'Big Bang' transition to cloud

1.5.3.3.1 Achieving objectives

Table 1.33: Achieving Objectives - Data Centre Option 3

Vision objective	Alignment
Delivering for Customers – Public Safety	Y
Delivering for Customers - Reliability	Y
Delivering for Customers – Customer Service	Y
A Good Employer – Health and Safety	Y
A Good Employer – Employee Engagement	Y
A Good Employer – Skills Development	Y
Sustainably Cost Efficient – Working within Industry Benchmarks	Y
Sustainably Cost Efficient – Delivering Profitable Growth	Y
Sustainably Cost Efficient – Environmentally and Socially Responsible	Y

1.5.3.3.2 Cost assessment

Table 1.34: Capex/Opex split – Data Centre Option 3

($'000)	2026	2027	2028	2029	2030	Total
Capex	17	17	440	863	440	1,777
Opex	-	-	159	440	536	1,135
Total	**17**	**17**	**599**	**1,303**	**976**	**2,912**

Table 1.35: AA5 Capex - Data Centre Option 3

($'000)	2026	2027	2028	2029	2030	Total
Data Centre Appliances	-	-	-	-	-	-
Data Centre Platform	-	-	423	846	423	1,693
Infrastructure tools	17	17	17	17	17	85

Total	**17**	**17**	**440**	**863**	**440**	**1,777**

1.5.3.3.3 Risk assessment

'Big Bang' transition carries a higher risk of potential service interruptions and/or technical challenges, as everything is transitioning simultaneously with less time for testing individual components.

Table 1.36: Risk Rating - Data Centre Option 3

Risk Area	Untreated	Treated
People	Intermediate	Negligible
Environmental impact	Intermediate	Negligible
Supply	Intermediate	Low
Impact on AGIG	High	Low
Reputation / Outrage	High	Negligible
Loss	High	Low
Overall Rating	**High**	**Low**

1.5.3.4 Options assessment – data centre

Option 2 is recommended as the most cost-effective long-term solution for our data centre based on a total expenditure (totex) assessment. Additionally, Option 2 has a lower risk rating compared to Option 3 due to a more gradual transition to the cloud, which is associated with fewer project risks.

Option	Capex	Opex	Totex	5-yr NPV[18]	Treated risk rating	Rank
Option 1 - BAU	3,544	-	3,544	(3,209)	Negligible	3
Option 2 - 'Organic' transition to cloud	1,004	1,809	2,813	(2,529)	Negligible	1
Option 3 - 'Big Bang' transition to cloud	1,777	1,135	2,912	(2,541)	Low	2

[18] NPV is calculated at the discount rate of 3.39% over the 5-year period from 1 January 2026 to 31 December 2030 and discounted to 1 January 2026. Assumes cashflow at year end.

1.5.4 Field connectivity

Several of our key business applications, including our asset management system (Maximo), procurement system (SAP S/4 HANA) and HSE incident management system (INX) are being upgraded and will soon offer a mobility function. The mobility function allows these systems to be used remotely via a phone/tablet app, meaning staff would have the ability to download asset data, order parts, and log safety incidents in the field. The mobility function is a now a standard offering, provided as part of the app upgrades.

We therefore have an opportunity to make use of these mobility features by procuring appropriate hardware devices and infrastructure/network services, which we can roll out to field staff. Implementing mobile solutions would solve our longstanding challenge of poor communication in the field and would help significantly improve the efficiency of our operations.

During the AA6 period, we propose to allocate budget to develop a mobility framework that leverages the new functionality of our core business applications.

We do not yet have a detailed cost estimate of for the final mobility framework, as this will be defined as we conduct the initial research and pilot project. However, our high level estimate for hardware and infrastructure costs assumed capex of approximately $1.5 million over the AA6 period.

1.6 Summary of cost/benefit assessment

To assess the options, the costs, objectives and risk are considered for each option. A summary of the options assessment is shown in Table 1.36.

Table 1.37: Summary of the options assessment for all workstreams

Option	Objectives	Costs	Treated risk level	NPV[19]
End user devices				
Option 1	Mostly aligns	$4.9m capex	Negligible	(4,511)
Option 2	Aligns	$4.5m capex	Negligible	(4,083)
Network and currency				
Option 1	Mostly aligns	$7.3m capex	Low	(6,922)
Option 2	Aligns	$7.2m capex	Negligible	(6,738)
Data centre				
Option 1	Mostly aligns	$3.5m capex	Negligible	(3,209)
Option 2	Aligns	$1.0m capex $1.8m opex	Negligible	(2,529)

[19] NPV is calculated at the discount rate of 3.39% over the 5-year period from 1 January 2026 to 31 December 2030 and discounted to 1 January 2026. Assumes cashflow at year end.

Option 3	Aligns	$1.8m capex $1.1m opex	Low	(2,541)

1.7 Proposed solution

We propose to proceed with the program of work that entails implementing the recommended options for each of the workstreams.

1.7.1 Why is the recommended option prudent?

1.7.1.1.1 End user devices

The recommended option proposes extending the refresh cycle for laptops, mobile phones and tablets by six months beyond the vendor-recommended term because, based on our experience and according to industry benchmarks, this can be done without a material increase of the risk of failure. For all other devices, the recommended option aligns with vendor recommendations, industry benchmarks and the practice of our industry counterparts (Table 1.37).

Table 1.38: DBP end user device refresh cycles compared with industry practice and Gartner recommendations

	DBP: recommended option	Gartner[20]	SA Power Networks[21]	Ausgrid[22]	Essential[23]
Laptops	3.5	3.5	3.5	3-4	4
WFH hardware	5	n/a	n/a	n/a	n/a
Monitors and docks	5	n/a	n/a	5	5
Desktops	5	5	5	n/a	4
MFPs	5	n/a	n/a	n/a	n/a
Satellite phones	3	n/a	n/a	n/a	n/a
Mobile phones	2.5	2.5	2.5	3	2-3
Tablets	3.5	3	3.5	4	3-4
Desk phones	5	n/a	n/a	n/a	n/a
AV and meeting room equipment	5	n/a	4	5	n/a

This approach is prudent because it delivers the best value for money while maintaining risk at an acceptable level.

1.7.1.1.2 Network and currency

The recommended option aligns with 'AGIG-one IT' approach to infrastructure refresh, which finalises the transition to the shared AGIG infrastructure environment commenced in AA5.

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[20] Gartner, Inc.: *Recommended Life Spans to Guide PC, Mobile and Other Device Replacement Strategies*, 31 March 2021

[21] SA Power Networks, *2020-25-2030 Regulatory Proposal*, Supporting document 5.12.5, 15 July 2024

[22] Ausgrid: Attachment 5.9.e – ICT & infrastructure program – 31 Jan 2023 – Public, Appendix 3

[23] Essential Energy ICT Business Plan – January 2023, p.12

This approach is prudent because it allows us to realise economies of scale from efficiently sharing the resources; it has a better NPV and treated risk level than its alternative.

1.7.1.1.3 Data centre

The recommended option of gradual transition to the cloud achieves cost savings ($0.7m for five-year NPV) compared to continuing the current on-premises arrangements.

It is prudent because follows the prevailing industry trends, delivers best value for money and has lower level of risk than the 'big bang' rapid transition also considered as one of the alternatives.

1.7.2 Implementation of the initiatives

End user device refresh is a standard BAU process that is not expected to face any challenges.

The preferred option for 'Network and currency' workstream dovetails into the program of work already undertaken by other AGIG entities, which decreases the implementation complexity and risk of failure.

Transition to the cloud is the journey undertaken by many companies, and we will be following a well-established pathway. The recommended option of gradual transition will allow us to further de-risk the implementation by using a staged approach and learning along the way.

1.7.3 Estimating the efficient costs

Costs for this project have been estimated using standard Australian market rates for labour and consulting, previous costs for similar projects and competitive tender pricing for services and licensing.

Replacement timelines and priorities are primarily driven by the device asset lifecycle, as defined in our lifecycle management framework. We have also had regard to our other IT programs of work in the next AA period (as described in our IT Investment Plan, provided at Attachment 9.9). In particular, the planned infrastructure renewal will ensure our devices are compatible with the objectives of the AGIG IT Strategy and Roadmap. Project streams will be delivered throughout the access arrangement to optimise and ensure the most efficient utilisation of resources, across both this, and other IT investments.

Table 1.39: IT sustaining infrastructure capex by project

ID	Category / Project	2026	2027	2028	2029	2030	Total
End User Devices							
DBP30-New-11	End User Devices	765	765	765	765	765	**3,825**
DBP30-New-13	Meeting Room Refresh	640	-	-	-	-	**640**
End User Devices total		**1,405**	**765**	**765**	**765**	**765**	**4,465**
Network and currency							

ID	Category / Project	2026	2027	2028	2029	2030	Total
DBP30-New-01	Office networking	410	-	154	-	999	1,564
DBP30-New-02	AD consolidation	-	256	150	-	-	406
DBP30-New-05	SOE	-	969	128	-	-	1,097
DBP30-New-06	OS currency	279	280	281	280	280	1,400
DBP30-New-07	SQL currency	362	390	-	22	-	775
DBP30-New-08	SNOW upgrades	100	100	100	100	100	500
DBP30-New-09	Collaboration	-	-	-	200	-	200
DBP30-New-10	Citrix Farm	251	-	-	-	-	251
DBP30-New-12	Citrix Virtual Servers	-	-	50	-	50	100
DBP30-New-14	SD-WAN	826	-	-	-	235	1,060
Network and currency total		**2,229**	**1,995**	**864**	**602**	**1,663**	**7,353**
Data centre							
DBP30-New-03	Data Centre Platform	380	109	108	108	214	**919**
DBP30-New-04	Infrastructure tools	17	17	17	17	17	**85**
Data centre total		**397**	**126**	**125**	**125**	**231**	**1,004**
Field connectivity							
Field connectivity total		**750**	**750**				**1,500**
Grand total		**4,780**	**3,636**	**1,753**	**1,491**	**2,660**	**14,321**

Table 1.40: IT sustaining infrastructure capex, by cost type

($'000)	2026	2027	2028	2029	2030	Total
Internal Labour	905	827	524	380	567	3,203
Contractors / Consultants	-	-	-	-	-	-
Materials & Services	3,876	2,809	1,230	1,111	2,093	11,118
Travel & Others	-	-	-	-	-	-
Total	**4,782**	**3,638**	**1,756**	**1,493**	**2,662**	**14,321**

1.7.4 Consistency with the National Gas Rules

Option 2, deliver proactive IT sustaining infrastructure initiatives, is the recommended solution and will maintain IT Infrastructure in line with accepted good industry practice.

1.7.4.1.1 Rule 79(2)(c)

The proposed expenditure on our IT sustaining infrastructure project is required to maintain the integrity of services through current, supported and fit for purpose IT infrastructure, managing technology risks and preventing material outages that impact the ability of the business to function (including tracking and reporting of business information to meet our regulatory obligations and requirements). Therefore this expenditure is consistent with NGR 79(2)(c)(ii) and (iii).

1.7.4.1.2 Rule 79(1)

The proposed expenditure on our IT sustaining infrastructure is also consistent with Rule 79(1)(a), specifically we consider the capital expenditure is:

- *Prudent* – The expenditure is necessary in order to address the identified risks to DBP, Reputation, Asset Damage and Supply. The project is based on the proactive replacement of IT infrastructure assets which have arrived at the end of their useful economic life, avoiding operational inefficiencies due to outages or deteriorated performance. The proposed expenditure can therefore be seen to be of a nature that would be incurred by a prudent service provider.

- *Efficient* – The forecast expenditure is based on historic costs for similar replacements. Pricing for these assets is sought through a competitive tender process, and is subject to regular market testing to ensure efficient prices are achieved. The proposed expenditure can therefore be considered consistent with the expenditure that a prudent service provider acting efficiently would incur.

- *Consistent with accepted good industry practice* – The proposed asset lifecycle for our IT infrastructure assets is consistent with that employed across industries.

- *Achieves the lowest sustainable cost of delivering pipeline services* – The proposed proactive replacement of IT infrastructure is more cost effective than a reactive, or lower frequency replacement program. Repair costs, and lost productivity, for IT infrastructure assets which fail, are typically more costly than replacement over the medium to longer term.

1.8 Comparison to previous periods

1.8.1 AA6 forecast compared to AA5 and AA4

In AA6, capital expenditure of $14.3 million is forecast for the IT sustaining infrastructure program. Table 1.40 shows the forecast AA6 capex compared with the actual capex in AA5.

Table 1.41: AA6 forecast capex compared with AA5 actual/estimated capex ($'000)

Forecast spend ($'000)	2026	2027	2028	2029	2030	AA6	AA5	Variance
End user devices	1,405	765	765	765	765	4,465	2,619	1,846
Network and currency	2,229	1,995	864	602	1,663	7,353	1,260	6,092
Data centre	397	126	125	125	231	1,004	1,884	(880)

Field connectivity	750	750				1,500	-	1,500
Total	**4,780**	**3,636**	**1,753**	**1,491**	**2,660**	**14,321**	**5,763**	**8,558**

However, due to the opex to capex transfer and AGIG-wide infrastructure consolidation that occurred during the AA5 period, it is more informative to compare the DBP total (capex plus opex[24]) IT infrastructure expenditure over the three AA periods (Figure 1.7).

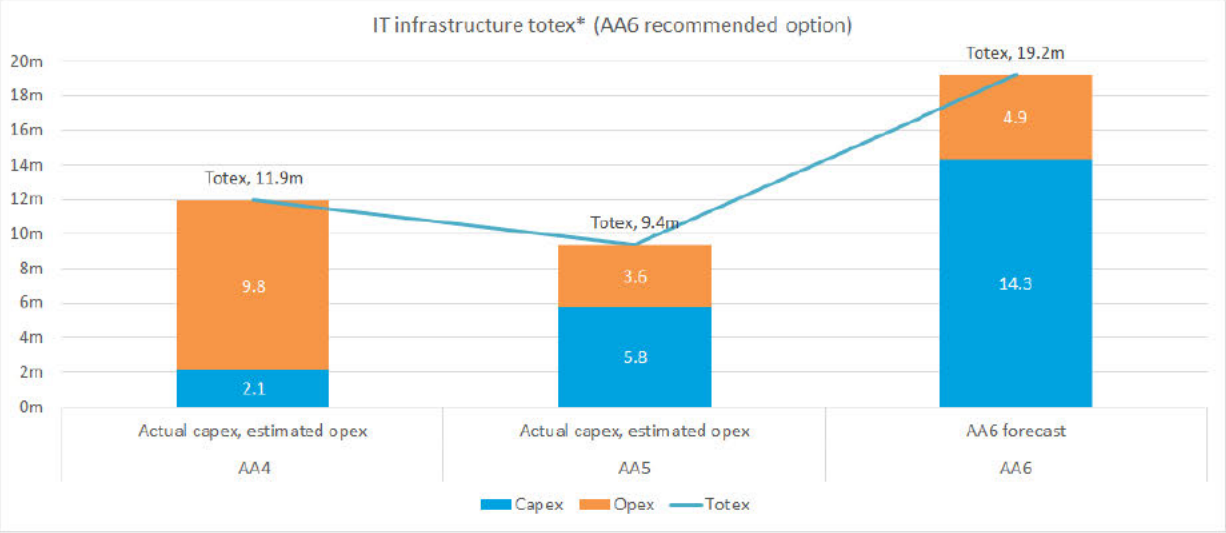


Figure 1.7: Total IT infrastructure expenditure* over the 15-year period from 2021 until 2030. ** **Note:** Opex estimates are based o [redacted] contracts. Opex excludes licences, internal labour, Service Desk/Deskside & SDM contracts, and data communications.*

1.8.1.1 Reasons for variances

Figure 1.8 provides a summary of the key changes in IT total infrastructure expenditure over the three AA periods. These changes are explained in the following sections.

[24] **Note:** Opex estimates are based on [redacted] contracts. Opex excludes licences, internal labour, Service Desk/Deskside & SDM contracts, and data communications.

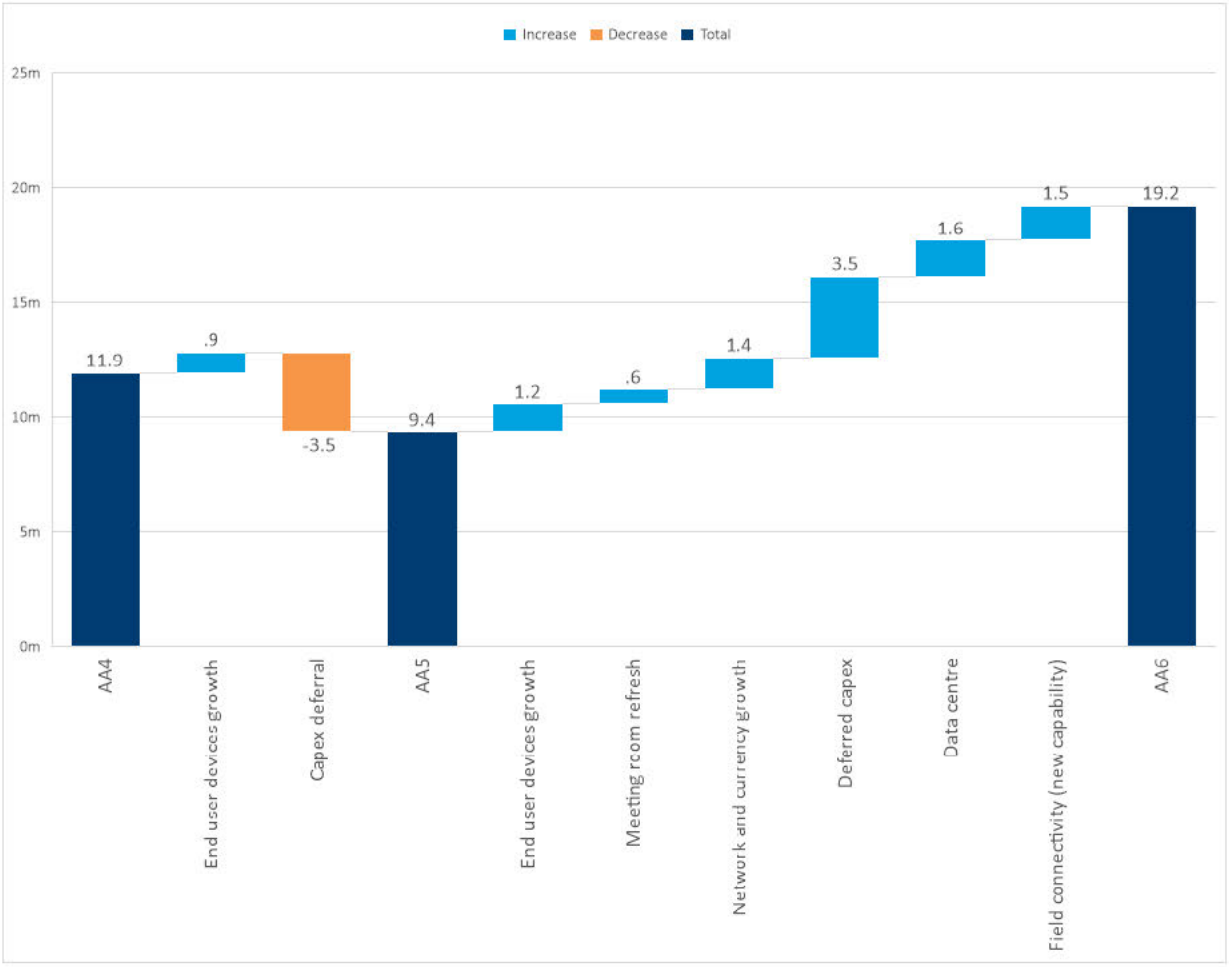


Figure 1.8: Estimated IT infrastructure totex* changes from AA4 to AA6.
** **Note:** Opex estimates are based o [redacted] contracts. Opex excludes licences, internal labour, Service Desk/Deskside & SDM contracts, and data communications.*

1.8.1.1.1 End user devices

The primary reason for the forecast expenditure increase is the significant (circa 28%) increase in the DBP user base, comprising both employees and contractors requiring the DBP IT equipment. The business reasons for this increase are:

- increased demand for transmission services
- centralisation of services, including the establishment of the National Gas Control centre.

Other reasons include:

- increased staff mobility necessitating additional equipment purchases, supporting infrastructure set up and faster refresh cycles of laptops and other personal computing equipment
- WFH and hybrid working arrangements requiring additional equipment and infrastructure set up.

Table 1.41 lists the current quantities of each of the end user devices owned by DBP and the reasons for change in the device quantities since 2020.

Table 1.42: Quantities of different types of end user devices

Device	Quantity		Drivers for change
	As at 2020	As at 2024	
Laptops	270	345	• Increase in the DBP user base
WFH hardware	-	50	• WFH/hybrid arrangements during and post Covid
Desktops	30	28	• Increased staff mobility and hybrid working arrangements driving the change from desktops to laptops
Sat phone	120	24	• Increase in the DBP user base
Mobile Phones		195	
Tablets		21	• Increased staff mobility and WFH/hybrid arrangements driving additional increases in mobile devices & accessories
Desk 'phones'	300	238	• Reduced need for this technology

1.8.1.1.2 Meeting room refresh

In AA5, there was a refurbishment of the Perth office, which was done as part of the Project Elevate undertaken by the DBP Property department. The AV equipment was purchased from that project budget and therefore not included in the AA5 actuals. There were previously six meeting rooms, now 10 (40% increase) with more sophisticated AV equipment due to remote and hybrid working requirements.

1.8.1.1.3 Network and currency

The primary drivers for the expenditure increase in this workstream are:

- the increase in the end user devices driven by the significant increase in the user base, increased staff mobility and WFH/hybrid arrangements as detailed in the previous section
- greater demand for network connectivity in the field, for example, for accessing the corporate applications that became available to our field crews during the AA5 period
- increased requirements for security risks mitigation.

1.8.1.1.4 Capex deferral

The AA6 forecast includes the network and currency capex that was deferred from AA5 due to funding constraints. As discussed in Section 1.3.1.1, since the DBP AA5 IT Investment Plan was developed prior to AGIG's approach to technology was finalised, it didn't include the 'AGIG One IT' roadmap infrastructure projects. Although DBP engaged in key initiatives (mainly related to the data centre consolidation as discussed in Section 1.8.1.1.5), we only undertook what was absolutely necessary and prudently deferred the rest of DBP's share of the program until AA6.

Figure 1.8 illustrates the effect of this deferral by showing the actual totex (solid line) vs the totex that would have been incurred in AA5 if none of the projects were deferred into AA6.

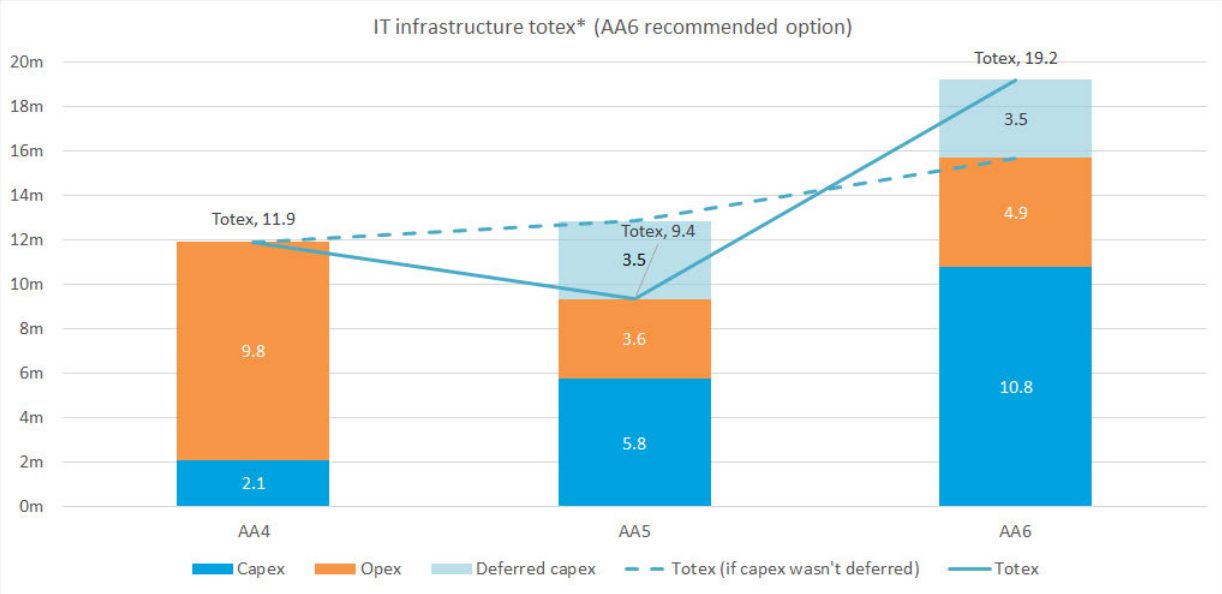


Figure 1.9: Total IT infrastructure expenditure over the 15-year period from 2021 until 2030 – the effect of capex deferral

1.8.1.1.5 Data Centre

The total data centre expenditure was reduced in AA5 compared to AA4 due to the consolidation of data centres as part of the 'AGIG One IT' roadmap. The reduction in totex in AA5 was partly due to economies of scale brought about by consolidation, partly due to leveraging the existing infrastructure already purchased by AGN and MGN.

The data centre infrastructure was due for refresh in AA5. Unlike some of the projects in the network and currency workstream, the data centre refresh could not be deferred due to security implications and the interconnected nature of the underlying services.

DBP undertook its part of the refresh, and this was the reason for the overspend compared to the amount determined in the AA5 Final Decision, which is further discussed in Section 1.8.2.

If DBP continued with the on-premise data centre arrangements in AA6 (Option 1: BAU), the data centre totex would have increased by $2.3 million compared to the AA5 due to the increased connectivity and security risk mitigation requirements. The move to cloud (Option 2: 'Organic' transition to cloud) mitigates this increase by efficient capex to opex substitution ($2.5 million reduction in capex substituted by $1.8 million increase in opex) and offers the most cost-effective solution in the long-term.

Figure 1.11 provides an overview of the IT sustaining infrastructure program.

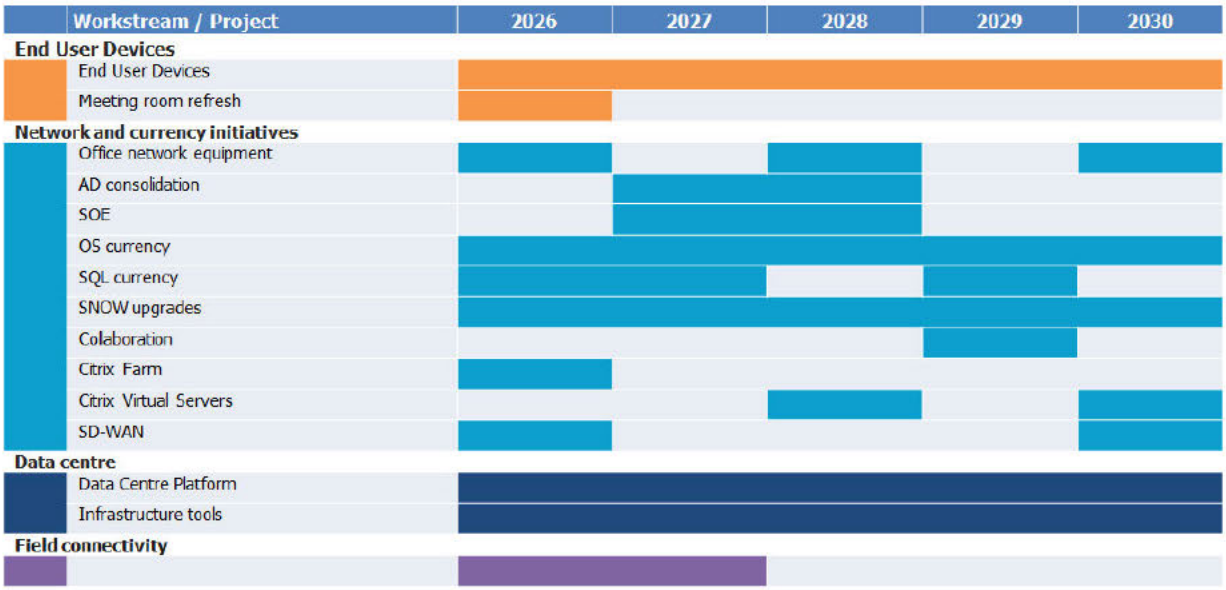


Figure 1.10: AA6 forecast capital works program

1.8.2 AA5 variance

Actual expenditure during the AA5 period was $2.0 million higher than the amount determined in the AA5 Final Decision.

Table 1.43: AA5 actual/estimated capital expenditure compared with budget

Actual v budget ($'000)	2021	2022	2023	2024	2025	AA5
AA5 actual/estimate	344	882	447	1,144	2,947	5,763
AA5 approved	528	790	499	791	1,176	3,784
Variance	**(185)**	**92**	**(52)**	**353**	**1,771**	**1,979**

The reason for the variance between the actual capex and the AA5 approved capex is the opex to capex transfer and the consolidation of the data centres that occurred in AA5 as part of the 'AGIG One IT' Strategy & Roadmap implementation. As discussed in Section 1.8.1.1, as part of the consolidation DBP leveraged the existing data centre infrastructure already purchased by AGN and MGN.

That infrastructure was due to refresh in 2024-25, which was the reason for the capex overspend compared to the amount determined in the AA5 Final Decision during the last two years of the AA5 period shown in Table 1.42.

A. Cost estimates

Detailed cost estimates for each workstream are available upon request:

- End user devices:
  - AGIG Reg Technology Costing Infra Renewal - DBP AA6 - EUD.xlsx
- Network and currency:
  - AGIG Reg Technology Costing Infra Renewal - DBP AA6 NW & Currency.xlsx
- Data Centre:
  - AGIG Reg Technology Costing Infra Renewal - DBP AA6 Data Centre.xlsx

B. Infrastructure categories

- **IT Data Centre Platforms**

  This category is comprised of high performance, hyper-converged hardware upon which server operating systems are hosted that run the business applications. The clusters include memory, compute and storage capacity to run virtualised operating systems (Windows or Linux) for various business applications. Data Centre platform equipment is typically replaced every 5 years in line with asset depreciation cycles.

- **Data Centre Core Network**

  This is comprised of high performance switching and routing equipment that enables network connectivity from DBP's office locations to the central Data Centre where the applications are hosted as well as between AGIG office locations to enable inter-company communication and collaboration. Data Centre Core Network equipment is typically replaced every 5 years in line with asset depreciation cycles.

- **Data Centre Appliances**

  This is comprised of specialised equipment such as wireless local area network (LAN) controllers that define the perimeter of the internal and external (internet) networks through which all traffic into and out of the data centre flows. Data Centre appliance equipment is typically replaced every 5 years in line with asset depreciation cycles.

- **Office Networking Equipment**

  This includes network switching and routing equipment located at end points of the connected network, i.e. the DBP office locations that provides a secure and private network connection to the central AGIG data centres within which the DBP applications are hosted and run. Office Networking equipment is typically replaced every 5 years in line with asset depreciation cycles.

- **Operating Systems**

  This comprises the virtualised server operating systems (Windows Server and Linux Redhat) and the workstation operating systems (currently Windows 10) on the end user desktops and laptops. Typically, the Standard Operating Environment (SOE) for each type is updated

and replaced every 3-5 years. For servers a staged program of replacement is performed over a number of years to opportunistically align with application upgrades or replacements. For end user devices, a new SOE is developed and deployed to the fleet within a shorter period to ensure standardisation of the user experience as quickly as possible. The version of a particular IT or OT application will often dictate the version of server operating system upon which it can run to ensure it will function as designed. This is why it is imperative to holistically consider operating system upgrades in line with application version upgrades or replacements both for server based and workstation-based applications.

- **Databases**

  This comprises the database software products upon which business and infrastructure related applications are reliant. Typically, databases are updated or replaced every 3-4 years to remain current and take advantage of new functionality, efficiencies and performance improvements. Database upgrades can be performed independently of application upgrades, though it is also generally the case that a database version upgrade will accompany an application upgrade or replacement. The version of a particular IT or OT application will often dictate the version of database software upon which it can run to ensure it will function as designed. This is why it is imperative to holistically consider database upgrades in line with application version upgrades or replacements.

- **Infrastructure Management Tools**

  This element of the infrastructure incorporates the suite of tools required to manage the technology environment and includes things such as monitoring software, backup hardware and software, the software distribution system for deployment of security updates, process orchestration software, the mobile device management platform, and secure file transfer services. Infrastructure tools are typically upgraded or replaced every 3-4 years to remain current and take advantage of new functionality to improve infrastructure management.

- **Authentication and Identity Management**

  This element involves the setup, management and maintenance of AGIG's multiple Active Directory (AD) instances which facilitate user identity authentication as well as access to applications and computing resources through policies and security groups. Like other infrastructure technologies, the functional version of AD needs to be upgraded or replaced every 3-4 years to remain current, take advantage of new or improved functionality and remain supported by the product vendor. AGIG has multiple corporate Active Directory instances, of which one is provided to DBP. A program to consolidate and upgrade the disparate Active Directory environments is required to drive standardisation of user experience, efficiencies of AD management and optimise the foundational component of the technology landscape through which all access is governed and controlled.

- **End User Devices**

  This comprises all equipment required by end users to perform their work and includes:

  - End user compute devices (e.g. laptops, tablets, mobile phones)
  - Office equipment (e.g. desktops, monitors, docking stations)

- Peripheral equipment such as keyboards, mice, etc.
- Working from home (WFH) hardware
- Printers and multi-function devices (MFPs)
- Mobile devices including mobile phones, tablet devices and satellite phones
- Telephony tools such as desk phones, handsets and headsets

Office End User equipment is typically replaced every 2-5 years in line with warranty and asset depreciation cycles. It is worth noting that approximately 50% of DBP devices operate in remote (red dust) environments and have a shorter than average lifespan. End user computing equipment has been maintained and replaced on a continuous cycle in the current AA period with a proportion of the end user fleet of devices replaced every year. This approach is expected to continue in the next AA period.

- **Meeting room equipment**

Meeting room equipment includes Video Conferencing, presentation and digital signage technology for DBP offices.

- The existing meeting rooms in the DBP offices have existing video conferencing capabilities including screens, cameras, microphone, speakers and control systems that require a hardware refresh every five years to ensure vendor support, reliability and compatibility with Microsoft Teams functionality.
- Across the DBP offices there are digital signage screens that present information to staff. This hardware and associated platforms require a hardware and software refresh every five years to ensure vendor support, reliability and compatibility with Microsoft Teams functionality.

This current AV equipment was purchased and installed in 2021 under the office fit out Propert budget (Project Elevate) and requires a refresh in 2026.

- **End User Compute Software**

This comprises the workstation operating systems, optimisation technologies and collaboration tools required by end users to function effectively. This includes the following components.

- Standard Operating Environment (SOE) image:
  - Base windows operating system, preferred web browsers, embedded end-point client software such as Adobe Reader, SAP GUI, Citrix Workspace, file compression software, etc., and standard productivity tools such as Microsoft Office365.
- Optimisation and Collaboration Tools:
  - SharePoint platform and sites, Office365 platform and features, Citrix farms and Microsoft Teams services.

Typically, the SOE image is updated and replaced every 3-5 years to optimise user productivity and leverage improved performance as well as new features and functionality. Any new SOE is developed and deployed to the fleet of end-point devices in a relatively short timespan to ensure standardisation of the user experience as quickly as possible.

The software components that make up a suite of products to optimise the end user experience or provide platforms for collaboration are typically upgraded or replaced every 3-5 years. For subscription-based services like Office365 or Teams, it is possible to benefit from iterative development by Microsoft on a more frequent basis, but care needs to be taken when releasing new capability to the user population to ensure compatibility of these tools with applications, and that DBP's security and operating conditions are not compromised. Optimisation technology like Citrix and collaboration platforms like SharePoint require a more structured approach to manage upgrades and replacements which would also typically be every 3-5 years.

- **IT Service Management tools**

  This category includes the software that provides digital workflows and procedures to support standard IT processes, including:

  - Incident Management
  - Request Management
  - Change Management
  - Knowledge Management
  - IT Purchasing

C. Risk Management Framework

Risk Management Process

Risk management is a constant cycle of identification, analysis, treatment, monitoring, reporting and then back to identification (as illustrated in Figure 1.12). When considering risk and determining the appropriate mitigation activities, we seek to balance the risk outcome with our delivery capabilities and cost implications. Consistent with stakeholder expectations, safety and reliability of supply are our highest priorities.



Figure 1.11 Risk management principles

Our risk assessment approach focuses on understanding the potential severity of failure events associated with each asset and the likelihood that the event will occur. Based on these two key inputs, the risk assessment and derived risk rating then guides the actions required to reduce or manage the risk to an acceptable level.

Our risk management framework is based on:

AS/NZS ISO 31000 Risk Management - Principles and Guidelines, AS 2885 Pipelines-Gas and Liquid Petroleum; and AS/NZS 4645 Gas Distribution Network Management.

The Gas Act 1997 and Gas Regulations 2012, through their incorporation of AS/NZS 4645 and the Work Health and Safety Act 2012, place a regulatory obligation and requirement on DBP/AGIG to reduce risks rated high or extreme to low or negligible as soon as possible (immediately if extreme). If it is not possible to reduce the risk to low or negligible, then we must reduce the risk to as low as reasonably practicable (ALARP).

When assessing risk for the purpose of investment decisions, rather than analysing all conceivable risks associated with an asset, we look at a credible, primary risk event to test the level of investment required. Where that credible risk event has an overall risk rating of intermediate or higher, we will undertake investment to reduce the risk.

Six consequence categories are considered for each type of risk:

1. **People** – injuries or illness to employees and contractors or members of the public
2. **Environmental impact** – impact on the surroundings in which the asset operates, including natural, built and Aboriginal cultural heritage, soil, water, vegetation, fauna, air and their interrelationships
3. **Supply** – disruption in the provision of services/supply, impacting customers
4. **Impact on AGIG** – ability of DBP/AGIG to operate the asset(s) without restrictions due to regulatory enforcement or legal actions
5. **Reputation / outrage** – impact on stakeholders' opinion of DBP/AGIG, including personnel, customers, investors, security holders, regulators and the community
6. **Loss** – financial impact on DBP/AGIG

Enterprise Risk Matrix – Tables

RISK MATRIX						
		Consequence				
	Frequency	1 Trivial	2 Minor	3 Severe	4 Major	5 Catastrophic
E	Frequent	LOW	INTERMEDIATE	HIGH	EXTREME	EXTREME
D	Occasional	LOW	LOW	INTERMEDIATE	HIGH	EXTREME
C	Unlikely	NEGLIGIBLE	LOW	INTERMEDIATE	HIGH	HIGH
B	Remote	NEGLIGIBLE	NEGLIGIBLE	LOW	INTERMEDIATE	HIGH
A	Hypothetical	NEGLIGIBLE	NEGLIGIBLE	NEGLIGIBLE	LOW	INTERMEDIATE

CONSEQUENCE DEFINITIONS						
	People	Environmental Impact	Supply	Impact on AGIG	Reputation / Outrage	Loss
5 Catastrophic	More than two fatalities	Impact widespread; Viability of ecosystems or species affected; or Permanent major changes.	Widespread or significant societal impact, such as complete loss of supply to a major city for an extended time (> a few days) *Interruption of supply for ≥1 week; or Curtailment (>30% capacity) for ≥2 weeks*	Would threaten the survival of AGIG without an additional unplanned equity contribution.	Prolonged adverse *international* coverage (social and media) on business and energy industry	>$31 M
4 Major	Up to two fatalities; or Several people with life-threatening injuries	Major impact well outside pipeline corridor or site; or Long-term severe effects; or Rectification difficult	Widespread societal impact such as loss of supply to a major city for a short time (hours to days) or to a localised area for a longer time *Interruption of supply for ≥1 day but <1 week; or Curtailment (>30%capacity) for ≥3 days but <2 weeks.*	Would threaten the effective operation of AGIG for a substantial period, including its ability to raise capital, or have a significant effect on how AGIG will operate in the future.	Prolonged adverse *national* coverage (social and media) / Sustained negative reports by financial analysts	≤$31 M >$16 M
3 Severe	Injury or illness requiring hospital treatment	Localised impact, substantially rectified within a year or so	Localised societal impact or short-term supply interruption (hours) *Curtailment (>30%capacity) for <3 days; or Curtailment (<30%capacity) for ≥2 days but <1week*	No threat to the effective operation of AGIG, but exposes AGIG to unacceptable cost consequences.	Sustained adverse *national* media articles or viral social media	≤$16 M >$6 M
2 Minor	Injuries requiring first aid treatment	Impact very localised and very short-term (weeks), minimal rectification	Interruption or restriction of supply but shortfall met from other sources	No significant impact on AGIG, issues are dealt with internally.	Sustained adverse *local* media articles or detrimental social media comments	≤$6 M >$3 M

			Curtailment (<30%capacity) for <2 days			
1 Trivial	Minimal impact on health and safety	No effect; or Minor impact rectified rapidly (days) with negligible residual effect	No loss or restriction of pipeline supply	No significant impact on AGIG, issues are routinely dealt with by operational areas.	Isolated adverse *local* media comment or articles, or low levels of detrimental social media comments	≤$3 M

FREQUENCY DEFINITIONS		
	Frequency Definitions	**Numerical Guidelines** (event/1,000km/year)
E Frequent	Expected to occur once per year or more	≥ 1 (yearly)
D Occasional	May occur occasionally in the life of the pipeline	1 to 0.1 (every 10 years or less)
C Unlikely	Unlikely to occur within the life of the pipeline, but possible	0.1 to 0.001 (10^{-1} to 10^{-3}) (every 1,000 years or less)
B Remote	Not anticipated to occur for this pipeline at this location	0.001 to 0.00001 (10^{-3} to 10^{-5}) (every 100,000 years or less)
A Hypothetical	Event is theoretically possible, but would only occur under extraordinary circumstances	< 0.00001 (< 10^{-5}) (less frequent than every 100,000 years)

RISK TREATMENT ACTION	
EXTREME The risk is intolerable	Modify the threat, the frequency or consequence so that the risk rank is reduced to 'Intermediate' or lower. For an in-service pipeline/asset, the risk shall be reduced immediately.
HIGH The risk is intolerable	Modify the threat, the frequency or consequence so that the risk rank is reduced to 'Intermediate' or lower. For an in-service pipeline/asset, the risk shall be reduced as soon as possible. Risk reduction should be completed within a timescale of not more than a few weeks. **For Commercial risks, review the risks and where practicable reduce by additional mitigation measures such as hedging, insurance, etc.**
INTERMEDIATE The risk is tolerable if ALARP	Repeat threat identification and risk evaluation processes to verify the risk estimation; determine the accuracy and uncertainty of the estimation. Where the risk rank is confirmed to be 'Intermediate', where reasonably practicable modify the threat, the frequency or consequence to reduce the risk rank to 'Low' or 'Negligible'. Where it is not reasonably practicable to reduce the risk rank to "Low" or "Negligible", action shall be taken to: (a) Remove threats, reduce frequencies and/or reduce severity of consequences to the extent practicable; and (b) Formally demonstrate ALARP. For an in-service pipeline/asset, the reduction to 'Low' or 'Negligible' or demonstration of ALARP shall be completed as soon as possible. Risk reduction or demonstration of ALARP should be completed within a few months.
LOW The risk is tolerable	Determine the management plan for the threat to prevent occurrence and to monitor changes that could affect the classification.

NEGLIGIBLE The risk is tolerable	Review at the next relevant SMS/Formal Safety Assessment (for periodic operational review, land use change, encroachment, or change of operating conditions).

D. Risk assessment

End user devices

Primary Risk Event	Proposed Action		People	Environmental impact	Supply	Impact on AGIG	Reputation / Outrage	Loss
Failure/reliability of end user devices such as laptops and AV systems due to age. Security and reliability concerns that mobile devices are usupported by vendor due to age (end of life with no vendor support)	Option 1 - Vendor recommended refresh	Likelihood	Hypothetical	Hypothetical	Hypothetical	Hypothetical	Hypothetical	Hypothetical
		Consequence	Trivial	Trivial	Trivial	Minor	Minor	Minor
		Risk Level	NEGLIGIBLE	NEGLIGIBLE	NEGLIGIBLE	NEGLIGIBLE	NEGLIGIBLE	NEGLIGIBLE
	Option 2 - Conservative refresh	Likelihood	Remote	Remote	Remote	Remote	Remote	Remote
		Consequence	Trivial	Trivial	Trivial	Minor	Minor	Minor
		Risk Level	NEGLIGIBLE	NEGLIGIBLE	NEGLIGIBLE	NEGLIGIBLE	NEGLIGIBLE	NEGLIGIBLE
	Untreated risk	Likelihood	Frequent	Frequent	Frequent	Frequent	Frequent	Frequent
		Consequence	Trivial	Trivial	Minor	Severe	Severe	Severe
		Risk Level	LOW	LOW	INTERMEDIATE	HIGH	HIGH	HIGH

Network and currency

Primary Risk Event	Proposed Action		People	Environmental impact	Supply	Impact on AGIG	Reputation / Outrage	Loss
Failure/reliability of networking devices due to age. Security and	Option 1 - DBP Centric approach	Likelihood	Remote	Remote	Remote	Remote	Remote	Remote
		Consequence	Minor	Minor	Minor	Severe	Severe	Severe
		Risk Level	NEGLIGIBLE	NEGLIGIBLE	NEGLIGIBLE	LOW	LOW	LOW

reliability concerns that systems (OS, SQL, Citrix, SOE) are usupported by vendor due to age (end of life with no vendor support)	Option 2 - AGIG One IT approach	Likelihood	Hypothetical	Hypothetical	Hypothetical	Hypothetical	Hypothetical	Hypothetical
		Consequence	Minor	Minor	Minor	Severe	Severe	Severe
		Risk Level	NEGLIGIBLE	NEGLIGIBLE	NEGLIGIBLE	NEGLIGIBLE	NEGLIGIBLE	NEGLIGIBLE
	Untreated risk	Likelihood	Frequent	Frequent	Frequent	Frequent	Frequent	Frequent
		Consequence	Minor	Minor	Minor	Severe	Severe	Severe
		Risk Level	INTERMEDIATE	INTERMEDIATE	INTERMEDIATE	HIGH	HIGH	HIGH

Data centre

Primary Risk Event	Proposed Action		People	Environmental impact	Supply	Impact on AGIG	Reputation / Outrage	Loss
Failure/reliability of physical server infrastructre devices due to age. Security and reliability concerns that infrastructure is usupported by vendor due to age (end of life with no vendor support)	Option 1 - BAU	Likelihood	Hypothetical	Hypothetical	Remote	Remote	Hypothetical	Remote
		Consequence	Trivial	Trivial	Minor	Minor	Trivial	Minor
		Risk Level	NEGLIGIBLE	NEGLIGIBLE	NEGLIGIBLE	NEGLIGIBLE	NEGLIGIBLE	NEGLIGIBLE
	Option 2 - Organic transition to Cloud	Likelihood	Hypothetical	Hypothetical	Remote	Remote	Hypothetical	Remote
		Consequence	Trivial	Trivial	Minor	Minor	Trivial	Minor
		Risk Level	NEGLIGIBLE	NEGLIGIBLE	NEGLIGIBLE	NEGLIGIBLE	NEGLIGIBLE	NEGLIGIBLE
	Option 3 - Big Bang transition to cloud	Likelihood	Hypothetical	Hypothetical	Unlikely	Unlikely	Hypothetical	Unlikely
		Consequence	Trivial	Trivial	Minor	Minor	Trivial	Minor
		Risk Level	NEGLIGIBLE	NEGLIGIBLE	LOW	LOW	NEGLIGIBLE	LOW
	Untreated risk	Likelihood	Frequent	Frequent	Frequent	Frequent	Frequent	Frequent
		Consequence	Minor	Minor	Minor	Severe	Severe	Severe
		Risk Level	INTERMEDIATE	INTERMEDIATE	INTERMEDIATE	HIGH	HIGH	HIGH

Capex DBP35: Power generation and management

1.1 Project approvals

Table 1.1: DBP35 Power generation and management – Project approvals

Prepared by	Tim Aujard, Head of Asset Performance
Reviewed by	Jeff Kong, Head of Transmission Asset Strategy
Approved by	Tawake Rakai, EGM Transmission Asset Management

1.2 Project overview

Table 1.2: DBP35 Power generation and management – Project overview

Description of problem /opportunity	This business case considers the various power generation and management assets used to meet the electricity needs to operate the DBNGP. Power generation technology and its commercial viability is evolving quickly. We have an opportunity to look at our operational requirements and identify where we can adopt more efficient energy solutions. Historically, our various power assets have been managed individually, or as part of a broader program (e.g. compressor stations or meter stations). We are now taking a more holistic and strategic approach our power assets, considering the best options overall to keep the pipeline operating while reducing costs and carbon emissions in line with requirements under the Safeguard Mechanism. Consolidating different power assets into one business case allows for a comprehensive view of energy production and consumption patterns, helping identify inefficiencies and overlaps in the system. The six categories of power related assets are: • Gas and diesel engines • GEA control systems • Closed cycle vapor turbogenerators (CCVT) • Renewable power supply • Loadbank control panels • Electrical system upgrades This business case outlines our proposal for all six of our power asset categories. Integrated management of these power asset categories helps to pinpoint opportunities to reduce overall consumption and carbon emissions, enhance sustainability and improve the overall efficiency of energy solutions. Our approach remains to apply standard asset management practice, using end-of-life/technical obsolescence as a typical trigger for investment. However, rather than simply replacing assets like-for-like when they are at the end of their technical life, we are considering our overall emissions footprint and identifying where we can adopt alternative or more efficient technology to reduce our carbon footprint. This includes replacing assets where prudent, economically efficient and socially responsible to do so.
Untreated risk	As per risk matrix = High

Options considered	• Option 1 – Move to a replacement on failure policy (no upfront capex or opex) • Option 2 – Replace end of technical life assets, including replacing 5 GEAs with right-sized equivalents ($31.3 million capex, $3.5 million opex) • Option 3 – Replace end of technical life assets, including replacing 7 GEAs with right-sized equivalents ($34.6 million capex, $3.5 million opex)
Proposed solution	Option 3 is the recommended option. In the AA6 period we propose to replace all our obsolete power generation and management assets including: • 12 GEA control systems • 19 CCVTs • 5 solar PV arrays • 65 batteries • 32 rectifiers • 10 loadbank control panels We will also replace seven GEAs with contemporary, 'right-sized' GEAs to avoid expensive major overhaul costs, help us meet our emission reduction targets in line with our Multi-Year Monitoring Plan, and reduce our fuel consumption. This includes two GEAs at CS2 and CS3, which while not yet due for major overhaul, would benefit from being replaced with more efficient, appropriately sized engines. We will also upgrade the electrical systems at 30 of our key locations to allow for increased renewable power use to contribute to our emissions reduction efforts. The program also includes scheduled minor overhauls of GEAs. Overhauls are expensed as opex.
Estimated cost	The forecast direct cost (excluding overheads) during the next five-year period (AA6) is $34.6 million in capital and $3.5 million in operating expenditure.

Capex	5,863	8,842	7,459	8,581	3,893	**34,638**
Opex	1,400	700	350	700	350	**3,500**

Basis of costs	All costs in this business case are expressed in real unescalated dollars December 2024 unless otherwise stated.
Treated risk	As per risk matrix = Intermediate
Variation from AA5	This business case is new in AA6. Some of these activities were undertaken under different business cases in AA5, including for example GEA overhauls, but have since been brought together in one plan to allow management of the asset class as a whole. This will also provide us with a better opportunity to meet our obligations to reduce our carbon emissions in line with our Multi-Year Monitoring Plan.
Alignment to our vision	This option delivers against all relevant objectives. By replacing end of technical life assets, we are reducing the potential for safety issues and supply disruptions that may otherwise occur if obsolete assets fail in service. Mitigating supply and safety issues is consistent with *Delivering for Customers*. The proposed solution is also consistent with our objective of being *Sustainably Cost Efficient*, as we will be reducing emissions, while applying technology that is consistent with good industry practice, at a reasonable cost.

Consistency with the National Gas Rules (NGR)	**NGR 79(1)** – The proposed asset replacement is consistent with accepted good industry practice, several practicable options have been considered, and market/unit rates have been tested to achieve the lowest sustainable cost of providing pipeline services. **NGR 79(2)** – These assets provide the only source of power at operationally critical sites on the pipeline, such as compressor stations and communications sites. They are controlled remotely and switched on and off to meet the immediate power needs of the compressor station in support of the gas requirements of our customers. Without power, there is a risk that gas flow cannot be controlled properly, causing a safety and supply risk, particularly in the event of an emergency. The proposed expenditure for the replacement of engines is required to maintain and improve the safety and maintain the integrity of services as per NGR 79(2)(c)(i) and (ii). **NGR 74** – The forecast costs are based on the latest market rate testing, and project options consider the asset management requirements. Cost assessments have been conducted for each option based on the best information available at the time of developing this business case. The estimate has therefore been arrived at on a reasonable basis and represents the best estimate possible in the circumstances.
Stakeholder engagement	Shippers have told us they highly value current levels of reliability and would be concerned if this were to change. They also expect us to maintain a strong focus on operational issues as it is important for reliability and emergency management. Our GEA engine replacement program will address failure risks as the units reach end of life whilst ensuring reliable and appropriately sized units are in place. During shipper roundtable meetings, we shared an overview of our expenditure program, which included the proposed power management capex. No concerns were raised at the time, and there was general acceptance that DBP should adopt lower-carbon and more efficient energy solutions where practicable and cost effective to do so.
Other relevant documents	This Business Case should be read in conjunction with: • Asset Management Plan • Compressor Station Power Generation Asset Strategy • Asset Management Plan – Electrical Control and Instrumentation • Multi-Year Monitoring Plan • Risk Management Policy and Operational Risk Model (together our Risk Management Framework)

1.3 Background

This business case considers the various power generation and management assets used to operate the DBNGP. Power generation technology and its commercial viability is evolving quickly. We therefore have an opportunity to look at our operational requirements and identify where we can adopt more efficient energy solutions.

Our power assets provide electricity at compressor stations and other large facilities such as those at Dampier. Our compressor stations are powered using mains power where we are able to economically connect the site to an electricity network (Western Power in the south and

Horizon Power in the north). However, for a number of our compressor stations this is not feasible. In these instances, we use onsite gas and diesel engine alternators (GEAs and DEAs).

Historically, our various power assets have been managed individually, or as part of a broader program (e.g. compressor stations or meter stations). We are now shifting to a more holistic approach to managing our power assets, considering the best options overall to keep the pipeline operating while reducing fuel consumption and carbon emissions in line with our Multi-Year Monitoring Plan.

1.3.1 Compliance with emissions reduction requirements

One of the drivers for investment in our power generation assets is to help achieve our emissions reduction targets under the Safeguard Mechanism. The Safeguard Mechanism seeks a year-on-year 4.9% reduction in emissions intensity for power generation (commencing 2023/24 reporting period). Furthermore, the DBNGP is required to align its site-specific emissions intensity factor with the industry average emissions factor using a year-on-year reduction until the 2029/30 reporting period. This results in a requirement to reduce the emissions intensity of DBNGP power generation by 56% to avoid exceeding the power generation emissions target.

Under Section 65 of the National Greenhouse and Energy Reporting (Safeguard Mechanism) Rule 2015, we applied for a multi-year monitoring period due to an exceedance of 20,817 tCO_2e above our FY23 Transitional Calculated Baseline of 246,362 tCO2e. As part of the application to the Clean Energy Regulator, we set out our plan (Multi-Year Monitoring Plan) to reduce our emissions.

Power generation accounts for approximately 8% of total DBNGP CO_2 emissions. The majority of our power generation occurs at our compressor stations. Two of our compressor stations are connected to the electricity grid, the remainder use GEAs to generate electricity (with DEAs in reserve).

Many of the GEAs are old and relatively inefficient. In some cases, the GEAs are significantly oversized, capable of producing far more electricity than is required to operate the site. GEA technology has advanced, with modern GEAs able to produce electricity more efficiently and at an appropriate output level.

As per the proposal outlined in the sections below, if we were to replace seven GEAs at six compressor stations with the right sized and more efficient GEAs, we would reduce our emissions by approximately 1,010 tCO_2e per annum. Of the seven that are proposed to be replaced, five are approaching or beyond their technical life (in terms of running hours) and are due for a costly major overhaul. The remaining two, while not yet at end-of-life, are large and relatively inefficient older model GEAs. Both are due for an overhaul during the AA7 period. There is therefore an opportunity to replace these two with more efficient modern engines and reduce ongoing carbon emission intensity.

Along the DBNGP, smaller MLV facilities are either solar powered, grid connected or powered by gas fired CCVTs. If, as proposed below, we replace CCVTs at 19 repeater sites along the pipeline with solar and batteries, each CCVT replacement will reduce our emissions by 130 tCO2e per annum.

Should we be unable to achieve our required emissions reductions over the period, we would need to purchase Australian Carbon Credit Units or pay penalties.

1.3.2 GEA works program

The purpose of a GEA is to generate electricity. They are used at compressor stations as prime power generation and at MLVs for backup power generation for battery charging. They range from [redacted] at compressor stations.

The DBNGP operates 26 GEAs and six (DEAs)[1]. Our GEAs were installed at the time of the commissioning of the relevant section of the pipeline. As these assets are critical to maintain pipeline pressure, they are subject to a preventative maintenance routine that involves the following:

- Scheduled in-service inspections
- Scheduled overhaul
- Scheduled replacement

There are two primary GEA unit types installed at DBNGP compressor stations, supplied by different manufacturers. They are [redacted]. An image of a GEA is shown in Figure 1.3.

Figure 1.1: GEA



[1] In addition to the primary GEAs, there are also diesel engine alternators (DEAs) that provide backup power. These include 2 x [redacted] at Pluto Interconnect Compressor Station.

1.3.2.1 GEA overhauls and replacement

The maintenance regime performed on GEAs is based on preventative maintenance requirements directed by the OEM. This is complemented with periodic checks and scheduled maintenance at specified intervals, based on operational run hours or calendar time, whichever comes first. Maintenance practices are subject to Australian Standards and relevant codes of practices. Prescriptive maintenance requirements are also set by the relevant state pipeline regulator or from state government regulations.

In addition to monthly monitoring and routing maintenance, each GEA is also subject to an overhaul program. GEAs have minor overhauls after 12,000 and 24,000 hours, and then require a major 'zero-hour' overhaul at around 54,000 hours (this can vary depending on the model, but ~54,000 is a reasonable indicator).

The average cost of a minor overhaul is $350,000, with a major overhaul ranging from $500,000 to $700,000. Overhauls are expensed as opex.

Overhauls

Over the AA6 period, eleven of our GEAs are expected to fall due for either major or minor overhaul, with two of these GEAs requiring two minor overhauls each within the period.

Major (zero-hour) overhauls are high cost and time consuming activities. As part of our ongoing asset management practice, and in light of our commitments under the Safeguard Mechanism and Multi-Year Monitoring Plan, we have reviewed our power management requirements and are shifting away from the historical practice of simply undertaking major overhauls and like-for-like replacements.

Our revised approach going forward is that all future zero-hour overhauls of GEAs are subject to an engineering and asset performance review. Zero-hour overhauls should only proceed if it is the most cost effective option. The preference is to defer overhaul indefinitely, or where this is not safe or practicable to defer overhauls, replace the engine with a correctly sized (smaller) and more efficient GEA that will still meet the power needs of the site.

We have therefore looked at the overhauls program for the AA6 period and identified opportunities to replace GEAs rather than conduct major overhauls. Table 1.3 summarises our findings.

Table 1.3: GEAs requiring overhaul during the AA6 period

Facility	Unit	Utilisation	Estimated run hours by end of the AA6 period if not overhauled	Overhaul major/minor	Recommended action in AA6
CS1	2	45%	141936	Major	Replace
CS2	3	79%	129674	Minor	Overhaul
CS3	1	47%	39935	Minor	Overhaul

Facility	Unit	Utilisation	Estimated run hours by end of the AA6 period if not overhauled	Overhaul major/minor	Recommended action in AA6
CS4	1	11%	107925	Major	Replace
CS4	3	82%	40277	Minor	Overhaul
CS5	1	57%	34833	Minor	Overhaul
CS5	2	43%	66420	Major	Replace
CS6	1	41%	78402	Major	Replace
CS6	2	39%	83128	Major	Replace
CS9	1	44%	95850	Minor x 2	Overhaul
CS9	2	56%	98966	Minor x 2	Overhaul

As shown in Table 1.3, we plan to overhaul six of the eleven GEAs during the period, with the units at CS9 each requiring two minor overhauls during the period (so eight overhauls in all). The other five are earmarked for replacement rather than overhaul, as we have an opportunity to replace these currently oversized units with smaller, more efficient GEAs. The proposed replacement and right-sizing of GEAs is discussed in the following section.

We have therefore budgeted opex to complete eight GEA overhauls during the period, at a cost of ~$350,000 each. We have also included contingency for two premature failures during the period, again at a cost of $350,000 each (see Table 1.5).

Table 1.4: GEA overhauls program, opex $'000 2024

GEA overhauls	2026	2027	2028	2029	2030	Total
Unit	CS4 Unit 3 CS9 Unit 1	CS3 unit 3 CS3 Unit 1 CS5 Unit 1 CS9 Unit 2	-	CS9 Unit 1	CS9 Unit 2	**8 minor overhauls**
Minor overhaul	700	1,400	-	350	350	**2,800**
Budget for premature failure	-	-	350	350	-	**700**
Total overhauls opex	**700**	**1,400**	**350**	**700**	**350**	**3,500**

Replacements

As part of our commitment to reduce emissions, we have looked at whether there is scope to replace some of our less efficient GEAs with newer, more appropriately sized engines. We are experiencing a significant increase in costs associated with the maintenance of these units (around $700,000 for a zero-hour overhaul on our [redacted] engines, when compared with a [redacted]). This has meant we have considered whether it is prudent and ultimately more efficient to replace rather than continue to maintain these units given the current and forecast use of the pipeline, and currently available technology.

Moreover, in some cases we have an opportunity to 'right-size' the replacement engines to be more cost efficient in their operations, reduce system use gas (SUG) consumption, and reduce emissions while maintaining pipeline service.

Our assessment has concluded that we can right-size seven of our GEA engines (See Table 1.5).

Table 1.5: GEAs identified for right-sizing in the AA6 period

Facility	Unit	Type	Current power	New unit power	Due for overhaul in AA6	Driver for replacement
CS1	2	[redacted]a	400 kW	200-300 kW	Yes	End of life. Zero-hour overhaul due
CS4	1	[redacted]	507 kW	200-300 kW	Yes	End of life. Zero-hour overhaul due
CS5	2	[redacted]	500 kW	200-300 kW	Yes	End of life. Zero-hour overhaul due
CS6	1	[redacted]	400 kW	200-300 kW	Yes	End of life. Zero-hour overhaul due
CS6	2	[redacted]	400 kW	200-300 kW	Yes	End of life. Zero-hour overhaul due
CS3	2	[redacted]	500 kW	200-300 kW	No	Heavily utilised. Opportunity to schedule GEA replacement to coincide with control system replacements at CS3 in 2026
CS2	4	[redacted]	850 kW	200-300 kW	No	Significantly over-powered and inefficient. Opportunity to replace when crews are onsite in 2030 to replace control systems

Of those identified for replacement, five of the engines are due for a zero-hour overhaul, so we are replacing them with more efficient GEAs with a power capacity of 200 to 300 kW. The remaining two, have slightly different drivers.

CS3 Unit 2 is heavily utilised. While it is not scheduled for zero-hour overhaul until the beginning of the AA7 period, we have an opportunity to replace it in 2026 as our crews will be onsite at CS3 replacing the control systems on all three GEAs. Given Unit 2 is approaching its major overhaul in 2030/31, it makes sense to bring the work forward and replace the GEA with a smaller, more efficient engine while we are replacing the control system.

CS2 Unit 4 is significantly oversized. While the run hours are relatively low (around 10,000), the engine is an 850 kW machine. An 850 kW GEA is substantially larger than what is required to operate the compressor, and produces significantly more emissions than the other units. In 2030 we are scheduled to replace the control systems for CS2 Unit 1 and Unit 3, therefore we will take the opportunity while our crews are there to replace the oversized 850 kW unit with a smaller, more efficient GEA.

Table 1.4 shows the proposed replacement schedule.

Table 1.6: GEA replacements program, capex $'000 2024

GEA replacements	2026	2027	2028	2029	2030	Total
Unit	CS3 Unit 2	CS4 Unit 1 CS1 Unit 2	CS5 Unit 2	CS6 Unit 1 CS6 Unit 2	CS2 Unit 4	N/A
Number of replacements	1	2	1	2	1	**7**
Total replacement capex	**1,660**	**3,320**	**1,660**	**3,320**	**1,660**	**11,620**

Aligning these GEA replacements with the GEA control system replacements is a key part of our GEA management strategy. Where practicable, we have attempted to align GEA replacements with the scheduled replacement of end-of-life control packages at the same compressor station site. This is discussed further below.

1.3.2.2 GEA control systems

During the period, several of our GEAs require new control systems, as the existing control systems will reach their 15-year replacement cycle (as recommended by the OEM). The GEA control systems are the 'brains' of these units, therefore it is important the control systems are fit for purpose and do not fail. The GEA control systems are linked to our station control system, and allow us to activate units in a structured manner and start up the compressors remotely when required. If the control systems fail, then the GEA will not start and there will be insufficient AC power to start the compressor units. If the GEAs fail when the compressor is running, the compressor units are designed to shut down safely. GEAs also provide AC power to supply all equipment and buildings at the compressor stations.

Replacement of a GEA control system includes replacing the control panel, including HMI, fire and gas system, programmable logic controller, relays, isolators, push buttons and any other items requiring replacement as per the OEM recommendations. Currently, we use four different types of control system. Our approach for this control system replacement work is to replace the obsolete assets with standardised units.[2]

Table 1.7 shows the GEAs that require new control systems during the AA6 period.

[2] The standardised power management system program is in line with the recommendations of a FEED study undertaken in 2012 by [redacted]. The current power management systems were identified as having older control system hardware which has become obsolete. The legacy architecture was also identified as severely restricting effective integration into the compressor station control system, leading to loss of event history. The FEED study recommended our GEA control systems should all use the same technology, with a standardised control system. With standardised and integrated systems, control and system stability will be optimised, while the ability to generate deep analytics will be significantly increased. This will allow us to monitor GEA performance more closely and identify when proactive intervention (or replacement) is required.

Table 1.7: Schedule of control systems replacements, $'000 2024

Control systems	2026	2027	2028	2029	2030	Total
Unit	CS3 Unit 1 CS3 Unit 2 CS3 Unit D1	CS4 Unit 1 CS4 Unit 3	CS5 Unit 1 CS5 Unit 2 CS5 Unit D1	CS7 Unit 2 CS7 Unit 3	CS2 Unit 1 CS2 Unti 3	
Number of replacements	3	2	3	2	2	**12**
Average cost per replacement	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	**N/A**
Total replacement capex	**1,689**	**1,126**	**1,689**	**1,126**	**1,126**	**6,756**

We have optimised this program against the GEA replacement program to avoid the unnecessary duplication of reconfiguration and integration works that would arise from a new unit being installed after the control system has been replaced. It also ensures the installation of the GEAs and GEA control systems occurs at the same time (to the extent possible) with field staff attending compressor stations only once rather than multiple times, minimising overall installation costs.

1.3.2.3 Optimised works program

The proposed program of works to upgrade our GEA assets is shown in the following table.

Table 1.8: GEA maintenance and replacement program, units and $'000 2024

	2026	2027	2028	2029	2030	Total
Opex						
Overhaul vol.	2	4	-	1	1	**8+2**
Overhaul cost	700	1,400	-	350	350	**2,800**
Provision for premature failure	-	-	350	350	-	**700**
Total opex	**700**	**1,400**	**350**	**700**	**350**	**3,500**
Capex						
GEA replacement vol.	1	2	1	2	1	**7**
GEA replacement cost	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Control system vol.	3	2	3	2	2	**12**
Control system cost	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Total capex	**3,349**	**4,446**	**3,349**	**4,446**	**2,786**	**18,376**
Total expenditure	**4,049**	**5,846**	**3,699**	**5,146**	**3,136**	**21,876**

1.3.3 Closed Cycle Vapour Turbogenerators

A CCVT is a type of power generation system that operates on the principles of the Rankine cycle, using an organic working fluid in a closed loop. CCVTs are comprised of a:

- Combustion system – This system provides the necessary heat to the vapour generator. It typically uses fuels like natural gas or liquefied petroleum gas, which are ideal for remote and harsh environments

- Vapour generator – The heat from the combustion system is used to vaporize the working fluid in the vapour generator
- Turbo-alternator – The vaporised working fluid drives a turbine connected to an alternator, generating electricity. The turbo-alternator is designed to have minimal moving parts, reducing maintenance needs
- Air-cooled condenser – After passing through the turbine, the vapor is condensed back into a liquid in the air-cooled condenser, completing the cycle
- Rectifier – This component converts the generated AC power into DC power, which is often required for telecommunications and other remote applications

Nineteen of our repeater sites along the pipeline are powered by CCVTs. We originally selected CCVTs as they are designed to allow for minimal maintenance, and don't require any overhaul at any point during their technical life. They can operate continuously for long periods and are designed to withstand extreme environmental conditions, from very low to high temperatures and are suitable for remote and difficult-to-access locations. Their reliability and low maintenance requirements, make them ideal for use on the DBNGP.

Our fleet of CCVTs are now beyond the end of their technical life and need replacing. We considered a range of options to replace the CCVTs, including replacing like-for-like. We determined that, consistent with our drive to reduce emissions per our Multi-Year Monitoring Plan, we will move to power these sites with renewable energy.

We commenced the replacement program during the AA5 period, addressing five sites. We will complete the program in AA6. The proposed AA6 program is shown in Table 1.9.

Table 1.9: CCVT replacement program, $'000 2024

	2026	2027	2028	2029	2030	Total
Number	2	4	4	4	-	**14**
Cost	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Total capex	**1,360**	**2,720**	**2,720**	**2,720**	-	**9,520**

1.3.4 Renewable power supply

We use renewable energy (solar photovoltaic (PV) panels coupled with a charger (rectifier) and battery) where it is possible and economically viable to do so. For smaller sites such as repeater sites and spur sites we use this as a primary energy source and/or uninterruptible power supply (UPS).

The various components of the renewable energy solution have different technical lives, with components such as rectifiers around seven years and PV panels at 15 years. As with all our assets, we consider more than just age to determine the optimal time to replace technically obsolete equipment. We make base our investment decisions on the importance of the sites, the condition of the equipment, and the efficiency and sustainability of the broader power generation solution.

In the AA6 period, the following equipment will reach the end of life and are due for replacement:

- Five solar PV arrays at spur sites
- Six batteries at compressor stations, four for uninterruptible power supplies (UPSs) and 59 at repeater sites
- Seven rectifiers at compressor stations, seven at mainline valves and 18 at meter stations.

The AA6 replacement program is shown in Table 1.10.

Table 1.10: Obsolete renewable energy replacement program, $'000 2024

	2026	2027	2028	2029	2030	Total
Batteries at repeater sites	-	640	640	640	-	**1,920**
Meter Stations - power system/rectifiers replacement	325	325	-	-	-	**650**
Repeater sites (south) - power system/rectifiers replacement	-	-	-	-	332	**332**
Solar PV systems	100	100	100	100	100	**500**
UPS batteries (24V)	109	109	-	109	109	**436**
UPS batteries (110V)	180	-	180	-	-	**360**
Replace 110 DC battery chargers	90	-	120	-	120	**330**
Replace 120V DC battery and chargers for all Stage 4 units	-	152	-	152	-	**304**
UPS replacement at compressor stations	-	-	-	64	96	**160**
Total capex	**804**	**1,326**	**1,040**	**1,065**	**757**	**4,992**

1.3.5 Loadbank control panels

We use loadbanks at compressor stations for testing, maintenance and validation of our power generation systems. We have identified an issue with the loadbank control panels installed as part of the Stage 5A expansion. The design of some of the cabling and components has been causing electrical overheating and tripping.

We commenced a program to replace these loadbanks in AA5 and will continue it in AA6 at a rate of two per year aligned with the optimised GEA maintenance and replacement, and control system replacement program.

Table 1.11: Loadbank control panels replacement program, units and $'000 2024

	2026	2027	2028	2029	2030	Total
Loadbank control replacement volumes	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Loadbank control replacement costs ($'000)	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	**1,300**

1.3.6 Electrical system upgrades

Our electrical systems at 30 MLVs and meter stations were installed during pipeline construction (initial build and key expansion stages). Key elements of the electrical systems such as wiring and circuits need to be upgraded to current standards to provide us with the opportunity to install renewable power generation and increase our uptake of low emissions technologies at strategic locations along the pipeline.

The works associated with the upgrades include:

- Installing solar PV arrays
- Upgrading wiring from the meter to ACDB
- Upgrading DEA circuits to current supported plugs and sockets

We propose to undertake works at six sites each year, prioritising the most heavily frequented sites. We expect these works will cost around $15,000 per site.

Table 1.12: Electrical system upgrades at mete stations and MLVs program, $'000 2024

	2026	2027	2028	2029	2030	Total
Meter station/MLV sites	6	6	6	6	6	**30**
Electrical system upgrades costs ($'000)	90	90	90	90	90	**450**

1.4 Risk assessment

Risk management is a constant cycle of analysis, treatment, monitoring, reporting and then identifying once again, with a commitment to balance outcomes sought with delivery and cost implications considered and assessed.

Our risk assessment approach focuses on understanding the potential severity of failure events associated with each asset and the likelihood that the event will occur.

Figure 1.2: Risk management principles



Based on these two key inputs, the risk assessment and derived risk rating then guides the actions and activities required to ensure safety and compliance are not compromised, while delivery of this outcome is done as efficiently and effectively as possible.

The risk rating assesses the consequence and likelihood of the risk. The risk of an event associated with failure of an asset is rated based on the combined effect of the consequence and likelihood rating to provide an overall risk rating. This risk rating guides the risk management and mitigation activities and facilitates prioritisation.

DBP's operational risk framework is based on AS/NZS 2885 and requires all identified risks ranked as intermediate or above to be addressed. For risks ranked as high DBP must 'Modify the threat, the frequency or the consequence to reduce the risk rank to intermediate or lower'.

Six areas are considered for each type of risk:

1. People – injuries or illness to employees and contractors or members of the public
2. Environmental impact – impact on the surroundings in which the asset operates, including natural, built and Aboriginal cultural heritage, soil, water, vegetation, fauna, air and their interrelationships
3. Supply – disruption in the provision of services/supply, impacting customers
4. Impact on AGIG/DBP – impact on AGIG (DBP) due to restrictions and enforcement, such as regulatory enforcement or legal actions
5. Reputation – impact on stakeholders' views of AGIG (DBP), including personnel, customers, investors, security holders, regulators and the community
6. Loss – financial impact on AGIG (DBP)

The primary risk event we are addressing is that end of life or out of support power generation equipment and management systems fail, impacting on power supply to critical equipment affecting reliable gas supply to customers and/or the ability to effectively respond in the event of an emergency. The untreated risk rating associated with power generation and management assets is presented in Figure 1.2.

Figure 1.3: Untreated risk rating

	Trivial	Minor	Severe	Major	Catastrophic
Frequent		Environmental			
Occasional			DBP Reputation	Supply	
Unlikely			Loss		
Remote	People				
Hypothetical					

Negligible	Low	Intermediate	High	Extreme

The drivers of the risk rating for each area are discussed below.

- **DBP** – failure in the power generation and management assets could result in one or more compressor stations becoming non-operational. This could be due to the failure of onsite generation, or the loss of communications leading to a lack of ability to remotely control assets in the field. More critical sites such as CS8, CS9 and CS10 will have an immediate impact on customer demand and result in poor financial and reputational outcomes for DBP
- **Supply** – inability to run compressor stations would result in supply interruptions both for the shippers as well as producers. These events will lead to contractual breaches for failure to supply shippers with their contracted capacities
- **Loss** – without the planned investment in managing our power generation and management assets, there is a high risk operational assets will be damaged. An integrity breach potentially costing millions of dollars in penalties and foregone revenue for both DBP and customers. Reactive costs to repair damage will likely escalate compared to the planned works program to maintain the design intent of the assets
- **Environment** – without significant investment in maintaining our assets and upgrading them to lower emissions technologies where it is economic to do so, we would be unable to meet our obligations under the Multi-Year Monitoring Plan to meet our targets set by the Clean Energy Regulator. This would affect our environmental outcomes
- **Reputation** – effective power generation and management assets required to ensure there are few unplanned outages, which leads to irate customers due to the impact on customer demand. Underinvestment in integrity activities may lead to reputational damage and outrage internally as well as externally

- **People** – failure in the power generation and management assets could result in the loss of communications and/or loss of power supply to remote site accommodation. This poses a high HSE risk to our staff and contractors and may in some circumstances render remote sites unusable for example due to extreme weather conditions

1.5 Options considered

Different options for managing our power generation and management systems over the AA6 period have been considered. The options are:

- Option 1 – Move to a replacement on failure policy
- Option 2 – Replace end of technical life assets, including replacing 5 GEAs with right-sized equivalents
- Option 3 – Replace end of technical life assets, including replacing 7 GEAs with right-sized equivalents (this is the recommended option)

A further option to install solar panels and batteries instead of a GEA based solution was considered. However, this option was not considered viable at this stage as the technology price point makes the investment unreasonable. This option will be under regular review until such time that investment in a solar based solution provides a competitive alternative to GEAs without compromising reliability and performance.

1.5.1 Option 1 – Move to a replacement on failure policy

With this option, the volume of power generation and management asset replacements undertaken in the AA6 period would be directly driven by the number of breakages/outages experienced on these assets, with a reactive rather than proactive approach to the programme.

While it is not possible to predict with accuracy the number of failures that will occur over the next five years, given many assets are at the technical end of life during the AA6 period, the likelihood of failure is expected to be higher than during AA5 if not treated proactively. Given the higher cost of reactive replacement compared with proactive replacement (potentially two to five times higher per asset depending on asset type and location), the potential cost of works during AA6 is significantly greater than the proposed works program if widespread asset failure arises.

Should asset failure be lower than expected, the overall cost of reactive GEA engine replacements may be less than forecast. However, the lack of proactive risk management means DBP (and its customers) will carry the risk associated with aged and end-of-life assets for longer than is reasonable and necessary. Such an approach only serves to push expenditure further into the future, it does not eliminate the need to spend it.

Neither of these outcomes are tolerable for us and our customers. An entirely reactive 'replace on failure' approach to managing these assets is not consistent with good asset management practice, and therefore not consistent with NGR 79(1)(a).

1.5.1.1 Advantages and disadvantages

The advantage of this option is the potentially lower capital cost. It also means we would not be prematurely replacing any GEAs that are not yet past their technical life.

There are several disadvantages to this option. Moving to replace on failure would address only the assets which have actually failed, with a focus on returning them to being operational as quickly as possible, rather than proactively managing and planning for them. It would do little to address the residual risk associated with end-of-life assets that have not yet failed.

A replace on failure option could also impact throughput and contracted supply obligations. It would also increase frequency of remote travel to address ad-hoc failures, which is considered one of the highest risk activities on the DBNGP.

Unplanned availability of compressor units and communications sites may also require changes to the pipeline operation that do not represent an optimised case for the level of supply and demand. This would result in extra fuel gas consumption and costs, which would not have been incurred had the units been available.

By not replacing older higher emissions units with new lower emissions technologies, we are unable to reduce our carbon footprint in line with our Multi-Year Monitoring Plan, and may incur significant penalties. This is also inconsistent with being environmentally and socially responsible.

Further, entirely reactive replacement is not consistent with good asset management practice and is not sustainably cost efficient.

1.5.1.2 Achievement of objectives

The following table outlines how this option will support the achievement of our vision objectives in AA6.

Table 1.13: Alignment with vision objectives – Option 1

Vision objective	Alignment
Delivering for Customers – Public Safety	-
Delivering for Customers – Reliability	N
Delivering for Customers – Customer Service	-
A Good Employer – Health and Safety	-
A Good Employer – Employee Engagement	-
A Good Employer – Skills Development	-
Sustainably Cost Efficient – Working within Industry Benchmarks	N
Sustainably Cost Efficient – Delivering Profitable Growth	-
Sustainably Cost Efficient – Environmentally and Socially Responsible	N

This option may reduce costs in the short term but is inefficient over the medium-to-long term. It does not deliver against customer service as poorly maintained and unreliable power sources will likely cause supply interruptions. It does not deliver against being sustainably cost efficient

as leaving higher emissions power generation sources in service and paying penalties associated with these emissions is not socially or environmentally responsible, it is also not economic to do so.

1.5.1.3 Cost assessment

With this option, the unit costs incurred would almost certainly be higher. Corrective activities are likely to incur higher costs than planned alternative due to:

- Additional travel costs (planned activities allow us to share travel costs across different activities at the same location)
- Increased likelihood of overtime and shift penalties (planned activities allow us to optimise staff rostering)
- Additional costs for expediated freight
- Additional costs for removing crews from other planned work to address a corrective maintenance requirement and then remobilising to complete the previous planned work

We may also incur unplanned operating expenditure, as failures could lead to interruption to supply and associated contract delivery breaches. Interruption to supply to major industrial sites could result in substantial penalties/refunds (depending on the contractual arrangements in place) and does not include any cost related to damage to customers' plant due to loss of gas supply.

While it is not possible to estimate precisely how many asset failures will occur during the AA6 period, broad cost estimate can be developed based by escalating the cost of the proposed works program if delivered reactively. It is a generally accepted asset management principle that delivery of works reactively is significantly more expensive that undertaking proactive or preventative works. Various sources cite the increase in reactive costs compared with proactive can be between two and five times[3] more than undertaking the same works proactively.

For the DBNGP, the cost escalation for reactive vs proactive works varies depending on the type (and scarcity) of asset being replaced, as well as the remoteness of the asset from the Perth Metropolitan area. Taking a conservative approach, if we assume a weighted average increase of only 1.5 times the material and labour/contractor costs if the work program were to be undertaken entirely reactively[4], we estimate the reactive power generation and management asset replacement works program would cost approximately ~$52 million to deliver.

We would also fail to meet our commitments under the Multi-Year Monitoring Plan agreed with the Clean Energy Regulator. This would mean we would need to purchase Australian Carbon

[3] Marshall Institute, Omega engineering, ARMS reliability.

[4] This is a rule of thumb estimate, noting that some aspects of the program would be undertaken reactively anyway, and assuming that in this scenario 'proactive' maintenance works are all undertaken as assets/components fail.

Credit Units (ACCUs) to cover the shortfall. We expect the shortfall would be around 29,210 tCO2e. At ~$45/tCO2e[5], we would need to spend $1.3 million to purchase ACCUs.

Should for, whatever reason, we be unable to purchase ACCUs to cover the shortfall, we would be subject to financial penalties for exceeding our emissions baseline, and it may damage our public reputation and stakeholder trust.

In any event, costs associated with a predominantly replace on failure works program would not be such as 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.

1.5.1.4 Risk assessment

The residual risk associated with power generation and management assets under Option 1 does not change from the untreated risk.

Table 1.14: Risks assessment – Option 1

Risk category	Untreated	Treated
People	Negligible	Negligible
Environmental	Intermediate	Intermediate
Supply	High	High
DBP	Intermediate	Intermediate
Reputation	Intermediate	Intermediate
Loss	Intermediate	Intermediate

By moving to replacement on failure, none of the identified risks are mitigated. The adoption of this approach is inconsistent with our Operational Risk Framework.

1.5.2 Option 2 – Replace end of technical life assets, including replacing 5 GEAs with right-sized equivalents

Under this option we would replace all our power generation and management assets that are expected to be at, or past their technical end of life. This would include replacing the 5 GEAs that require a zero-hour overhaul with smaller, more appropriately sized engines. However, we would not replace the two additional units that are net yet due for zero-hour overhauls.

1.5.2.1 Advantages and disadvantages

By considering the entire power systems under one program, DBP can identify and eliminate inefficiencies in current power systems as well as identifying opportunities to combine works

[5] Based on the November 2024 price reported by the Clean Energy Regulator, available at: https://cer.gov.au/markets/reports-and-data/quarterly-carbon-market-reports/quarterly-carbon-market-report-september-quarter-2024/australian-carbon-credit-units-accus

programs that ensure a comprehensive approach for various power and control systems to work seamlessly together, standardises systems and reduces the risk of failures and downtime.

Once the project is complete it will be easier to identify opportunities for improvement across the overall system, which can lead to cost savings in both installation and maintenance in future. Planning the power systems as a whole also makes it easier to accommodate future changes in demand, for example it allows for better integration of renewable energy sources as the technologies evolve and less carbon intensive solutions become available.

A proactive replacement program for our end-of-life power systems offers several advantages over the reactive approach outlined in Option 1. Planned replacement allows for better budgeting and resource allocation, avoiding increased reactive costs, which are particularly high for remote working where we experience higher logistics and emergency response costs..

The program outlined in Option 2 incudes the replacement of CCVTs that is in line with our Multi-Year Monitoring Plan, but does not consider the two GEA units that, under the plan, we propose to replace ahead of the end of their technical life. This option is expected to reduce our emissions by 23,150 tCO2e over the AA6 period. Applying the value of emissions reduction[6] determined by the MCE[7], this would provide a quantified benefit of $2.2 million as shown in Table 1.15.

Table 1.15: Value of emissions reduction, Option 2, $2024

	2026	2027	2028	2029	2030	Total
CCVT replacement						
Units replaced	2	4	4	4	-	**14**
CO2e reduction	260	780	1,300	1,820	1,820	**5,980**
Value of emissions reduction ($)	80	84	89	95	105	**N/A**
Total value ($)	**20,800**	**65,520**	**115,700**	**172,900**	**191,100**	**566,020**
GEA replacement						
Units replaced	0	2	1	2	0	**5**
CO2e reduction	0	2,020	3,030	5,050	5,050	**15,150**
Value of emissions reduction ($)	80	84	89	95	105	**N/A**
Total value ($)	**0**	**169,680**	**269,670**	**479,750**	**530,250**	**1,449,350**
Overall emissions reduction ($)	**260**	**2,800**	**4,330**	**6,870**	**6,870**	**21,130**
Overall value of emissions reduction ($)	**20,800**	**235,200**	**385,370**	**652,650**	**721,350**	**2,015,370**

[6] The VER measures the dollar value per tonne of avoided greenhouse gas emissions in order to operationalise emissions reduction as a component of the national energy objectives, as agreed by the MCE.

[7] See Appendix 11 of the Australian Energy Market Commission's Final Guidelines, National energy objectives, March 2024, available at: https://www.aemc.gov.au/sites/default/files/2024-03/AEMC%20guide%20on%20how%20energy%20objectives%20shape%20our%20decisions%20clean%20200324.pdf

Based on our calculations, the quantified benefits of the reduction in emissions alone offsets the upfront capex associated with the replacement of a GEA within 10-12 years.

A key disadvantage of reducing the size of power systems today is the potential for increased costs and investments in the future should power requirements significantly grow. Downsizing power systems can result in immediate capital cost savings, but it may also lead to limited capacity to handle future demand. This lack of foresight can necessitate significant additional investments to upgrade or expand the power infrastructure when demand increases.

For instance, adding new power generation units or upgrading existing ones can be more costly and time-consuming than initially planning for larger capacity. While downsizing may seem advantageous in the short term, it could lead to higher long-term costs and challenges in meeting future power needs. DBP has assessed this risk as part of the program, however the risk of this occurring is low versus the guaranteed benefits of smaller and more efficient units that have fit for purpose control systems

1.5.2.2 Achievement of objectives

The following table outlines how this option will support the achievement of our vision objectives.

Table 1.16: Alignment with our vision – Option 2

Vision objective	Alignment
Delivering for Customers – Public Safety	-
Delivering for Customers - Reliability	Y
Delivering for Customers – Customer Service	-
A Good Employer – Health and Safety	Y
A Good Employer – Employee Engagement	-
A Good Employer – Skills Development	-
Sustainably Cost Efficient – Working within Industry Benchmarks	Y
Sustainably Cost Efficient – Delivering Profitable Growth	-
Sustainably Cost Efficient – Environmentally and Socially Responsible	Y

This option delivers against all objectives as the replacement of end of technical life assets delivers improved operational outcomes, and reduces the potential supply disruptions that may otherwise occur if obsolete assets fail in service. This option does also reduce emissions, consistent with our drive to be environmentally and socially responsible, albeit we would not be able to meet our commitments under the Multi-Year Monitoring Plan. While we could offset this shortfall by purchasing ACCUs, this is not consistent with our objective of being environmentally and socially responsible.

1.5.2.3 Cost assessment

Adopting this option would cost $31.3 million in capex and $3.5 million in opex as shown in Table 1.17.

Table 1.17: Cost assessment – Option 2, $'000 2024

	2026	2027	2028	2029	2030	Total
Capex						
GEA replacement	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]0
Control system replacement	1,689	1,126	1,689	1,126	1,126	6,756
CCVT replacement	1,360	2,720	2,720	2,720	0	9,520
Renewable energy replacement	804	1,326	1,040	1065	757	4,992
Loadbank Control Panel	260	260	260	260	260	1,300
Electrical system upgrades	90	90	90	90	90	450
Total capex	**4,203**	**8,842**	**7,459**	**8,581**	**2,233**	**31,318**
Opex						
GEA overhauls	700	1,400	350	700	350	3,500
ACCUs	0	45	45	90	90	273
Total opex	**700**	**1,445**	**395**	**790**	**440**	**3,773**

1.5.2.4 Risk assessment

Table 1.18 shows the residual risk associated with power generation and management assets if this option was selected. The risk is reduced to intermediate, but as we could feasibly and cost effectively reduce the environmental risk further by reducing emissions rather than purchasing offsets, it is not ALARP.

Table 1.18: Risk assessment – Option 2

Risk category	Untreated	Treated
People	Negligible	Negligible
Environmental	Intermediate	Negligible
Supply	High	Intermediate
DBP	Intermediate	Low
Reputation	Intermediate	Low
Loss	Intermediate	Low

1.5.3 Option 3 – Replace end of technical life assets, including replacing 7 GEAs with right-sized equivalents

This option is the same as Option 2 whereby we will replace end of technical life power generation and management assets with modern equivalent, right-sized assets. However, we will also replace two GEAs that are not yet due for major overhauls, but we will be on site at

their locations doing other work during the period and so can take the opportunity to replace these assets.

1.5.3.1 Advantages and disadvantages

This option provides the same advantages and disadvantages as Option 2, but with the additional advantage that we will be able to meet our emissions reduction commitments under our Multi-Year Monitoring Plan. This will provide actual emissions reductions, rather than requiring us to purchase ACCUs to offset a shortfall.

Table 1.19 shows the emissions reduction benefits of the additional two GEAs over the AA6 period.

Table 1.19: Value of emissions reduction, Option 2, $2024

GEA optimisation	2026	2027	2028	2029	2030	Total
Option 2						
Units replaced	0	2	1	2	0	5
Cumulative CO2e reduction	0	2,020	3,030	5,050	5,050	15,150
Value of emissions reduction ($)	80	84	89	95	105	N/A
Total value ($)	**0**	**169,680**	**269,670**	**479,750**	**530,250**	**1,449,350**
Option 3						
Units replaced	1	2	1	2	1	7
Cumulative CO2e reduction	1,010	2,020	3,030	5,050	6,060	17,170
Value of emissions reduction ($)	80	84	89	95	105	N/A
Total value ($)	**80,800**	**169,680**	**269,670**	**479,750**	**636,300**	**1,636,200**
Net benefit of option 3 ($)	**80,800**	**0**	**0**	**0**	**106,050**	**186,850**

1.5.3.2 Achievement of objectives

The following table outlines how this option will support the achievement of our vision objectives.

Table 1.20: Alignment to vision objectives – Option 3

Vision objective	Alignment
Delivering for Customers – Public Safety	-
Delivering for Customers – Reliability	Y
Delivering for Customers – Customer Service	-
A Good Employer – Health and Safety	Y
A Good Employer – Employee Engagement	-
A Good Employer – Skills Development	-
Sustainably Cost Efficient – Working within Industry Benchmarks	Y
Sustainably Cost Efficient – Delivering Profitable Growth	-
Sustainably Cost Efficient – Environmentally and Socially Responsible	Y

This option delivers against all relevant objectives. The main difference between this option and Option 2, is that it allows for greater emissions reduction and a requirement to purchase fewer carbon credits. It can therefore be considered more sustainably cost efficient.

1.5.3.3 Cost assessment

Adopting this option would cost $34.0 million in capex and $4.2 million in opex as shown in Table 1.21.

Table 1.21: Cost assessment – Option 3, $'000 2024

	2026	2027	2028	2029	2030	Total
Capex						
GEA replacement	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Control system replacement	1,689	1,126	1,689	1,126	1,126	6,756
CCVT replacement	1,360	2,720	2,720	2,720	-	9,520
Renewable energy replacement	804	1,326	1,040	1065	757	4,992
Loadbank Control Panel	260	260	260	260	260	1,300
Electrical system upgrades	90	90	90	90	90	450
Total capex	**5,863**	**8,842**	**7,459**	**8,581**	**3,893**	**34,638**
Opex						
GEA overhauls	700	1,400	350	700	350	3,500
Total opex	**700**	**1,400**	**350**	**700**	**350**	**3,500**

1.5.3.4 Risk assessment

Option 3 represents the lowest residual risk, as it is targeting the individual assets in line with the in service experience, and meeting our commitments under the Multi-Year Monitoring Plan. The risk is reduced to intermediate, and as we will meet our emissions reductions targets reflects an outcome that is ALARP.

Table 1.22: Risk assessment – Option 3

Risk category	Untreated	Treated
People	Negligible	Negligible
Environmental	Intermediate	Negligible
Supply	High	Intermediate
DBP	Intermediate	Low
Reputation	Intermediate	Low
Loss	Intermediate	Low

1.6 Summary of options assessment

To assess the options, the costs, objectives and risk are considered for each option. A summary of the option assessment is shown in Table 1.23.

Table 1.23: Summary of options assessment

Option	Achievement of objectives	Cost	Treated risk
Option 1 – Replace on failure	This option does not achieve our objectives of delivering for customers, being a good employer or being sustainably cost efficient	No upfront capex or opex	High This option does not reduce any of the untreated risks to an acceptable level
Option 2 – Replace end of technical life assets, including replacing 5 GEAs with right-sized equivalents	This option achieves our objectives of delivering for customers, being a good employer and being sustainably cost efficient	$31.3 million capex $3.5 million opex	Intermediate This option reduces the untreated risks to an acceptable level but is not optimised for the long term
Option 3 – Replace end of technical life assets, including replacing 7 GEAs with right-sized equivalents	This option achieves our objectives of delivering for customers, being a good employer and being sustainably cost efficient	$34.6 million capex $3.5 million opex	Intermediate This option reduces the untreated risks to an acceptable level and is optimised for the long term

1.7 Proposed solution

1.7.1 Why is the recommended option prudent?

Option 3 is the recommended solution due to its alignment with our risk management framework, asset management principles and the relevant manufacturers' specification. It supports our vision and values and delivers for our customers on public safety, reliability of performance and customer service.

Failure to proactively plan for the replacement of power generation and management assets could result in catastrophic failure of an asset which would result in loss of through-put, unreliable AC power generation on site, excessive operating expenditure and impact on reliability and the ability to meet contractual obligations.

Option 3 also delivers the necessary emissions reductions in a reasonably cost effective manner; it is therefore considered ALARP.

Option 1 is forecast to be more expensive, however regardless of the costs, taking a replace on failure asset management approach for ageing assets would not be aligned to regulatory rules, in particular 79(1) "*as would be incurred by a prudent service provider acting efficiently, in accordance with accepted good industry practice…*"

Option 2 meets our objectives, but is not ALARP as we can reasonably be expected to meet our commitments under the Multi-Year Monitoring Plan through an actual reduction of emissions, rather than through the purchase of ACCU offsets. We therefore do not consider this option is ALARP.

1.7.2 Estimating the efficient costs

The unit rates used for all projects managed within this program of include the internal labour, external labour and materials/other costs forecast.

Where possible, the unit rate used to determine the cost of the program in AA6 is based on a three year average actual cost incurred by DBP in AA5. Where this has not been possible, these activities have been estimated based on the historical cost of a similar program of work.

'One-off' activities, such as a major asset replacement, are usually determined through market testing and where practicable, a competitive tender process.

Where a competitive tender has not yet occurred, the associated cost is estimated in two ways:

1. where the work is sufficiently comparable to other work – the most recent historical average unit rate or actual cost and matched to similar locations where the program is delivered externally; and
2. where the work is unique or greater than $5 million – an estimate is developed based on internal estimates from different engineering disciplines or from external engineering specialists.

Specialist engineering disciplines, procurement and construction management activities are provided utilising internal resources, supplemented by external specialist input as required. This is the model that has been successfully deployed and implemented on the DBNGP under the existing AA5 and previous arrangements.

Key assumptions which have been made in the cost estimation for the compressor station program include:

- Cost based on historical expenditure noting that these works are not new
- Estimates derived from contractual rates of vendors to be utilised
- Resource cost based on other similar projects ongoing at present or in previous AA periods
- Original Equipment Manufacturer contractual rates for spares and labour that are part of our services agreements

1.7.3 Consistency with the National Gas Rules

NGR 79(1) and NGR 91

Option 3 is consistent with Rule 79(1)(a) and 91, which require that capital expenditure must be such as 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.

DBP considers that the capital expenditure is:

- **Prudent** – the project is based on replacement of existing assets are arriving at the end of their useful lives. Assets are scheduled to be replaced ahead of failure, minimising disruption to customers, mitigating pipeline integrity risk, and allowing for efficient resource scheduling. The proposed expenditure is there consistent with such that would be incurred by a prudent service provider

- **Efficient** – forecast expenditure is based on the actual unit cost incurred by DBP in the delivery of similar work undertaken in AA5. The design and operational delivery of the program is forecast for completion by internal staff and external resources. External resources are engaged as a result of formal contracts in place following the tender process, as per DBP's Procurement Policy. These services are reviewed annually by DBP's Contracts and Procurement functions, and new rates negotiated accordingly

  Original Equipment Manufacturer (OEM) costs, while less controllable than labour costs, are also reviewed annually to test that the costs of spare parts and materials is consistent with market conditions. The review is undertaken by Contracts and Procurement. The proposed expenditure can therefore be considered consistent with the expenditure that a prudent service provider acting efficiently would incur
- **Consistent with accepted and good industry practice** – the proposed works program follows good industry practice of aligning replacement activity with commitments embedded within the AMP and manufacturer's recommendations. It meets the commitments made under our Multi-Year Monitoring Plan to reduce our CO2e emissions. DBP's commitment to continuous improvement and adopting new technologies/process where practicable is also consistent with ISO 55001, the prevailing industry asset management standard. Therefore, the proposed capital expenditure is such as would be incurred by a prudent service provider acting efficiently, in accordance with accepted good industry practice
- Required to **achieve the lowest sustainable cost of delivering pipeline services** – the proposed option achieves the lowest sustainable cost delivery of services by undertaking works that reduce risks to as low as reasonably practicable while maintaining reliability of supply. This mitigates the costs of reactive works and penalties resulting from asset failure. DBP is undertaking works in a proactive, planned and scheduled manner, with the volume of activity based on useful life and in line with manufacturer's guidance and associated support. It also considers continuous improvement in the way DBP manages assets throughout their lifecycle by introducing new and emerging techniques and technologies, which may reduce costs over the medium-to-long term

NGR 79(2)(c)

The proposed works program is necessary to maintain integrity of pipeline services. Replacing, repairing and/or managing these assets satisfies the grounds under Section 79(2)(c) of the National Gas Rules (NGR), which states capex is justifiable if:

(c) the capital expenditure is necessary:

(i) to maintain and improve the safety of services; or

(ii) to maintain the integrity of services; or

(iii) to comply with a regulatory obligation or requirement; …

There is a clear need to maintain the integrity of services, which would otherwise be compromised should these assets not be replaced, repaired or managed in line with the AMP and/or at the end of their useful life.

The power generation and management equipment provides primary power at critical operational sites such as compressor stations and provide a power source for communications along the pipeline, without which we would have a lack of control of the pipeline. Other equipment is responsible for powering our remote sites, without which staff would be unable to work, or stay. This is particularly important in remote areas with extreme weather conditions.

NGR 74

NGR74(2) requires that a forecast of estimate:

a) *must be arrived at on a reasonable basis; and*
b) *must represent the best forecast or estimate possible in the circumstances.*

The forecast costs in this business case are based on the latest market rate testing, and project options consider the asset management requirements as per the latest AMP. Cost assessments have been conducted for each option based on the best information available at the time of developing this business case. The estimate has therefore been arrived at on a reasonable basis and represents the best estimate possible in the circumstances.

Appendix A Comparison of risk assessments

Summary of risk assessments

Project Ref No	Description	Primary Risk Event	Proposed Action		People	Environment	Supply	DBP	Reputation	Loss
DBP35	Power generation and management	Failure of end of life or out of support power generation equipment and management systems impacting on power supply to critical equipment affecting reliable gas supply to customers and/or the ability to effectively respond in the event of an emergency.	Untreated Risk	Likelihood	Remote	Frequent	Occasional	Occasional	Occasional	Unlikely
				Consequence	Trivial	Minor	Major	Severe	Severe	Severe
				Risk Level	NEGLIGIBLE	INTERMEDIATE	HIGH	INTERMEDIATE	INTERMEDIATE	INTERMEDIATE
			Move to a replacement on failure policy	Likelihood	Remote	Frequent	Unlikely	Occasional	Occasional	Unlikely
				Consequence	Trivial	Minor	Major	Severe	Severe	Severe
				Risk Level	NEGLIGIBLE	INTERMEDIATE	HIGH	INTERMEDIATE	INTERMEDIATE	INTERMEDIATE
			Replace end of technical life assets with modern, right-sized equivalents	Likelihood	Remote	Remote	Remote	Remote	Remote	Remote
				Consequence	Trivial	Minor	Major	Severe	Severe	Severe
				Risk Level	NEGLIGIBLE	NEGLIGIBLE	INTERMEDIATE	LOW	LOW	LOW
			Replace end of technical life and end of economic life assets with modern, right-sized equivalents	Likelihood	Remote	Remote	Remote	Remote	Remote	Remote
				Consequence	Trivial	Minor	Major	Severe	Severe	Severe
				Risk Level	NEGLIGIBLE	NEGLIGIBLE	INTERMEDIATE	LOW	LOW	LOW

Capex DBP38: Structures and Operational Sites

1.1 Project approvals

Table 1.1: DBP38 Structures and Operational Sites – Project approvals

Prepared by	Andrew Stanwix, Principal Engineer Mechanical David Martin, Head of Mainline Transmission
Reviewed by	Jeff Kong, Head of Transmission Asset Strategy
Approved by	Tawake Rakai, GM Transmission Asset Management

1.2 Project overview

Table 1.2: DBP38 Structures and Operational Sites – Project overview

Description of problem /opportunity	The DBNGP pipeline is 40 years old. The majority of our operational sites were constructed during first 10-15 years of operation, and for the most part have not been modernised since they were first built. Over the years, our investment priorities have focused on our primary assets such as the pipelines, compressor stations, meter stations and main line valves. While we have maintained our sites to keep them functional, there has not been the same level of investment in our structures, buildings, and operational facilities. As such, a number of emerging risks and HSE requirements have been gradually increasing, which now need to be addressed before they become major problems and cause serious harm. We have therefore performed a strategic review of all of the key structures and operational sites, which has highlighted a need to take a longer-term view of these facilities to address compliance issues and align with industry standards for reasonable workplace environments. We have developed a program of investments that will address health, safety, environmental and security requirements. Our structures and operational sites program will also modernise staff facilities to make sure we can cater for a diverse workforce, attract and retain talent, and be a socially responsible employer. The structures and operational sites program has two broad categories: • Health, safety, environment and security compliance • Operational facility structures and accommodation Note this business case does not cover the Jandakot operational site, which is subject to a separate business case.
Untreated risk	As per risk matrix = High
Options considered	• **Option 1** – Complete HSE and security compliance driven projects only ($12.7 million) • **Option 2** – Complete HSE and security compliance driven projects, replace substandard facilities and replace the accommodation at **two** of our most used and dilapidated sites ($27.0 million) (this is the recommended option) • **Option 3** – Complete HSE and security compliance driven projects, replace substandard facilities and replace the accommodation at **four** sites that are rated 'very poor' ($39.2 million)

Proposed solution	The proposed solution (Option 2) is to conduct the non-negotiable compliance driven projects and deliver a 15-year accommodation remediation program, addressing two of our most dilapidated sites during AA6, and then addressing the rest over the course of the next two AA periods. Option 1, addressing compliance requirements only, does not address the root cause of problems, and would simply push existing problems down the road to incur more future expense. Option 3, where we would address all our 'very poor' condition sites within the AA6 period, would be the best option in terms of promoting the wellbeing of our workforce. However, we are aware that construction costs for these types of projects are high, and are conscious of the impact on prices. We therefore feel Option 2 achieves an appropriate balance between cost and risk.
Estimated cost	The forecast direct cost (excluding overheads) during the next five-year period (AA6) is $27.0 million.

Health, safety, environment and security compliance	2,811	2,271	1,759	1,804	1,583	10,228
Operational facility structures and accommodation	308	6,683	908	6,508	2,408	16,815
Total	**3,119**	**8,954**	**2,667**	**8,312**	**3,991**	**27,043**

Basis of costs	All costs in this business case are expressed in real unescalated dollars December 2024 unless otherwise stated.
Treated risk	As per risk matrix = Intermediate
Variation from AA5	This project is new for the AA6 period.
Alignment to our vision	DBP aims to be *A Good Employer* by providing operational environments that comply with relevant workplace health and safety legislation, regulations and codes of conduct, and align with good health and safety practices in the industry. We have reviewed our facilities in line with industry standard practices and we are currently not meeting those standards in a number of critical areas. Our current deficits are particularly around the provision of working environments that reflects the reasonable expectations of a diverse workforce, which if they remain unaddressed will impact on our ability to retain resources, skills and knowledge.
Consistency with the National Gas Rules (NGR)	**NGR 79(1)** – the proposed asset replacement, proactive works and upgrade program is consistent with accepted good industry practice, several practicable options have been considered, and market/unit rates have been tested to achieve the lowest sustainable cost of providing pipeline services. **NGR 79(2)** – investment to address known compliance issues and align our operational sites with industry standard practice is necessary to: • Ensure safe and reasonable working conditions for our employees necessary to help attract and retain staff with necessary skills and talent • Protect the environment from unnecessary contamination for the safety of the public

	• Help address the physical security risks identified as required based on a risk assessment undertaken in line with the Security of Critical Infrastructure (SoCI) Act to ensure the safe ongoing operation on the pipeline. On this basis, the proposed expenditure is conforming capex based on the grounds of NGR 79(2)(c)(i) and (ii) to comply with a regulatory obligation or requirement and to maintain the safety, reliability, and integrity of services. **NGR 74** – the forecast costs are based on the latest market rate testing or historical spending on similar projects. Cost assessments have been conducted for each option based on the best information available at the time of developing this business case. The estimate has therefore been arrived at on a reasonable basis and represents the best estimate possible in the circumstances.
Stakeholder engagement	Our shippers told us they expect us to maintain a strong focus on operational issues as it is important for reliability and emergency management. Our structures and operational sites program will replace end of life assets and address compliance concerns with industry standard solutions, whilst attracting and retaining a more diverse workforce. We would like to remediate all 'very poor' accommodation to improve the wellbeing of our operational staff, but have considered the impact of expediting the accommodation program on the prices our shippers pay and have extended the program of work over multiple access arrangements.
Other relevant documents	This business case should be read in conjunction with: • Asset Management Plan • DBP Safety Case • Risk Management Policy and Operational Risk Model (together our Risk Management Framework) • Business case DBP10: Jandakot facility redevelopment

1.3 Background

Structures and operational sites are the buildings and facilities our employees use to support core operations. They include compressor/meter station compounds, accommodation, storage facilities, remote offices, and associated equipment installed all along the >1,500km pipeline. Note these do not include the corporate and operational headquarters in Perth or Jandakot. Investments to maintain and refurbish these metropolitan sites are covered under other business cases (see for example DBP10: Jandakot facility redevelopment).

Operational sites and their structures are required to be in good working order and meet compliance requirements, such that the primary assets can be maintained effectively and in a timely manner. Our sites are remote, in harsh environments. It is not practicable for our employees to constantly travel long distances by road from the metropolitan area to regional sites[1] and transport tools and equipment. We must therefore provide accommodation, storage facilities, secure compounds, utilities and safe access so that our remote sites can be manned.

[1] Travelling by road is an 'extreme' risk activity

The DBNGP has a combination of compressor and meter station sites, MLV sites, repeater sites and other operational sites. Each require various levels of investment to ensure they are fit-for-purpose and in line with good industry practice.

Table 1.3 provides a summary of our key structures and operational sites.

Table 1.3: Key structures and operational sites

Operational site	Number of sites
Compressor station sites	10
Compressor station accommodation blocks	8
Compressor station workshops	10
Compressor station helicopter landing pads	5
Inlet and meter station sites	63
Mainline valve and loop line valve sites	84
Communications spur sites	9
Repeater sites	42
Dampier site	1
Kwinana Junction facility	1
Karratha accommodation	1
Total	**234**

Historical investment in structures and operational sites has been sporadic in nature. Installation of accommodation and other facilities has typically aligned with larger expansion projects or when the pipeline was initially constructed or compressor stations commissioned. The ongoing upgrade of our remote structures and sites has not been a priority as investments and our asset management systems have typically focused on primary operational assets.

The standard of working conditions and accommodation have deteriorated over time, both in terms of condition and modernity. For example, several of our sites do not have modern toilet facilities or access to a reliable supply of fresh water. Others are not compliant with working from height guidelines and pose avoidable risks to our workforce.

Our facilities are also falling short in terms of employee expectations (e.g. internet connectivity) and increasing quality of facilities provided in other sectors such as mining. While we do not propose to uplift our facilities to the quality of a major FI-FO site, we are competing with the mining sector for staff and therefore need to offer a reasonably attractive alternative.

These issues, together with our commitment to continuously improving our asset management practices, has led us to undertake a holistic review of all our structures and operational sites. Applying the same asset management principles that we use for our primary operational assets, we have identified the works that need to be completed.

The required works have been categorised into two areas:

1. Health safety and environment (HSE) and security compliance
2. Operational facility structures and accommodation

Table 1.4 summarises the scope required under each.

Table 1.4: Summary of the required works

Category	Scope
HSE and security compliance	• Working at height upgrades
	• Earthing grid refurbishment
	• Reverse osmosis unit replacement
	• Provide water supply to compressor sites
	• Remote site toilets installation
	• Air conditioning replacement
	• Office equipment upgrade
	• Helicopter landing pad refurbishment and installation
	• Site oil management
	• Concrete odorant bund replacement
	• Physical security improvements at selected DBNGP sites
	• Palisade fencing installation at Kwinana Junction
	• Swipe card access installation at CS9
	• Compound fencing replacement
	• Compressor station boom gate installation
Operational facility structures and accommodation	• Compressor station site accommodation
	• Site building conversion
	• Building and structural rectification following inspection
	• Northern operational hub

More information on the scope of the required works is provided in the following sections and in Appendix A and B.

1.3.1 HSE and security compliance

This category of works includes ten projects aimed to address known HSE risks at operational sites. This ranges from the remediation of potentially unsafe earthing grids to the provision of water and toilets at our remote sites. We have also identified five projects addressing risks associated with unauthorised access to our operational sites.

Each project is summarised below, further information in Appendix A.

1.3.1.1 Working at heights

During 2023 and 2024, DBP conducted a thorough working at heights review in accordance with Australian Standard AS1657:2018. This included all MLV sites, meter stations, repeater station sites, and compressor stations. This assessment aimed to identify potential hazards and ensure compliance with safety standards. The review identified a total of 733 issues across these various operational sites.

We have sought to prioritise projects based on a risk ranking process considering the likelihood and consequence of each issue in accordance with our risk framework. Using this we have

developed a rolling program of works focusing on implementing corrective measures as soon as practicable within budget and delivery constraints.

In AA6 we have identified we can address 102 of the highest risk issues to reduce the risk to as low as reasonably practicable (ALARP). This approach ensures that the most significant threats to safety are addressed promptly, minimising the potential for accidents and enhancing overall safety across DBP's operations.

By complying with AS1657:2018 and prioritising high risk issues, DBP demonstrates its commitment to maintaining a safe working environment for its employees and contractors. This initiative not only safeguards the wellbeing of personnel but also promotes operational efficiency and compliance with regulatory requirements. The ongoing efforts to reduce high risk issues to ALARP levels underscore DBP's dedication to continuous improvement in safety practices and is in line with our zero harm policy.

1.3.1.2 Earthing grid refurbishment

Earthing grids at operational sites play a vital role in ensuring safety and operational reliability. They provide a low-resistance path for fault currents to travel safely to the ground, significantly reducing the risk of electrical shocks to personnel. By dissipating fault currents, earthing grids protect sensitive equipment from electrical surges and lightning strikes, thus minimising potential damage. Additionally, they help maintain a consistent electrical potential across the site, which is crucial for the reliable operation of protective devices and control systems.

This voltage control ensures that step and touch voltages are kept within safe limits, protecting both personnel and equipment. Five sites have been identified in AA6 for earthing grid refurbishment.

1.3.1.3 Replacement of reverse osmosis units

Compressor station site water on most stations is supplied via a bore. In these remote, barren locations, the bore water is not suitable for bathing or washing in, let alone for drinking. Before the bore water can be used, it must be treated via a reverse osmosis unit. If reverse osmosis units fail the only alternative is to start transporting large volumes of fresh water to our remote locations by the use of water trucks.

In total we have six reverse osmosis units in operation along the pipeline. All of them are old and now obsolete. In recent years we have seen significant failures, leading to us trucking water into these sites at great expense. We therefore need to start replacing these reverse osmosis units as soon as practicable.

1.3.1.4 Provide water supply to compressor stations

Compressor stations need water supply for:

- Hygiene and sanitation for onsite personnel including for drinking, handwashing and emergency showers, all of which contribute to the health and wellbeing of the staff
- Cooling systems to maintain optimal operating temperatures for compressor stations, preventing equipment overheating and ensuring efficient performance

- Various maintenance tasks, such as cleaning equipment and facilities to prevent contamination
- Fire suppression systems, providing an immediate source of water in the event of a fire

Typically, DBP has to replace one system (bores, pumps and meters) every five to ten years as their performance deteriorates with age. We therefore expect one failure to occur in the AA6 period and have budgeted accordingly.

1.3.1.5 Installation of remote site toilets

Most DBP operational sites lack proper toilet facilities, except for compressor stations. Some MLV sites have drop toilets, but many of the tin shed buildings have deteriorated due to weathering and cyclone damage, and are also havens for snakes, spiders, and wasps.

Installing proper toilet facilities is essential for maintaining staff hygiene, health, and wellbeing. Inadequate facilities can lead to health issues and discomfort, affecting employees' ability to work efficiently. Safe and secure toilets deter staff from venturing into unsafe areas or adjacent farmland, reducing the risk of accidents or wildlife encounters. Providing appropriate facilities shows organisational support and respect for employees, sending a strong message that the company values their wellbeing.

1.3.1.6 Replacement of air conditioning units

Air conditioning units are required in multiple buildings at compressor stations and meter stations, including for example workshops, warehouses and turbine buildings. They provide a suitable and stable temperature environment for our staff and allow equipment to operate reliably within their defined operating temperatures.

This program targets the replacement of air conditioning units at compressor and meter stations which are at the end of their technical life of five to ten years. Replacement of these units is an ongoing program.

1.3.1.7 Office equipment upgrade

Compressor stations have fallen behind industry expected standards for contemporary office spaces. They are not fit for purpose when considered in terms of ergonomics, communications or meetings and general teamworking.

This project is to systematically upgrade the office facilities at compressor stations over a five-year period, addressing the highest utilised spaces and location first. Where possible, the project will align with the compressor station accommodation upgrades project to maximise the utilisation of the same resources. The plan is not to fundamentally change the office buildings, but to make moderate and reasonable upgrades with items such as fit for purpose chairs, tables and stand up desks.

1.3.1.8 Helicopter landing facilities

Helicopters are used on the DBP for asset activity inspections and/or to mobilise staff quickly where necessary. We have a number of old landing pads that need to be refurbished to ensure

they remain safe and fit for purpose; others need to be reinstated in new locations (e.g. where they have been built out). Where the helicopter pads have deteriorated, or have not existed, oil and fuels have seeped into the ground over the years due to spillages during the refuelling process.

This scope of work is to install new fit for purpose helicopter landing pads and have small adjacent sheds to hold the aviation fuel. Three sites are planned to be completed over the next five years.

1.3.1.9 Site oil management

DBP has two underground sump tanks at each of the ten compressor stations to collect and contain liquids that accumulate during the compression process, such as water, oil, and other hydrocarbons. These sump tanks, typically double walled to prevent environmental contamination, have been in use for 15 to 35 years. Regular maintenance has identified failing older tanks with cracks, prompting a ten-year project to refurbish or replace them. The first nine tanks are due for refurbishment soon, with the remainder scheduled for future periods. Refurbished tanks are expected to last an additional 20 to 30 years. Specific refurbishments include one sump at CS9, CS8, and CS5, and two at CS6, CS3, and CS1, with costs based on historical data.

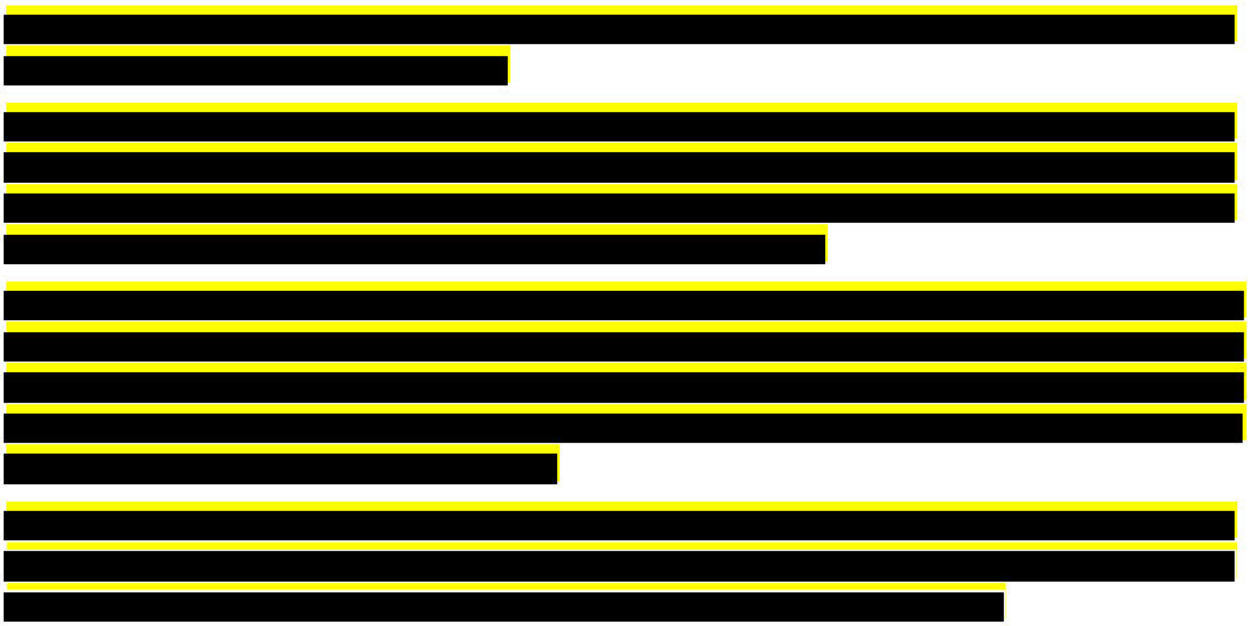
Additionally, each compressor station has an oil farm for safe oil storage. They were originally installed as elevated storage facilities (to mitigate against ground seepage), however changes in safe work practices have identified that they now pose risks from working at heights and manual handling perspective. To mitigate these risks, DBP proposes replacing the old-style elevated oil farms with new ground-level storage facilities.

1.3.1.10 Replacement of concrete odorant bunds

Concrete bunds are required for odorant tanks at gas facilities to contain spills and leaks, preventing harmful substances from contaminating the surrounding environment. They act as a barrier, ensuring that any accidental releases are confined within a designated area, making it easier to manage and clean up. The concrete bunds were initially installed with compliance to AS1940 at the time of the station construction, however they are now falling into disrepair due to their age.

Six bunds have been identified as requiring replacement in the next five years.

[redacted]



1.3.2 Operational facility structures and accommodation

We have identified five key areas of investment required to meet industry standards in relation to our compressor station operational site structures and accommodation. The largest program of works is to upgrade the accommodation at two of our compressor stations where they have high use and are in poor condition.

The proposed program is a more proactive and structured approach than the previously piecemeal investments made over the past 40 years. Improving our operational accommodation will address our currently inability to house sufficient staff during maintenance activities, and also allow us to provide gender-specific facilities.

A summary of the key projects is provided below. Further information is provided in Appendix B.

1.3.2.1 Compressor station accommodation

DBP must house its operational workforce during maintenance and capital projects at remote compressor stations. Current accommodations are outdated and inadequate. These buildings, aged between 32 and 40 years, can hold 12-15 people, with additional capacity in nearby transportable dongas. The last significant upgrade to the compressor station accommodation was done 16 years ago, with occasional fixes applied since when problems have been identified. The dongas require significant maintenance or replacement.

Upgrading accommodations to current codes of practice is crucial. The *Safe Work Australia Environment and Facilities Code of Practice 2011* highlights the need for safety and separation from workplace hazards, essential for compressor stations. Existing accommodation lacks modern amenities, privacy, and accessibility, with shared bathrooms posing challenges for all workers, especially those with mobility issues.

New accommodation will provide a safe, comfortable living environment, positively impacting workers' mental health and job satisfaction, which is essential in remote areas. High-speed

internet will help maintain connections with families, reducing isolation. Upgrading facilities is critical to support inclusivity, addressing diverse workforce needs and fostering a respectful environment. Modern accommodation will help attract and retain skilled professionals by reducing the gap between DBP's facilities and those of its competitors for resources such as mining companies, albeit we do not propose to provide facilities such as catered kitchens, pools etc.

We propose to relocate accommodation huts further from high-pressure facilities, reducing noise impact and exposure to potential gas release hazards. Relocating the accommodation allows current facilities to remain operational during construction, minimising disruption. With a total of eight sites prioritised based on current conditions and usage, we intend to complete two sites over the next five years. This balances the wellbeing of our staff with the cost impact for our customers.

1.3.2.2 Northern operational hub

DBP proposes to establish an operational hub at the northern end of the pipeline, most likely in or near Karratha. We do not currently have a suitable operational site in the region. Our staff operate out of a leased house in Baynton, which is being used as a makeshift depot. Originally leased as staff accommodation, the house has become an unofficial storage site for parts and equipment, with crew members using it a base for local operations.

The house is not suited to this purpose. The property is small, has limited storage space, and is not designed to accommodate the types and volumes of equipment used by our teams. The poor facilities are an obvious health and safety risk, and expecting our staff to continue with these working arrangements does not represent the actions of a socially responsible employer.

Note the DBNGP used to have two northern depots, in Geraldton and Karratha. However, these were closed in 1998 when the pipeline was privatised and purchased by Epic Energy.

[redacted]

1.3.2.3 Site building conversions

DBP has decommissioned LM500 turbines from the fleet at compressor stations 2, 3, 4, 6 and 7. LM500 turbines are housed in standalone buildings, which we consider can be cost-effectively re-purposed to storage facilities. This five-year project will rectify one site per year.

1.3.2.4 Building and structural rectification following inspection

As part of our improved asset management practices for our building and structures, we are increasing the volume of inspections. By conducting more frequent inspections can make sure our structures and operational sites remain fit for purpose by undertaking ongoing investment

at a sustainable level. This will avoid the need for another major investment program like that which has become necessary today.

This program will enable short term solutions to be implemented whilst longer term building and structure strategies are developed and implemented. Examples of such types of activities include fixing leaks, replacing damaged of faulty assets such as wiring, insulation and flooring, and sealing cracks.

1.3.2.5 Workshop at CS9

Compressor Station 9 is a permanently manned operational site. It is used as a staging area for the turbine and compressor removal equipment in the event of a failure on CS09/2, and is a convenient location near Perth and the start of the pipeline north. The site has no undercover storage meaning this expensive specialised equipment sits unprotected from environmental conditions, and the previous small electrical workshop was converted to an office to meet site operational needs.

There is an opportunity to upskill staff at the site and establish a fit for purpose mechanical, electrical and instrumentation workshop, with storage, that is positioned to reduce turbine noise at the accommodation block. This solution will also enable DBP insource activities such as pipe spooling and minor repairs/maintenance to equipment.

Outsourcing mechanical and E&I work often comes with higher costs and mark-ups from third-party vendors. Insourcing can reduce these expenses and we can leverage internal resources more efficiently. Over time, we expect the savings from reduced labour costs and streamlined processes will be realised.

1.4 Risk assessment

Risk management is a constant cycle of analysis, treatment, monitoring, reporting and then identifying once again, with a commitment to balance outcomes sought with delivery and cost implications considered and assessed.

Our risk assessment approach focuses on understanding the potential severity of failure events associated with each asset and the likelihood that the event will occur.

Based on these two key inputs, the risk assessment and derived risk rating then guides the actions and activities required to ensure safety and compliance are not compromised, while delivery of this outcome is done as efficiently and effectively as possible.

Figure 1.1: Risk management principles



The risk rating assesses the consequence and likelihood of the risk. The risk of an event associated with failure of an asset is rated based on the combined effect of the consequence and likelihood rating to provide an overall risk rating. This risk rating guides the risk management and mitigation activities and facilitates prioritisation.

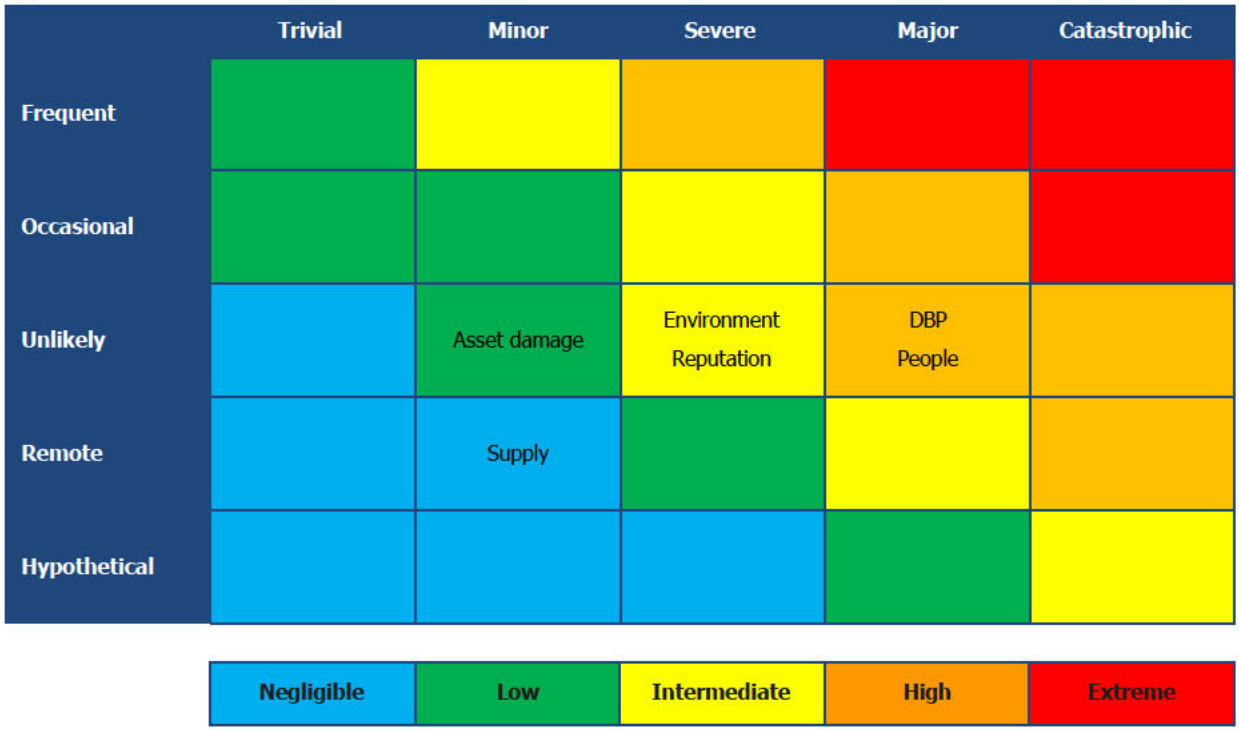
Our Operational Risk Framework is based on AS/NZS 2885 and requires all identified risks ranked as intermediate or above to be addressed. For risks ranked as high we must *'Modify the threat, the frequency or the consequence to reduce the risk rank to intermediate or lower'.*

Six areas are considered for each type of risk:

1. DBP – corporate/financial risk
2. People – safety risk to the public and employees
3. Environmental – risk of adverse impact on environment/local ecosystems
4. Reputation/Outrage – risk of customer anger and reputational damage
5. Asset damage/Loss – dollar impact on assets
6. Supply – risk of supply interruption to customers

The primary risk event is that ageing and unsuitable operational facilities and structures causes heightened HSE and security risks and psychosocial hazards. The overall risk under an untreated scenario is high, as shown in Figure 1.2.

Figure 1.2: Untreated risk rating



The drivers of the risk rating for each key area are discussed below.

- **DBP** – By not addressing key risks and delivering a holistic and standardised long-term solution for structures and operational sites, DBP will continue to incur increasing reactive operational costs that do not address the key compliance issues, nor provide industry standard workplace environments for our staff. Existing temporary solutions will pose further safety and financial risks as they continue to deteriorate

- **People** – Falling from heights is considered high risk from an operational HSE perspective. Travelling by road has been identified as 'extreme' risk in our risk register, and without fit for purpose accommodation our staff would need to drive further, and more frequently. Having sites that can cater to all personnel and is in aligned industry standards is important not only for the prevention of psycho-social hazards, but also required to attract and retain a skilled and diverse operational staff in the context of improving standards in competing industries such as mining
- **Reputation/Outrage** – By not addressing known, major deficiencies with our structures and operational sites (including non-compliance with legislation and regulations, and HSE risks) is inconsistent with our vision, objectives and values. There is a risk that this inconsistency translates into a risk that potential employees, suppliers and AGIG-wide customers choose not to engage with DBP due to the lacking corporate social responsibility

1.5 Options considered

Different options have been considered to ensure we are able to refurbish and maintain our structures and operational sites to meet industry standards. The options for the AA6 period are:

- Option 1 – Complete HSE and security compliance driven projects only
- Option 2 – Complete HSE and security compliance driven projects, replace substandard facilities and replace the accommodation at **two** of our most used and dilapidated sites
- Option 3 – Complete HSE and security compliance driven projects, replace substandard facilities and replace the accommodation at **four** sites that are rated 'very poor'

The options are discussed in the following sections.

1.5.1 Option 1 – Complete HSE and security compliance driven projects only

Under Option 1, we would only deliver the HSE and security compliance projects (e.g. working from heights, SOCI investments, etc.). Investment in structures such as accommodation facilities and operational buildings would only be completed in a reactive manner, addressing material risks as they arise, with short term maintenance fixes.

1.5.1.1 Advantages and disadvantages

The advantage of Option 1 is that it would allow us to address all our immediate compliance issues. It is also a lower cost option than the alternatives.

The major disadvantage of Option 1 is that it will do little to address the ongoing issue of employee wellbeing and not having fit-for-purpose operational facilities. If we continue to offer poor quality accommodation, unhygienic toilet facilities, makeshift storage sites, and poor access/communications, we will find it increasingly difficult to retain and attract employees.

The lack of a suitable northern depot and 'bases' from which our staff can work means we are foregoing the opportunity to improve the efficiency and effectiveness of our operations. Our operational practices have evolved and grown over time as the pipeline has been looped and

new gas supply has entered the system. Our operational sites have not evolved at a similar pace. It is imperative we invest to bring our sites and structures up to a reasonable standard.

1.5.1.2 Achievement of objectives

Table 1.5 outlines how this option will support the achievement of our vision objectives in AA6.

Table 1.5: Achieving objectives – Option 1

Vision objective	Alignment
Delivering for Customers – Public Safety	Y
Delivering for Customers – Reliability	-
Delivering for Customers – Customer Service	-
A Good Employer – Health and Safety	Y
A Good Employer – Employee Engagement	N
A Good Employer – Skills Development	N
Sustainably Cost Efficient – Working within Industry Benchmarks	N
Sustainably Cost Efficient – Delivering Profitable Growth	-
Sustainably Cost Efficient – Environmentally and Socially Responsible	N

This option does not align with our vision objectives of being a good employer as it fails to meet industry standards to attract and retain skilled staff, and is not sustainably cost efficient as it is inconsistent with industry benchmarks and fails to meet the corporate social responsibility expectations.

1.5.1.3 Cost assessment

The forecast capex under this option is $12.7 million for the AA6 period. This includes $10.2 million for compliance driven projects, and a conservative provision of $500,000 per annum for reactive works to address issues at operational sites and accommodation as they are identified through the period.

A summary of these project costs is provided in Table 1.6.

Table 1.6: Summary of costs - Option 1, $'000 2024

Project	2026	2027	2028	2029	2030	Total
Compliance - HSE	1,737	1,847	1,603	1,704	1,483	8,374
Compliance - Physical security	1,074	424	156	100	100	1,854
Total compliance	**2,811**	**2,271**	**1,759**	**1,804**	**1,583**	**10,228**
Reactive works	**500**	**500**	**500**	**500**	**500**	**2,500**
Total	**3,311**	**2,771**	**2,259**	**2,304**	**2,083**	**12,728**

1.5.1.4 Risk assessment

Table 1.7 shows that the treated risk does address compliance related risks, however the poor and sub-standard condition of our accommodation will not be adequately treated, leaving our people risk at intermediate.

Table 1.7: Risk rating - Option 1

Risk category	Untreated	Treated
People	High	Intermediate
Environmental	Intermediate	Negligible
Supply	Negligible	Negligible
DBP	High	Negligible
Reputation	Intermediate	Negligible
Loss	Low	Negligible

This option addresses the compliance risks to DBP, People, Reputation, Asset Damage and Supply, however it does not address the risk to as low as reasonably practicable (ALARP) as it leaves our accommodation largely untreated.

1.5.2 Option 2 – Complete HSE and security compliance driven projects, replace substandard facilities and replace the accommodation at two of our most used and dilapidated sites

Option 2 completes all the known HSE and security compliance related projects as in option 1. However, it also sees us:

- Repurposing existing structures where possible for storage solutions to better protect our tools and equipment that need to be stored in secure and weather protected conditions at remote locations
- Constructing a workshop at CS9 to better utilise and upskill our workforce
- Starting to proactively invest to improve our staff accommodation at two of our highest use, most dilapidated remote sites
- Establishing a northern hub at Karratha

1.5.2.1 Advantages and disadvantages

The advantage of Option 2 is that it will address our most urgent compliance issues, as well as commencing the process of addressing our poor remote accommodation and facilities. By establishing the northern hub and upgrading two of our most dilapidated compressor station sites, we will improve staff wellbeing, improve productivity, and send a strong signal to current and potential employees that DBP is a good place to work.

A disadvantage of Option 2 is that it means two of our sites will remain in 'very poor' condition. It is also a higher cost than Option 1.

1.5.2.2 Achievement of objectives

Table 1.8 outlines how this option will support the achievement of our vision objectives in AA6.

Table 1.8: Achieving objectives – Option 2

Vision objective	Alignment
Delivering for Customers – Public Safety	Y
Delivering for Customers – Reliability	-
Delivering for Customers – Customer Service	-
A Good Employer – Health and Safety	Y
A Good Employer – Employee Engagement	Y
A Good Employer – Skills Development	Y
Sustainably Cost Efficient – Working within Industry Benchmarks	Y
Sustainably Cost Efficient – Delivering Profitable Growth	-
Sustainably Cost Efficient – Environmentally and Socially Responsible	Y

This option delivers against our vision objectives of delivering for customers, being a good employer and being sustainably cost efficient.

1.5.2.3 Cost assessment

The forecast capex under this option is $27 million over the AA6 period. This includes $10.2 million for compliance driven projects (per option 1), and $16.8 million for structures and operational sites.

A summary of these project costs is provided in Table 1.9.

Table 1.9: Summary of costs – Option 2, $'000 2024

Project	2026	2027	2028	2029	2030	Total
HSE and Security compliance	**2,811**	**2,271**	**1,759**	**1,804**	**1,583**	**10,228**
Compressor station site accommodation	-	6,100	500	6,100	-	12,700
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Site building conversion	308	308	308	308	308	1,540
Building and structural rectification following inspection	-	-	100	100	100	300
Workshop at CS9	-	275	-	-	-	275
Total operational facility structures and accommodation	**308**	**6,683**	**908**	**6,508**	**2,408**	**16,815**
Total	**3,119**	**8,954**	**2,667**	**8,312**	**3,991**	**27,043**

1.5.2.4 Risk assessment

Addressing all the compliance related risks and investing to achieve industry standards in accommodation, whilst repurposing buildings where possible, reduces the risk to ALARP.

Table 1.10: Risk rating - Option 2

Risk category	Untreated	Treated
People	High	Intermediate
Environmental	Intermediate	Negligible
Supply	Negligible	Negligible
DBP	High	Negligible
Reputation	Intermediate	Negligible
Loss	Low	Negligible

1.5.3 Option 3 – Complete HSE and security compliance driven projects, replace substandard facilities and replace the accommodation at four sites that are rated 'very poor'

Option 3 includes all projects under Option 2, but also seeks to implement a more aggressive investment in accommodation that will enable **four** critical operational accommodation sites to be upgraded to ensure they are fit for purpose.

1.5.3.1 Advantages and disadvantages

The advantage of Option 3 is that it will address our most urgent compliance issues. It will see a northern hub established and all four of the poorest condition accommodation facilities brought up to an acceptable standard. This will improve staff wellbeing, improve productivity, and send a strong signal to current and potential employees that DBP is a good place to work.

A disadvantage of Option 3 is that it is a significantly higher cost than Option 2. The work program under Option 3 would also be quite intensive, with no guarantees that all four 'very poor' sites could be upgraded within the five year period.

1.5.3.2 Achievement of objectives

Table 1.11 below outlines how this option will support the achievement of our vision objectives.

Table 1.11: Achieving Objectives

Vision objective	Alignment
Delivering for Customers – Public Safety	Y
Delivering for Customers – Reliability	-
Delivering for Customers – Customer Service	-
A Good Employer – Health and Safety	Y
A Good Employer – Employee Engagement	Y
A Good Employer – Skills Development	Y
Sustainably Cost Efficient – Working within Industry Benchmarks	Y
Sustainably Cost Efficient – Delivering Profitable Growth	-
Sustainably Cost Efficient – Environmentally and Socially Responsible	Y

Much the same as Option 2, this option aligns with our vision objectives of delivering for customers and being a good employer. However, it does do at a significantly higher cost.

1.5.3.3 Cost assessment

The forecast capex under this option is $39.2 million for the AA6 period. This is wholly driven by the two additional operational accommodation sites proposed to be addressed in the AA6 period. It is not an increase in overall project costs, it only brings forward costs from future AA periods into AA6. The breakdown of costs is shown in Table 1.12.

Table 1.12: Summary of costs - Option 3, $'000 2024

Project	2026	2027	2028	2029	2030	Total
HSE and security compliance	**2,811**	**2,271**	**1,759**	**1,804**	**1,583**	**10,228**
Compressor station site accommodation	500	6,100	6,100	6,100	6,100	24,900
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Site building conversion	308	308	308	308	308	1,540
Building and structural rectification following inspection	-	-	100	100	100	300
Workshop at CS9	-	275	-	-	-	275
Total operational facility structures and accommodation	**808**	**6683**	**6508**	**6508**	**8508**	**29,015**
Total	**3,619**	**8,954**	**8,267**	**8,312**	**10,091**	**39,243**

1.5.3.4 Risk assessment

Addressing all the compliance related risks and investing to achieve industry standards in accommodation, whilst repurposing buildings where possible, reduces the risk to ALARP, albeit at a higher cost in AA6 at than Option 2.

Table 1.13: Risk rating - Option 3

Risk category	Untreated	Treated
People	High	Intermediate
Environmental	Intermediate	Negligible
Supply	Negligible	Negligible
DBP	High	Negligible
Reputation	Intermediate	Negligible
Loss	Low	Negligible

1.6 Summary of options assessment

To assess the options, the costs, objectives and risk are considered for each option. A summary of the option assessment is shown in Table 1.14.

Table 1.14: Summary of options assessment

Option	Achievement of objectives	Cost	Treated risk (integrity/reliability)
Option 1: Complete compliance driven projects only	Does not align with any of our objectives of delivering for customers, being a good employer or being sustainably cost efficient	$12.7 million	Does not adequately address identified high and intermediate risks to DBP, People, Reputation, Asset Damage and Supply
Option 2: Complete compliance driven projects, replace substandard facilities and replace the accommodation at **two** of our most used and dilapidated sites	Aligns with our objectives of delivering for customers, being a good employer and being sustainably cost efficient	$27.0 million	Adequately addresses identified high and intermediate risks to DBP, People, Reputation, Asset Damage and Supply reducing them to ALARP
Option 3: Complete compliance driven projects, replace substandard facilities and replace the accommodation at **four** of our sites rated 'very poor'	Aligns with our objectives of delivering for customers, being a good employer and being sustainably cost efficient	$39.2 million	Adequately addresses identified high and intermediate risks to DBP, People, Reputation, Asset Damage and Supply reducing them to ALARP

1.7 Proposed solution

1.7.1 Why is the recommended option prudent?

Option 1 is not preferred as although it does address the risks for our compliance program, the opportunities to repurpose buildings and taking a short term view of accommodation with minor investments would not simply defer matter further into the future.

Options 2 and 3 addresses the identified compliance related risks and provide a solution for operational structures and accommodation that is consistent with good industry practice. Both options start to address the identified significant issues with our accommodation solutions for our staff at remote sites. Both options will help attract and retain staff in a highly competitive market for skilled labour.

Our preferred option would be to address more sites within the AA6 period (option 3), but have considered the cost on our customers and have recommended option 2, which reflects a longer program, targeting the highest use and most dilapidated sites first. Staging the program over a longer period will also allow us to use lessons learned and develop more targeted solutions for the ongoing program into future periods.

1.7.2 Estimating the efficient costs

The unit rates used for all projects managed within this program include the forecast internal labour, external labour/contractors, materials, travel and other costs.

Where possible, the unit rates used to determine the cost of the program in AA6 is based on actual historical costs of the same or similar program of work. The cost of these activities would usually be determined through a competitive tender process.

1.7.3 Consistency with the National Gas Rules

NGR 79(1)

The proposed compliance rectifications and building upgrades are also consistent with the requirements of NGR 79(1)(a), specifically we consider that the capital expenditure is:

- **Prudent** – The expenditure is necessary in order to address the identified health, safety, environment and safety compliance issues. The investment is also required to repurpose existing structures and construct fit for purpose accommodation which can be seen to be of a nature that would be incurred by a prudent service provider.
- **Efficient** – Combining the structures and operational sites into a single workstream delivers efficiencies in planning and delivery, and the utilisation of existing buildings as opposed to building new buildings is an efficient use of resources. Building a new accommodation block away from the existing accommodation block so as not to interrupt operations, also ensure s uninterrupted maintenance and capital works. The proposed expenditure can therefore be considered consistent with the expenditure that a prudent service provider acting efficiently would incur.
- **Consistent with accepted and good industry practice** – The proposed expenditure relates to addressing compliance related risk, which all good businesses commit to, and DBP is using industry standard remote accommodation designs for the long term, therefore the proposed capital expenditure is such as would be incurred by a prudent service provider acting efficiently, in accordance with accepted good industry practice.
- To achieve the **lowest sustainable cost of delivering pipeline services** – The sustainable delivery of services includes reducing risks to as low as reasonably practicable and maintaining reliability of supply, whilst achieving the lowest sustainable costs by undertaking the works in line with the relevant Australian Standards and codes of practice.

NGR 79(2)

Operational sites and structures are not the primary asset; however, they are critical to maintain and operate the pipeline, main line valves, compressors, repeater sites and other key infrastructure. Addressing the health, safety, environment and security issues under one program of works allows for efficient planning and delivery in addressing compliance risks. The conversion of redundant buildings into useful storage and workshop areas are the actions of a prudent operator, and the phased investment in accommodation to align our facilities with industry standards demonstrate our commitment to our staff and investment for the long term. These programs are therefore consistent with consistent with NGR 79(2)(c)(ii).

NGR 74

The forecast costs in this business case are based on the latest market rate testing, and project options consider the asset management requirements as per the latest AMP. Cost assessments have been conducted for each option based on the best information available at the time of developing this business case. The estimate has therefore been arrived at on a reasonable basis and represents the best estimate possible in the circumstances.

Appendix A Health, safety, environment and security

Table Appendix A.1: Proposed HSE and security compliance capex, $'000 2024

Project	2026	2027	2028	2029	2030	Total
Working at heights	451	451	451	451	451	**2,255**
Remote site toilets	300	300	300	300	480	**1,680**
Reverse osmosis units	300	300	300	300	300	**1,500**
Water supply at remote sites	0	0	0	201	0	**201**
Earthing grid refurb	90	90	90	90	90	**450**
Replace air con at CS	40	40	40	40	40	**200**
Office equipment upgrade	75	75	0	0	0	**150**
Helicopter landing pads	200	200	0	200	0	**600**
Oil sump tanks	181	91	122	122	122	**638**
Oil farms		200	200	0	0	**400**
Concrete odorant bunds	100	100	100	0	0	**300**
CCTV installation	224	224	56	0	0	**504**
Palisade fencing at Kwinana Junction	350	0	0	0	0	**350**
Swipe card access at CS9	300	0	0	0	0	**300**
CS boom gates	100	100	0	0	0	**200**
Replace compound fencing	100	100	100	100	100	**500**
Total	**2,811**	**2,271**	**1,759**	**1,804**	**1,583**	**10,228**

A.1 Working at heights

During 2023 and 2024 DBP has undertaken a comprehensive working at heights review against Australian Standard AS1657:2018 for all our MLV sites, meter stations, repeater stations and all compressor sites.

The assessment criteria reviewed infrastructure compliance for walkways, handrails, stairs ladders, step ladders, ladder cages, step through ladders and side access ladders as per the following table:

Table Appendix A.2: AS1675 :2018 assessment criteria

Design	Design Component	Requirement
Walkway	Head room	2000mm
	Walkway width	Min 600mm
	End of	Clearly visible (Yellow) Non-slip nosing
	Height Difference between Walkways, Platforms and Landings	<300mm
		Min 300mm Max 450mm
		>450mm
Handrail	Gap	Max 100mm from structure
	Gap	Min 25mm Max 50mm between joins
	Bottom (Start Point)	Max 90mm above landing

Design	Design Component	Requirement
	Height	Min 900mm Max 1100mm
	Clearance	Min 50mm
	Size Dia	Min 30mm Max 65mm
	Mid rail	Max 450 from bottom with toe board 100mm, Max 450 from top
Stairs	Treads	Clearly visible (Yellow) Non-slip nosing
	Tread Depth	Min 185mm
	Handrail	2 or more steps
	Bottom landing	900mm long
	Width	Min 600mm
	Flight	Min 2 Max 18 risers
	Riser	Min 130mm Max 225
	Going	Min 215mm Max 355
	Nosing	Clearly visible (Yellow)
	Landing	Min 600mm from bottom tread
	Landing	Width of stairs
	Slope	Min 20 degrees Max 45 degrees
Ladders	Rungs	Non-slip grip
	Rungs	Min 20mm Max 50mm
	Rungs from bottom landing	<=150mm of landing Vertical above landing
	Landing bottom	Min 900mm long from bottom rung
	Landing top	Swing gate at top
Step type ladders	Step depth (Tread)	Min 100mm
	Spacing of tread	Min 200mm Max 300mm apart
	Angle	60 Min 70 Max
	Landing bottom	Min 900mm long from bottom rung Min 600mm width or width of landing whichever is greater
	Landing top	Swing gate at top
	Ladder enclosure (cage, side screen or other)	Fall of >6 metres
Ladder cages	Cage from bottom landing	Min 2000mm Max 2200mm
	Cage above top landing	Min 1000mm or to height of guardrail
Step through ladders	Ladder above top landing	Min 1000mm
Side access ladders	Ladder above top landing	Min 1000mm

In total 733 issues were recorded across our assets. To prioritise risk and investment we have used a likelihood consequence risk ranking process to identify a rolling program of works for corrective measures. The project will focus on the 102 high risks and their reduction to ALARP. A summary of the issues and selected examples is provided in the following sections.

A.1.1 Main line valve sites

23 site issues identified, zero ranked high. Example site MLV091-3.

MLV091-3	10/2/2023	MLV091 Nangetty Road Meter Station - Mercaptan Skid and Bund	1) No access stairs for personnel to use to enter / exit bund (height 400mm). Small concrete block sighted that may being used as a step.	D. Occasional	2. Minor	Medium	1.1) Install access stairs on two sides of the bund. If 2 or more steps are in place, then handrails are required. 1.2) Install hi vis (yellow) non-slip strip on the nosing of each stair. 1.3) Pour a landing for each access stairs, that meet AS requirements.





A.1.2 Meter stations and miscellaneous sites

84 issues identified, 7 ranked high. Example site, Clifton Road Meter Station.

Clifton Road Meter Station 2	3/1/2024	Pav Hut - Roof	1) Roof access periodically required for maintenance work. Currently performed with personnel working in FIPS. Note: Same Hazard / Design issue as raised for another Facilities Site by Andrew Hynes.	C. Unlikely	4. Major	High	1) Consider installing a platform and access stairs / ladder. This will prevent a fall and reliance on PPE.

Clifton Road Meter Station-4	3/1/2024	Repeater Tower	1) No access platform provided for ease of access to the ladder. Note: This may have not be provided for the purpose of preventing unauthorised access. 2) No fall restraint/arrest system in place for personnel using the ladder. This exposes personnel to a significant fall that would likely result in a fatality or serious injury. 3) No ladder enclosure has been installed for the ladder to meet AS requirements (where a fall of more than 6m). 4) No hi vis (yellow) anti-slip tread installed on the ladder rungs.	C. Unlikely	4. Major	High	1) Install an access stairs/ladder and platform to enable access to the ladder. Ensure a lockable gate or similar and signage is provided to prevent unauthorised access. 2) Install a certified fall restraint/arrest system that is suitable for the end users. 3) Assess if the installation a side screen, ladder cage or other type of enclosure to prevent a sideways fall from the ladder, if practical for the end users. 4) Install hi vis (yellow) anti- slip tread on the ladder rungs.





A.1.3 Repeater stations

230 issues raised, 40 ranked high. Example site Wagerup Repeater Station.

Wagerup Repeater Station - 3	3/5/2024	Wagerup Repeater Station - Yellow Hut Roof Access	1) Roof access periodically required for maintenance work. Currently performed with personnel working in FIPS.	C. Unlikely	4. Major	High	1) Consider installing a platform and access stairs / ladder. This will prevent a fall and reliance on PPE.



A.1.4 Compressor sites

396 issues raised and 55 are ranked high.

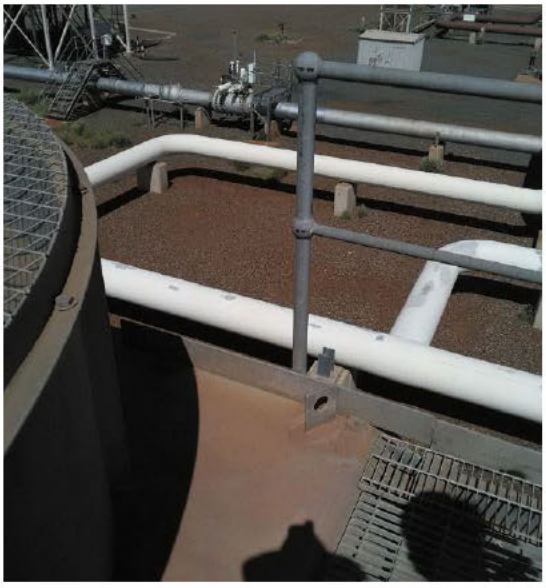
Table Appendix A.3: Compressor site HSE issues

Compressor site	Total issues risk ranked	High risks
CS1	19	4
CS2	13	4
CS3	36	4
CS4	28	3
CS5	37	5
CS6	40	8
CS7	52	9
CS8	76	7
CS9	48	3
CS10	47	8
Total	**396**	**55**

Example site Compressor Station 2.

CS02-3	2/21/2023	After Cooler Fans - Top Platforms	1) Several locations where there is a gap between the existing handrails and the fan enclosures exceeds the AS 1657 allowance (max 100mm). This creates the potential for a person to fall from height resulting in a fatality or significant injury due to the total fall distance.	C. Unlikely	4. Major	High	1) Extend the handrail to the fan enclosures to eliminate exposure to an unprotected edge.

CS02-4	2/21/2023	After Cooler Fans - Top Platforms	1) No guarding has been installed on the top of the fan enclosures, to prevent access during operation. Multiple fans at this location.	C. Unlikely	4. Major	High	1) Install a grid mesh hatch or similar and attach it to the existing structure.





The estimated cost of the working at heights program is $451,000 per annum for the next five years. This is based on actuals in 2023 and 2024 that are indicative of a sustainable and achievable scope of works, with an aim to remove all the highest risks over the next five years as priority.

A.2 Health and wellbeing

A.2.1 Remote site toilets

Remote site toilets are not available at the majority of DBP's operational sites, apart from compressor stations. Some main line valves sites do have drop toilets, however many of the tin shed buildings are dilapidated and are a haven for snakes, spiders and wasps.

Proper toilet facilities ensure that all staff can maintain their personal hygiene, which is essential for their health and wellbeing. Inadequate facilities can lead to health issues and discomfort, affecting an employee's ability to work efficiently.

Having appropriate facilities demonstrates organisational support and respect for all employees and sends a strong message that the company values its staff's wellbeing, which can improve

morale and job satisfaction, leading to higher productivity and retention rates for a diverse workforce.

The unit cost of the toilet is estimated at $18,000 based on market rates, and the transport and installation at remote locations makes up the remainder of the $30,000 per toilet allowance.

We are looking to install ten units over a five year period.

FigureAppendix A.1: proposed robust and standalone toilet design



A.2.2 Replacement of reverse osmosis units

Water reverse osmosis units are critical supporting infrastructure required for the supply of clean water at compressor stations for the health and safety of the employees. The bore water is stored in a raw water tank and then treated via the reverse osmosis plants to make the water suitable for use on site in all water systems, including cleaning.

If reverse osmosis units fail the only alternative is to start transporting large volumes of fresh water to our remote locations by the use of water trucks. This is costly and impractical. For example, CS6 and CS7 have had water trucked in and in recent years, CS3 and CS4 also have had water trucked into site for extended period of time. The issue with the CS4 osmosis unit is that it is not designed for the deteriorating quality of the water now being extracted from the bore.

Separately from the sanitation requirements on site, water is also used to clean equipment. If turbines get dirty water in them, it can lead to serious issues. Dirty water can cause erosion and

corrosion of turbine blades and other components, and this can reduce the efficiency of the turbine and lead to costly repairs or replacements. Contaminants in the water can form deposits on turbine blades, reducing their performance and leading to overheating. In severe cases, the damage caused by dirty water can lead to mechanical failures, posing safety risks to both the equipment and the personnel operating it.

We have six units in reverse osmosis operation on the DBP, which have all reached the end of their life, with most of the units being operational for more than ten years. We plan to progressively replace all these units over the next six years, with the first five being replaced over the next regulatory period.

A.2.3 Water supply to compressor stations

A compressor station needs a fresh water supply for several critical reasons. First, fresh water is essential for cooling purposes. Compressor stations generate substantial heat during operation, and fresh water is often used in cooling systems to maintain optimal operating temperatures, preventing equipment overheating and ensuring efficient performance.

Additionally, fresh water is crucial for hygiene and sanitation for onsite personnel. This includes drinking water, facilities for handwashing, and emergency showers, all of which contribute to the health and well-being of the staff.

Fresh water is also necessary for various maintenance tasks, such as cleaning equipment and facilities to prevent contamination. In some cases, fresh water may be used in fire suppression systems, providing an immediate source of water in the event of a fire.

Typically, DBP has to replace one water system every 5-10 years as their performance deteriorates with age. The scope of works includes bores, pumps and meters. DBP did not have a failure during the current period and therefore based on failure rates we consider it prudent and conservative to forecast a single failure during AA6. The estimate cost of water system replacement is $201,000, which is based on historical costs.

A.2.4 Earthing grid refurbishment at aboveground sites

Earthing grids provide a low-resistance path for fault currents to travel safely to the ground, significantly reducing the risk of electrical shocks to personnel. By dissipating fault currents, earthing grids protect sensitive equipment from electrical surges and lightning strikes, thus minimizing potential damage. Additionally, they help maintain a consistent electrical potential across the site, which is crucial for the reliable operation of protective devices and control systems.

This voltage control ensures that step and touch voltages are kept within safe limits, protecting both personnel and equipment. Five sites have been identified in AA6 for earthing grid refurbishment as they are currently underperforming.

The program will be an ongoing project over multiple regulatory periods, however, the five sites identified for AA6, in priority order are:

- MLV19
- MLV67
- MLV32

- MLV55
- MLV6

A.2.5 Replacement of air conditioning units at operational sites

Air conditioning units are required in multiple buildings at compressor stations and meter stations. For example:

- Accommodation areas
- Workshops
- Warehouses
- Store rooms
- Control rooms
- Turbine buildings
- Electrical switch room
- Equipment rooms

Air conditioning is essential so that equipment can operate reliably within its defined operating temperatures, as well as ensuring buildings where staff reside, and work are at a suitable temperature. This program targets the replacement of air conditioning units at compressor and meter stations which are approaching end of life. Their useful life is between five and ten years.

Replacement of these units is an ongoing program. The costs incurred are inclusive of design, installation with removal of old units, reconfiguration, patching and remedial works and the updating of spares, maintenance procedures and maintenance management requirements.

A.2.6 Office equipment upgrade

Compressor stations have fallen behind industry expected standards for contemporary office spaces. They are not fit for purpose when considered for ergonomic assessments, efficient flow of communications and spaces for meetings and general working.

This project is to systematically upgrade the office facilities at compressor stations over a five-year period, addressing the highest utilised spaces and locations first. Where possible, the project will align with the compressor station accommodation upgrades project to maximise the utilisation of the same resources.

The project plan is not to fundamentally change the office buildings, but to make moderate and reasonable upgrades with suitable chairs, tables, and stand-up desks.

A.3 Environment

A.3.1 Helicopter landing pads

Helicopters are used on the DBP for asset activity inspections as well as preventing third party damage to our asset from construction works adjacent to, or above, our asset. Several of our helicopter landing pads have been in place since each compressor station site was constructed, and in some cases the compressor station site has no landing pad at all.

The poor condition of the landing pads (or lack of a landing pad) means aviation oil and fuels have seeped into the ground over the years due to spillages during the refuelling process. This is a significant environmental concern. The poor condition sites also means dust and dirt can be dragged into the helicopter turbines, creating a safety issue for nearby personnel and unnecessary wear and tear on the helicopter.

We therefore need to invest to make sure those sites that require helicopter access have suitable landing pads and fuelling facilities, as well as somewhere safe to store aviation fuel and clean-up equipment.

We propose to address the highest-trafficked sites first, installing three helicopter pads during the AA6 period. The following table summarises the proposed program.

Table Appendix A.4: Helicopter landing pad program, $'000 2024

Compressor site	Helicopter pad	Replacement/install	Approx. cost
CS 2 – highest use	Yes – poor condition	2026	200
CS 5	No – required	2027	200
CS 1	Yes – poor condition	2029	200

This scope of work is to install landing pads with small adjacent sheds to hold the aviation fuel. Cost estimates are based on a high level scope of work and advice from potential vendors.

A.3.2 Refurbishment of underground oil sump tanks.

DBP operates 20 underground sump tanks at compressor stations. Underground sump tanks at compressor stations are used to collect and contain liquids that accumulate during the compression process. These liquids, often referred to as condensate or drip gas, can include water, oil, and other hydrocarbons that separate from the natural gas. The tanks are designed to prevent these liquids from contaminating the surrounding environment, particularly groundwater. DBP's tanks are typically double walled to provide an extra layer of protection against leaks and spills.

These oil sump tanks have been in operation as long as the compressor stations have been established. Through our regular maintenance we have identified that our older vintage of oil sumps are failing, evident by cracking. We are instigating a project to refurbish or replace the failing oil sumps over a 10-year period.

The first 9 are due to be refurbished in AA6 period, with the remainder to be completed in future periods. Once complete, the refurbished oil sumps are expected to last a further 20 to 30 years.

One sump is required to be refurbished at each of CS9, CS8 and CS5, and two sumps at each of CS6, CS3 and CS1.

A.3.3 Oil farms

Every compressor station has an oil farm used for the safe storage of oil, way from high-risk areas on site. The oil farms were originally designed to be elevated, however, this is posing risks from both a working from heights perspective, as well as a manual handling and safe access/egress perspective.

We are therefore proposing a program of works to progressively remove the old-style elevated oil farms with the new style farms that will enable us to safely manage oil and any potential contamination.

Figure Appendix A.2: Old style elevated oil farms vs ground-level storage facilities.



A.3.4 Replacement of concrete odorant bunds

Concrete bunds are required for odorant tanks at gas facilities to contain spills and leaks, preventing harmful substances from contaminating the surrounding environment. They act as a barrier, ensuring that any accidental releases are confined within a designated area, making it easier to manage and clean up. This containment is crucial for protecting soil and groundwater from pollution, which can have significant environmental and health impacts.

Concrete bunds were initially installed with compliance to AS1940 at the time of the station construction, however they are now falling into disrepair due to their age. Six odorant bunds have been identified as requiring replacement in the upcoming period at a unit cost of $50,000, which is based on costs for similar projects such as oil bunds.

A.4 Site security

[redacted]

These are described further below.

[redacted]

[redacted]

[redacted]

[redacted]

A.4.2 Compressor station boom gates

As per numerous HSE incident reports, the general public or contractors can enter our remote gas facilities unannounced. This is a risk to visitors and operational staff when we cannot control who and where people may be on site.

We currently use a yellow plastic chain that deteriorates over time due to UV damage, and can easily be removed for site access. In order to mitigate this risk automatic boom gates shall be installed to provide a visual barrier for visitors to get out of their vehicle and actively look for personnel on site. The gate designs will not prevent employees leaving the plant in an emergency, as they will be designed such that they can be driven through without excessive damage to a vehicle. [redacted]

A.4.3 Replacement of compound fencing

Compound fencing is essential for gas transmission sites due to its multiple protective functions. It enhances security, preventing unauthorized access and potential sabotage. This is critical for maintaining the integrity of our infrastructure. Additionally, fencing ensures safety by restricting entry to trained personnel, thus reducing accident risks.

Compound fencing is typically aligned to the age of the installation. The target of this project is to address our oldest facilities where the fencing has deteriorated over time, and can no longer perform its protective intent due to damage and corrosion.

Appendix B Operational facility structures and accommodation

Table Appendix B.1: Operational facility structures and accommodation proposed capex, $'000 2024

Project	2026	2027	2028	2029	2030	Total
Compressor station site accommodation	-	6,100	500	6,100	0	**12,700**
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Site building conversions	308	308	308	308	308	**1,540**
Building and structural rectifications	-	-	100	100	100	**300**
Workshop at CS9	-	275	-	-	-	**275**
Total	**308**	**6,683**	**908**	**6,508**	**2,408**	**16,815**

B.1 Compressor station site accommodation

The remote location of compressor stations requires that DBP must house the operational workforce when conducting maintenance and capital projects. The existing accommodation age ranges between 32 and 40 years old, with capacity for 12-15 people in the main building, and an additional eight overflow rooms. The oldest accommodation had major maintenance works undertaken 16 years ago, which included additional bedrooms and an amenity building. Over the life of the accommodation buildings, they have also undergone various levels of maintenance to keep them operational enough to avoid replacement. Transportable dongas have been installed as the overflow to further increase capacity, however other site amenities were not increased to allow for the capacity increase. These dongas are at the end of their useful working life and need major maintenance or replacement.

Figure Appendix B.1: Example of incremental piecemeal and temporary fixes of existing accommodation facilities at CS4



Safe Work Australia Environment and Facilities Code of Practice 2011 outlines key requirements for accommodation at remote work sites, emphasising the need to separate living spaces from any hazards present in the workplace that could adversely affect the health and safety of workers. In the compressor station context this would be separation from high pressure gas facilities and the associated hazards such as the noise of day to day operations, as well as the possible heat radiation caused by an asset failure incident. More specifically, the Code of Practice recommends that accommodation facilities:

- Include appropriate toilet, washing, and laundry facilities
- Offer suitable sleeping quarters that are shielded from noise and vibration
- Have all fittings, appliances, and equipment in good working condition

Replacing and upgrading accommodation with comfortable, well-designed living spaces can have a direct impact the mental health and physical well-being of workers, leading to higher job satisfaction and improved performance. This is particularly important in remote areas where employees spend extended periods away from home and family. In consideration of this, the accommodation upgrade shall include a reliable, high-speed internet connection to allow employees to communicate with their families back home. This will be a significant improvement on the current slow and intermittent internet connection at these sites.

From an Environmental, Social, and Governance (ESG) perspective, upgrading the accommodation also supports a more inclusive and diverse workplace. The existing accommodation bathroom facilities are shared between male and female workers, with little to no access for individuals with mobility issues.

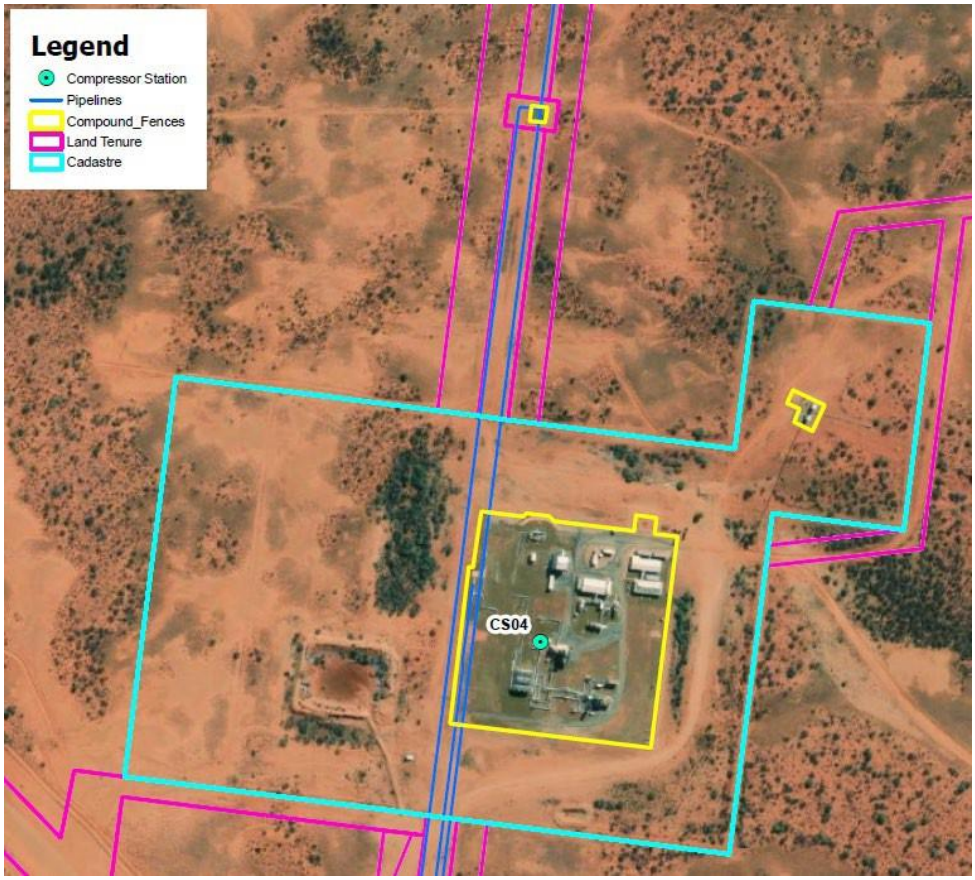
By improving the accommodation, including the addition of more private and accessible facilities, we can foster a more inclusive atmosphere that respects and accommodates the diversity of all workers, which is a fundamental aspect of modern ESG practices. Attracting skilled professionals to remote locations can be challenging; however, modern and comfortable accommodation can serve as a significant incentive for prospective employees, as well as aid retention of the existing skilled workforce.

The location of the new accommodation blocks will be moved further away from the live and noisy high pressure facilities and set to the edge of the site cadastre boundary (see CS 4 example photo below).

Figure Appendix B.2: operational site with accommodation in close proximity to live assets and noisy operations.



Figure Appendix B.3: Scale of operational site versus scale of site boundary



The proposed relocation will remove the accommodation buildings and staff away from high pressure gas should there be an uncontrolled gas release emergency. The hazard from heat radiation and ignition of a gas release would not be entirely removed if the new accommodation was built within the existing cadastre, however the increased distance would allow for further physical barriers to be put in place to reduce the risk to employees while in respite. This strategy will also enable the current facilities to be utilised whilst the new facilities are constructed, therefore reducing operational disruption and additional resources management.

Although DBP would like to complete one site per year, the forecast cost of each project, overlayed with the overall portfolio of projects requires, suggests it may be more prudent to only aim to complete two during the next five years. Completing the first two sites will give us greater transparency of costs going forward and will allow us to apply lessons learned to subsequent installations. The current estimate of $6.1 million per site is a combination of externally provided expert estimation, plus DBP internal management and materials.

There are a total of eight sites to complete, which we plan to upgrade over the next 12 years. They have been prioritised by inadequacy of the current facilities and their usage based on maintenance and planned capital works.

Table Appendix B.2: Summary of condition assessments of CS sites

Site	Current condition 1 – very poor 2- poor 3 - acceptable	Usage	Proposed construction
CS01	1	High	2028
CS02	1	High	2031
CS03	1	High – most remote – temperature	2027
CS04	1	Medium	2032
CS05	2	Medium	2033
CS06	2	Low	2036
CS08	2	Low	2037
CS09	2	Low	2039

The estimated costs for the project are based on third party contractor quotes to determine a basis of cost build up. However, in completing two sites over the upcoming period will enable us to refine and improve designs and cost estimations as part of continuous improvement.

B.2 Northern operational hub and accommodation

In addition to Compressor Site accommodation, DBP urgently needs a northern operational hub to effectively manage remote locations and move away from the unsuitable accommodation presently being used in Karratha. Currently, our staff operates out of a leased house in Baynton, which is far from ideal for handling the complexities of gas pipeline operations.

The property is small, has limited storage, and often becomes overwhelmed with tooling and equipment, particularly during handovers or periods of high maintenance. Establishing a dedicated operational hub in the north would significantly enhance response times to emergencies and maintenance issues. With personnel and resources stationed nearby, DBP can address problems promptly, minimising downtime and ensuring the continuous operation of pipelines. The hub would remove the need for additional time and travel getting to CS1 to collect parts and tools.

Moreover, a northern hub would improve operational efficiency. It would serve as a centralised location for logistics, maintenance coordination, and daily operations oversight, reducing the complexities of managing these activities from a distant headquarters. DBP also has many key customers in the area that need servicing with timely and effective maintenance and proactivity towards operational issues.

A dedicated hub would provide secure, organised storage for tools and spare parts, protecting them from environmental damage and theft. This ensures equipment is readily available and in good condition, which is essential for swift maintenance and emergency responses.

The operational hub would provide industry-standard accommodation for staff, greatly improving their wellbeing. The hub would feature comfortable living quarters, modern amenities, and recreational areas, which would help reduce travel fatigue, enhance job satisfaction, and boost morale. This investment in better accommodation aligns with good industry practices, showing a commitment to the health and wellbeing of employees.

Note the DBNGP used to have two northern depots, in Geraldton and Karratha. However, these were closed in 1998 when the pipeline was privatised and purchased by Epic Energy.



B.3 Site building conversions

At compressor stations CS2,3,4,6 & 7, we have decommissioned LM500 turbines from the fleet. LM500 turbines are housed in standalone buildings and an opportunity has presented itself to remove the LM500s and re-purpose these buildings to address storage risks at the site.

There are currently limited storage facilities for tools at these sites. Where we cannot store materials and equipment to the proper standard, they can be exposed to moisture, dust, extreme temperatures, and can suffer corrosion and wear, reducing their lifespan and effectiveness. This degradation not only increases maintenance and replacement costs but also leads to operational downtime when essential equipment fails unexpectedly.

The proposed solution is to create fit-for-purpose storage areas for tools and equipment by repurposing the LM500 buildings. This five-year project will rectify one site per year at a unit cost of $163,000

Table Appendix B.3: Proposed schedule for LM500 building conversions

Site	LM500 building conversion
CS2	2027
CS3	2028
CS4	2030
CS6	2026
CS7	2029

B.4 Building and structural rectification following inspection

As part of our improved asset management practices for our building and structures, we are increasing the volume of inspections. By conducting more frequent inspections we will stay aligned to our operational assets strategies and can make sure our structures and operational sites remain fit for purpose by undertaking ongoing investment at a sustainable level. This will avoid the need for another major investment program like that which has become necessary today.

We will undertake 48-month building and structural inspections, which is aligned to industry practice. In doing so we are likely to identify a mixture of major and minor rectifications, for which we must budget a capex allowance.

We propose a modest allowance of $100,000 per year starting in 2028, that will enable short term capital solutions to be implemented whilst longer term building and structure strategies are developed and implemented. Examples of such types of activities would include:

- Fixing leaks – Addressing minor leaks in roofs, windows, or plumbing can prevent water damage, mould growth, and structural issues that could lead to costly repairs

- Sealing cracks – Sealing cracks in walls, floors, or foundations can prevent water infiltration and structural damage, avoiding more extensive repairs later.
- Replacing damaged insulation – Fixing or replacing damaged insulation to prevent issues related to moisture and mould.
- Repairing faulty electrical wiring – Addressing minor electrical issues can prevent potential fire hazards and more significant electrical failures.
- Painting and surface protection – Applying protective coatings or paint to exposed surfaces can prevent rust, corrosion, and weather-related damage.
- Repairing damaged flooring – Fixing minor flooring issues, such as loose tiles or damaged floorboards, can prevent further deterioration and costly replacement.
- Upgrading safety features – Ensuring that safety features like handrails, smoke detectors, and fire extinguishers are in good working condition can prevent accidents and potential legal liabilities.
- Addressing cosmetic defects – Fixing minor cosmetic issues, such as chipped paint or cracked tiles, to prevent more significant problems developing.

B.5 Workshop at CS9

CS9 is used as a staging area for the turbine and compressor removal equipment in the event of a failure on CS09/2. It is conveniently located near Perth and the start of the pipeline north.

The laydown area for smaller deliveries and storing the site forklift is on the northern side of the control building, which provides little weather protection and is in direct sunlight through most of the afternoon. In addition, the forklift mast has been put through the ceiling on several occasions due to the low clearance height and we are unable to access the lean-to from the longer northern side of the building, as the roof is not high enough. Several years ago, the electrical workshop had to be converted to an office, which means that we no longer have a "clean room".

Pulling these challenges together, there is an opportunity to construct a heavy-duty workshop that would provide storage and a mechanical workshop, meaning we can store and test sensitive and expensive equipment (such as E&I devices) on site.

The functional design requirements have already been completed with the following scope:

- Large profile electric roller door
- External personnel door
- External single electric roller door to workshop for forklift access
- Internal single manual roller door for pallet trolley/forklift access
- Internal personnel door between main shed and workshop
- Pedestal mounted Kevrek in workshop area (similar to ACS GEA buildings)
- Conduit installation from control building
- 3 phase power supply, cable tray, reticulated power and light throughout
- Welding outlet in workshop with extraction fan and air conditioning
- Water and sewage, for a wash station (toilet not required)

- Industrial (welding) work bench with vice along eastern wall of workbench
- Industrial pallet racking around perimeter of building

CS9 is a permanently manned operational site. Although the staff on site have duties to perform during normal working hours, the staff have capacity to be upskilled and more productive to the overall needs of managing the asset.

By bringing the mechanical and E&I workshop in-house, DBP can maintain direct oversight over the quality of work. This helps ensure that repairs and maintenance meet the company's standards, with in-house technicians who understand the nuances of DBP's equipment.

Outsourcing mechanical work often comes with higher costs and mark-ups from third-party vendors. Insourcing the workshop can reduce these expenses and we can leverage internal resources more efficiently. Over time, the savings from reduced labour costs and streamlined processes will be realised.

A key vision of DBP is to be a good employer, which directly links to skills development. Employee morale and loyalty is known to improve with insourcing and providing opportunities for career growth and development.

The cost of installing the workshop is estimated at $275,000.

Appendix C Summary of risk assessment

Project Ref No	Description	Primary Risk Event	Proposed Action		People	Environment	Supply	DBP	Reputation	Loss
DBP38	Structures and operational sites	Ageing and unsuitable facilities to current standards and unfit for purpose structures causing heightened safety and security risks and pychosocial hazards	Untreated Risk	Likelihood	Unlikely	Unlikely	Remote	Unlikely	Unlikely	Unlikely
				Consequence	Major	Severe	Minor	Major	Severe	Minor
				Risk Level	HIGH	INTERMEDIATE	NEGLIGIBLE	HIGH	INTERMEDIATE	LOW
			Option 1 - Complete HSE and security compliance driven projects only	Likelihood	Remote	Remote	Remote	Remote	Remote	Remote
				Consequence	Major	Trivial	Minor	Minor	Minor	Minor
				Risk Level	INTERMEDIATE	NEGLIGIBLE	NEGLIGIBLE	NEGLIGIBLE	NEGLIGIBLE	NEGLIGIBLE
			Option 2 – Complete HSE and security compliance driven projects, replace substandard facilities and replace the accommodation at two of our most used and dilapidated sites	Likelihood	Remote	Remote	Remote	Remote	Remote	Remote
				Consequence	Major	Trivial	Minor	Minor	Minor	Minor
				Risk Level	INTERMEDIATE	NEGLIGIBLE	NEGLIGIBLE	NEGLIGIBLE	NEGLIGIBLE	NEGLIGIBLE
			Option 3 - Complete HSE and security compliance driven projects, replace substandard facilities and replace the accommodation at four sites that are rated 'very poor'	Likelihood	Remote	Remote	Remote	Remote	Remote	Remote
				Consequence	Major	Trivial	Minor	Minor	Minor	Minor
				Risk Level	INTERMEDIATE	NEGLIGIBLE	NEGLIGIBLE	NEGLIGIBLE	NEGLIGIBLE	NEGLIGIBLE