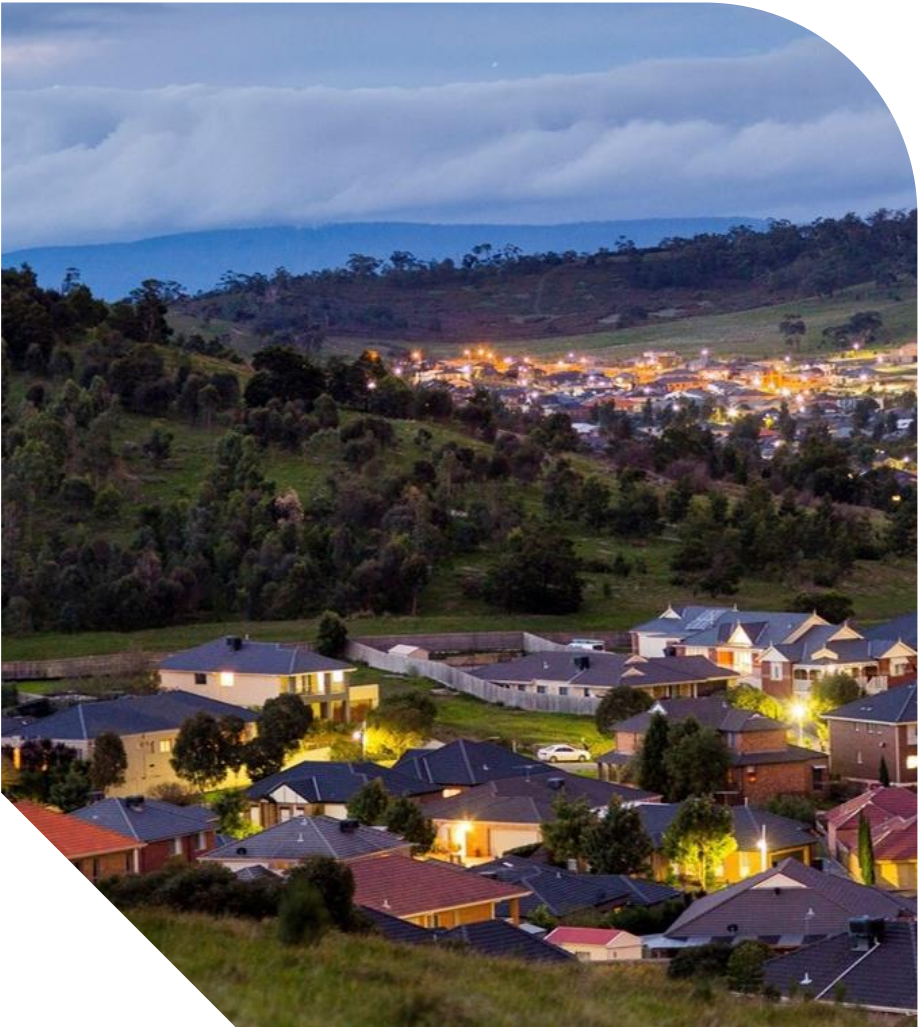


Gas Network

Transmission Pipeline Strategy PUBLIC

Friday, 10 June 2022

Document number:	AMS 30-50
Issue number:	4.0
Status:	Approved
Approver:	Stuart Dick
Date of approval:	17 December 2021



ISSUE / AMENDMENT STATUS

Issue Number	Date	Description	Author	Approved by
1.0	Feb 2012	Document Finalised	D Gupta	E Raffoul
2.0	Feb 2013	Revised post GAAR	D Gupta	E Raffoul
3.0	Feb 2014	2014 Update	D Gupta	E Raffoul
4.0	Dec 2021	Updated for GAAR 24-28	D Gupta	S Dick

Disclaimer

This document belongs to AusNet Services and may or may not contain all available information on the subject matter this document purports to address.

The information contained in this document is subject to review and AusNet Services may amend this document at any time. Amendments will be indicated in the Amendment Table, but AusNet Services does not undertake to keep this document up to date.

To the maximum extent permitted by law, AusNet Services makes no representation or warranty (express or implied) as to the accuracy, reliability, or completeness of the information contained in this document, or its suitability for any intended purpose. AusNet Services (which, for the purposes of this disclaimer, includes all of its related bodies corporate, its officers, employees, contractors, agents and consultants, and those of its related bodies corporate) shall have no liability for any loss or damage (be it direct or indirect, including liability by reason of negligence or negligent misstatement) for any statements, opinions, information or matter (expressed or implied) arising out of, contained in, or derived from, or for any omissions from, the information in this document.

Contact

This document is the responsibility of AusNet Services.

Please contact the indicated owner of the document with any inquiries.

AusNet Services
Level 31, 2 Southbank Boulevard
Melbourne Victoria 3006
Ph: (03) 9695 6000

Table of contents

Executive Summary	4
1. Document Overview	5
1.1. Purpose	5
1.2. Scope	5
1.3. Intelligent Inline Inspection	5
1.4. Asset Management Framework	6
1.5. References	8
2. Alignment with Drivers	9
3. Alignment with Network Objectives	11
4. Pipeline Network Overview	12
4.1. Pipeline Geographical Coverage	13
4.2. Pipeline Age Profile	15
4.3. Network Injection Points	17
5. Criteria for Pipelines for pigging	18
6. ILL Work Plan	20
6.1. Project Plan	20
6.2. Schedule	21
6.3. Capital Plan	21

Executive Summary

The main objectives of the Transmission Pipeline (TP) Strategy are to have an effective program of activities providing for:

- safe management of AusNet Services' Transmission Pipelines and Facilities,
- compliance with the requirements of AS 2885 "Pipelines – Gas and Liquid Petroleum"
- compliance with the requirements of the Pipeline Act 2005, and
- compliance with the Gas Safety Case and the Gas Safety Act 1997

This document outlines the strategic initiatives planned for the 2024-28 access arrangement period. These measures have proven to be effective and have managed the risk of high pressure gas escape and security of supply to both domestic and commercial customers.

This strategy supports the TP Integrity Management Plan (IMP) (Document No: AMP 30-03). The IMP is a comprehensive document which lists risk-based asset management practices. The IMP aims to achieve fit-for-purpose of the licenced gas transmission pipeline network by implementing a systematic approach to the utilization of resources on pipeline operation and maintenance activities and the application of sound engineering principles with due regard to safety and the environment.

Further to this, AusNet Services has 7 key network objectives to which the gas network is operated to. These objectives are:

- Maintain network safety in accordance with the Gas Safety Case;
- Maintain top quartile operating efficiency;
- Undertake prudent and sustainable network investment;
- Delivery of valued services to our customers;
- Simplify and remove cost by investing in technology and automation;
- Provide sector leading customer experience by improving systems, processes and communication;
- Secure future for gas with increased utilisation and renewable gas options.

An in-depth engineering review has been undertaken and advice from an independent, industry recognised pipeline consultant has been obtained. This advice was subsequently considered in the recommendations for the 2024-28 access arrangement period. Table 1 below provides an overview of the CAPEX requirement for the 2024-28 regulatory period.

Table 1: Planned Transmission Pipeline Capex Summary (\$2022, \$'000)

ACTIVITIES	2023-24	2024-25	2025-26	2026-27	2027-28	2024-28 TOTAL

1. Document Overview

1.1. Purpose

This Asset Management Strategy articulates AusNet Services' approach to maintain the integrity of gas transmission pipelines by making them feasible for getting inspected by undertaking intelligent in-line inspection

1.2. Scope

The scope of this strategy is to make possible In-line Inspection (ILI) of two AusNet Services' Pipelines:

- 1) PL 189 Bendigo City Gate (CG) to Abel Street and
- 2) PL 57 Corio CG to Benmore Street (DN350) and Benmore street to Buckley Grove (DN250)

This will require minor modifications to the pipelines such as removing plug valves, installing T-bars and fabrication of pig launchers and receivers.

1.3. Intelligent Inline Inspection

ILI generally refers to the use of Pipeline Inspection Gauges (PIGs), which range from simple devices used to clean a pipeline to sophisticated equipment used to obtain an array of measurements including pipeline wall thickness and the identification of defects. The information gathered through PIG-ing operations is used to make an assessment and recommendations about the future management of a pipeline. ILI is currently accepted as the most comprehensive technique available to gather the relevant information needed to determine pipeline integrity. It is therefore prudent for AusNet to establish an ongoing ILI program.

PIGs are inserted and retrieved from pipelines via PIG launchers and receivers. The differential pressure across the PIG is used to push the tool along the pipeline. See Figure 1 below for a photo of a PIG-ing operation.



Figure 1: Example of Intelligent Pig in Launcher

There are three general types of PIGs:

- **Cleaning PIGs:** Used to clean the pipeline of debris;
- **Gauge or Caliper PIGs:** Measures the roundness of the pipeline to determine areas of crushing or other deformations; and
- **Intelligent or Smart PIGs:** Measures wall thickness, corrosion, pitting, defects etc.

Intelligent PIGs use an array of technologies. Surface pitting and corrosion, as well as cracks and weld defects in steel/ferrous pipelines are often detected using magnetic flux leakage (MFL) PIGs. Others use electromagnetic acoustic transducers to detect pipe defects.

Some smart PIGs use a combination of technologies, such as providing MFL and caliper functions in a single tool.

With the exception of the Ring Main (License #203) and the Portland - Portland Smelter (License #196) pipelines, AusNet Services' gas transmission network was not designed to accommodate ILI through PIG-ing.

This is evident through the discontinuity of the pipeline networks, internal diameter variations along pipelines (i.e. telescopic pipelines cannot be PIG-ed), the use of valves that restrict flow and the absence of PIG-ing bars on pipeline off-takes.

1.4. Asset Management Framework

Figure 2 below provides an overview of AusNet Services asset management framework. This framework is centred around the objective to operate the network in top quartile of efficiency benchmarks with an aim to care for customers and strive to make energy more affordable.

The Gas asset management strategy plays a key role in ensuring alignment between asset management objectives, corporate objectives, and stakeholder requirement. This document is one of the strategies providing visibility on network performance, issues, risks, and investment required to support delivery of safe and reliable service and achieve the long-term objectives of the gas distribution network.

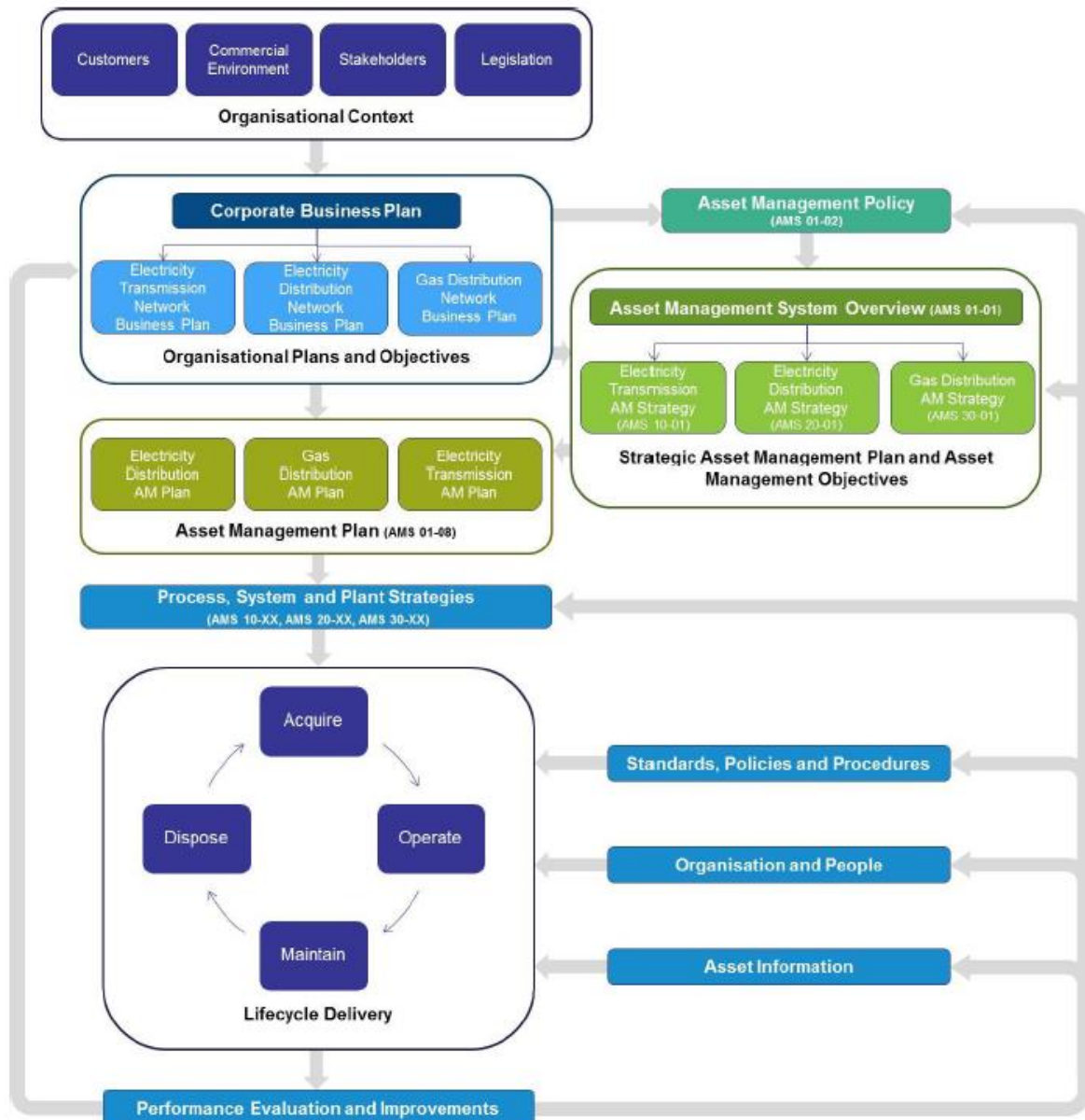


Figure 2: Ausnet Services Asset Management Framework

1.5. References

The following regulations and requirements are applicable to and influenced the design, operation and maintenance of the Transmission Pipeline asset class:

- Australian Standards
- AEMO Gas Quality Guidelines
- AusNet Services – Technical Standards and Procedures
- Asset Management Strategy – Gas Networks (AMS 30-01)
- Energy Safe Victoria Guidelines
- Gas Transmission Pipeline Integrity Management Plan (AMP 30-03)
- Gas Maintenance Plan (30-02)
- Gas Safety Act 1997
- Gas Safety Case (GSC 10-00)
- Gas System Contingency Plan – (AMP 30-05)
- Gas Distribution System Code
- Work Health & Safety Regulations

2. Alignment with Drivers

AusNet Services' purpose statement is "Connecting communities with energy and to accelerate a sustainable future". This statement places the customer (as individuals and communities) at the forefront as a business driver and acknowledges the critical relationship with their energy supply and usage. The following diagrams shows that Customers are a key theme linking the Corporate Business Strategy with the Gas Network Vision and Gas Network Objectives, which influence the key plant strategies forming the basis of the regulatory submission.

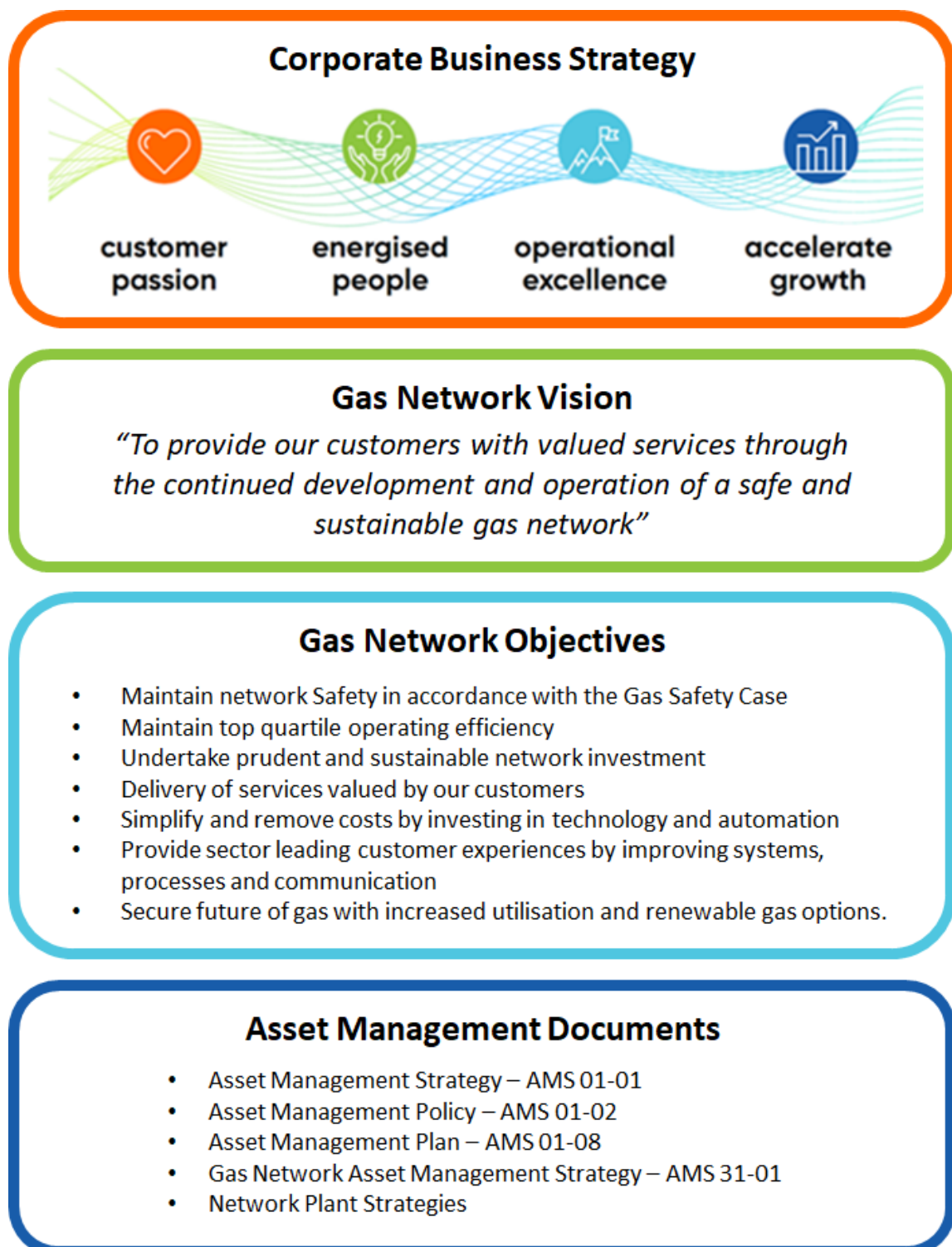


Figure 3: The Business Strategy, Network Vision and Objectives all centre around our customers

The Gas Network Objectives align with the four Corporate Business Objectives as shown below:

Maintain network Safety in accordance with the Gas Safety Case.

Maintaining network safety supports our commitment to “Mission Zero”, ensuring our people go home safely at the end of the day. This is one of the strategic priorities of the “energised people” corporate objective.

Maintain top quartile operating efficiency.

AusNet Services aspires to operate all three of its core networks in the top quartile of efficiency benchmarks. This aligns with the “operational excellence” corporate objective.

Undertake prudent and sustainable network investment.

This network objective supports AusNet Services’ obligation to undertake prudent and sustainable network investment, as defined in the National Gas Rules and Gas Distribution System Code. This in turn aligns with the “operational excellence” corporate objective.

Delivery of valued services to our customers.

AusNet Services strives to better understand our customers (their needs and behaviours) in order to deliver the services they value. This aligns with the “customer passion” corporate objective.

Simplify and remove costs by investing in technology and automation.

By working more efficiently, AusNet Services improves its “operational excellence” and provides better value for customers.

Provide sector leading customer experiences by improving systems, process and communication.

Similarly, improving how we work increases efficiency, thereby improving “operational excellence”.

Secure future of gas with increased utilisation and renewable gas options.

Exploration of renewable gas options and the role gas will play in the energy ecosystem of the future will support the “accelerate growth” corporate objective.

3. Alignment with Network Objectives

This section provides an overview of the alignment of the programs proposed in the Transmission Pipelines Strategy with AusNet Services' gas network objectives which govern how the network is operated and maintained.

Maintain network Safety in accordance with the Gas Safety Case.

ILI of the pipelines will enable AusNet Services to ensure that the pipelines are fit for purpose and prevent safety incidents due to the poor integrity of the pipelines.

Maintain top quartile operating efficiency.

ILI will promote operational excellence by identifying faults along the whole length of pipeline and consequently realign the operational activities.

Undertake prudent and sustainable network investment.

ILI allows us to ascertain the remaining life of the pipelines. Therefore, it identifies the opportunities to augment the pipeline's life and circumvent the need to invest in new pipeline.

Delivery of valued services to our customers.

Repairing faults identified through ILI enables the continual gas supply to both domestic and industrial customers.

Simplify and remove costs by investing in technology and automation.

ILI will create a set of pipeline integrity data which will provide greater information on the pipelines' conditions.

Provide sector leading customer experiences by improving systems, process and communication.

ILI will enable better asset management decisions which ultimately improve customer experience by reducing the likelihood of high pressure gas escape and interruption to supply.

Secure future of gas with increased utilisation and renewable gas options.

ILI will identify the topography of the wall thickness which will assist in designing a hydrogen compatible network.

4. Pipeline Network Overview

AusNet Services has 20 separate pipeline licences with a total length of 181.5kms. Detailed parameters of each pipeline can be referenced in the Pipeline Integrity Management Plan. AusNet Services operates and manages a natural gas transmission network in Melbourne's western and north-western metropolitan areas and in many regional centres in Victoria from Portland and Geelong in the south-west to Ballarat and Bendigo in the Central Goldfields.

AusNet Services' gas transmission pipelines form an interconnection between the principal transmission pipelines and the distribution network. It operates between 1050-2760 kPa as highlighted in

Figure 2 below.

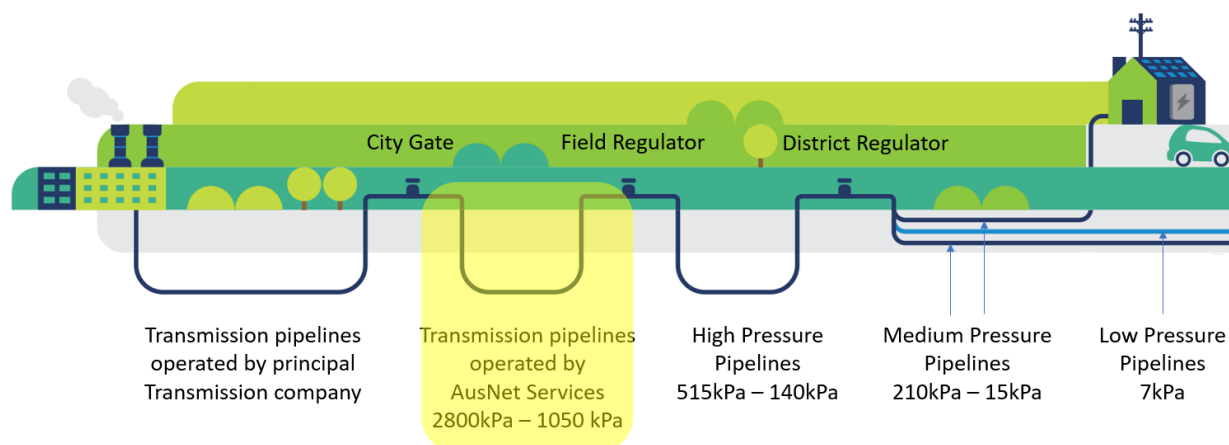


Figure 2: Schematic of Gas Network

Table 1 below lists the common operational parameters of the transmission pipeline network:

Table 1: AusNet Services Transmission Pipeline Network

PARAMETER	VALUES
Network Size	181.5 km
No. of Pipeline Licences in Regional Victoria	7
No. of Pipeline Licences in Metropolitan Melbourne	13
Pipe Diameter	100 mm – 500 mm

4.1. Pipeline Geographical Coverage

This section highlights the geographical coverage of AusNet Services' gas transmission pipeline network. Figure 3 and Figure 4 show the two pipeline licences PL-189 (Bendigo) and PI-57 (Geelong) which are covered under this strategy for PIG-ing during the 2024-28 access arrangement period.

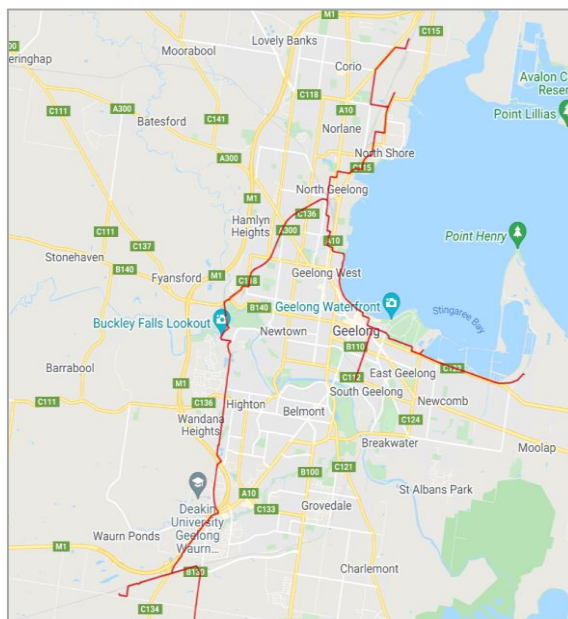


Figure 3: Geelong Pipeline Network

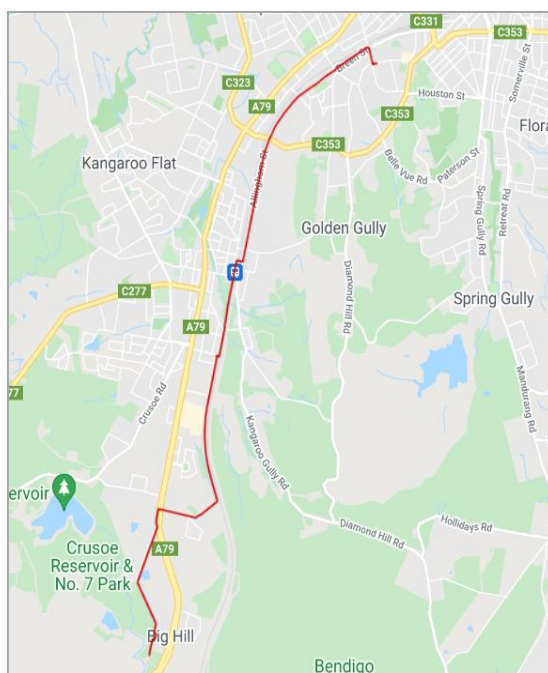


Figure 4: Bendigo Pipeline Network

Figure 5 and Figure 6 show all other pipelines within Ausnet Services' gas transmission network.

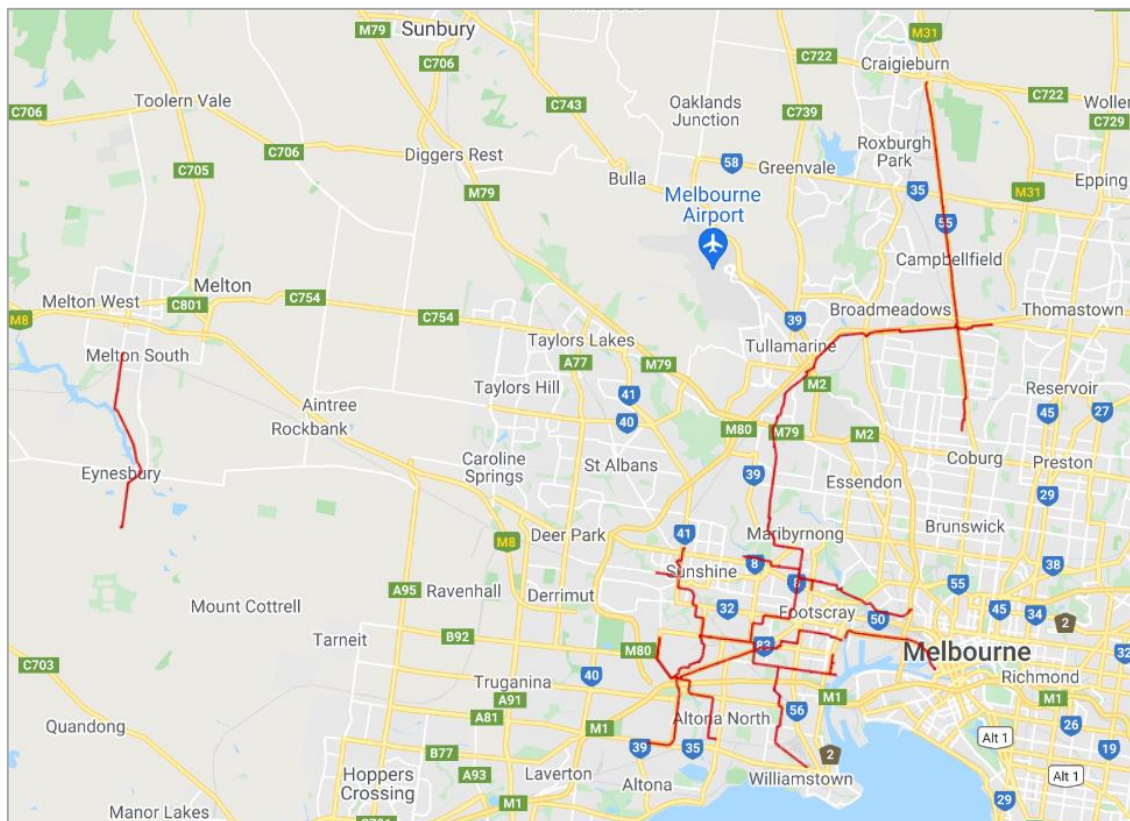


Figure 5: Metropolitan Pipeline Network

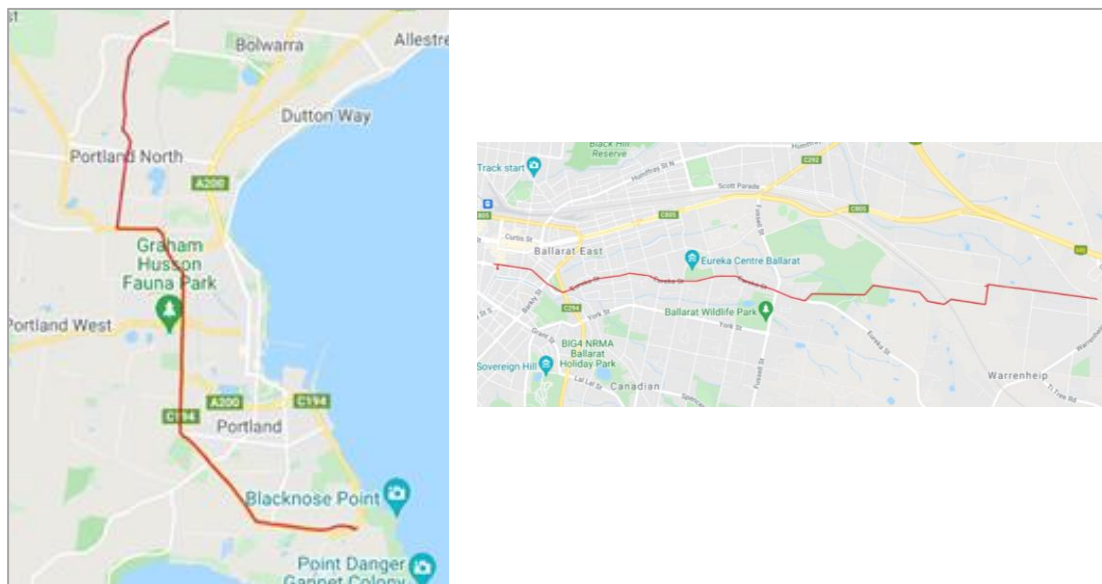


Figure 6: Portland and Ballarat Pipeline Network

4.2. Pipeline Age Profile

87% of the pipelines by length are more than 46 years of age. Figure 7 below identifies the number of pipeline licences and their associated ages with respect to length in the network.

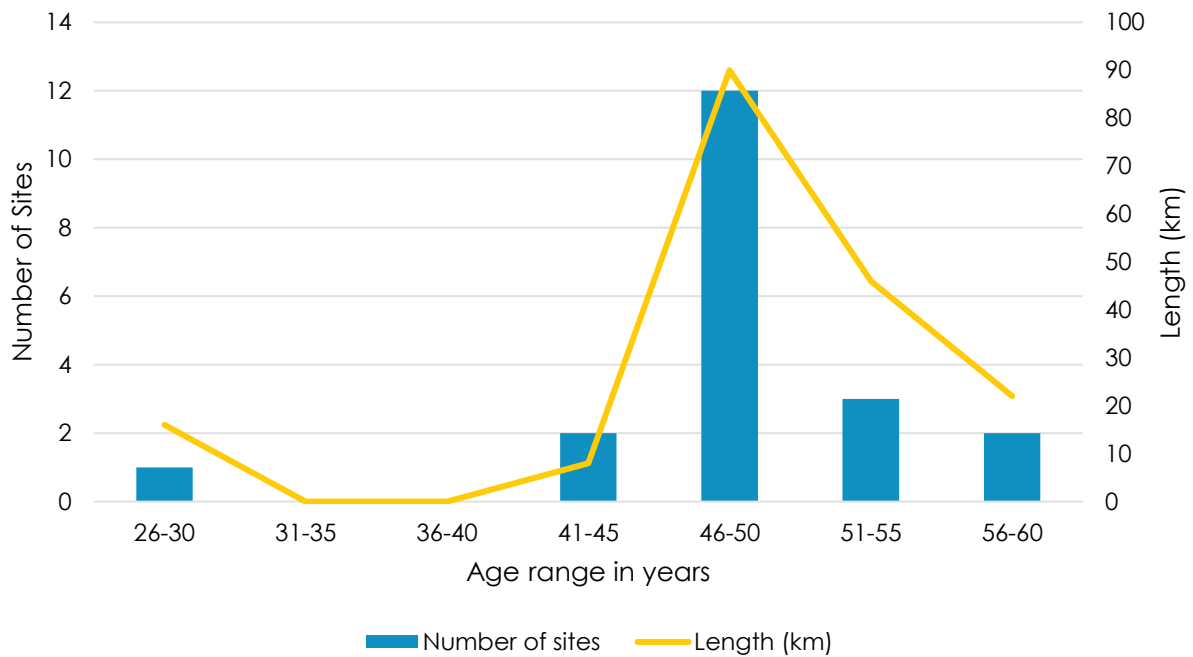


Figure 7: Age Profile of Transmission Pipelines

Table 2 below lists AusNet Services' pipeline licenses.

Table 2: AusNet Services Transmission Pipeline Network

LICENCE NO. (PL NO)	NAME / LOCATION	LICENSED LENGTH (KM)	MAOP (KPA)
16	Altona to Derrimut	6.44	2756
17	Derrimut to West Melbourne	15.7	2756
18	Footscray to Sunshine	12.03	2756
19	West Footscray to Williamstown	8.8	2756
54	Fawkner to Coburg	4.5	2760
64	Fawkner to Craigieburn	10.75	2760
76	Maidstone to Braybrook	4.1	2760
82	Sunshine to Sunshine North	1.2	2760
84	Yarraville to Yarraville	2.8	2750
90	Exford to Melton	8	2760
113	Brooklyn to Altona	4.9	2760
197	Brooklyn Compressor Station to Somerville Road	1.7	2760
203	Keon Park West to North Melbourne	25	2760
80	North Geelong to Fyansford	4.93	2760
97	Corio to Shell Refinery	0.6	2760
99	Fyansford to Waurin Ponds	17.0	2750
57	Corio to Belmont to Point Henry	21.0	2760
196	Portland City Gate to Portland Smelter Services	15.8	2760
188	Ballarat City Gate to Dana Street	7.1	1900
189	Bendigo City Gate to Able Street	9.2	1900

4.3. Network Injection Points

There are four injection points into the inner metropolitan transmission network:

- 1) **Brooklyn**
- 2) **West Melbourne** (Docklands)
- 3) **Spotswood**
- 4) **Keon Park West:** (The gas is supplied by APA groups Wollert Compressor Station. The tie-in with Dandenong Supply Point at Keon Park Metering Station is closed and can be turned on during emergencies.)

Regional Injection Points:

- 1) **Ballarat**
- 2) **Bendigo**
- 3) **Geelong**
- 4) **Portland**

5. Criteria for Pipelines for pigging

An assessment was carried out to ascertain the feasibility of and consequently select the pipelines for pigging during the 2024-28 access arrangement period. The main criteria in order of priority are:

- 1) Single fed networks, where the pipeline damage may result in large scale supply interruption.
- 2) Adequate length of pipe with consistent diameter – this is a critical requirement to undertake pigging operations.
- 3) Easy access where the pig launcher and receiver can be installed.
- 4) Older than 48 years of age.

The criteria are developed in order to manage the risk of licensed pipelines and also to assess the feasibility where they can be pigged.

The assessment process follows a Traffic Light system where Green highlights criteria being passed and Red identifies a failed criteria. In the case where a criterion fails, subsequent assessment is not required.

The Ring Main Pipeline (PL 203) is excluded for the assessment as it was recently pigged in 2021.

Table 3: Assessment for Pipelines

LICENCE NO.	PIPELINE NAME	SINGLE FED	ADEQUATE SECTIONS	EASY ACCESS	AGE \geq 48 YEARS
84	Yarraville to Yarraville				
113	Brooklyn to Altona				
99	Fyansford to Waurin Ponds				
90	Exford to Melton				
97	Corio to Shell Refinery				
57	Corio to Belmont to Point Henry				
82	Sunshine to Sunshine North				
54	Fawkner to Coburg				
76	Maidstone to Braybrook				
80	Nth Geelong to Fyansford				
188	Ballarat City Gate to Dana Street				
189	Bendigo City Gate to Able Street				
196	Portland City Gate to Smelter				
197	Brooklyn Compressor Station to Somerville Rd				
64	Fawkner to Craigieburn				
18	Footscray to Sunshine				
19	West Footscray to Williamstown				
17	Derrimut to West Melbourne				
16	Altona to Derrimut				

NOTES:

License 99	Includes ~7kms of new pipes
License 90	<ul style="list-style-type: none"> - ~1.5 km section is upgraded. - ~3.5km section is earmarked for replacement in 2022-23
License 97	A very small dedicated service line
License 57	<ul style="list-style-type: none"> - Large section (100m-200m) of continual coating crack at 6'O Clock position. - Lic-57 becomes a back bone for Lic 80, 97 & 99. - The pipeline has 2 main sections and; both have adequate space to install launcher & receiver. <p>A branch to Geelong city hub will not be pigged.</p>
License 82	~30% section has been upgraded as part of regional rail link project.
License 80	This is a section continuing from Licence -57. Receiver may require traffic interruption
License 188	Receiver may require traffic interruption around city hub.
License 196	It is only 30 year old pipeline.

The above assessment of pipelines against four main criteria concluded that PL 57 and PL 189 can feasibly be pigged and will become a basis to reduce the risk of pipeline failure in Geelong and Bendigo. This assessment was validated by CNC Project management whilst establishing the project plan for pigging. This process can be used to inform future selections for pigging in subsequent access arrangement periods.

6. ILI Work Plan

6.1. Project Plan

AusNet Services has undertaken the preliminary study by engaging an independent industry expert. The study identified the PL-189 (Bendigo) and PL-57 (Geelong) pipelines as having feasible characteristics for ILI. Below are the details covered in the report developed by an independent industry expert:

- **Feature Survey** – A Feature Survey was developed mapping all PL-189 and PL-57 pipeline features including bends, valves, fittings, branches and other pipeline components that could detriment a tool inspection run. Each identified feature will be assigned a risk level to provide a visual guide to the areas of concern.
- **Gap Analysis** – A gap analysis was carried out. This identified areas where further information might be required, by physically inspecting a feature to obtain additional details for further review and assessment.
- **Design and Constructability Review** – The assessment was carried out for the design of traps and the locations on the pipelines to install them for launching and receiving the pigs. Constructability review was carried out assessing the extent of site works to formulate a plan for the Scope of Works.
- **Operations and Functional Review** – A review on assessing the PIG-ing operability was carried out. Recommendations were made on which tool must be used.
- **Supplier Engagement** – The PIG-ing supplier 'Rosen' was contacted to discuss the review and obtain budget pricing for PIG-ing services.
- **Scope of Works** – A high level scope of work was developed for the fabrication for PIG launcher and PIG receiver including investigation by excavation and physical inspections.
- **Cost Estimating** – A high level cost estimate has been developed. It covers: detailed feasibility, design, fabrication, pipe modification, engaging PIG-ing contractor, undertaking PIG-ing activity et al.
- **Schedule** – An end-to-end schedule has been developed starting from a detailed FEED through to the PIG-ing activity.

6.2. Schedule

The project is planned to commence mid-2023. A high-level schedule is developed outlining end-to-end work plan. Figure 8: Project Time Line for PL-189 and PL-57 ILI Figure 8 below identifies the project plan in chronological order

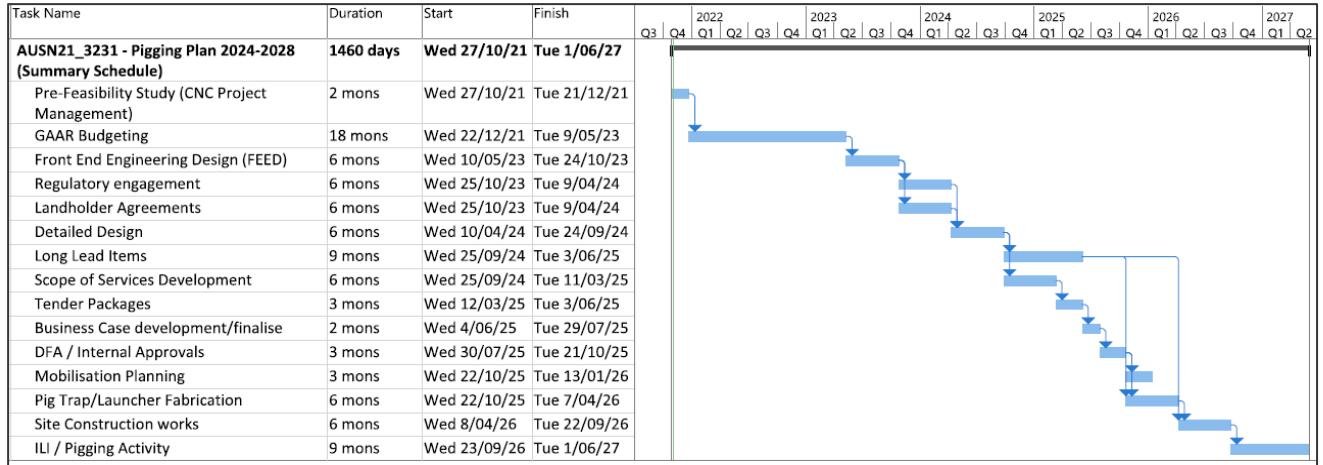


Figure 8: Project Time Line for PL-189 and PL-57 ILI

6.3. Capital Plan

A detailed activity-based estimate has been prepared. This can be referred to in Appendix C of CNC's report. The following table provides the summary of annual expenditure during the FY20024-28 GAAR period:

Table 5: Estimate for 2024-28 Access Arrangement Period

ACTIVITIES	2023-24	2024-25	2025-26	2026-27	2027-28	2024-28 TOTAL
[C.I.C]						

Table 6: PL-189 Estimate for GAAR period 2024-28

ACTIVITIES	2023-24	2024-25	2025-26	2026-27	2027-28	2024-28 TOTAL
	[C.I.C]					

Table 7: PL-57 Estimate for GAAR period 2024-28

ACTIVITIES	2023-24	2024-25	2025-26	2026-27	2027-28	2024-28 TOTAL
	[C.I.C]					

A. Appendix A

Refer to attached CNC' report (document no: AUSN21_3231 - AusNet Pigging Plan Report).

AusNet Services

Level 31
2 Southbank Boulevard
Southbank VIC 3006
T +613 9695 6000
F +613 9695 6666
Locked Bag 14051 Melbourne City Mail Centre Melbourne VIC 8001
www.AusNetservices.com.au

Follow us on



@AusNetServices



@AusNetServices



@AusNet.Services.Energy

AusNet

