

## Gas Network

### Network Planning Report – Sunbury PUBLIC

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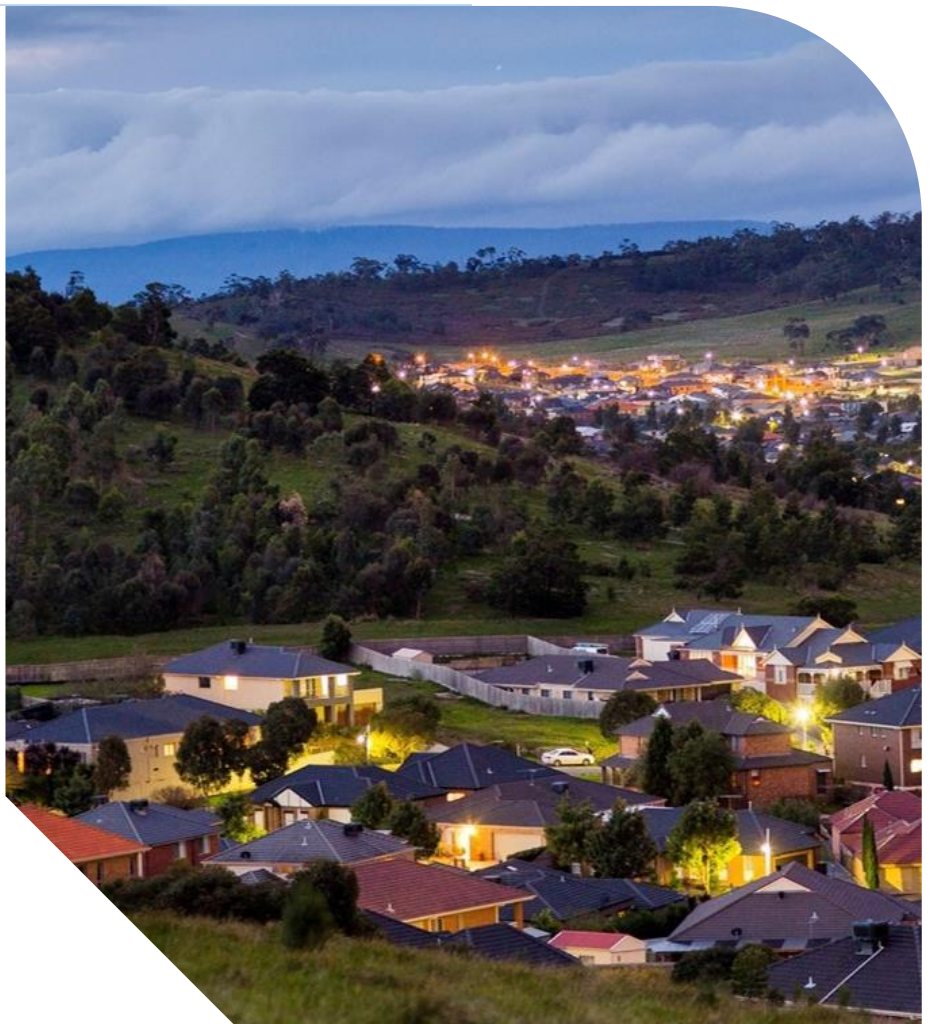
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# Executive Summary

The High Pressure (HP1) network Sunbury network will be unable to support projected gas consumption growth in the Eastern region and would require a network reinforcement by FY2023 to increase network capacity required towards the growth corridor to provide adequate supply pressure and complying with Gas distribution code.

## **Recommendation - FY23**

Construct approximately [C.I.C] of 180mm polyethylene along Evans St, Harker St, Jackson St crossing Jackson Creek and tie-in to existing 125mm polyethylene at Sunningdale Ave.

# 1. Network Overview

The Sunbury gas network is one of AusNet Services' metropolitan High Pressure (HP1) networks located in the North-Western metro region. It is currently a standalone network solely supplied by Sunbury City Gate. The Sunbury network is separated into Western and Eastern regions, segregated by Jacksons Creek with only a single supply main connecting the two.

Sunbury's Eastern growth corridor is forecasted to grow at a significant rate in the Eastern region and further expanding away from existing supply source of Sunbury City Gate in the Western region of the network. The residential growth and expansions in the Eastern Growth Corridor of Sunbury comprise of 3 residential developments totalling to approximately 4,700 new residential connection and a large industrial and commercial development with estimated value up to \$14 million. This significant growth is estimated to cause the decline in supply pressure in the Sunbury's Eastern fringe network due to the current network capacity limitations in the single supply mains across Jacksons Creek.

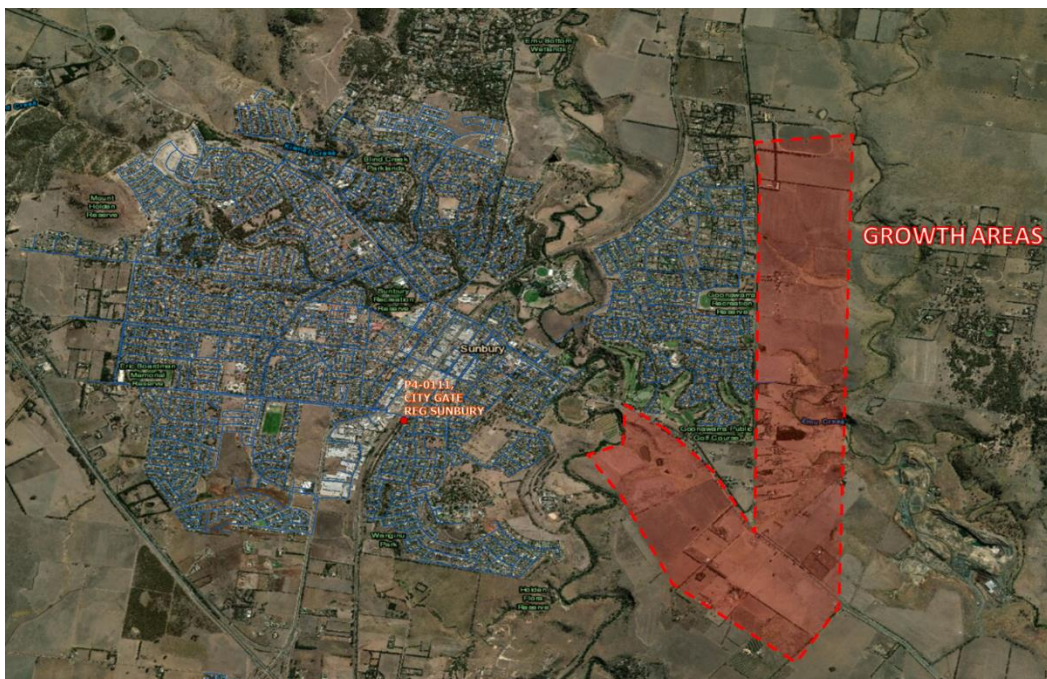
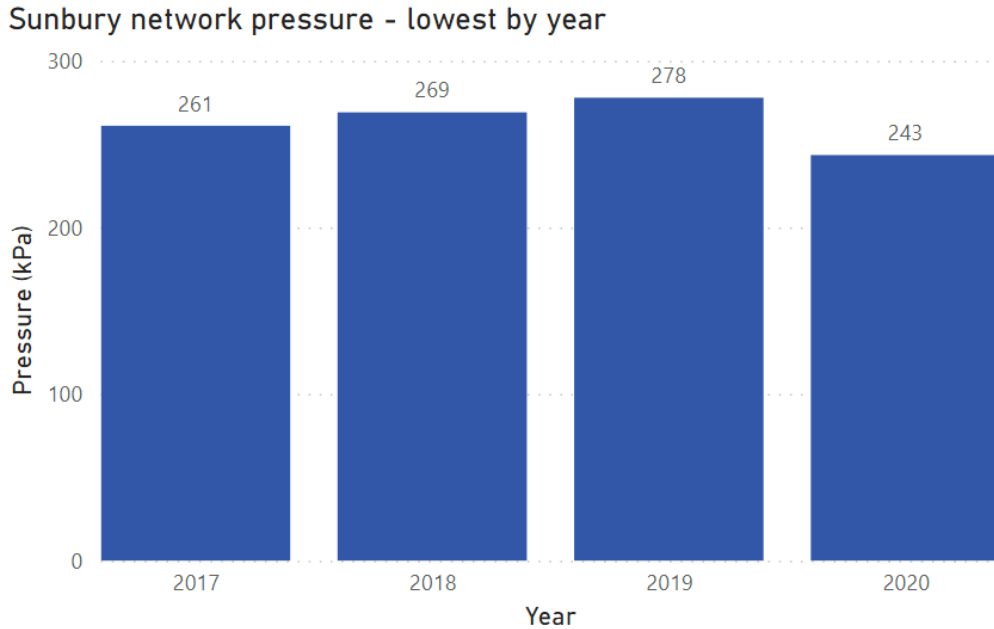


Figure 1: Sunbury gas distribution network overview

## 2. Network Performance

The chart below details the instances of lowest network pressure instances experienced in each year of the Sunbury Eastern region as of August 2020.



**Figure 2: Sunbury Network Performance Issues**

The lowest pressure instances per year shown above showing the current limited availability of capacity in the Eastern region of Sunbury network due to the current single supply steel main of 100mm in diameter connecting the Western and Eastern region across Jackson Creek. Therefore, with the proposed development of approximately 4,700 new residential connection concentrated only in Sunbury East, the demand on the Sunbury Eastern network will be increasing at significant rate and shortfall in supply is estimated with the existing network. The planned residential development include:

The capacity constraints in the Sunbury Eastern network are driven by:

- Limited capacity in the single 100mm steel supply mains connecting to the Eastern region.
- Strong residential developments planned the next 5 years.

### 3. Network Modelling

Network model for the Sunbury High Pressure network is matched with latest analysis of the network using SCADA monitoring, winter testing fringe pressures in 2020.

The matched model illustrates the current performance of the Sunbury network and limited capacity available in the Eastern region due to the existing single supply mains connection to the East.

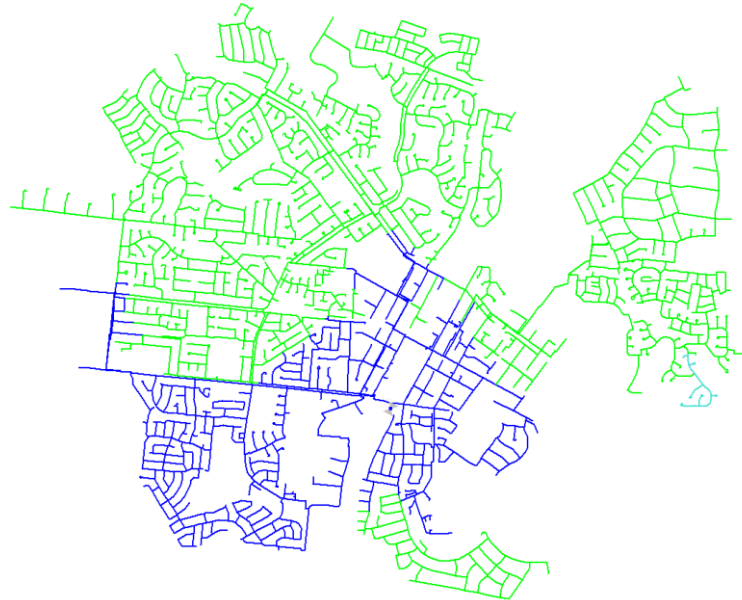


Figure 3: Sunbury matched model - winter 2020

Growth Forecasts rates provided by Finance Data Analytics team in AusNet Services' Finance department for the Sunbury area as shown in table below

Table 1: Sunbury Growth Rate Forecast

Postcode	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28
3429	4.5%	4.5%	3.5%	3.5%	3.5%	2.5%

Modelling the growth forecast rates above, the forecast minimum network pressures and estimated number of customer impact for the regulatory period can be obtained and detailed below:

Table 2: Sunbury forecasted minimum pressure and customer impact

Sunbury	2022/23	2023/24	2024/25
Minimum pressure (kPa)	185	123	Reinforcement Required
Customer impact (no.)	0	1,150	-

## 4. Recommendations

### 4.1. Options considered

Several options were considered to increase the Sunbury network capacity, which include

**Table 3: Options Description Summary**

OPTION	DESCRIPTION SUMMARY
1	No Capital Expenditure
2	Sunbury internal reinforcement
3	New Sunbury East City Gate and pipeline reinforcement

### 4.2. Option 1 – Do Nothing / No Capital expenditure

The Sunbury distribution network is supplied solely from the Sunbury city gate. During peak conditions, the regulators at the city gate can be raised further from 450kPa to 500kPa to push more gas through to the fringes of the network.

The consequence of accepting this option is that any pressure at or above the 500kPa threshold accelerates the wear of the regulator components. It is therefore not recommended from a safety and engineering standard perspective to operate the regulator at or above 500kPa for an extended period of time.

This option is not acceptable based on safety and engineering concerns

#### 4.2.1. Cost Estimations

##### Raise Sunbury City Gate outlet pressure to 500kPa

- The cost of the non-capital expenditure option is to accept safety risk from regulator failures due to the acceleration of deterioration of the regulator components.

**Total capital expenditure = \$0**

#### 4.2.2. Capacity

The benefits of the non-capital expenditure option are the deferred capital expenditure.



## 4.3. Option 2 – Sunbury internal reinforcements

Due to the current capacity constraints caused by the single supply 100mm mains supplying the Eastern region of Sunbury network separated by the Jackson Creek, the proposed Sunbury internal reinforcement of constructing a large diameter supply mains from existing Sunbury City Gate to the Eastern region would considerably increase capacity to the Eastern region of the network and allow adequate supply for additional residential connections. This reinforcement would alleviate current capacity restrictions through existing single supply 100mm mains by looping backbone mains throughout the Sunbury network.

Network Reinforcement work comprises of:

1. Construct approximately [C.I.C] of 180mm polyethylene along Evans St, Harker St, Jackson St crossing Jackson Creek and tie-in to existing 125mm polyethylene at Sunningdale Ave.

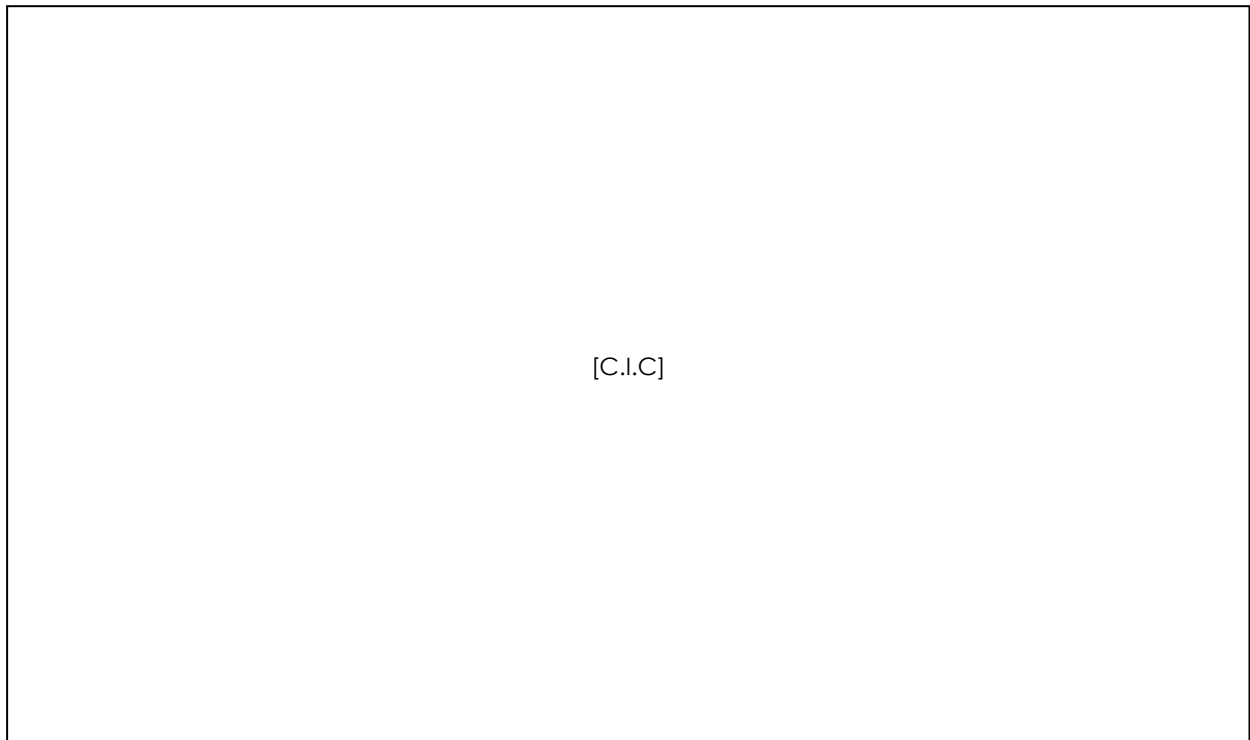


Figure 4: Sunbury Reinforcement - Option 2

### 4.3.1. Cost Estimations

[C.I.C]

### 4.3.2. Capacity

Table 4: Option 2 – Sunbury Identified Network Reinforcement

2023/24 Forecast Minimum Pressure	Affected Customers	REINFORCEMENT SUMMARY	Post Reinforcement Minimum Pressure
27kPa	4,000	[C.I.C] of 180mm P10	344kPa

Table 5: Sunbury Forecast Minimum Network Pressures

2022/23	2023/24	2023/24	2024/25	2025/26
123kPa	27kPa	344kPa	320kPa	310kPa

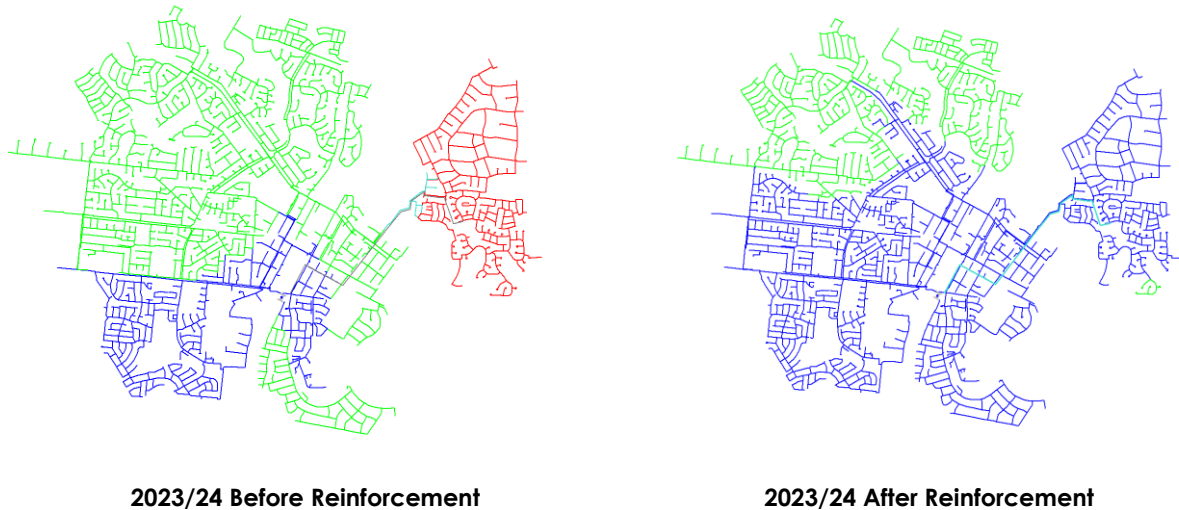


Figure 5: Sunbury before and after augmentation

## 4.4. Option 3 – New Sunbury East City Gate and pipeline reinforcement

APA’s construction of the Western Outer Ring Main (WORM) is to be completed by the end of 2023. This pipeline will be passing through the Sunbury East growth corridor and a new proposed City Gate can be constructed along this pipeline and be connected to existing Sunbury network along Sunbury Road to address current limited capacity availability for future growth in the Sunbury growing network and provide long term capacity solution to capture the entire projected Sunbury East growth corridor, ensuring safe and reliable supply to the Sunbury network.

Network Reinforcement work comprises of:

- Construct a new City Gate at 525 Sunbury Rd, Bulla.
- Construct approximately [C.I.C] of 180mm PE mains along Sunbury Rd from new city Gate to Sunbury Rd and Lancefield intersection.

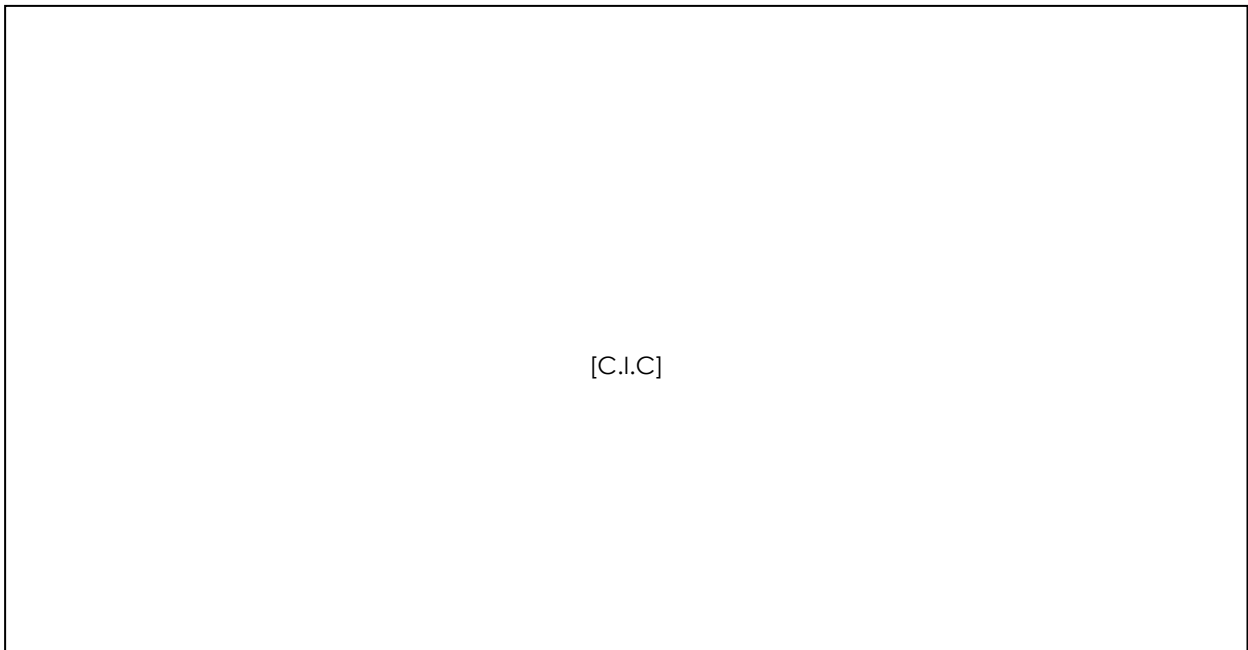


Figure 6: Sunbury Reinforcement - Option 3

#### 4.4.1. Cost and benefit analysis

[ C.I.C]

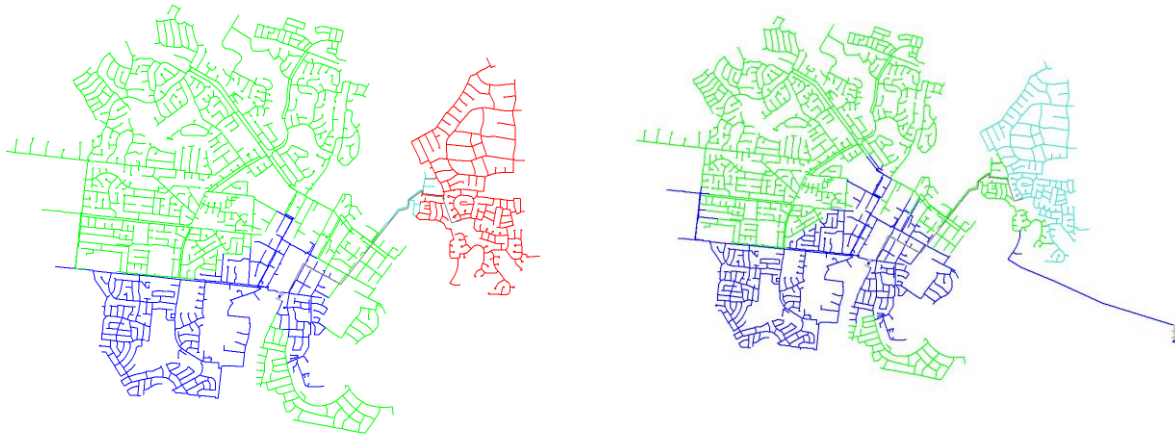
#### 4.4.2. Capacity

Table 6: Option 3 - Sunbury Identified Network Reinforcement

2023 Forecast Minimum Pressure	Affected Customers	REINFORCEMENT SUMMARY	Post Reinforcement Minimum Pressure
27kPa	4,000	New City Gate and [C.I.C] of 180P10	400kPa

Table 7: Sunbury Forecast Minimum Network Pressures

2022/23	2023/24	2023/24	2024/25	2025/26
123kPa	27kPa	400kPa	395kPa	393kPa



2023/24 Before Facility Installation

2023/24 After Facility Installation

Figure 7: Sunbury before and after augmentation

## 4.5. Benefit Assessment

The preferred solution is Option 2 which involves the construction of a [C.I.C] of 180PE pipeline in total along Evans St, Harker St and Jackson St required to be in service by FY23/24. This augmentation is considered the most cost-effective solution to increase the capacity of the Sunbury network.

Table 8: Options Assessment Summary

OPTION	BENEFITS	COSTS (\$2020)
<b>Option 1</b>	Nil.	Continue accepting Sunbury capacity shortfall and further network pressure deterioration and compromised safety and reliability of existing network.
<b>Option 2</b>	Preferred solution – Addressing current capacity limitations in the Eastern Sunbury network to allow sufficient supply for proposed residential development in Sunbury East.	[C.I.C]
<b>Option 3</b>	This option would provide long term supply solution for the Sunbury East for all future development in the Sunbury East area. However, this would come at a higher cost and delay in required network capacity increase due to proposed APA's WORM completion timeline in 2023.	[C.I.C]

# 5. Capital expenditure summary

Table 9: Capital Expenditure Summary

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

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