

Gas Network

Network Planning Report – Bacchus Marsh PUBLIC

Friday, 10 June 2022

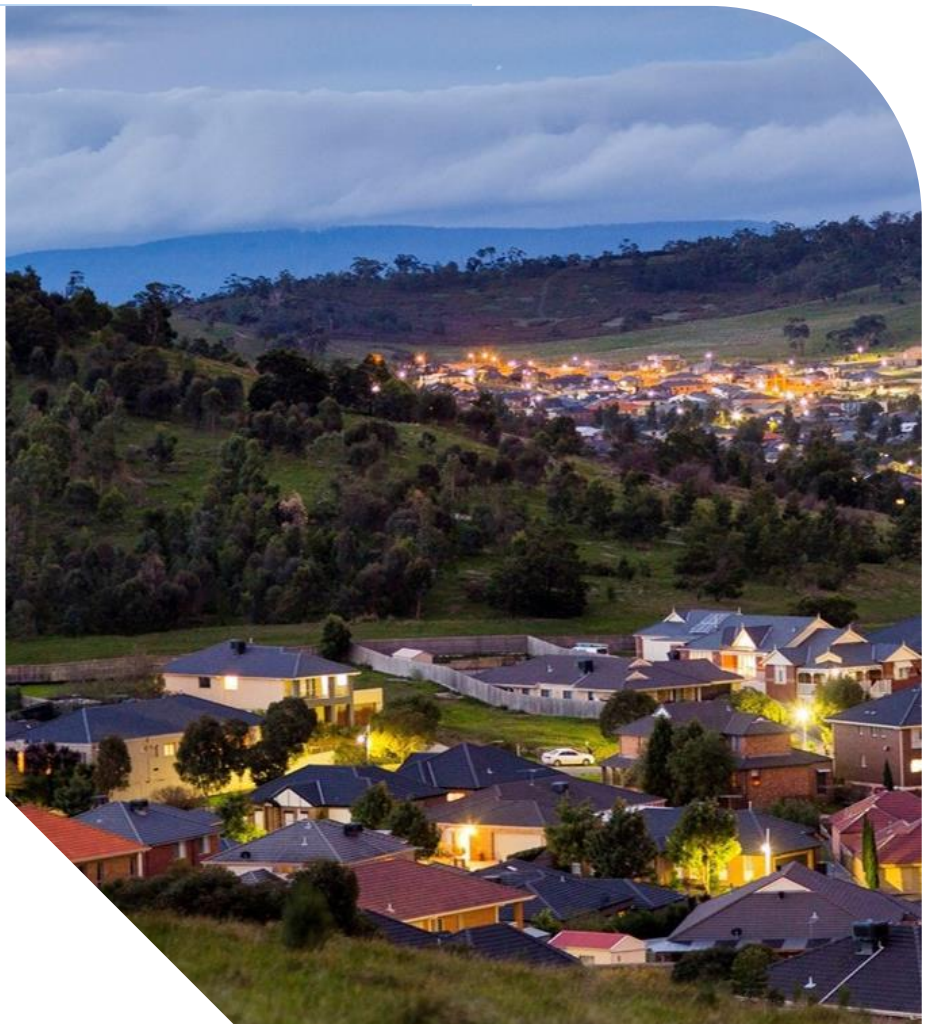
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Executive Summary

The High Pressure (HP1) network Bacchus Marsh network will be unable to support projected gas consumption growth in the Northern region and would require a network reinforcement by FY2023/24 to boost network capacity in affected areas to maintain adequate minimum network pressure and complying with Gas distribution code.

Recommendation - FY23/24

Construct approximately [C.I.C] of 125mm polyethylene along O'Leary Way crossing Werribee River and tie-in to existing 125mm polyethylene at Halletts Way.

1. Network Overview

The Bacchus Marsh network is one of AusNet Services' growing regional networks. It is currently a standalone network solely supplied by Bacchus Marsh City Gate.

Bacchus Marsh High Pressure network is divided in to a northern and southern quadrant segregated by the Western Highway with only a current single supply main connecting the two. Growth is occurring in the northern quadrant furthest away from the sole supplying City Gate source.

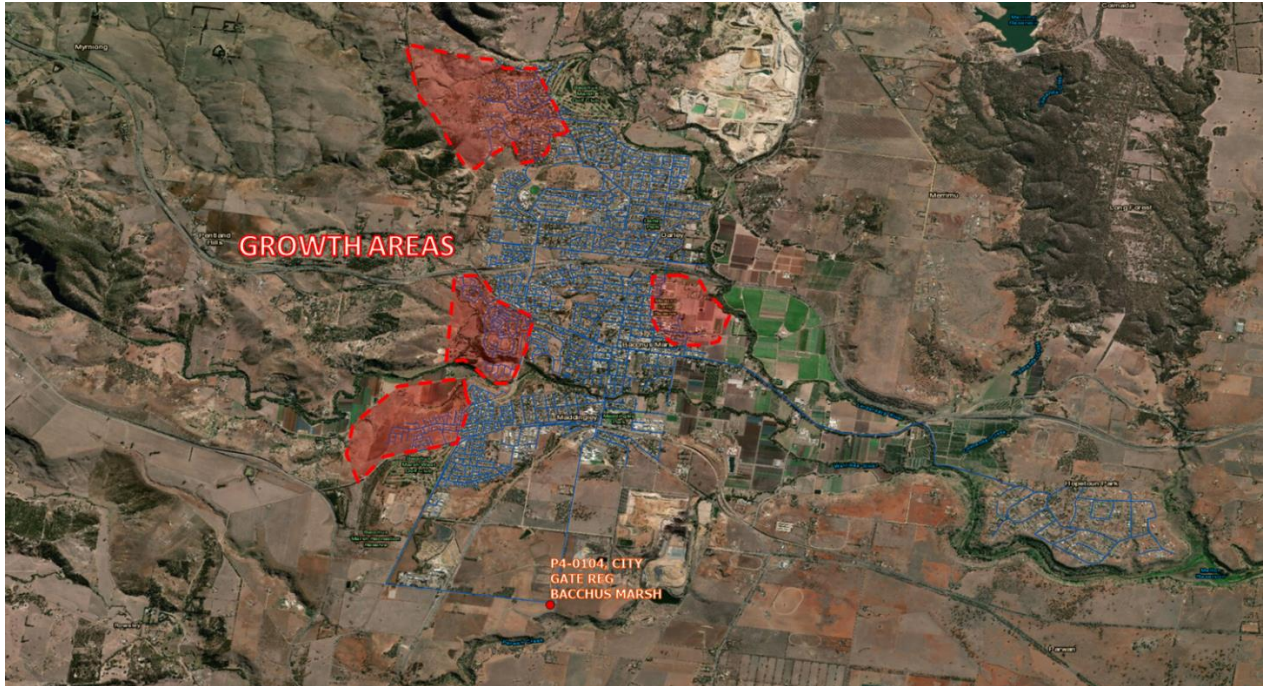


Figure 1: Bacchus Marsh gas distribution network overview

2. Network Performance

As a result of continual growth of the towns Maddingley and Darley within the Bacchus Marsh networks. Network pressures at Darley and Hopetoun Park at the fringes of Bacchus Marsh network have been experiencing increasing low supply pressure events, dropping below gas distribution code of 140kPa minimum during peak demand periods. Low pressures can lead to poor appliance performance or customer outages. The chart below details the instances of low network pressure experienced in the Bacchus Marsh fringe areas in recent years as of August 2020.

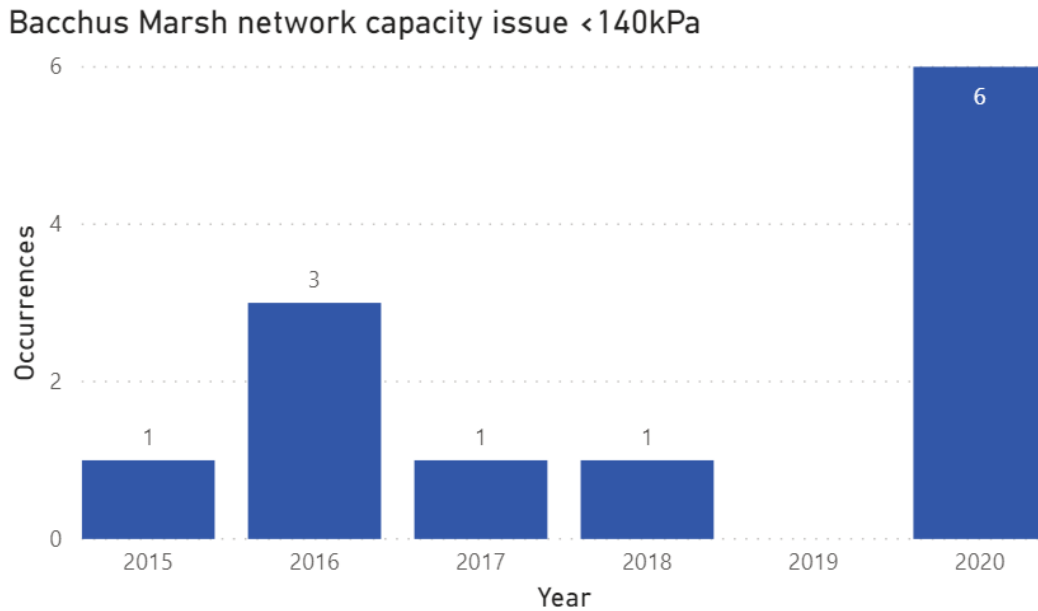


Figure 2: Bacchus Marsh Network Performance Issues

The chart below details the instances of low network pressure experienced in the Bacchus Marsh network in recent years as of August 2020.

Bacchus Marsh Fringe Pressure

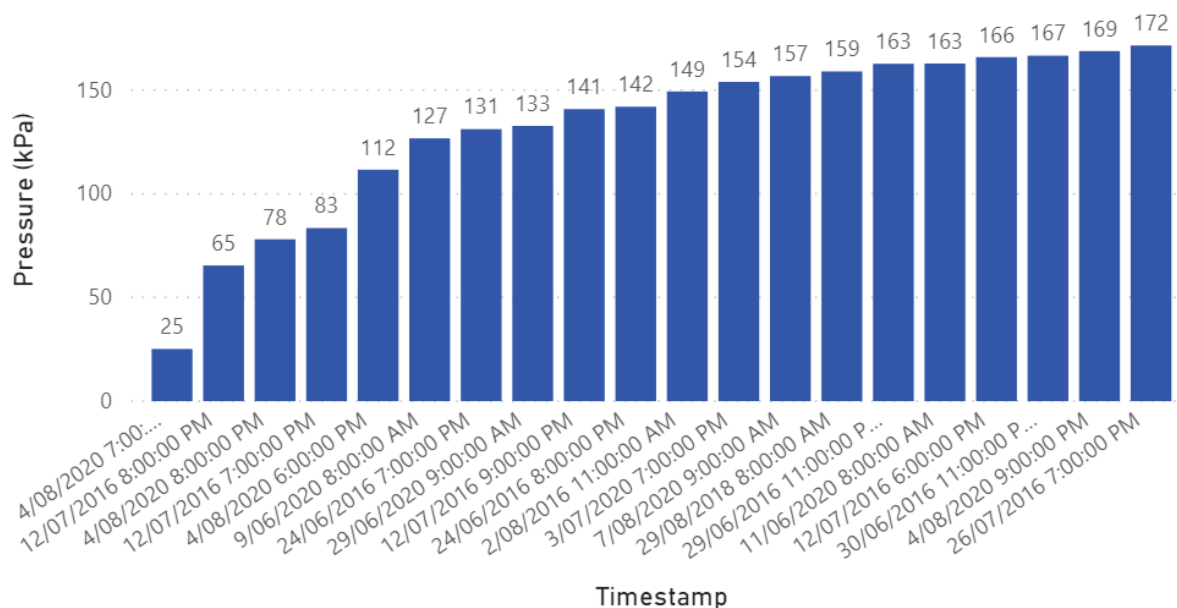


Figure 3: Bacchus Marsh lowest fringe pressure instances

The increasing number of low network pressure instances shown above have been resulting in increasing number of customer supply affected since 2015 showing the current capacity limitations in the Bacchus Marsh network.

The major contributor to capacity constraints in the Bacchus Marsh networks include:

- Continued growth in the northern section in the Bacchus Marsh and Darley areas away from the supply source in the South at Bacchus Marsh City Gate.
- Single lateral critical supply mains connecting to Northern side of Bacchus Marsh network.

3. Network Modelling

Network model for the Bacchus Marsh High Pressure network is matched with latest analysis of the network using SCADA monitoring, fringe pressures in 2020. The matched model illustrates the affected areas at the Northern section fringes as shown below.

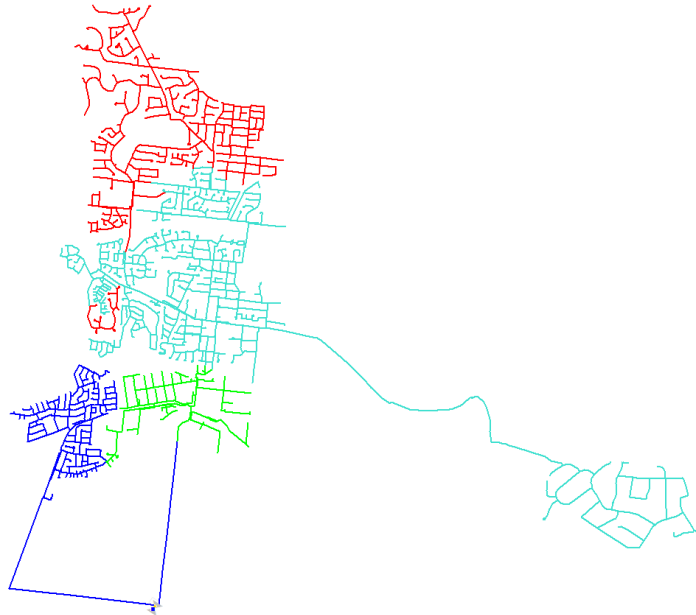


Figure 4: Bacchus Marsh matched model - winter 2020

Growth Forecasts rates provided by Finance Data Analytics team in AusNet Services' Finance department for the Bacchus Marsh are as shown in table below.

Table 1: Bacchus Marsh Growth Rate Forecast

Postcode	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28
3340	0.82%	0.82%	0.81%	0.81%	0.81%	0.81%

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: Bacchus Marsh forecasted minimum pressure and customer impact

Bacchus Marsh	2021/22	2022/23	2023/24
Minimum pressure (kPa)	147	136	Reinforcement required
Customer impact (no.)	0	400	-

Based on the consumption growth forecast, the Bacchus Marsh network will be unable to support projected gas consumption growth and would require a network reinforcement by FY2023/24 to boost network capacity in affected areas and complying with Gas distribution code.

4. Recommendations

4.1. Options considered

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

Table 3: Options Description Summary

OPTION	DESCRIPTION SUMMARY
1	No Capital Expenditure
2	O'Leary Way network reinforcements
3	Guillines Road Looping Reinforcement

4.2. Option 1 – Do Nothing / No Capital expenditure

The Bacchus Marsh distribution network is supplied solely from the Bacchus Marsh city gate. During peak conditions, the regulators at the city gate can be raised further from 470kPa 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 which may lead to asset failure earlier than its expected useful life. 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 Bacchus Marsh 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 - O’Leary Way network reinforcements

Due to the current capacity constraints caused by the single lateral supply mains supplying the Northern side of Bacchus Marsh network separated by the Werribee River, the O’Leary Way network reinforcement would provide an additional supply point connecting the Southern network to the Northern network regions. This additional connection would significantly increase capacity to the Northern fringes and ensure sufficient pressure is maintained in the area.

Network Reinforcement work comprises of:

1. Construct approximately [C.I.C] of 125mm polyethylene from O’Leary Way and Calderwood Rd intersection along O’Leary Way crossing Werribee River and tie-in to existing 125mm polyethylene at Halletts Way and Adelong Way intersection.

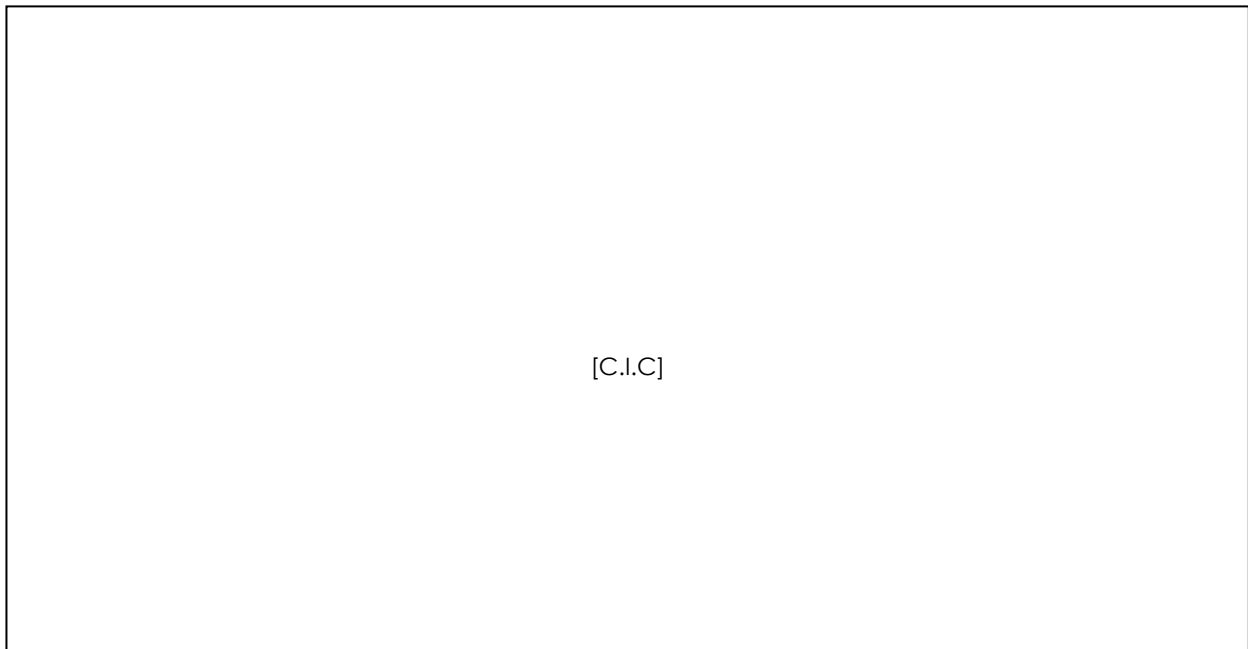


Figure 5: Bacchus Marsh Reinforcement - Option 2

4.3.1. Cost Estimations

[C.I.C]

4.3.2. Capacity

Table 4: Option 2 - Bacchus Marsh Identified Network Reinforcement

2023/24 Forecast Minimum Pressure	Affected Customers	REINFORCEMENT SUMMARY	Post Reinforcement Minimum Pressure
124kPa	1,400	[C.I.C] of 125mm P10	148kPa

Table 5: Bacchus Marsh Forecast Minimum Network Pressures

Postcode	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28
3340	136kPa	126kPa	148kPa	145kPa	143kPa	140kPa



Figure 6: Bacchus Marsh before and after augmentation

4.4. Option 3 – Guillines Road Looping reinforcement

This option proposes an alternative pipeline reinforcement alignment to alleviate the current capacity constraints caused by the limited supply to the Northern side of Bacchus Marsh network by looping outlet pipe from Bacchus Marsh city gate along Guillines Road. The looping reinforcement would boost capacity up to the Northern fringes of the work to address current capacity shortfall and provide long term security of supply to the network.

Network Reinforcement work comprises of:

1. Construct approximately [C.I.C] of 180mm polyethylene along Guillines Road and Tie-in to the existing 150mm steel main at Sth Maddingley Rd and Gayor st.

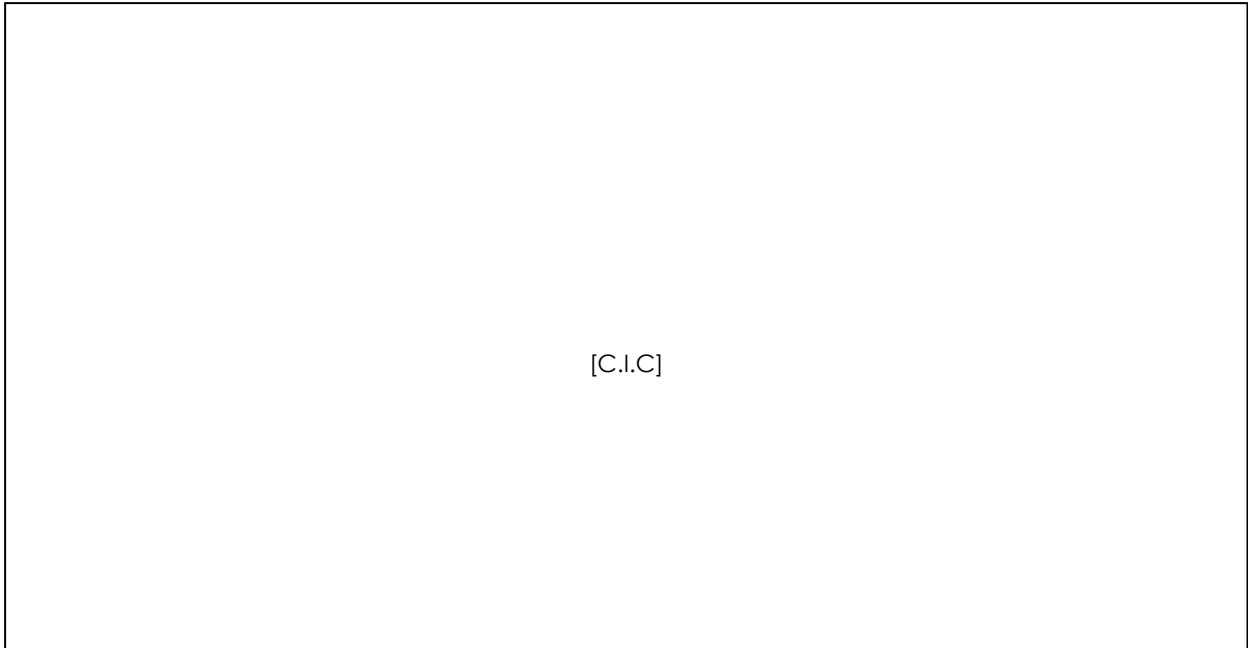


Figure 7: Bacchus Marsh Reinforcement - Option 3

4.4.1. Cost and benefit analysis

[C.I.C]

4.4.2. Capacity

Table 6: Option 3 - Bacchus Marsh Identified Network Reinforcement

2023/24 Forecast Minimum Pressure	Affected Customers	REINFORCEMENT SUMMARY	Post Reinforcement Minimum Pressure
124kPa	1,400	[C.I.C] of 180mm P10	201kPa

Table 7: Bacchus Marsh Forecast Minimum Network Pressures

Postcode	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28
3340	136kPa	126kPa	201kPa	199kPa	197kPa	195kPa



Figure 8: Bacchus Marsh before and after augmentation

4.5. Benefit Assessment

The preferred solution is Option 2 which involves the construction of a [C.I.C] of 125PE pipeline in total along O’Leary Way required to be in service by winter 2023 and 550m of 125PE pipeline along Halletts Way required to be in service by winter 2025. This augmentation is considered the most cost-effective solution to augment the capacity of the Bacchus Marsh network.

Table 8: Options Assessment Summary

OPTION	BENEFITS	COSTS (\$2020)
Option 1	Nil.	Continue accepting Bacchus Marsh capacity shortfall and further network pressure deterioration and compromised safety and reliability of existing network.
Option 2	Preferred solution – addressing current capacity shortfall and maintain adequate supply pressure for the Bacchus Marsh Northern fringe areas.	[C.I.C]
Option 3	While this proposed option also addresses current capacity shortfall and provide long term security of supply solution, the Guillines Rd looping reinforcement requires almost three times the length of mains compared to option 2 to achieve the same result. Therefore, this option 3 is not a recommended solution.	[C.I.C]

5. Capital expenditure summary

Table 9: Capital Expenditure Summary

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

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