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APA VTS

Application under Rule 80 of the National Gas Rules

December 1, 2021

Contents

1. Summary

The purpose of this application is to ensure the Victorian-based projects to bring increased gas supply into Victoria are not disadvantaged by the market carriage model relative to projects based on locations outside Victoria.

Victoria has long been supplied by natural gas supplied from the Bass Strait fields through the Longford gas plant. These fields are now in decline – this is well documented. AEMO's 2020 Gas Statement of Opportunities (**GSOO**) forecast gas shortfalls by 2023; its 2021 GSOO and Victorian Gas Planning Report (**VGPR**) forecast shortfalls in gas supply by 2026, assuming AIE's Port Kembla LNG import terminal (**PKGT**) proceeds on time.

The APA VTS proposed access arrangement lodged 1 December 2021 includes a proposal to increase the capacity of the South West Pipeline (**SWP**) to bring more gas into Melbourne on the peak day. However, even with this expansion, AEMO's GSOO and VGPR are clear that additional gas must be brought into Victoria to meet annual supply adequacy needs.

Iona gas storage does not currently have enough capacity to serve as seasonal storage.[1] Its limited storage volumes restrict its role to meeting peak day, rather than seasonal, requirements. There remains a need to source additional gas to meet Victoria's annual needs.

There are a number of projects mooted to bring more gas into Victoria, which, for the purposes of this application, fall into two general categories: those that require investment outside the VTS and those that require investment both outside and within the VTS. At the date of lodgement of this application, none of these projects has reached Final Investment Decision (**FID**).

In the first category:

- The completion of the PKGT would require investment in the terminal itself, but also bi-directionality and compression on the Eastern Gas Pipeline. However, once that gas reaches Longford, the Longford-Melbourne Pipeline has sufficient capacity, considering the declines in Longford production, that the VTS would not require investment to accommodate this additional gas.
- Additional expansion of the APA East Coast Grid to allow further injections at Culcairn would require additional upstream compression to deliver more gas to Culcairn. However, once at Culcairn, the Victoria-NSW Interconnect would have sufficient southbound capacity to accept significant quantities of gas without further VTS investment.
- Further expansion of the APA East Coast Grid to deliver more gas to Wilton to then be shipped southbound on the Eastern Gas Pipeline would also require investment outside Victoria, but as

[1] The Iona Gas Storage facility holds approximately 16 PJ of useable gas, compared to an annual VTS load in the order of 200 PJ/year, weighted more heavily to winter than summer. With the completion of the WORM and bi-directionality of the proposed SWP compressors, there may be scope for Iona storage to cycle more frequently over the winter season.

with the PKGT, the Longford-Melbourne Pipeline has sufficient capacity to accommodate these additional flows without further investment in Victoria.

In the second category, there are three projects proposed to bring more gas into Victoria, which may require investment in the VTS:

- An LNG import terminal at Geelong, proposed by VIVA Energy. This could provide seasonal injections in the order of 600 TJ/day over the course of the southern winter. Depending on the need to be able to maintain deliverability from Iona, this could require augmentation of the SWP, the Brooklyn-Lara Pipeline and the Brooklyn City Gate.
- An LNG import terminal in deep water off Avalon, proposed by Vopak. This could provide seasonal injections in the order of 600 TJ/day over the course of the southern winter. Depending on the need to be able to maintain deliverability from Iona, this could require augmentation of the SWP, the Brooklyn-Lara Pipeline and the Brooklyn City Gate.
- Further augmentations to the Iona Gas Storage facility proposed by Lochard Energy, which would increase both the amount of gas that could be stored, and also the daily deliverability rate. This project may require additional looping of the SWP, and also upgrades to the Brooklyn City Gate.

It is these three projects that are the subject of this Rule 80 application.

While these three projects are the subject of public proposals, none have reached FID, and are not expected to do so before the VTS access arrangement proposal is required to be lodged with the AER on 1 December 2021. However, we acknowledge that these are long lead-time projects that will need confidence that they can access the VTS before they can reach FID.

The VTS is unique in that, under the market carriage model, there is no scope to enter into bilateral arrangement with shippers to support investment in pipeline capacity – all such investment must pass through the access arrangement process. This places these last three projects, all potentially requiring investment in the VTS, at a competitive disadvantage relative to those projects only requiring investment outside the VTS, which investment can be undertaken through commercial arrangements.

To maintain a level playing field, APA lodges this application under Rule 80 of the National Gas Rules, seeking the pre-approval of the AER to consider these projects as conforming capital expenditure if they are built.

Acknowledging the contingent nature of this approval, APA VTS accepts that the AER may grant conditional approval, subject to a supply project publicly announcing it has reached FID, and subject to a final approval by the AER.

2. The supply and demand balance in Victoria

2.1. AEMO's GSOO and VGPR results

2.1.1. Declining production in Longford

AEMO's 2021 GSOO reports that production from the legacy Bass Strait fields, through the Longford gas plant, is declining, and declining more rapidly than previously reported.

This decline relates to both annual production and peak day capability – maximum daily production is falling faster than annual production (2021 GSOO p5). "The last major southern gas field offering flexible supply is expected to be depleted ahead of winter 2023, reducing gas system resilience."

The accompanying 2021 Victorian Gas Planning Report (VGPR) indicates:

> *(p4) Overall production from existing gas production facilities is forecast to decline each year between 2021 and 2025. Significant declines are expected from the existing fields, predominantly in the Gippsland zone, with the largest annual reduction of 72 PJ forecast for 2023. This is mainly due to the forecast reduction of capacity associated with depletion of the large legacy gas fields that supply the Longford Gas Plant prior to winter 2023.*
>
> *(p7) The large decline in winter production capacity, due to the forecast reduction of capacity associated with depletion of Longford's large legacy gas fields from 2023, also reduces available peak day supply.*
>
> *Gippsland production is forecast to decline by 54%, reducing from 1,072 TJ/d in 2021 to 488 TJ/d in 2025. Production capacity in winter 2023 is forecast to be 561 TJ/d without new supply.*

3. The Declared Wholesale Gas Market

The Victorian Declared Wholesale Gas Market (DWGM) is a mandatory market in which all gas must be traded. This includes gas which is already subject to bilateral gas supply agreements – not just gas which is genuinely "traded" in the market. As a consequence, approximately 80-90% of all gas traded through the DWGM is traded "within participant", where supply is bid into the market at the market floor of $zero, and demand is bid out of the market at the market cap of $800. This was recognised by the AEMC in its 2015 review of the Declared Wholesale Gas Market.[2]

[2] AEMC, Final Technical Report, Review of the Victorian declared wholesale gas market, 30 June 2017. https://www.aemc.gov.au/sites/default/files/content/fbda53c7-0ccd-4116-969d-9a0b9aa634a9/Final-technical-report-Final-for-publication.PDF

In the DWGM, transport is "bundled" with dispatch through the DWGM. That is, access to the transmission network is secured through the DWGM market process – there is no scope to reserve capacity on the VTS as exists on contract carriage pipelines elsewhere in Australia.

In a contract carriage pipeline, the pipeline owner will expand the pipeline capacity through bilateral contractual arrangements with counterparties. The pipeliner promises to reserve that capacity for the counterparty's use when required – the counterparty has "bought" that capacity for the term of the contract. There is no scope for contractual capacity arrangements in the VTS.

Because access to the VTS is bundled with dispatch of the gas through the DWGM, even if a shipper were to underwrite a capacity expansion, it would have no rights to that capacity – it would have no confidence that it would be able to access the capacity it underwrote. As a consequence, shippers never underwrite capacity expansions in the VTS.[3] The current project proponents have been understandably reluctant to contribute to the costs of SWP expansion.

All capacity expansion in the VTS therefore occurs through the regulatory process. This places VTS-connected supply projects at a disadvantage to projects connected to contract carriage pipelines outside Victoria.

Entry Capacity Certificates

AEMO dispatches gas in the DWGM in merit order, as it does in the National Electricity Market. However, there are key differences in the operation of these markets:

From 1 January 2023, the DWGM will feature Entry and Exit Capacity Certificates.[4] These certificates provide "tie-breaking" rights in the DWGM, such that where two bids are made at the same price, gas bid into the market at $X **with** Entry Capacity Certificates attached will be dispatched in preference to gas bid into the market at $X **without** Entry Capacity Certificates attached.

This is critically important because gas bid into the market at $zero **with** Entry Capacity Certificates attached will be dispatched in preference to gas bid into the market at $zero **without** Entry Capacity Certificates attached.

If an FSRU's customers are unable to secure sufficient Entry Capacity Certificates, they will not have certainty that they will be able to have their gas dispatched, and they will be reluctant to reserve capacity on the FSRU. This will undermine the economics of the FSRU project.

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[3] There is an exception, of sorts, under Rules 329C(2) and 329E(1), in which the DTS Service Provider can expand the pipeline outside of an access arrangement process, and once the capacity has been accepted by AEMO, the DTS Service provider can then direct AEMO to assign the created entry capacity certificates to the proponent. The proponent does not gain rights to the pipeline capacity, simply the tie-breaking rights associated with the entry capacity certificates.

[4] For the purposes of this discussion, this structure is currently applicable to Authorised Maximum Daily Quantity Credit Certificates, "AMDQcc".

Similarly, if expanded Iona gas storage customers are unable to secure sufficient Entry Capacity Certificates, they will not have certainty that they will be able to have their gas dispatched, and they will be reluctant to reserve additional capacity in Iona gas storage. This will undermine the economics of the Iona gas storage expansion project.

AEMO has not indicated (and will not until a project is "committed") if Iona and the FSRUs will be in the same "entry zone" for Entry Capacity Certificates or if the expanded Iona and any FSRUs will be in dedicated zones. If they are in the same zone, shippers can choose to use their Entry Capacity Certificates to nominate between Iona and an FSRU on any given day.

If shippers using Iona and shippers using one or two FSRUs are simultaneously bidding in at $zero to have their gas dispatched, it is possible the market could settle at $zero on a peak day.

Entry capacity certificates are created by AEMO based on the capacity of the injection pipeline and must be purchased through a competitive auction process. Incumbents are not assigned entry capacity certificates.

AEMO's procedures create entry capacity certificates based on the normal operating conditions of the pipeline system. Not all the entry capacity certificates issued will necessarily be available on a given day.[5]

These constructs have profound implications for investment in the VTS:

Investment in supply projects

We anticipate that, when an LNG ship is in port, the FSRU project proponent will require users to bid the gas into the DWGM at $zero to ensure dispatch so that the ship can unload as quickly as possible and be on its way. A bid of greater than $zero will place its dispatch behind other bids in the market, potentially leaving the ship in port unable to unload. Similarly a bid of $zero without Entry Capacity Certificates attached will be dispatched behind other bids of $zero that do have Entry Capacity Certificates attached (including bids from Culcairn and Longford).

This is a concern for projects seeking to deliver additional supply into Victoria from points west of Melbourne. In order to ensure there are sufficient Entry Capacity Certificates available west of Melbourne to ensure that additional supply can be dispatched into the market, the SWP will require augmentation.

This presents a circular chicken-and-egg problem:

- The supply proponent requires certainty that it will be able to access the pipeline before it can reach FID;

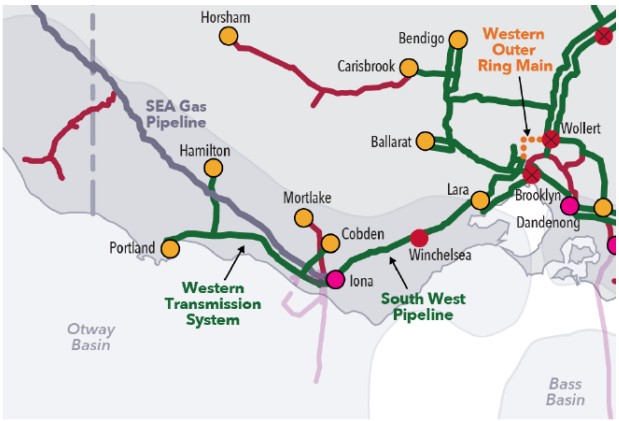
[5] For example, on a peak system day, maximum deliveries from Longford requires Iona to be "backed off". So while there may be a given quantity of entry capacity certificates on the South West Pipeline, they will not all be available for use on the peak day. Significant injections from a Geelong or Avalon FSRU will require significant reductions in Iona deliverability, regardless of the number of entry capacity certificates held.

- The supply proponent will need to be sure it can acquire sufficient Entry Capacity Certificates to provide certainty that its supply will be able to be dispatched through the DWGM and injected into the market;
- The SWP will require augmentation in order for a sufficient number of Entry Capacity Certificates to be created to provide that certainty to the supply proponents (noting that shippers must compete for the Entry Capacity Certificates at auction);
- In order for APA VTS to present an acceptable augmentation capex business case to the AER for approval, it will need to demonstrate that the best forecast of injection demand includes the injection demand created by the additional supply proponent;
- The forecast injection demand for the supply proponent would need to be supported by the supply proponent having reached FID on its supply project.
- The supply proponent requires certainty that it will be able to access the pipeline before it can reach FID; ...

4. About the SWP

The SWP runs from Port Campbell, in western Victoria, to the Brooklyn City Gate in Melbourne's west. At the western end, it

- takes supply from gas fields in the offshore Otway Basin;
- connects to the SEAGas pipeline to send gas west to Adelaide;
- connects to the Iona underground storage facility.



The SWP is bi-directional, allowing for both refill of, and withdrawal from, Iona storage.

At Winchelsea, midway along the SWP, is one Taurus Compressor rated at 5,740 kW.

The SWP currently has a capacity of 426 TJ/day Eastbound (towards Melbourne) and 140 TJ/day Westbound (towards Iona). The WORM was approved to increase westbound Iona refill capacity, but also provides a small consequential increase in eastbound capacity. Once the WORM is built the SWP capacity will be 468 TJ/day Eastbound and 220 TJ/day Westbound.

The APA VTS access arrangement proposes two additional compressors to be built, one at Stonehaven and one at Pirron. Once these compressors are in service, the SWP will have an eastbound capacity of 570 TJ/day, matching the current FID-committed capacity of Iona storage to inject into the VTS.

5. Rule 79(2) justification requirements

As discussed in the APA VTS 2023-28 access arrangement proposal, demand in Victoria is not forecast to increase over the foreseeable future. However, as discussed above, it is clear that production from Longford, east of Melbourne, is in decline, and that additional supplies are required to bring more gas into Melbourne, not just on the peak day, but throughout the year.

These projects, if they proceed, would therefore be justified under Rule 79(2)(c)(iv):

> (2) Capital expenditure is justifiable if: ...
>
> (c) the capital expenditure is necessary: ...
>
> (iv) to maintain the service provider's capacity to meet levels of demand for services existing at the time the capital expenditure is incurred (as distinct from projected demand that is dependent on an expansion of pipeline capacity);

As discussed in the APA VTS access arrangement proposal, the forecast for future Victorian gas demand is flat at best. This investment is being driven entirely by the reduction in supply as the Bass Strait fields decline. No portion of this investment is proposed to enable new demand to be served – it is entirely required to meet levels of demand for services existing at the time the capital expenditure is incurred (as distinct from projected demand that is dependent on an expansion of pipeline capacity).

This capital expenditure would be required for the provision of the reference service, in accordance with Rule 79(6).

5.1. Preferred options

It is not the role of APA VTS to choose where Victorian gas will be sourced, and APA VTS expresses no preference towards any of the proposed projects. The market is best placed to decide the best source of gas to meet Victoria's future needs.

However, owing to the structural elements of the market carriage model applying in Victoria, projects requiring investment in the VTS are placed at a structural disadvantage relative to projects that require investment only in contract carriage facilities. Absent confidence that the VTS can be expanded to meet additional injections from these projects, these projects are virtually eliminated from consideration.

This Rule 80 application seeks to address that structural disadvantage, to allow these proposed projects to compete on a level playing field against other projects proposing to bring additional gas supplies into Victoria.

5.2. A supportive investment environment

It should be noted that these SWP expansions will require a supportive investment environment in order to proceed. As discussed in the APA VTS access arrangement proposal, there is a strong tension between the needs for peak day security of supply and annual supply adequacy on one hand, against the ambitions of the Victorian government to reduce gas use through the Net Zero 2050 target and the Gas Substitution Road Map on the other.

The APA VTS access arrangement proposal includes three elements to create the supportive investment environment required to allow these projects to proceed:

- If gas demand falls as envisioned by the Victorian Gas Substitution Road Map, the Infrastructure Victoria interim report and the AEMO IASR, the investment required to accommodate these projects may only be required for a relatively short term –less than the long term nature of the required capital investment. There is a risk that gas may not play a sufficient role in the Victorian energy mix to enable APA VTS to recover its capital over the technical life of the assets required to be built. The APA VTS proposed access arrangement therefore proposes to limit depreciable asset lives to 30 years, and to review depreciable asset lives at each VTS access arrangement review going forward. This investment would be subject to the curtailed regulatory depreciation asset lives.
- If gas demand falls after these expansions are completed, the investment could be exposed to the National Gas Rules Capital Redundancy provisions in Rule 85. The APA VTS access arrangement proposal includes a Fixed Principle under Rule 99 that the capital redundancy provisions of Rule 85 or the Access Arrangement are never to apply to investment to expand the capacity of the VTS during the upcoming access arrangement period. This investment would be subject to that Fixed Principle.
- The APA VTS proposed access arrangement includes a “pre-approved capex pass through” provision to allow APA VTS to begin recovering a return on and of capital, and associated operating expenditure from the date of commissioning any project approved under Rule 80. This investment would be subject to that pass-through provision.

To be clear, these elements to create a supportive investment environment are not part of this Rule 80 application – these elements can only be approved by the AER in the context of the APA VTS access arrangement.

However, if these elements are not accepted by the AER in the APA VTS access arrangement, the resultant risk/reward balance will render it very difficult to attract capital to these projects, notwithstanding the AER’s approval of this Rule 80 application. APA VTS has been frank on this point with project proponents, the AER, AEMO, state and federal government agencies, and consumer representatives and industry participants through the stakeholder consultation process.

6. Proposed capital expenditure

The actions needed to augment the SWP depend on which, or which combination of projects proceeds, and potentially the order in which they proceed.

6.1. Iona gas storage expansion

Project overview

Lochard is intending to further expand their injection capacity, with Stage 1 under development to deliver 570 TJ/d by early calendar year 2023. Further expansion opportunities up to 670 TJ/d associated with additional fields and facility upgrades during 2025-2028 with an incremental storage volume up to 15PJ is also being considered.

Required capital expenditure

As developed in the business case attached, should Lochard Energy expand the Iona gas storage facility to achieve deliverability of 670 TJ/day, the SWP would require looping and compressor modifications to be able to deliver that gas to the Melbourne load centre.

The required actions include:

- 74 km looping
- Winchelsea Re-staging and aftercooler bypass
- Brooklyn City Gate and Brooklyn Lara Pipeline City Gate Upgrade

This would allow an additional 100 TJ/d of Iona injections into the VTS during winter peak periods. Total cost of this project is estimated at $215.8 million ($2021)

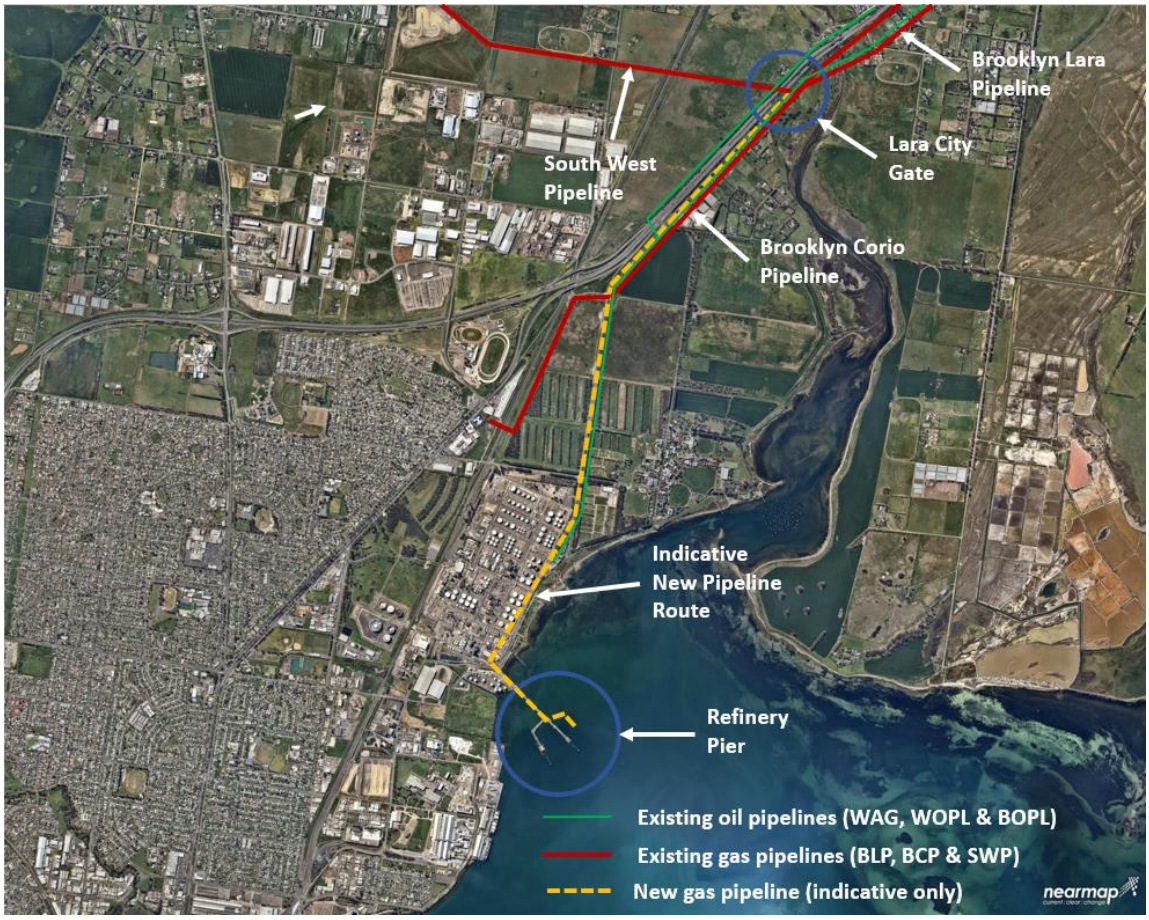
6.2. Geelong/Avalon FSRU

Project overview

Viva Energy Geelong FSRU

Viva Energy, owner of the former Shell refinery in Geelong, is proposing to establish an LNG Import Terminal at its Geelong Port.[6] Vaporised gas from an FSRU will be sent via a new (6km) pipeline which will tie into the VTS at Lara on the SWP.

[6] See https://www.vivaenergy.com.au/operations/geelong/geelong-energy-hub/viva-energy-gas-terminal-project and https://www.vivaenergy.com.au/ArticleDocuments/877/Viva%20Energy%20Gas%20Terminal%20Pipeline%20Factsheet.pdf.aspx?Embed=Y

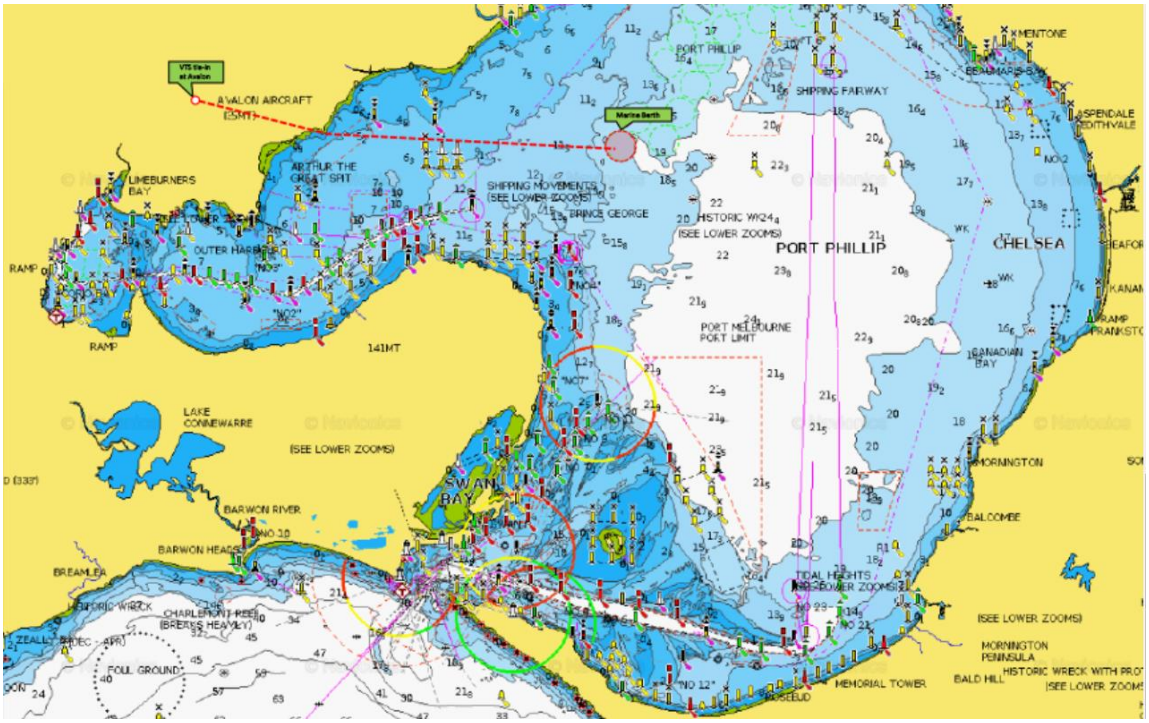


Based on preliminary inputs provided by Viva, the amount of LNG injections into the VTS at Lara is expected to be in the range of 645 TJ/d (1 in 20 winter peak day) to 310 TJ/d (hot summer day). This assumes Iona gas injections are fully backed off and also reduction in Longford/Bass Gas injections.

Vopak Avalon FSRU

Vopak proposes[7] an FSRU to connect via a sub-sea pipeline coming aground at Avalon, which would connect to the SWP in much the same way as the VIVA proposal. It is a similar project to the VIVA proposal, injecting approximately the same volumes.

[7] See https://www.afr.com/companies/energy/vopak-vies-for-coveted-lng-import-terminal-licence-20210315-p57avc .



Required capital expenditure

The AEMO 2021/VGPR (p62) identifies that the capacity of the SWP would be increased by injections from an FSRU at either of Geelong or Avalon. This is primarily due to higher pressure injections closer to the Melbourne load centre. Injections from an FSRU would curtail Iona injections to the system:

> The SWP can support large injections from the western LNG terminal, even without additional compression, due to its location close to the Melbourne demand zone and high injection pressure. This increases the SWP transportation capacity up to 741 TJ/d on a 1-in-20 system demand day, an increase of 273 TJ/d compared to the modelled capacity with the WORM.
>
> The SWP capacity with western LNG injections is limited by the Brooklyn CG maximum flow limit and Sale CG minimum pressure requirements. For demands above 400 TJ/d, minimum Longford CPP injections are required to maintain Sale CG pressure, which leads to less injections from the SWP to satisfy the supply-demand balance.
>
> Initial analysis shows that if western LNG injections are maximised, then Iona CPP will not be able to also inject at maximum capacity due to allowable pipeline pressures; on a 1-in-20 system demand day, the achievable Iona CPP injection is 141 TJ/d without exceeding SWP pressures. To achieve the maximum Iona CPP injections discussed in Section 5.1.1 of 468 TJ/d, as well as western LNG

injections, additional pipeline augmentations would be required to further increase SWP capacity, discussed in Section 5.3.3.

Further analysis and consultation will be conducted to determine the interaction between Iona CPP and western LNG injections for scheduling purposes.

However, this increase in capacity is not without cost. Accommodating an FSRU would require upgrades to the Brooklyn City Gate and the Brooklyn to Lara Pipeline City Gate. The attached business case is equally applicable to either project.

This would allow a combined total of 720 TJ/d of LNG and Iona injections into the VTS.

Cost of this upgrade is estimated at $14.78 million ($2021).

Appendix A Business cases

Business Case – Capital Expenditure (Capex)

South West Pipeline Expansion – Iona 670 TJ/d Injection

Service Provider: APA VTS Australia (Operations) Pty Limited
Asset: Victorian Transmission System (VTS) (i.e. APA GasNet System as defined under the Service Envelope Agreement (SEA))
Business Case: 602

Project Approvals

TABLE 1: BUSINESS CASE – PROJECT APPROVALS

Prepared By	**Sheila Krishnan, Manager Asset Capacity Planning**
Reviewed By	**Daniel Tucci, Asset Manager**
Approved By	**Mark Fothergill, General Manager Infrastructure Engineering**

Project Overview

TABLE 2: BUSINESS CASE – PROJECT OVERVIEW

Description of Issue/Project	**AEMO's Gas Statement of Opportunities (GSOO) and Victorian Gas Planning Report (VGPR) have predicted a shortfall in gas supplies in the Victorian Transmission System (VTS) to meet winter demands as early as 2023. This shortfall is driven by the declining gas supplies from Longford.** **APA is proposing to expand the South West Pipeline (SWP) to allow more gas from Lochard's Underground Gas Storage (UGS) facility to be injected into the VTS during winter period to reduce the risk of supply shortfall in the VTS during winter in the short term. Iona's injection capacity is currently 530 TJ/d and constrained by the SWP to 468 TJ/d (post Western Outer Ring Main constructed). APA is submitting a Rule 79 proposal to install two additional compressors on the SWP plus upgrade works to Brooklyn City Gate (BCG) to increase Iona's injection capacity to 570 TJ/d.** **Lochard achieved FID in December 2020 to further increase their injection capacity to 570 TJ/d by 1 January 2023. Lochard is also planning to increase their injection capacity to 670 TJ/d and increasing their storage to 30 PJ by Q4 2024, subject to achieving FID in Q3 2022.** **There for APA is submitting a Rule 80 proposal for a further expansion to the South West Pipeline to increase Iona injection capacity from 570 TJ/d to 670 TJ/d.**
Options Considered	**Option 1: Do Nothing.** **Option 2: Install looping on the SWP** **Option 3: Install compression and looping**
Proposed Solution	**74 km x 20 inch looping on the SWP around Stonehaven and Pirron compressors. In addition, an upgrade of Brooklyn Lara Pipeline City Gate (BLP CG), Brooklyn City Gate (BCG) and Winchelsea CS would be required to increase flowrates into the Melbourne network.**
Estimated Cost	**$215.8 m**
Consistency with the National Gas Rules (NGR)	**APA VTS considers that the above presented capital project meets the criteria of Rule 79(2)(c)(iv), that is, the South West Pipeline investment is required to maintain the capacity to meet existing levels of demand for services, hence the capital expenditure is justified as conforming capital expenditure but conditional to the project achieving Financial Investment Decision (FID).**

Stakeholder Engagement	**APA has had regular engagement with stakeholders related to this project for a number of years. The stakeholders effected by this project are:** • **Australian Energy Market Operator (AEMO)** • **Victorian Market Participants, including the VTS AA consumer roundtable** • **Lochard Energy**

Background

AEMO's Gas Statement of Opportunities (GSOO 2021) and Victorian Gas Planning Report (VGPR 2021) have forecasted that there would be a shortfall in gas supplies into the VTS to meet its demands as early as 2023. The shortfall is mainly driven by declining gas supplies from Longford. Port Kembla LNG Terminal (PKGT) was expected to be constructed by 2023 to mitigate the shortfall in gas supplies in the VTS. However, PKGT has not publicly announced that it has achieved Financial Investment Decision (FID) to date and may not be ready by winter 2023. Without PKGT, a shortfall of 100 TJ/d is predicted to occur in a winter peak condition in 2023 and subsequent winters, hence posing a threat to system security in the VTS.

APA is submitting a Rule 79 proposal in the Access Arrangement 2023-2027 to augment the SWP Pipeline to allow more gas to be injected from Iona. Lochard Energy's Iona underground storage facilities has a standing injection capacity of 530TJ/d. Currently, Iona injection into the VTS is constrained to 445 TJ/d due to the capacity of the SWP. Once the Western Outer Ring Main (WORM) is completed in 2023, Iona will be able to inject up to 468 TJ/d[1] into the VTS, which is still well short of their capacity of 530 TJ/d. Lochard achieved Financial Investment Decision (FID) in December 2020 to commit to increase their injection capacity to 570 TJ/d by 1 January 2023. Hence, APA is proposing to install new compressor stations at Pirron and Stonehaven, including upgrade works at the Brooklyn City Gate (BCG)[1] to increase the SWP capacity to allow 570 TJ/d Iona injection.

With continuing decline in Longford supplies, other gas supplies may need to be sourced to supplement the shortfall in the VTS. LNG Import terminal projects such as Port Kembla Gas Terminal (PKGT), Viva Energy and Vopak are planning to bring additional gas to the VTS but have not achieved FID. However, Lochard is planning to further increase their Heytesbury Underground Storage (HUGS) up to 30 TJ/d by Q4 2024, subject to achieving FID in Q3 2022[2]. With the HUGS project, injection capacities from the reservoir will also increase to 670 TJ/d.

In the immediate future, these additional gas sources will help solve the shortfall in gas supply.

To mitigate the impending supply-demand shortfall, APA is proposing, in a Rule 80 submission, augmentation to the SWP to increase Iona's injection capacity into the VTS from 570 TJ/d to 670 TJ/d, contingent on Lochard achieving FID for their expansion. Lochard's increased storage and injection rates will balance the seasonal gas supply profile by storing gas during low demand periods to use it as peak shaving during the winter period, when the demand is high.

Risk Assessment

The National Gas Rules lists the following justifiable methods for Capital Expenditure;

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; or

iv. to maintain the service provider's capacity to meet levels of demand for services existing at the time the capital expenditure is incurred (as distinct from projected demand that is dependent on an expansion of pipeline capacity).

[1] Business Case, "South West Pipeline Expansion, Iona 570 TJ/d Injection".

[2] Corresponding from Lochard Energy to APA, "2021110 Letter to APA on Iona expansion capacity.pdf."

As the Gas Industry Act and the Gas Safety Act (Part 2 (ESV), Section 9, "Objectives of ESV under this Act are (a) to ensure the safety of the conveyance, sale, supply, measurement, control and use of gas; …" and Part 3 (Gas Safety), Section 32 "General duties of gas companies. A gas company must manage and operate each of its facilities to minimise as far as practicable—…(c) the hazards and risks to the safety of the public and customers arising from— (i) interruptions to the conveyance or supply of gas; and (ii) the reinstatement of an interrupted gas supply.") imposes obligations on network operators and owners that relate to the continuity of gas supply, it is APA's belief that all points therefore justify Capital Expenditure required to ensure gas supply to VTS customers are maintained.

Construction. The project is of routine nature to APA VTS. The risk is mainly related to factors that are outside APA VTS control, particularly land heritage issues and delays due to weather conditions.

Technical. All construction work would be completed by technically proven contractors, to APA VTS's engineering design and specifications. All construction processes are overseen by APA VTS.

Operation. The facilities will be operated in accordance with APA VTS's standard management practices for assets of this type. APA VTS has a suitably qualified and experienced workforce in Victoria to perform this type of operation.

Regulatory. This investment should be regarded as complying with Rule 79, and therefore is conforming capital expenditure.

Options Considered

Several options were considered to increase the Iona injections into the VTS as follows:

1.1 Option 1 – Do Nothing /No Capital Expenditure Option

APA does not submit any capital expenditure for any expansion on the SWP.

To mitigate the risk of shortfall over time, there would be reliance on gas supplies from outside Victoria, such as, ECG expansion Stage 3 (including expansion of the Young to Culcairn Victorian Interconnect), PKGT or within Victoria with LNG Import terminals.

1.2 Option 2 – Looping

Option 2 assumes that Stonehaven and Pirron compressors proposed for increasing Iona injection capacity to 570 TJ/d is approved and constructed. Looping is required to increase Iona injections to 670 TJ/d. Refer to B for the configuration of the expansion.

Table 1: Installation of looping on SWP

Option	Augmentation	Iona Injection Capacity (TJ/d)	SWP Capacity (TJ/d)[3]	Capital Expenditure ($m)	Commentary
2	74 km x 20 inch looping Restaging of Winchelsea Compressor and aftercooler bypass works Upgrade of Brooklyn City Gate (BCG) and Brooklyn Lara City Gate (BLP CG)	670	650	215.8	Looping: 22 km and 26 km upstream and downstream of Pirron compressor station. Looping: 19 km and 7 km upstream and downstream of Stonehaven compressor station. Re-staging Winchelsea compressor to accommodate higher flowrates. BCG and BLP CG upgrade due to maximum flows exceeded through facilities. Refer to Appendix C for upgrade items. The Brooklyn site is very congested. Removal/relocation of assets required to create space to upgrade these facilities.

To cater for longer term focus, the pipeline loops would be built to be hydrogen (H2) ready. APA VTS has proposed to conduct studies on the viability of the transporting up to 10% H2 blend in the transmission pipelines of the VTS. With renewable energy zones around the Western Transmission System and opportunities for H2 production in industrial areas like Geelong, looping installed on the SWP could later be used to transport H2. Note that Iona is unable to accept H2 gas into its Underground storage, therefore for any new H2 opportunity in the south west region of the VTS, new pipeline will have to be laid. Hence for Option 2,

[3] The difference between Iona injection capacity and SWP capacity is approximately 20 TJ/d. Iona injection supplies west to the Western Transmission System (20 TJ/d in winter peak conditions) and east towards Melbourne. For example, for the expansion case where Iona injection capacity is increased to 670 TJ/d, the SWP capacity is 650 TJ/d

the pipeline would be laid for H2 readiness and later could be decoupled from the SWP to transport H2 or H2/natural gas blends to/from Geelong and WTS.

Option 2 is the preferred option which has the least cost of the augmentation compared to Option 3 below. The project can only be completed in 2027 as land approvals for the looping could take up to 36 months and another 13 months to complete the project.

1.3 Option 3 – Compression and Looping

Option 3 details the augmentation for a combination of compression and looping to increase Iona injection capacity. The augmentation assumes that Pirron and Stonehaven compressor have been installed to enable Iona injections of 570 TJ/d. To increase Iona injections to 670 TJ/d, a second Taurus 60[4] unit is installed at Winchelsea and looping. Refer to Appendix B for the configuration of the expansion.

Option	Augmentation	Iona Injection Capacity (TJ/d)	SWP Capacity (TJ/d)	Capital Expenditure ($m)	Commentary
3	Winchelsea T60 2nd unit 65 km x 20 inch looping Re-staging of existing Winchelsea T60 unit and aftercooler bypass works Upgrade of BCG and BLP CG	670	650	219.1	Looping: 22 km and 17 km upstream and downstream of Pirron compressor station. Looping: 19 km and 7 km upstream and downstream of Stonehaven compressor station. Restaging of existing Winchelsea unit due to higher cycling. BCG and BLP CG upgrade required because maximum flows exceeded through facilities. Additional runs required for each facility. As Brooklyn site is currently congested, site costs required to create space to upgrade these facilities.

In this option, an additional compressor at Winchelsea does not significantly reduce the requirement to loop the SWP. Looping has only been reduced by 9 km compared to Option 2. Like Option 2, the pipeline loops will be built for H2 readiness.

Option 3 is less cost effective than Option 2 and will also have higher operating costs, considering an additional compressor unit at Winchelsea. Project completion would be in 2027 as land approvals which could take up to 36 months and another 13 months to complete the project.

1.4 Summary of Cost/Benefit Analysis

The cost/benefits of the SWP Expansion from 570 TJ/d to 670 TJ/d are outlined in the table below.

TABLE 5.3: SUMMARY OF COST/BENEFIT ANALYSIS

[4] Taurus 60 compressor from Solar Turbine which a power rating of 5.6 MW.

Option	Benefits (Risk Reduction)	Costs
Option 1 Do Nothing Options	• No capital expenditure required.	• Capex: $0 m • Risk of shortfall of gas supplies in the VTS as Longford continues to decline.
Option 2: **Recommended Option** 74 km looping Winchelsea Re-staging and aftercooler bypass BCG and BLP CG Upgrade	• Allows additional 100 TJ/d of Iona injections into the VTS during winter peak periods.	• Capex: $215.8 m
Option 3 Winchelsea 2nd unit T60 installation 65 km looping Winchelsea Re-staging and aftercooler bypass BCG and BLP CG Upgrade	• Allows additional 100 TJ/d of Iona injections into the VTS during winter peak periods.	• Capex: $ 219.1 m • Less cost-effective option than Option 2. • Higher operating costs for an additional compressor unit.

1.5 Consistency with the National Gas Rules

The requirements for justification of conforming capital expenditure specified in Rule 80(2) are as follows:

The capital expenditure must be justifiable on one of the following grounds;

a. The overall economic value of the expenditure is positive, or

b. The present value of the expected incremental revenue to be generated as a result of the expenditure exceeds the present value of the capital expenditure, or

c. The capital expenditure is necessary;

i. To maintain and improve the safety of services, or

ii. To maintain integrity of services, or

iii. To comply with regulatory obligation or requirement, or

iv. To maintain the service provider's capacity to meet levels of demand for services existing at the time the capital expenditure is incurred (as distinct from projected demand that is dependent on an expansion of pipeline capacity); or

d. The capital expenditure is an aggregate amount divisible into two parts, one referable to incremental services and the other referable to a purpose referred to in paragraph "c", and the former is justifiable under paragraph "b" and the latter under paragraph "c".

APA considers that the above presented capital project meets the criteria of Rule 80 that is the project capital expenditure is necessary to maintain integrity of services, and to maintain the capacity to meet existing levels of demand for services, hence the capital expenditure is justified under Rule 79 as conforming for the purpose of its inclusion into the capital base of the APA VTS System, should the project proceed.

1.6 Cost Breakdown

The capital and operating costs for the Project (Option2) is detailed in the Table below in 2021 dollars.

TABLE 5.4: CAPEX/OPEX SPLIT

Option 2	2023	2024	2025	2026	2027	Total
Capex	**6.30 m**	**8.53 m**	**21.31 m**	**123.76 m**	**55.89 m**	**215.79 m**
Opex					0.30 m	**0.30 m**
Total	**6.30 m**	**8.53 m**	**21.31 m**	**123.76 m**	**56.19 m**	**216.1 m**

TABLE 5.5: PROJECT COST ESTIMATE, BY COST

TOTAL PROJECT	2023	2024	2025	2026	2027	Total
Project Management		0.71 m	2.85 m	2.85 m	2.76 m	**9.18 m**
Land & Approvals	6.30 m	5.81 m	5.81 m	1.45 m		**19.38 m**
Design		2.01 m	8.02 m		1.52 m	**11.55 m**
Procurement			4.62 m	41.54 m	4.51 m	**50.55 m**
Construction				77.92 m	38.50 m	**116.42 m**
Commissioning & Handover					3.59 m	**3.59 m**
Other – Brooklyn Site Cleanup					5.0 m	**5.0 m**
Total	**6.30 m**	**8.53 m**	**21.31 m**	**123.76 m**	**55.89 m**	**215.79 m**

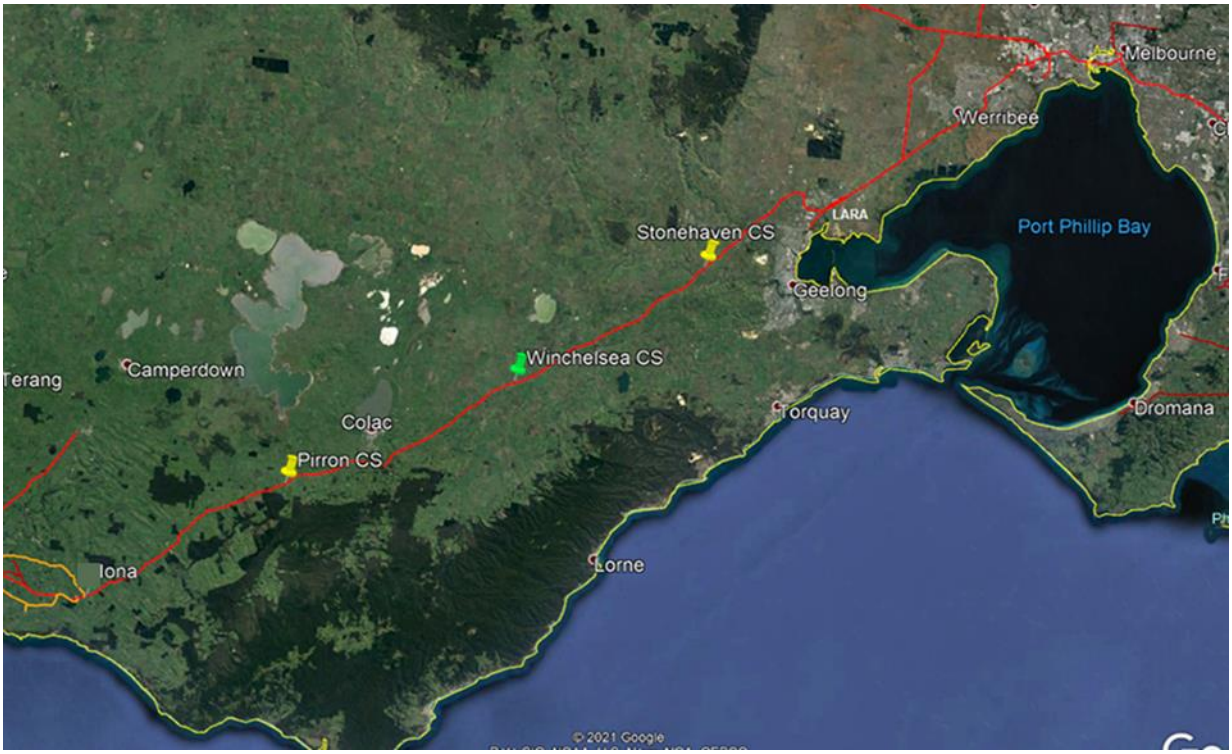
The cost breakdowns by asset type are shown in the following tables.

Looping	2023	2024	2025	2026	2027	Total
Project Management		0.71 m	2.85 m	2.85 m	1.19 m	**7.61 m**
Land & Approvals	6.30 m	5.81 m	5.81 m	1.45 m		**19.38 m**
Design		2.01 m	8.02 m			**10.03 m**
Procurement			4.62 m	41.54 m		**46.15 m**
Construction				77.92 m	34.63 m	**112.55 m**
Commissioning & Handover					2.77 m	**2.77 m**
Total	**6.30 m**	**8.53 m**	**21.31 m**	**123.76 m**	**38.58 m**	**198.48 m**

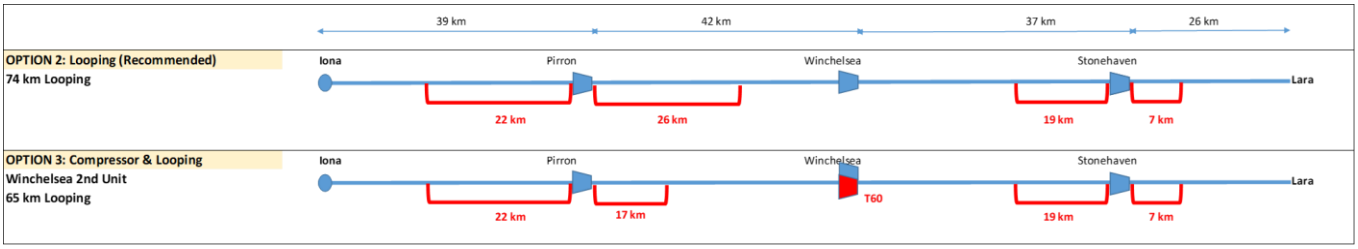
BCG & BLP CG Upgrade, Winchelsea Aftercooler Bypass	2023	2024	2025	2026	2027	Total
Project Management					1.27 m	**1.27 m**
Land & Approvals						
Design					1.45 m	**1.45 m**
Procurement					3.60 m	**3.60 m**
Construction					3.31 m	**3.31 m**
Commissioning & Handover					0.78 m	**0.78 m**
					5.0 m	**5.0 m**
Total					**15.41 m**	**15.41 m**

Winchelsea Unit Re-staging	2023	2024	2025	2026	2027	Total
Project Management					0.30m	**0.30 m**
Land & Approvals						
Design					0.07 m	**0.07 m**
Procurement					0.91 m	**0.91 m**
Construction					0.56 m	**0.56 m**
Commissioning & Handover					0.05	**0.05 m**
Total					**1.90 m**	**1.90 m**

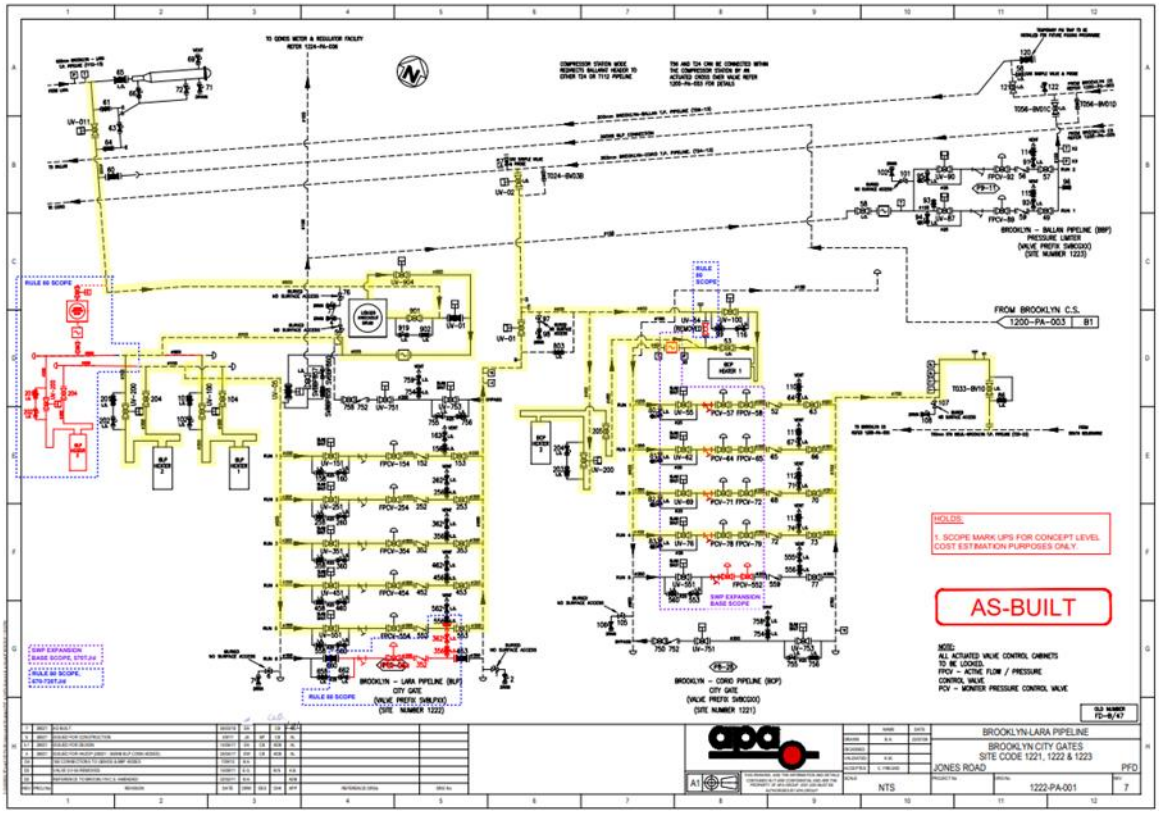
Appendix A: Location of the SWP and Compressor sites

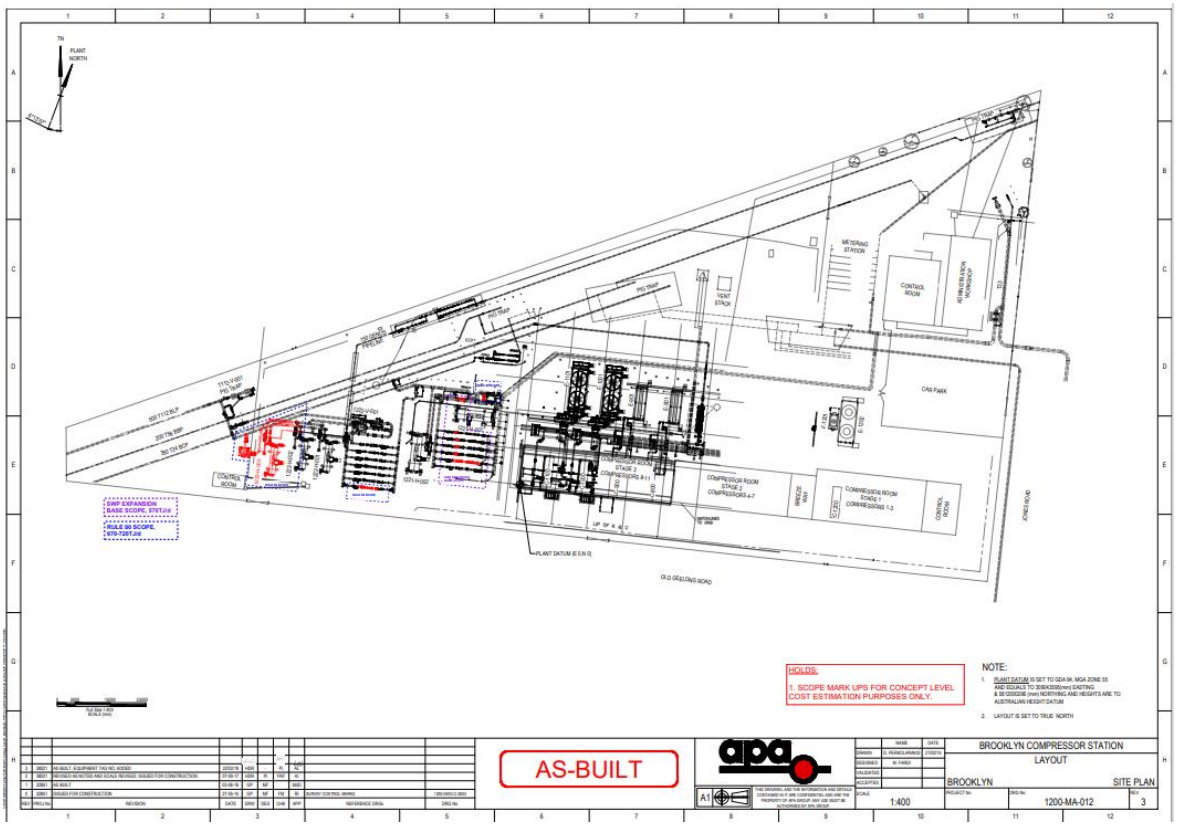


APPENDIX B: Configuration of Expansion Options



APPENDIX C: BCG & BLP CG Upgrade





BLP CG

- DN500 piping tie-in
- DN500 piping from BLP to new KO Drum / Heater
- 1 x KO Drum o 1 x DN500 ultrasonic flowmeter
- 1 x 625kW Heater and associated piping
- 1 x Control Valve Run

BCP CG

- 1 x DN600 Bypass Valve

Business Case – Capital Expenditure (Capex)

LNG Import Terminal Connection to SWP – Brooklyn Facilities Upgrade

Service Provider: APA VTS Australia (Operations) Pty Limited
Asset: Victorian Transmission System (VTS) (i.e. APA GasNet System as defined under the Service Envelope Agreement (SEA))
Business Case: 603

Project Approvals

TABLE 1: BUSINESS CASE – PROJECT APPROVALS

Prepared By	Sheila Krishnan, Manager Asset Capacity Planning
Reviewed By	Daniel Tucci, Asset Manager
Approved By	Mark Fothergill, General Manager Infrastructure Engineering

Project Overview

TABLE 2: BUSINESS CASE – PROJECT OVERVIEW

Description of Issue/Project	AEMO's Gas Statement of Opportunities (GSOO) and Victorian Gas Planning Report (VGPR) have predicted a shortfall in gas supplies in the Victorian Transmission System (VTS) to meet winter demands as early as 2023. This shortfall is driven by the declining gas supplies from Longford. There are currently two LNG Import Terminal projects which are looking to connect to the VTS around the Geelong area on South West Pipeline (SWP). Viva Energy and Vopak projects have not reached Financial Investment Decision (FID) yet but are targeting to supply gas into the VTS from 2024. Both parties have independently approached APA to understand the VTS capacity to accommodate 500 - 600 TJ/d of gas supplies from their facilities. APA is submitting a Rule 80 proposal to upgrade Brooklyn City Gate (BCG) and Brooklyn Lara Pipeline City Gate (BLP CG) that would allow higher flows to be supplied into the VTS should either of the LNG projects connect to the SWP. The upgrade of the Brooklyn facilities is the minimum amount of capital expenditure required to increase the South West Pipeline by 150 - 252 TJ/d.
Options Considered	Option 1: Do Nothing. Option 2: Upgrade Brooklyn City Gate (BCG) and Brooklyn Lara Pipeline City Gate (BLP CG)
Proposed Solution	Upgrade of Brooklyn City Gate (BCG) and Brooklyn Lapa Pipeline City Gate (BLP CG) would allow up to 720 TJ/d of supply injection into the SWP. This assumes a total combined injection of an LNG Import Terminal and Iona into the SWP without further augmentation to the VTS. This proposal assumes the augmentation to the SWP by installing two new compressor stations at Pirron and Stonehaven has occurred.
Estimated Cost	**$14.78 m**
Consistency with the National Gas Rules (NGR)	APA VTS considers that the above presented capital project meets the criteria of **Rule 79,** that is, the South West Pipeline investment is required for integrity of services, and to maintain the capacity to meet existing levels of demand for services, hence the capital expenditure is justified as conforming capital expenditure but conditional to the project achieving Financial Investment Decision (FID).

Stakeholder Engagement	APA has had regular engagement with stakeholders related to this project. The stakeholders effected by this project are: • Australian Energy Market Operator (AEMO) • Victorian Market Participants • Lochard Energy • Viva Energy • **Vopak**

Background

AEMO's Gas Statement of Opportunities (GSOO 2021) and Victorian Gas Planning Report (VGPR 2021) have predicted a shortfall in gas supplies in the Victorian Transmission System (VTS) to meet winter demands as early as 2023. This shortfall is driven by the declining gas supplies from Longford. Port Kembla LNG Terminal (PKGT) was expected to be constructed by 2023 to mitigate the shortfall in gas supplies in the VTS. However, PKGT has not achieved Financial Investment Decision (FID) to date. Without PKGT, a shortfall of 100 TJ/d is predicted to occur in a winter peak condition in 2023 and subsequent winters, hence posing a threat to system security in the VTS.

For the Access Arrangement 2023 – 2027 period, APA is submitting a Rule 79 proposal to augment the South West Pipeline (SWP) to enable up to 570 TJ/d of gas to be injected from Iona. Iona has an injection capacity of 530TJ/d and has achieved Financial Investment Decision (FID) in December 2020 to further increase their injection capacity to 570 TJ/d by 1 January 2023. Hence, APA is proposing augmentation to the SWP by installing two new compressor stations at Pirron and Stonehaven (including an upgrade on the BCG) to increase the SWP capacity from 468 TJ/d (post WORM) to 570 TJ/d[1].

With continuing decline in Longford supplies, other gas supplies would need to be sourced to supplement the supply shortfall in the VTS. LNG projects for Viva Energy and Vopak are planning to connect at Lara/Geelong area but may achieve FID in some time 2022 and targeting gas supply from 2024. Both Viva and Vopak have independently approached APA to understand the VTS capacity to accommodate 500 - 600 TJ/d of gas supplies from their facilities.

Therefore, APA is proposing in a Rule 80 submission to increase the capacity of the SWP with an LNG Import Terminal connection to the VTS. APA's proposal is to upgrade Brooklyn City Gate (BCG) and Brooklyn Lara Pipeline City Gate (BLP CG) which would allow higher flows to be supplied into the VTS should either one of the LNG projects connects to the VTS. The upgrade of the Brooklyn facilities is the minimum amount of capital expenditure required to increase the South West Pipeline by approximately 150 - 252 TJ/d[2]. This proposal assumes the augmentation to the SWP by installing two new compressor stations at Pirron and Stonehaven has occurred.

LNG Injection versus Iona Injection

Currently, Iona Underground Storage supplies gas into the SWP. An LNG connection to the SWP located further downstream of Iona, hence will impact the injection capacity of Iona. For both Iona and LNG to inject to their full capacities, significant capital expenditure would be required on the SWP and Brooklyn Lara Pipeline (BLP).

APA has determined that by upgrading the capacities of the BCG and BLP CG, a significant increase to the SWP can be achieved, With this upgrade, there will be a relationship between the amount of LNG and Iona injection into the SWP.

The relationship between LNG injection and Iona injection into the SWP is shown in Figure 1 below.

[1] Business Case 601 "South West Expansion - Iona 570 TJ/d injection"

[2] Increase of 252 TJ/d injection capacity is based on the post WORM Iona capacity of 468 TJ/d (i.e. corresponding to SWP capacity of 448 TJ/d). The increase in capacity is 150 TJ/d if SWP expansion is approved to allow Iona injection increase to 570 TJ/d.

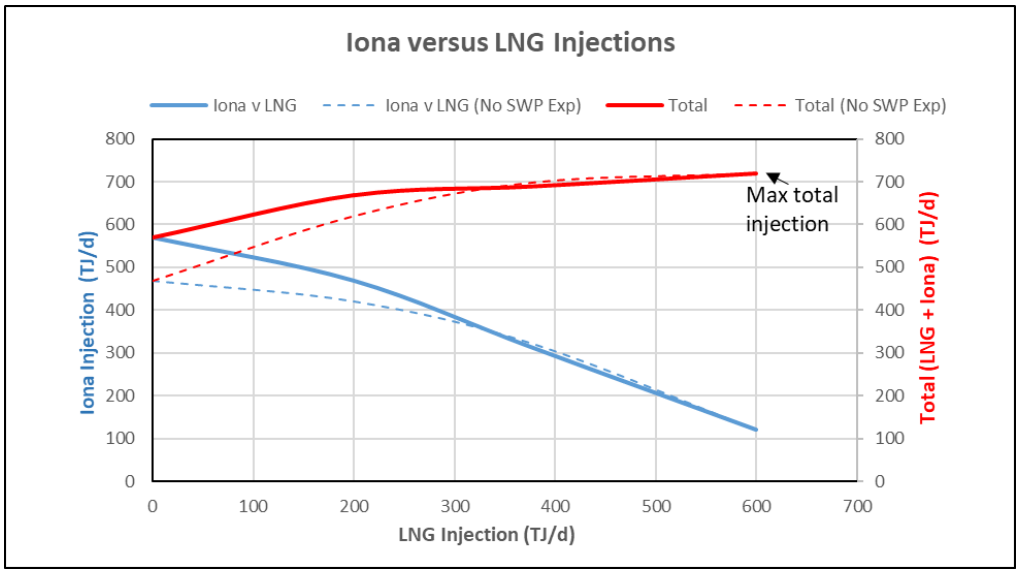


Figure 1: Iona - LNG Injection Relationship

The thick lines in the Figure 1 above show the case where SWP expansion (Pirron and Stonehaven compressors) is implemented to allow Iona maximum injections of 570 TJ/d. The dotted lines show the case without the SWP expansion.

SWP expansion allows higher Iona injections during low LNG injections. However, as LNG injections increase, the capacity for Iona to inject into the SWP decreases disproportionately as Iona is located further upstream and will be pressured out by the LNG injections.

yLNG injection will increase the overall SWP capacity because it's located downstream of Iona and closer to Melbourne. The maximum combined injection capacity of Iona and LNG is 720 TJ/d, achieved during a winter peak with the upgrade of Brooklyn facilities. Beyond 720 TJ/d, further augmentation is required on the Brooklyn – Lara pipeline and Western Outer Ring Main (WORM).

Hence, by upgrading the BCG and BLP CG, the LNG connection to the VTS increases the SWP capacity by 252 TJ/d, that is, from post-WORM 468 TJ/d injection capacity (or by 150 TJ/d, after SWP Expansion for Iona 570 TJ/d injections).

The upgrade will provide an initial increase in gas supply injection capacity into the VTS. Options could be considered at a later stage to further increase the injection capacity by more augmentation or sourcing gas outside the VTS to supplement the continuing decline in Longford supplies.

Risk Assessment

The National Gas Rules lists the following justifiable methods for Capital Expenditure;

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; or

iv. to maintain the service provider's capacity to meet levels of demand for services existing at the time the capital expenditure is incurred (as distinct from projected demand that is dependent on an expansion of pipeline capacity).

As the Gas Industry Act and the Gas Safety Act (Part 2 (ESV), Section 9, "Objectives of ESV under this Act are (a) to ensure the safety of the conveyance, sale, supply, measurement, control and use of gas; …" and Part 3 (Gas Safety), Section 32 "General duties of gas companies. A gas company must manage and operate each of its facilities to minimise as far as practicable—…(c) the hazards and risks to the safety of the public and customers arising from— (i) interruptions to the conveyance or supply of gas;

and (ii) the reinstatement of an interrupted gas supply.") imposes obligations on network operators and owners that relate to the continuity of gas supply, it is APA's belief that all points therefore justify Capital Expenditure required to ensure gas supply to customers at VTS network are maintained.

Construction. The project is of routine nature to APA VTS. The risk is mainly related to factors that are outside APA VTS control, particularly land heritage issues and delays due to weather conditions.

Technical. All construction work would be completed by technically proven contractors, to APA VTS's engineering design and specifications. All construction processes are overseen by APA VTS.

Operation. The facilities will be operated in accordance with APA VTS's standard management practices for assets of this type. APA VTS has a suitably qualified and experienced workforce in Victoria to perform this type of operation.

Regulatory. This investment should be regarded as complying with Rule 79, and therefore is conforming capital expenditure.

Options Considered

Several options were considered to increase the South West Pipeline injections into the VTS as follows:

1.1 Option 1 – Do Nothing /No Capital Expenditure Option

APA does not submit any capital expenditure for expansion.

To mitigate the risk of supply shortfall over time due to declining Longford supplies, there would be reliance on gas supplies from outside Victoria, such as, ECG expansion Stage 3 (including expansion of the Young to Culcairn Victorian Interconnect), Port Kembla Gas Terminal (PKGT).

1.2 Option 2 – Upgrade of BCG and BLP CG (Recommended)

Table 1 below details the BCG and BLP CG upgrade capacity and capital expenditure.

Table 1: Installation of looping on SWP

Option	Augmentation	LNG-Iona injection capability (TJ/d)	SWP Capacity[3] (TJ/d)	Capital Expenditure ($m)	Commentary
2	Upgrade of BCG and BLP CG	720	700	14.78	BCG and BLP CG upgrade due to maximum flows exceeded through facilities. Refer to Appendix A for upgrade items. The Brooklyn site is very congested. Removal/relocation of assets required to create space to upgrade these facilities.

1.3 Summary of Cost/Benefit Analysis

The cost/benefits of the BCG and BLP CG Upgrade Project are outlined in the table below.

TABLE 5.3: SUMMARY OF COST/BENEFIT ANALYSIS

Option	Benefits (Risk Reduction)	Costs
Option 1 Do Nothing Option	• No capital expenditure required	• Capex: $0 m • Risk of shortfall of gas supplies in the VTS as Longford continues to decline.
Option 2: **Recommended Option** Upgrade of BCG and BLP CG	• Allows injections of 720 TJ/d of LNG - Iona injections into the VTS. • Minimum amount of capital for an expansion of SWP capacity for an initial increase of 150-250 TJ/d in gas supplies into the VTS.	• Capex: $14.78 m

[3] Iona injection supplies west to the Western Transmission System (20 TJ/d in winter peak conditions) and east towards Melbourne.

1.4 Consistency with the National Gas Rules

The requirements for justification of conforming capital expenditure specified in Rule 79 are as follows:

The capital expenditure must be justifiable on one of the following grounds;

a. The overall economic value of the expenditure is positive, or

b. The present value of the expected incremental revenue to be generated as a result of the expenditure exceeds the present value of the capital expenditure, or

c. The capital expenditure is necessary;

i. To maintain and improve the safety of services, or

ii. To maintain integrity of services, or

iii. To comply with regulatory obligation or requirement, or

iv. To maintain the service provider's capacity to meet levels of demand for services existing at the time the capital expenditure is incurred (as distinct from projected demand that is dependent on an expansion of pipeline capacity); or

d. The capital expenditure is an aggregate amount divisible into two parts, one referable to incremental services and the other referable to a purpose referred to in paragraph "c", and the former is justifiable under paragraph "b" and the latter under paragraph "c".

APA considers that the above presented capital project meets the criteria of Rule 80 that is the project capital expenditure is necessary to maintain integrity of services, and to maintain the capacity to meet existing levels of demand for services, hence the capital expenditure is justified under Rule 79 as conforming for the purpose of its inclusion into the capital base of the APA VTS System, should the project proceed.

1.5 Cost Breakdown

The capital and operating costs for the Project (Option 2) are detailed in the Table below in 2021 dollars.

TABLE 5.4: CAPEX/OPEX SPLIT

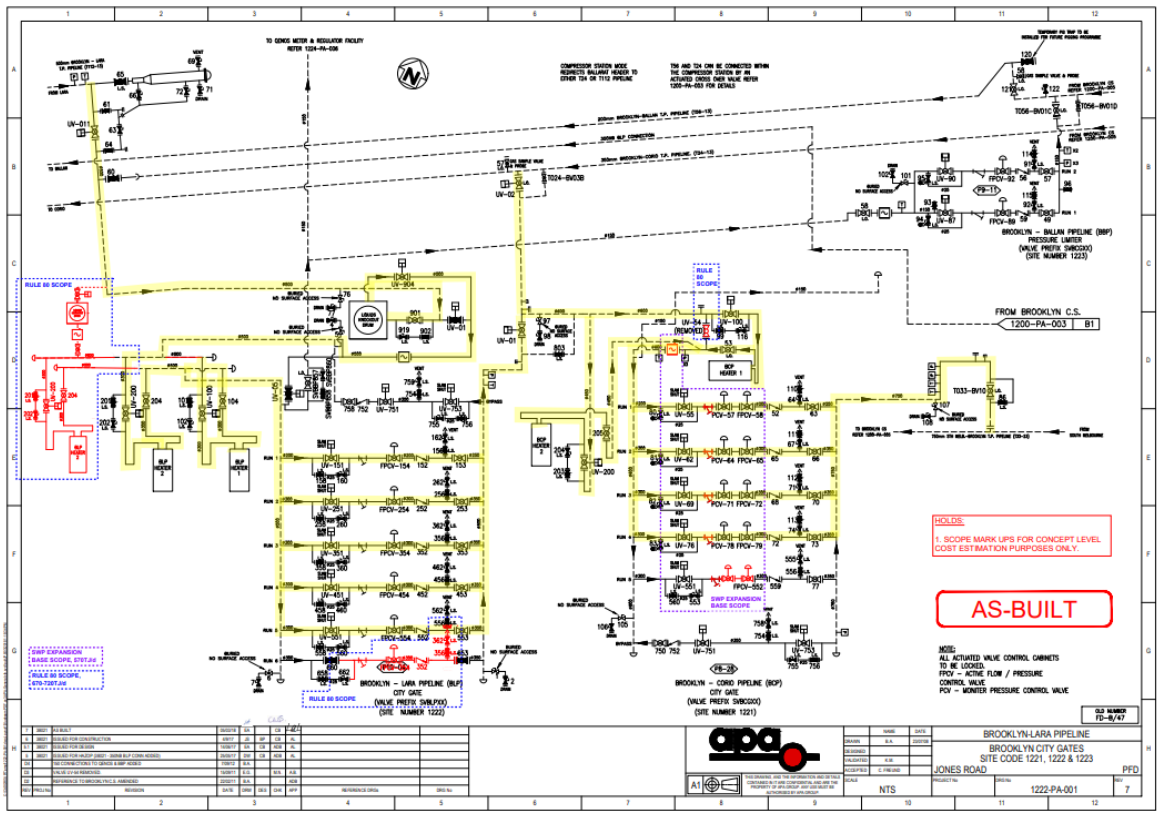
Option 2	2023	2024	2025	2026	2027	Total
Capex		14.00 m	0.78 m			**14.78 m**
Opex			0.04 m	0.04 m	0.04 m	**0.12 m**
Total		**14.0 m**	**0.82 m**	**0.04 m**	**0.04 m**	**14.90 m**

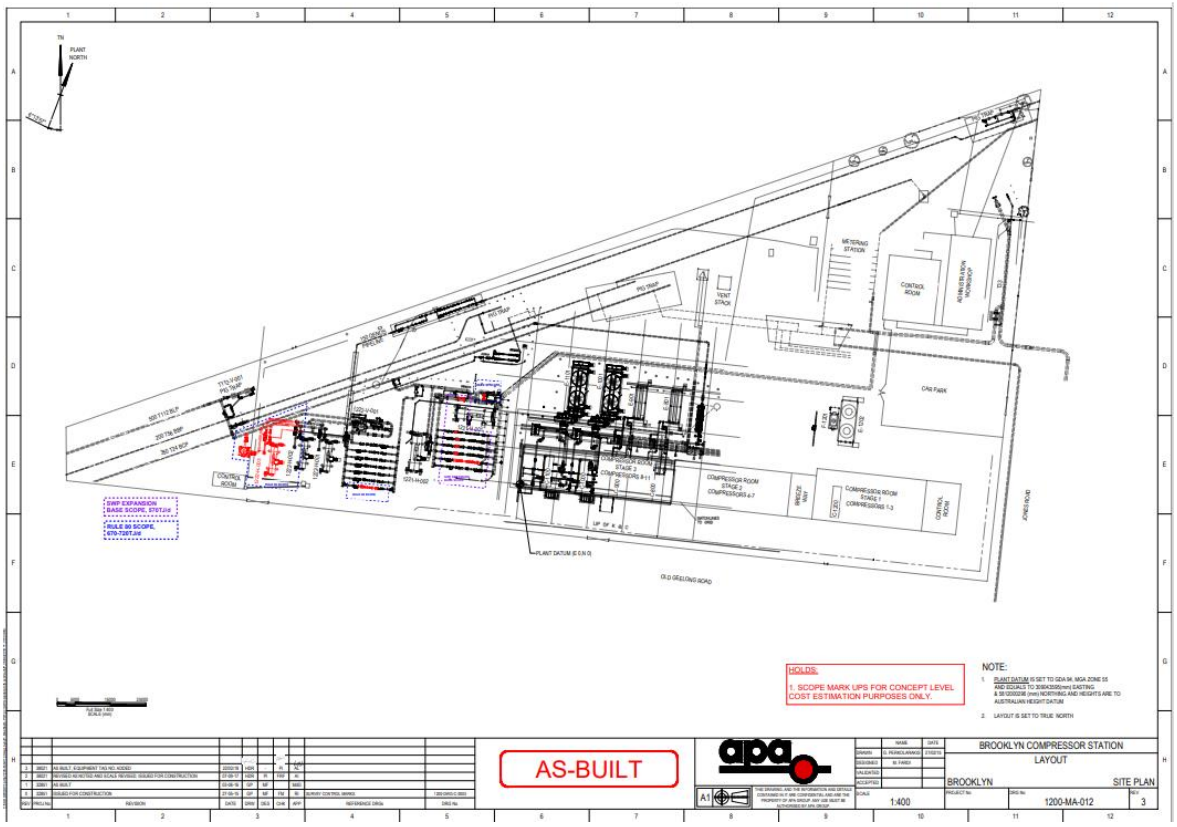
The cost breakdowns are shown in the following tables.

TABLE 5.5: PROJECT COST ESTIMATE, BY COST

	2023	2024	2025	2026	2027	Total
Project Management		1.27 m				**1.27 m**
Land & Approvals						
Design		1.15 m				**1.15 m**
Procurement		3.38 m				**3.38 m**
Construction		3.19 m				**3.19 m**
Commissioning & Handover			0.78 m			**0.78 m**
Other – Brooklyn Site Clean up		5.0 m				**5.0 m**
Total		**14.0 m**	**0.78 m**			**14.78 m**

Appendix A: Schematic of Upgrade of BCG and BLP CG





Note: The following upgrades are required to achieve injection flows on the SWP of 720 TJ/d and are on top of that required for the SWP 570 TJ/d expansion, that is, installing two new compressor stations at Pirron and Stonehaven.

BLP CG

- DN500 piping tie-in
- DN500 piping from BLP to new KO Drum / Heater
- 1 x KO Drum o 1 x DN500 ultrasonic flowmeter
- 1 x 625kW Heater and associated piping
- 1 x Control Valve Run

BCP CG

- 1 x DN600 Bypass Valve