Business Case

Service provider	APA GasNet Australia (Operations) Pty Limited
Asset	Victorian Transmission System
Project	*Western Outer Ring Main (WORM)*
Project type	*Capex – Security of Supply*
Project No:	*BC083*
Prepared by	Sheila Krishnan/Alex Curran
Endorsed by (State Manager Asset Management)	Craig Bonar
Approved by(General Manager Asset Management)	Mark Fothergill
Date	3rd March 2012

PURPOSE

To present a project recommendation and justification for the GasNet Victorian Transmission System Western Outer Ring Main (WORM) Project.

The Project aims to:

- Reduce exposure to loss of supply from major gas plant (especially Longford), and
- Facilitate incremental capacity of the pipelines between Iona, Melbourne and Culcairn.

BACKGROUND

The Victorian Transmission System (VTS) currently transports approximately 220 PJ/a of gas to delivery points supplying over 1.5 million domestic, industrial and Commercial customers, 5 Gas Power Generator plants and also exports to NSW and South Australia.

The VTS has various gas receipt points, that is, Longford including VicHub, Pakenham Bass Gas, Iona (Western Underground Storage (WUGS) and SEAGas), Culcairn and also from the LNG storage tank at Dandenong. Longford is the major receipt point, providing over 73% of the gas into the VTS on a peak basis. Iona supplies about 14% of the total gas receipts on an annual basis. During the winter peak periods, LNG is used to provide the peak shaving capability and also for line-pack management. Gas can also be imported into the VTS from NSW via Culcairn.

The VTS in its current configuration can be viewed as three major corridors of supply, that is, East from Longford to Melbourne via Dandenong; West from Iona to Melbourne via Brooklyn and North to Culcairn via Wollert (refer Attachment 1).

Each of these corridors move gas to and away from Melbourne with a combination of compression and pressure regulation. The pipeline system was designed primarily for gas flow from east, that is, from Longford, which was, for the majority of the history of the system, the only injection point into the Victorian system.

Gas demand on the VTS is seasonal with average daily demands of approximately 350 TJ/d, 600 TJ/d and 1000 TJ/d during the summer, shoulder and winter periods, respectively.

Due to the configuration and seasonal nature of the demand on the VTS, linepack management to meet load supply-demand on the VTS is complex. For example, the management of inter-day demand-supply of the VTS requires gas from Longford to be stored and withdrawn from the South West Pipeline (SWP), otherwise, gas cannot be receipted into the Longford pipeline during low demand days.

The operation of the VTS is very focussed on meeting supply-demand with detailed planning processes to ensure the pipeline system capacity can meet load growth forecasts. However, a significant aspect which also needs to be covered in the infrastructure planning of the VTS is the issue of security of supply. For a pipeline

supplying over 220 PJ/a of gas to mainly domestic customers, the question of whether there is reasonable security of supply in the VTS, particularly during a receipt point outage, is a pertinent one.

IDENTIFICATION OF NEED

APA GasNet has conducted an independent risk study (refer Attachment 4 reference 2: R2A report) of the VTS gas supply chain. This study has demonstrated that the VTS, in its current configuration, has an unacceptable level of security of supply in the event of a major gas plant outage at Longford. In short, an outage at Longford of the scope and duration as has been seen in the last decade would lead to forced curtailment of domestic customers in both shoulder and winter periods.

The major constraining section contributing to this risk is the Melbourne section of the VTS, which is where the three corridors of supply interchange. The lower operating pressure within the Melbourne zone limits the capacity to move larger volumes of gas east or westbound during a receipt point outage at Longford.

An extended outage of the Longford plant could affect gas supply to over 1.5 million gas customers on the VTS, causing major expenditure for the gas distributors to relight customer pilot lights and reinstatement of the distribution networks, as well as loss of revenue for gas retailers. The value of lost load to customers and loss of government revenue is substantial. The Longford incident of Sep-98 is reported to have cost in excess of $1.3 billion, a loss of export earnings of $200m and insurance cost of $150m for the 10 days during which gas was curtailed. (refer Longford Royal Commission).

During a receipt point outage, shipper access to gas would be constrained, hence causing a large increase to the market price of gas. The monetary impact on the Victorian gas market is substantial.

The independent risk study has identified that alleviating this risk delivers benefits for current customers in excess of the cost the proposed project.

Proposal

To mitigate the risk of loss of supply during a major Longford outage, it is proposed that a large diameter interconnection be constructed to remove the constraining section around the Melbourne system, enabling gas to move between the supply corridors, particularly during supply outage at Longford. The interconnection is known as the Western Outer Ring Main (WORM). APA GasNet proposed to construct this project by 2014.

WORM Description

The WORM project consists of the following stages:

- Stage 1: 8.3 km x 500 mm Rockbank to Plumpton

  This project has been committed for 2012 and the main purpose of the timing of this project was to remove an immediate capacity constraint on

the Sunbury lateral. The pipeline was upsized to 500 mm in order to be extended to form the WORM.

- Stage 2 & 3: 49.3 km x 500 mm Wollert to Rockbank (via Kalkallo)

  The 49.3 km x 500 mm pipeline will complete the WORM project. Included in these Stages are:

  - Installation of additional compression (WCS6 – Centaur 50) at Wollert Compressor Station (CS) 'B' allowing compression from Pakenham to Wollert pipeline (existing connection) to the new WORM (new connection).

  - A new interconnecting Pressure Reduction Station at Wollert connecting the Brooklyn Lara Pipeline (BLP) to the Pakenham-Wollert Pipeline.

Once the WORM project is completed, the operation of major supply Pressure Reduction Stations (PRS) stations at Dandenong, Brooklyn and Wollert would be set at fixed outlet pressure, including Brooklyn and Lara supplying the Geelong pipeline. Wollert becomes a hub managing transfers across the Pakenham-Wollert-Rockbank systems and balances linepack in the VTS.

Benefits of the WORM

There are several benefits for customers of the VTS arising from the removal of current constraints through the construction of the WORM:

1. Provides Security of Supply to the VTS

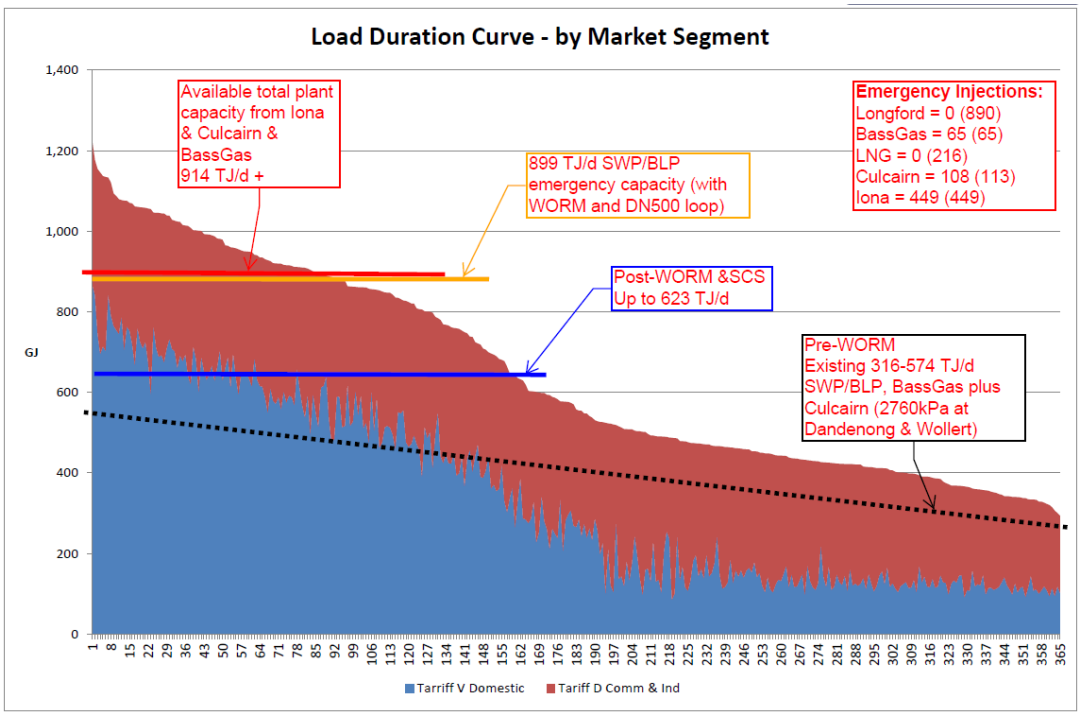
In event of loss of supply from any of the market scheduled gas trains at Longford (GP1, GP2, GP3), Iona (WUGS, Otway or Minerva) or Pakenham (Lang Lang), it would be possible for alternate supplies to be scheduled. Flow constraints on either South West Pipeline/Brooklyn Lara Pipeline or Eastern systems are removed with the WORM. For example, gas from the WUGS or from the north from Culcairn would be able to respond with additional shortfall volumes should a supply issue occur at Longford, and vice-versa.

A study has been conducted by an independent risk consultant R2A Due Diligence Engineers (refer Attachment 4 reference 2) on a due diligence review of the security of supply of the VTS. A functional model was set up to demonstrate the impact of lost load during 5, 10 and 15 day receipt point outages for winter, shoulder and summer load demands. The study also looked at the availability of the supply chain components from well head to the pipeline and facilities, and the likelihood of supply interruptions, for example plant failure, bushfire, terrorism and accidents.

The findings of the study showed that WORM has a major benefit to security of supply for domestic (Tariff V) customers, particularly for a supply disruption from the Longford, during the shoulder demand period of the VTS and also significantly reduces the impact of a winter supply disruption.

This benefit is shown graphically in Figure 1 below, demonstrating the current risk to domestic customers (block shading in blue) in the event of a supply outage at Longford before construction of the WORM (black dotted line) and after construction of the WORM (blue line). In particular, the graph shows the number of days in a year where an extended outage at Longford could lead to domestic customer curtailment. This moves from 148 days of potential risk to 60 days of potential risk in each year based on the current load duration curve. This is a significant reduction in risk, and the value of this reduction is discussed in the R2A report.

Figure 1: Load Duration Curve – By Market Segment



As can also be seen from Figure 1 the WORM does not fully mitigate the risk of supply disruption to domestic customers arising from a total supply failure from the east in all seasons due to the remaining constraints in the VTS configuration. However, it delivers a necessary strategic link to enable further incremental expansion of the SWP/Brooklyn Lara Pipeline (BLP) and hence make existing Iona plant capacity available to the Victorian and NSW gas market. For example, the transmission capacity from the west would need to be doubled at least to fully alleviate this risk, as discussed in the Australian Energy Market Operator Vision 2030 document (refer Attachment 4, Reference 4). Iona available capacity is about 700 TJ/d compared with current SWP capacity of 353 TJ/d.

However, the WORM does provide an immediate and substantial benefit to the existing customers, particularly the smaller retail and domestic customers through the year, if the major industrial customers (representing up to 400 TJ/d) are load-shed as expected during a major loss of supply incident.

The probably of an outage has been modelled by R2A based on past experience of outages at Longford and other plant. A major Longford outage occurred in 25 September 1998 for a period of 30 days which had a catastrophic consequence on the gas market in Victoria. A report by McLennan Magasanik Associates Pty Ltd for VENCorp in 2005 (refer Attachment 4, reference 5) identified loss to Table 2-5 customers arising from failure to supply 1270 TJ over 7 days amounted to $86 million. Using this data and retailer published rates, the R2A study (2012) found that monetary impact of a supply outage at Longford in terms of the value of gas rated at $89.75/GJ for a 10 day outage would be a savings of $67 m with the WORM.

With the WORM, the savings calculated on an annualised cost of risk value for a 5, 10 day and 15 day disruption period, would be in the order of $46 million, $77.7 million and $105.8 million respectively over the 60 year life of the project.

2. Simplicity of Operation and Increase in System Reliability

A direct connection between the WORM and the Pakenham to Wollert pipeline would allow gas to flow interchangeably between the east and west systems with fixed operating set points and without direct operator intervention. The VTS will therefore be able to operate within a tighter band of operation than is currently achieved. AEMO currently manages linepack with stop/start operation at Brooklyn and Wollert Compressor Stations and Brooklyn City Gate. Current practices to move gas out of the South West Pipeline/Brooklyn Lara Pipeline is to change the set points at the Brooklyn, Wollert and Dandenong regulator stations.

Lower dependence on operator intervention is expected to increase system reliability and reduced stop/start operation will reduce equipment wear and tear and therefore reduce the risk of failure. In the past year, there were over 5000 setpoint changes in the operation of the VTS recorded. There would also be reduced scope for operator error by removing the need for AEMO operators to constantly change settings. For example, several instances of filter failure leading to severe damage to regulators at the Brooklyn Lara Pipeline CG and Lara South West Pipeline City Gate have been experienced due to start-up of these station under undesirable conditions by the operators.

With the WORM in place, there will be better management of the VTS. Currently, the VTS operates within a tight band of linepack. The WORM creates additional “storage” or buffer, hence having the following benefits:

- Linepack Balancing: The capability of balancing linepack across the Western/Northern/Eastern systems using the WORM and Wollert compressor hub reduces the risk of Longford or Iona plant trip due to a high pressure constraints (e.g. in early morning) in the supplying Longford or Iona pipelines. High operating pressures at both Longford and Iona are required in order to meet peak loads.

- Gas Powered Generation readiness: Management of linepack depletion due to short-term operation of Gas Powered Generation in the first half of the gas day becomes easier with the facility to transfer gas across the WORM as required, matching the available supply to the demand location. Operation of the Geelong pipeline at 5000 kPag typical pressure (fixed nominal setpoints at Lara and Brooklyn) allows Gas Powered Generation [redacted]

- Gas-on-gas competition: Ability to maintain gas contracts with the assurance that any surplus gas supply can be physically injected into the VTS, even in periods of low system demand.

3. Optimal Capital Expenditure and Reducing Operating Costs

The WORM complements APA GasNet's compressor and growth strategies.

APA GasNet's long term strategy is to downgrade the Brooklyn compressor site (Attachment 4 reference 1). The Brooklyn compressors are currently used to refill the Western Underground Storage facility and also to maintain capacity on the Brooklyn to Ballarat and Geelong systems. The downgrade the Brooklyn compressor site is necessary because of the congestion of equipment at the site and also Brooklyn is not the optimal location in terms of capacity expansion of the VTS. The WORM project realises that strategy.

With the WORM, one compressor unit at Wollert would increase the capacity into Western Underground Storage facility to over 100 TJ/d with 1030 TJ/d injections at Longford (and over 180 TJ/d with 750 TJ/d injections at Longford). The increased capacity to the Western Underground Storage facility is achieved with considerably less than half the compression required compared to using two compressors at Brooklyn. Greater package efficiency (lower fuel per volume of gas moved) is achievable by compressing at Wollert into the WORM as available suction pressure from the Pakenham to Wollert pipeline is significantly higher than the Melbourne pressure.

With the compressor at Wollert, a target pressure of 5000 kPa can be achieved at Iona, which will remove the need for upgrading of the compressor aftercoolers at Iona in the short to medium term.

Connection of the new Rockbank Pressure Regulator Station (refer Attachment 4, reference 6a) supplied from the WORM would reduce the dependence on compression at Brooklyn to supply Ballarat.

The two proposed compressors at Brooklyn, that is Brooklyn 13 and 14 (deferred from Access Arrangement 3), can be replaced by the new compressors required at Wollert for the WORM and Stonehaven. The locations of these two new compressors are strategically better placed for capacity expansion of the South West Pipeline and Northern Wollert Pipeline. The Stonehaven compressor also provides additional pressure at Iona thus deferring and possibly avoiding upgrade of the compressor power and capacity at Iona.

APA GasNet calculates that the net Project capital value of the WORM taking into account projects would be avoided by the WORM is $39.4 million. This suggests that the WORM Project achieves a payback over the 60 year pipeline life for any one outage event exceeding about 5 days.

Considerable operating cost savings are achievable by fixing regulator station outlet pressure setpoints at Brooklyn, Wollert, Lara and Wandong. As the WORM permits the major Melbourne supply points at Dandenong, Brooklyn and Wollert (and shortly Lilydale) to be operated at a fixed delivery pressure, it would result in additional capacity for metering and regulating facility offtakes, particularly in the areas in close proximity to Brooklyn and Wollert. The additional minimum pressures would result in deferral of upgrades to metering stations and regulator stations nearing capacity. These cost savings would deliver benefits to the distributors who pay for these assets. Heaters capital and operating expenditure on the VTS may also be avoided or deferred, if operating pressures were fixed. For example, heaters are not proposed for the pressure regulator stations (PRS) at Plumpton, Rockbank and proposed Wollert (WORM) facilities.

4. Provision for future growth to the VTS

While the main justification for the WORM is for security of supply, the WORM does provide capacity for the VTS for future growth.

The WORM route will provide an offtake point for a mains extension to Kalkallo for a new Custody Transfer point for the new industrial and housing in the area (refer Attachment 4 reference 6c). The WORM also provides future connection provisions for new custody transfer meter (CTM) stations for Network Operators at Tullamarine and Mickleham.

Currently, the Stonehaven compressor (refer Attachment 4 reference 6b) is designed to increase capacity of the South West Pipeline up to 412 TJ/day. Further compression (Winchelsea and/or Pirron) on the South West Pipeline or looping would further increase the capacity of the Pipeline. The WORM would be able to move the higher volumes of gas from the South West Pipeline, hence unlocking the supply capacity from the west.

In combination with the Stonehaven compressor, the WORM provides the additional capacity to growth such as new Gas Powered Generation. For example, the WORM could support Wollert CCGT (500MW to 1500MW),

Newport CCGT, Truganina OCGT (360MW), LaTrobe Valley (2000MW). The WORM also supports gas exports to Culcairn by removing the constraint of western flow.

EVALUATION OF ALTERNATIVES

The options presented were considered, which include:

(1) WORM not proceeding

No capital expenditure required for the WORM but with the following consequences:

- The current risk to security of supply identified in the R2A report continues to increase with increasing organic growth in the VTS. In the event of Longford outage or Iona outage, the numbers of customers at risk of loss of supply and market financial losses would increase with each year. The level of security of supply at the current status is already considered unacceptable.

- There would be continuing complex operational and linepack management of the VTS impacting on supply and equipment reliability.

- There would be non-optimal capital expenditure (for example in compression at Brooklyn) that is not consistent with APA GasNet's long term strategic plans for both refurbishment and upgrade and augmentation investments in the VTS.

Option: Development of the Brooklyn Compressor Site

If the WORM did not proceed, several projects would be required, which are predominantly the upgrade of the Brooklyn compressor stations 8, 9 and 10 and installation of new Brooklyn compressor Station 13 and 14, refer Attachment 3.

Continued development of the Brooklyn site is not considered a prudent long term investment for the following reasons:

- Unlike the WORM, the capital expenditure put into Brooklyn compression does not provide system wide benefits in terms of security of supply to the VTS. The level of security of supply of the VTS remains as it currently is. The main benefit of the Brooklyn compressors are only to the Western and Melbourne Zones. For purposes of accessing Iona gas to supplement extended shortfalls in the Longford supplies, Brooklyn compression does not provide that capability, unlike the combination of WORM and Stonehaven compression.

- In terms of provision for future growth, more compressors at Brooklyn does not address the emerging trends of gas exports from Longford and Iona into NSW for projects such as LNG and Gas Powered Generation (GPG) in both Victoria and NSW. A better placed compressor at Wollert (CS6) and the WORM would provide that capacity for the longer term.

Considering the already congested Brooklyn site in the heart of urban development, the strategy to divert the capital expenditure for Brooklyn compressors 13 and 14 with the more strategically placed compressors at Stonehaven and Wollert would effectively contribute, coupled with the WORM pipeline, to both security of supply and potential for capacity expansion and therefore is a more prudent solution.

(2) Construction of the Western Outer Ring Main (WORM)

In order to remove the bottleneck around Melbourne, a DN500 interconnection pipeline would be built between the Rockbank to Plumpton Pipeline and Wollert. This will connect to the South West Pipeline/Brooklyn Lara Pipeline to the Longford-Pakenham – Wollert and the Wollert to Culcairn pipeline creating a high pressure ring main around Melbourne.

There were several routes and pipe size options considered in the WORM analysis.

Route Options**:**

Four route options were considered, refer to Attachment 2. The route lengths vary between 47.2 km (Route 1), 47.2 km (Route 2) 38.4 km (Route 3) and 49.311 km (Route 4).

All four route options are within the Melbourne urban growth boundaries. The western part of the preferred route is a combination of existing pipeline easement and proposed new freeway reserve. A Public Acquisition Overlay (PAO) is already in place for the freeway corridor which means that the land within the overlay will not be available for development. The route options for the eastern portion of the proposed pipeline are affected heavily by the uncertainty of future urban development and native vegetation grasslands.

APA GasNet has selected Route 4 (49.311 km) as the preferred route. While Route 4 has the longest distance, it provides the greatest certainty for both the approvals process and for easement acquisition as it follows an existing infrastructure corridor established by the PAO.

APA GasNet has conducted an independent study (refer Attachment 4, Reference 3: Monarc report) to investigate the environmental impact on the four routes (in terms of cost) and has factored in consideration to the urban development in the area. The report assumes that the pipeline could be constructed on all alternatives routes and has calculated the costs of surveys and potential net gain obligations only.

Currently plans are being developed by the Victorian Growth Areas Authority and local Councils. APA GasNet does not know the extent of the relevant planning zones, layout or stage of the developments. APA is aware of several residential developments such as the new suburbs of Merryfields and Lokerbie which are in their planning stages. Developers will likely oppose any move to build a pipeline through areas targeted for development. The cost of securing easements through land that is able to be developed for residential will be very high and time consuming.

The other consideration given to the route selection is native vegetation. There are areas of significant native vegetation along all the route options. If the route affects greater than 10 habitat hectares of native vegetation, an Environment Effects Statement (EES) under the Environment Effects Act 1978 would be triggered. This

would likely add up to 18 months to the schedule for approval. APA GasNet believes that following the PAO alignment would have the lowest overall net impact on the environment and for this reason it is more likely that an EES may not be required on Option 4 than the other three options (i.e. native vegetation in the PAO will more than likely be destroyed with the construction of the freeway). Following the route Option 4 is also consistent with the principals of the Victorian Native Vegetation Guidelines which require proponents, in order of priority, to avoid, minimise and compensate for vegetation loss.

Most areas of native vegetation in the areas north and west of Melbourne are likely to be habitat for the Golden Sun Moth. The environmental studies required by Department of Sustainability & Environment for the Golden Sun Moth are onerous and can only be carried out over a very short part of the year. This could potentially delay project approvals by many months.

The only route option that provides any level of certainty is Route 4, the most northern route which avoids some of the cost, environmental and approval issues of the other southern routes. The Public Acquisition Overlay (PAO) is already in place which means that the land within the overlay will not be available for development, though there would still be cost associated with easement acquisition. Route 4 should give greater certainty to environmental approvals as native vegetation within the PAO is already destined for removal. There may still be some level of native vegetation offsets payable but it would be unlikely to require an EES.

Diameter Options:

The current main purpose of the WORM is to provide security of supply to the VTS. However over time, the WORM will not only provide security of supply but would provide capacity for growth in the VTS. The selection of the DN500 was based on a number of criteria. Being a major infrastructure development, and considering that the pipeline route traversed through a developing urban area, it would be prudent to factor in a pipe size with at least a 20 year planning horizon. An undersized pipe could result in costly pipeline duplication and might not be possible when the area is fully developed.

Modelling of the VTS with various pipeline diameters was conducted with a 2032 growth forecast. APA GasNet also assumed that there would be full looping of the Northern Zone by 2032 with the Eastern Grid Transmission pipeline fully operational with 226 TJ/d exports to NSW and a combination of looping and compression on the South West Pipeline to maximise the potential of Iona supplies. It was found that a 500 mm pipeline is sufficient to meet the projected growth forecast. A 400 mm pipeline was found to be constrained due to unacceptable pressure drops/ velocities for a peak 2032 demand scenario. A larger diameter pipeline, e.g. 600 mm or greater, was also considered feasible.

APA GasNet considers a 500 mm pipeline a reasonable pipe size considering the uncertainly of the future growth and gas availability beyond the 5-10 year horizon. The 500 mm pipe size would provide security of supply and over time, provide capacity for new growth such as exports to NSW and for new Gas Powered Generation.

(3) Construction of a Brooklyn to Dandenong Pipeline

This option entails a 48 km of 500 mm Class 600 MAOP pipeline interconnection between Brooklyn to Dandenong via a crossing through Port Philip Bay. A Brooklyn – Dandenong interconnection would functionally provide some benefits to the Melbourne section of the VTS during a Longford outage.

The disadvantage of this pipeline is that it would be extremely expensive to build as the pipeline route would be through highly built up areas and also a crossing through the bay. Moreover, additional compression at Brooklyn would be required to support periodic supply of Longford gas into the SWP/BLP. The pipeline route would be more difficult and have longer lead times compared to constructing the WORM. In terms of security of supply, this option only benefits the Melbourne section and does not provide any benefits to the Northern zone. This option also does not provide the potential to increase the pipeline capacity for future growth, particularly exports.

Summary

In summary, the WORM project provides the greatest benefit to security of supply and provision for long term growth than all other options. Currently, the WORM pipeline between Plumpton and Wollert is the missing interconnection to the configuration of the VTS, which remove the constraining section around Melbourne and unlocks the available gas from Iona. It has the added benefit of improving the operability of the VTS with better control of linepack and provides potential capacity for long term growth of the VTS.

ESTIMATED COST

Capital Expenditure:

The capital cost for the options are detailed in the Table below in 2012 dollars. Also shown are the cost of the related projects in association with the WORM or project which have to be done if the WORM does not proceed. Attachment 3 details the related projects.

Budget for Project **$million (2012)**	**Option 1 WORM Not Proceeding**	**Option 2 WORM (Stage 2 &3)**			**Option 3 Brooklyn – Dandenong Loop**
		Pipeline (49.3km x 500 mm)	Compressor Centaur 50 at Wollert	Facilities Dual Regulators + Check Valve at Wollert	48 km x 500 mm including Phillip Bay crossing
Preliminaries Establishment Project Management Approvals, Land	-	[redacted]	[redacted]	[redacted]	[redacted]
Procurement Materials	-	[redacted]	[redacted]	[redacted]	[redacted]
Construction	-	[redacted]	[redacted]	[redacted]	[redacted]
Total	**0.0**	**71.58**	**20.68**	**4.27**	**183.30**
		96.53			**183.30**
Other Related Projects (refer Attachment 3: Period 2013-2017 i.e. excl. 2012)	64.57	2.67			64.57
Total (including related projects)	64.57	99.2			247.9

Operating Costs:

Annual expenditure to operate and maintain the WORM and associated engineering facilities have been estimated to be in order of $456,500 per annum. This incremental operating expenditure has been included in forecast operating expenditure as a scope change. The WORM avoids operating expenditure at Brooklyn CS in the form of compressors which may be retired and not replaced, and reduces the compression operating hours and fuel costs. Net operating expenditure is estimated to be reduced in the following AA5 period despite additional pipeline length.

RISK ASSESSMENT

Route and Construction

There are a number of routes considered to complete the WORM project. The route presented in this business case represented the most likely route for the WORM. The proposed route is nearly 12 km longer than the shortest route option considered. However, this route is likely to be the most cost effective and accessible route, taking into account urban encroachment and environmental issues.

In terms of construction, the proposed project is of routine nature to APA GasNet. The risk is mainly related to factors that are outside APA GasNet control, particularly in built-up environment where placement of pipeline underground may be constrained by other utilities, and controlling parties.

Technical. All construction work would be completed by technically proven contractors, to the APA GasNet's engineering design and specifications. All construction process will be overseen by experienced APA personnel.

Operation. The WORM and associated facilities will be operated in accordance with APA/AEMO's standard management practices for assets of this type. APA/AEMO has a suitably qualified and experienced workforce in Victoria to perform this type operation. Regulators will not require operator intervention; compression will require stop/start operator action.

Regulatory. The WORM decreases the impact of loss of supply in the event of an extended outage from Longford. Without the WORM, the level of security of supply of the VTS is considered unacceptable. The WORM should be regarded as complying with Rule 79 (2c)ii, that is, maintaining the integrity of services in the VTS in terms of providing security of supply.

PLAN FOR EFFECTIVE EXECUTION

The requirement for conforming capital expenditure specified in Rule 79(1) is that the capital expenditure must be such as would be incurred by a prudent service provider acting efficiently, in accordance with accepted good industry practice, to achieve the lowest sustainable cost of providing services.

APA GasNet has systems and procedures guiding the development the capital projects from Concept through to the Delivery phase. For most capital projects over $1 million, design and procurement will be carried in-house and the delivery/construction phase will be tendered. If there is a constraint in resources, then the design and procurement could also be tendered out under an Engineering Procurement Contract Process. APA GasNet has preferred third party partners who are drawn upon to supplement any shortfall in engineering resources.

JUSTIFICATION

The requirements for justification of conforming capital expenditure specified in Rule 79(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".

This capital expenditure for the WORM project is justified under Rule 79(2c)(ii), that is, the capital expenditure is necessary to maintain integrity of services. Hence the capital expenditure is justified under Rule 79(2c)ii as conforming capital expenditure.

RECOMMENDATION

It is recommended that APA GasNet construct the 49.3 km DN500 WORM project to provide to reduce the impact of loss of supply to the DTS during an extended Longford outage by winter 2014.

ATTACHMENT 1: VTS Corridors of Supply

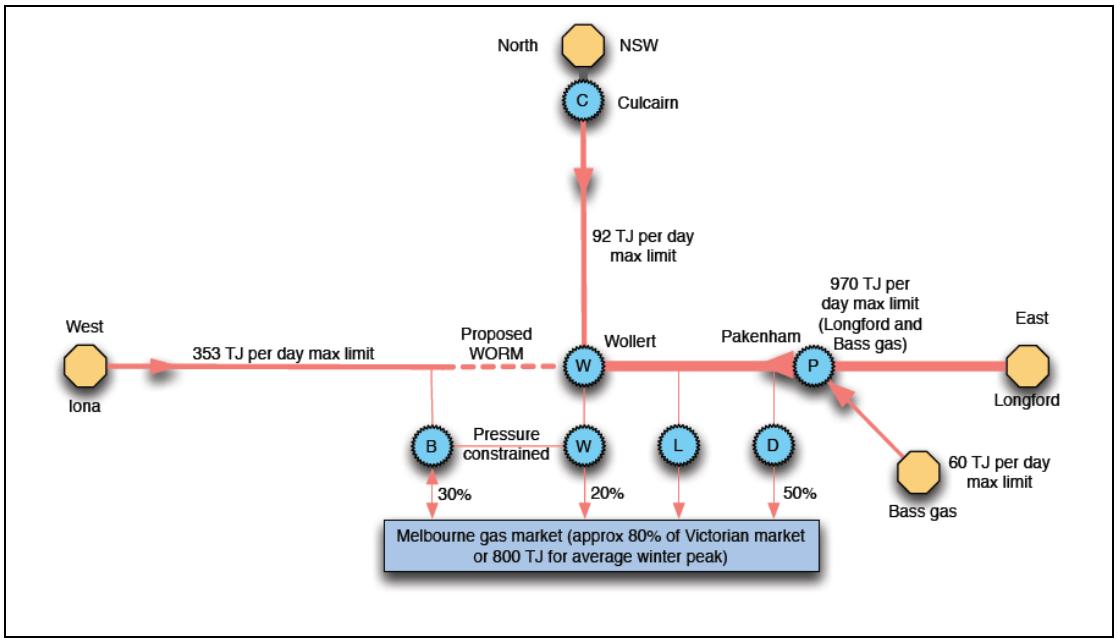


Diagram extracted from R2A report

ATTACHMENT 2: WORM ROUTE(S)

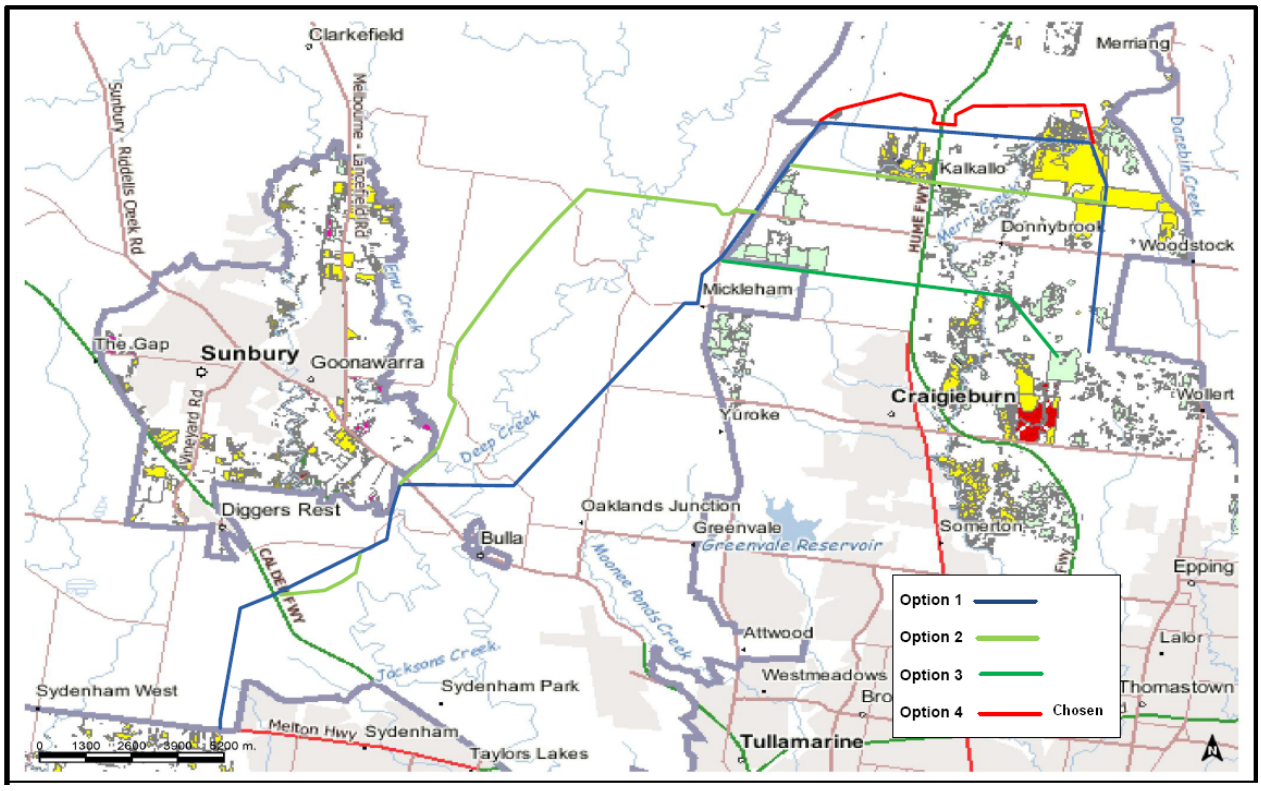


Diagram extracted from Monarc environmental Study.

ATTACHMENT 3

Projects with and Without the WORM (5 year forecast)	Year / Capital Expenditure $m						Total $m
Projects	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	
WORM Project							
Pipeline		[redacted]	[redacted]				71.58
Wollert 6 Compressor		[redacted]	[redacted]				20.68
Wollert Pressure Regulator		[redacted]	[redacted]				4.27
Projects Required with the WORM							
WORM Stage 1	13.5						13.5
Rockbank PRS (in lieu of BCS11 relocation deferred from AA3) (BC087)			2.117				2.117
BCS GEA Upgrade (BC045)				0.55			0.55
Total Capex with the WORM	**13.5**	**12.14**	**86.50**	**0.55**	**0**	**0.0**	**112.697**
OPEX with the WORM				0.5	0.5	0.5	1.5
WORM Not Proceeding							
Projects Required Without WORM							
Sunbury Loop	8.75						8.75
Brooklyn CS Station Isolation and Loading Valves			0.910				0.910
Brooklyn CS GEA Upgrade (larger requirement)			0.440	0.440			0.880
Wollert CS A Unit instrumentation				0.250	0.250		0.500
Brooklyn CS 11 & 13 & 14			55.0				55.00
Iona CS - Capacity Aftercooler upgrade			0.706				0.706
Brooklyn CS Ballarat Filter			0.400				0.400
Kalkallo Lateral (incremental length) (BC173)			6.17				6.17
Total Capex without the WORM proceeding	**8.75**	**0.0**	**63.63**	**0.69**	**0.25**		**73.316**
OPEX without the WORM			1.0	1.0	1.0	1.0	4.0
Net Project Cost (WORM – No WORM)							**39.381**

Attachment 4: References

1. “Compressor Strategy”, March 2012. APA GasNet

2. “Effectiveness of the Western Outer Ring Main (WORM) Project on Security of Supply of the Victorian Transmission System (VTS)”, March 2012, R2A Due Diligence Engineers, consultancy report.

3. “Western Outer Ring Main – High Level Pricing Estimate”, February 2012, Monarc Environment consultancy report.

4. “VENCorp Vision 2030 Update” VENCorp 2009, Section 4.4.3., Figures 66 and 67.

5. “The Value of Customer Reliability for Gas” McLennan Magasanik Associates, Sept 2005.

6. APA Business Cases:

    a. “ Rockbank PRS” (Business Case 087)

    b. “ Gas to Culcairn” (Business Case 175)

    c. “ Kalkallo Lateral” (Business Case 173)