23. Hazards and risks

This chapter provides an assessment of the potential risks of undertaking the project, including a summary of the preliminary pipeline hazard assessment undertaken in accordance with AS2885 for construction undertaken in the vicinity of gas pipelines.

The matters associated with project hazards and risk is best addressed at two stages during the life of the project: construction and operation. The information below provides an assessment into and highlights the matters to be considered in an integrated management approach through the life-span of the project.

23.1 Pipeline risk assessment methodology

Due to the potential for the natural gas / ethane pipelines to be impacted by either the construction, operation or maintenance of the proposed new water pipeline, an AS 2885 risk assessment was commissioned to ensure that all risks to these pipelines had been reduced to As Low As Reasonably Practicable (ALARP).

A risk assessment workshop was held based on the requirements of *AS 2885 Pipelines – gas and liquid petroleum* to examine the impact of the HSP on the existing Moomba to Sydney Gorodok ethane pipeline and the APA natural gas pipeline in the adjacent easement. This included the potential impact of the construction, operation and maintenance of the water pipeline.

The objectives for the workshop were:

- Identify threats to the existing hydrocarbon pipelines;
- Investigate the adequacy of the controls in reducing risks to ALARP; and
- Assess the currently designed safeguards and make recommendations on any additional control measure required.

The impacts on other infrastructure including but not limited to electricity, roads and railways have been identified through consultation with services and utility providers.

23.2 Potential hazards and risk

Construction and operation of the project could generate potential risks to the human environment, specifically:

- Hazard and risks associated with public health and safety during construction and operation;
- Hazards and risks associated with impacts to critical infrastructure and services; and
- Hazard and risks associated with the transfer of water between catchments.

These potential hazards and risks have been identified through a number of environmental, social, economic and technical assessments and are also discussed throughout this report. The following does not re-address all these issues, but rather provides a summary of the key considerations.

23.3 Impact assessment and mitigation measures

23.3.1 Hazard and risk during construction

General construction activities

General construction activities such as the operation of machinery, excavating and trenching, blasting, working in and adjacent to road areas, working near or under major services (overhead electrical cables) and underground services and utilities can be a hazard and a risk to the safety of construction workers, local residents, members of the public, livestock and crops, as well as to the environment. Potential hazards associated with working in the vicinity of gas pipelines are discussed further below.

Construction of the project would be undertaken consistent with an integrated Health, Safety and Environmental Management System that conforms to AS/NZS 4801:2001 Occupational Health and Safety (OH&S) Management Systems and AS/NZS ISO 14001:2004 Environmental Management Systems and accounts for findings of the Construction Hazard Assessment Implication Review (CHAIR) and Hazard and Operability (HAZOP) assessments undertaken. Management plans would be developed as follows:

- An OH&S management plan: this would include appropriate safety measures in accordance with applicable standards and regulations such as fencing and warning signs erected around the active works area to clearly delineate the boundary of the construction site and prevent public access, thereby reducing the threat from vandalism and personal injury;
- A CEMP: a program environmental manager would oversee the implementation of the environmental management system, including the provision of suitable training to field staff and routine inspections and audits. A system of field monitoring would also be undertaken as part of the environmental management plan. Environmentally sensitive areas, such as the Wollondilly River and other creek crossings would be protected with extra training provided to construction crews and additional sedimentation controls and protection measures (such as silt curtains around work areas); and
- The CEMP would be supported by a number of sub-plans (as discussed in Chapter 27), to minimise any hazards and risks due to construction of the project.

Construction works within the vicinity of gas pipelines

Construction within close proximity to the natural gas pipeline and ethane pipeline has been assessed in accordance with AS 2885-1-2007: *Pipelines - Gas and liquid petroleum - Design and construction* to assess the potential risks associated with the proposed work. A workshop was undertaken with the relevant infrastructure owners to assess the risks associated with the Project. Twelve potential hazards and associated risks were identified for the Project

The hazard with the highest assessed risk, even after implementation of recommendations, is rupture of one of the gas pipelines as a result of misdirected horizontal directional drilling at creek crossings and highways. Adverse interaction between adjacent cathodic protection systems was not risk ranked due to the inability to determine the consequence at this stage of the design, hence a recommendation for further investigation into the issue.

Table 23.1 Potential hazards and risks associated with construction near the gas pipelines

Hazard/Threats	Recommendations for management	Risk after implementation of recommendations
Blasting (not currently planned but may be necessary).	In the event that blasting is required, approval of the blasting criteria must be obtained by APA and Gorodok	Negligible
Use of temporary coffer dam in the vicinity of gas pipelines	Locate any coffer dams required clear of gas easement	Low
HDD going off track at creek crossing and highways and rupturing gas pipeline	Use tracking of the drilling head when drilling under the Hume highway to reduce the risk off going off track and impacting the gas line. Increase the offset from the gas pipelines at locations where HDD is used	Intermediate
Access to the water pipeline traversing the gas pipeline	Use administrative controls to ensure personnel stay to the water pipeline easement	Low
Installation of star pickets for fencing of construction areas	APA / Gorodok personnel to attend sites to approve any encroachment on to their easement	Negligible
Bogged vehicles during water pipeline maintenance (area above gas pipelines is prone to this)	None recorded	Negligible
CP/Anode beds running laterally off the gas pipelines for up to 400m	Ensure information on CP/Anode bed offtake is transferred to detailed design. Cross check with above ground markings during excavation to avoid digging up earth lines.	Low
Operation of parallel CP system if a steel pipeline is used	Conduct investigation into potential interaction between existing CP system and new DICL pipeline	No ranking of consequence due to unknown impact. Pending investigation.
Stress corrosion cracking - known problem in one of the existing gas pipelines	Project team to supply a gas detector for daily use prior to construction of each section in case of fugitive emissions. Include confirmation of gas free environment (including trench) as part of the daily pre-start meeting. Leak detection survey to be carried out by APA/ Qenos. Gas sniffers used to be suitable for both Methane and Ethane detection.	Negligible
Operation of scour valves	None recorded	Negligible
Construction of scour lines across gas easement	None recorded	Negligible
Failure of the water pipeline	None recorded	Low

Health and environmental protection during construction

Potential negative health impacts that may occur as a result of construction activities include the effects of noise and air quality (dust and gaseous emissions) pollution, as well as contamination and degradation of waterways. Such impacts are largely generic to infrastructure development projects and

a broad range of Government standards and controls exist in order to ensure that appropriate health outcomes are achieved, as discussed below:

- Noise and vibration:
  - The assessment of noise and vibration impacts was undertaken in accordance with relevant standards and guidelines (Chapter 18); and
  - The potential exists for construction activities to exceed the noise and vibration goals for the project in some circumstances. Construction activities would move from one area to another as the construction of the pipeline progresses. Consequently, construction noise at sensitive receivers would occur on a temporary basis. Ongoing consultation with affected landholders during the construction phase of the project would help to mitigate against any potential noise impacts. The impact of the construction activities would be minimised through the implementation of construction management plans.
- Air quality:

Potential sources of discharges to air associated with construction of the project include:

  - Dust and particulate emissions associated with earthworks, operation of construction equipment, initiation of explosives, material handling (including stockpiling, loading and haulage) and vehicle movements over unsealed areas / roads; and
  - Products of fuel combustion emitted as a result of construction vehicle movements, including site personnel commuting, delivery of construction materials and removal (haulage) of spoil and other waste materials.

The potential for off-site impacts is considered to be very low, as any potential emissions would be minimised through the management practices described in Chapter 19; Air quality

- Water quality and soils:

Erosion and sedimentation has the potential to impact water quality in downslope waterways through increased turbidity, siltation and degradation of aquatic habitats. These impacts would be managed through rigorous implementation, monitoring and auditing of the soils management sub-plan and measures listed in Chapters 9, 13, 14 and 15. The construction phase is not considered to present significant risks to drinking water quality due to the restrictions in placed to protect local water quality objectives.

Personnel trained and experienced in erosion and sediment control would undertake regular inspections and maintenance of the project site.

23.3.2 Hazard and risk during operation

Operation impacts on public health and safety

The design of the pump station and pipeline has been undertaken to minimise the potential for hazard and risk to public health and safety. Operation of the pump station and the pipeline itself are not considered to significantly impact on public health and safety provided all standard management practices are adhered to.

The Project infrastructure itself is at risk of vandalism, but would be afforded standard protection measures.

Operation impacts on drinking water quality

The proponent has responsibility for providing safe drinking water to the residents of Goulburn and the surrounding region. The operational phase of the Project would impact and introduce some new risks to the quality of Goulburn's drinking water supply. These new risks would not be beyond what could reasonably be expected from a surface water supply system in other parts of Australia, and would be manageable.

Potential drinking water quality impacts are discussed in detail in Chapter 9.

Operation impacts on surface water quality

The preferred approach to the management of scour water would be to utilise the water on the properties where scour valves would be located. Typically this would involve pumping (via collapsible fabric pipes) the scour water to a nearby existing farm dam. Where no suitably located farm dam exists, a small dam could be constructed with the approval of the landholder. This is normally viewed as advantageous by landholders, because of a universal need for water. No scour water would be directly released to watercourses.

The approach to managing the scour water would vary slightly depending on whether the treated water transfer scheme or the raw water transfer scheme is constructed. The potential impact of scour water on surface water quality is discussed in Chapter 14.

Emergency and incident response plans for water and sewerage networks

In the event of an emergency failure, water from the pipeline would be lost to the environment. Considering that it is being used for a potable water supply system even be it after treatment, it is unlikely to be highly harmful to the environment as in the case of an oil pipeline or similar. There is, in any case little that can be done to avoid such an incident.

If additional water has to be drained out to affect the repairs, then local arrangements as outlined in the above routine maintenance operations can be made. In the event that chlorine residuals are too high, then arrangements could be made to treat the water that has been put into a local farm dam.

The project in itself assists the Goulburn water supply to be more secure in the event of uncontrolled emissions or catastrophic failure because it gives GMC the ability to switch water supply from the Pejar / Sooley Dam supply to the Wingecaribee Reservoir supply while maintaining normal supply. Although not its primary intended purpose, the Project would give added assurance that if one catchment is under threat, the other can supply.

Following is a summary of generic response procedures for three specific key incidents, which have the potential for uncontrolled emissions on human health or eco systems and are likely to constitute an emergency under the Emergency Planning Code.

Natural disasters

The first priority would be to determine the extent of any damage to assets as quickly as possible so the emergency can be assessed and a plan of action developed. This plan of action would be coordinated with the relevant agencies. To cope with potential incidents it may be necessary for GMC to declare an emergency in order to provide the correct command and control structure to respond to the emergency directly and under instruction by an external Emergency Controller.

Water supply contamination

Water supply contamination can be through natural causes such as the after effects of fire or heavy rain that can affect water quality in the catchments or in local reservoirs; it may also be because of a deliberate act. The community and industry may be affected by loss of local supply or of fully treated water and resultant possible water restrictions, and health related issues.

Containing the contamination would be the key first response so that the number of people affected is minimised and the supply that can be maintained is free of contamination. This could require shutting off or limiting the water supply to customers.

Terrorism or vandalism to assets

Terrorism or vandalism may include bombing, water contamination, wilful destruction of equipment and pipelines or structures, and siege or hostage situations. Impacts on the community may include loss of water supply, water contamination, and localised flooding. Terrorism alerts are issued and revised on a regular basis and would be a guide to the possible response where there is a deliberate act. The overall objective would be to return normal supply expeditiously.

23.4 Summary of results

Hazards and risks during construction of the project would be undertaken consistent with an integrated Health, Safety and Environmental Management System that conforms to AS/NZS 4801:2001 OH&S Management Systems and AS/NZS ISO 14001:2004 Environmental Management Systems.

Noise and vibration impacts during construction may exceed the noise and vibration goals for the project in some circumstances, but instances would be infrequent, short-lived and temporary in nature and managed through the requirements of the noise and vibration sub-plan (refer to Chapter 18 for more information.).

The potential for off-site air pollution impacts associated with construction activities is considered to be low.

Erosion and sedimentation impacts would be managed through rigorous implementation, monitoring and auditing of the soils management sub-plan (refer to Chapter 14 for more information.).

Operation of the pump station, the pipeline itself and the outlet works are not considered to significantly impact on public health and safety.

Twelve hazards associated with constructing the proposed pipeline within the vicinity of the gas pipeline easement were identified in the preliminary pipeline hazard assessment. After the implementation of recommendations to manage the potential impacts, only one hazard continues to present an intermediate risk to the operation of the gas pipelines: HDD going off track at creek crossing and highways and potentially rupturing the gas pipeline/s. The recommended management action involves tracking the drilling head when drilling is undertake under streams, roads and railways to reduce the risk of the cutter head going off track and impacting the gas pipeline. The offset distance between the pipeline construction and the gas pipeline easement would also be increased proportional to the drilling distance required, *i.e.* 50 m of HDD required, therefore 50 m offset distance required.

The operational phase of the Project would introduce some new risks to the quality of Goulburn's drinking water supply. These new risks would not be beyond what could reasonably be expected from a

surface water supply system in other parts of Australia, and would be manageable. The Wingecarribee Reservoir is already a well utilised drinking water source reservoir.

Release of scour water to farm dams during operation would not pose a significant risk to the surface water quality and therefore livestock and vegetation health in the environments to which the water is released; however risks associated with the presence of additional chlorine in treated water and the potential for blue-green algae to be present in the raw water would be monitored and scheduling practices put in place to limit the potential impact to farm dam supplies through the release of scour water.

23.5 Mitigation measures

Ensuring the management of risk in an integrated fashion is important and the proponent is committed to achieving this by the development of integrated management risk management plans for the distinct stages of construction/commissioning and operation of the project. These integrated risk management plans would draw on the matters/principles assessed in this chapter and would manifest as a specific risk management sub-plan in the CEMP, and a separate risk management sub-plan for operation of the project. These management plans would be aligned to ISO 31000 (the international risk management standard) and AS/NZS 4360:2004 Risk Management and would provide a systematic pro-active approach of ongoing risk identification, assessment and risk ranking that would identify, analyse, assess, document, accept or mitigate and manage the risks for the different phases of the project. The proponent would be responsible for implementation of the risk management plan during operation of the project.

The plans would be integrated with other plans being prepared for the project (during construction), as described in this chapter (for example the CEMP, OH&S management plan, drinking water HACCP plan) as well as with other management plans already in use.

The integrated risk management plan for construction and commissioning of the project would be presented to the relevant agencies for consideration along with the construction environmental management plan prior to construction commencing. The operational integrated risk management plan would be finalised and presented for approval to the relevant Government Agencies prior to the operation of the project.

Specific mitigation measures relating to the construction of the pipeline within proximity to the gas pipeline easement are as follows:

- In the event that blasting is required, approval of the blasting criteria must be obtained by APA and Gorodok;
- Increase the offset from the gas pipelines at locations where HDD is used;
- Ensure information on Cathodic Protection / Anode bed offtakes are transferred to detailed design; and

Employ the daily use of a gas detector prior to and during construction to detect potential fugitive emissions arising from the gas pipeline.