# 25 Hazards – Stage 1

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This chapter provides an assessment of the potential hazards that could arise from Stage 1. It also includes mitigation measures to address these potential hazards.

## 25.1 Secretary's Environmental Assessment Requirements

The Secretary's Environmental Assessment Requirements relating to hazards, and where these requirements are addressed in this Environmental Impact Statement, are outlined in Table 25-1.

**Table 25-1: Secretary's Environmental Assessment Requirements – Hazards Stage 1**

| Reference | Requirement | Where addressed |
|---|---|---|
| **13. Other Issues** | | |
| **13.1** | Air quality, greenhouse gas and energy, climate change adaptation, waste management and resource use, hazard and risk assessments should be undertaken in accordance with the commitments in Section 9 of the Scoping Report. | Chapter 23<br>Chapter 24<br>This chapter<br>Chapter 26<br>Refer to Table 2 of Appendix A for Scoping Report requirements |

## 25.2 Legislative and policy context

The following guidelines inform or respond to the regulatory framework and have been applied to the assessment of Stage 1:

- Hazardous and Offensive Development Application Guidelines: Applying SEPP 33 (Department of Planning, 2011a)
- International Standard (ISO/IEC 31010: 2009) Risk Management – Risk Assessment Techniques
- *Work Health and Safety Act 2011 (NSW)* and Work Health and Safety Regulation 2017 (NSW)
- Australian Code for the Transport of Dangerous Goods by Road and Rail (edition 7.6) (National Transport Commission, 2018)
- Code of Practice: How to manage and control asbestos in the workplace (Safework Australia, 2019)
- Code of Practice: How to Safely Remove Asbestos (Safework NSW, 2016)
- Storage and Handling of Dangerous Goods Code of Practice (WorkCover, 2005) (noting this Code is a guide for processes and controls to manage risks and is not to be relied upon to ascertain requirements under the Work Health and Safety Regulation 2017)
- Hazardous Industry Planning Advisory Paper No. 6 – Guidelines for Hazard Analysis (Department of Planning, 2011b)
- Australian Standard AS2885 Pipelines – Gas and liquid petroleum
- Multi-Level Risk Assessment (Department of Planning and Infrastructure, 2011)
- Bushfire prone land mapping developed and published by the relevant local councils.

### 25.2.1 Dangerous goods and hazardous materials

Dangerous goods are substances or objects that pose acute risks to people, property and the environment due to their chemical or physical characteristics, while hazardous substances are chemicals or materials that can pose a significant risk to health and safety if not managed correctly.

Dangerous goods are classified according to their physical or chemical effects, such as fire, explosion, corrosion and poisoning, affecting property, the environment, or people. Dangerous goods are substances that, because of their physical, chemical (physico-chemical) or acute toxicity properties, present a risk to people, property, or the environment. Types of substances classified as dangerous goods include explosives, flammable liquids and gases, corrosives, and chemically reactive or acutely (highly) toxic substances. Dangerous goods are defined by the Australian Dangerous Goods Code. Many dangerous goods are also classed as hazardous substances.

Hazardous materials are those that meet the classification criteria specified by the Work Health and Safety Regulation 2017 and the Globally Harmonised System of Classification and Labelling of Chemicals (an internationally agreed system of chemical classification). The thresholds in 'Applying SEPP 33' represent the maximum quantities of hazardous materials that can be stored or transported without causing a significant off-site risk. Although SEPP 33 is not applicable to State significant infrastructure projects, the guidelines have been applied to inventories of dangerous goods likely to be stored at construction sites to assess the potential risk of Stage 1 to the environment and to public safety.

## 25.3 Assessment approach

A desktop assessment was carried out to identify environmental hazards that could arise during Stage 1. The assessment focused on hazards with the potential to adversely affect the quality of the surrounding environment, land uses and communities and included:

- Consideration of the relevant regulatory framework and guidelines
- Identification of the types of activities included in Stage 1 that may generate potential hazards
- Identification of the potential environmental impacts associated with the potential hazards
- Identification of mitigation measures to address potential hazards.

Other work, health and safety hazards are not specifically considered in this Environmental Impact Statement. These issues would be addressed by the relevant construction contractor in accordance with relevant guidelines and legislative requirements.

## 25.4 Avoidance and minimisation of impacts

The design development process for Stage 1 aimed to avoid or minimise potential hazards. This included selecting construction sites at Clyde and Silverwater which avoid potential interaction with major hazard facilities including Viva Energy's Clyde Terminal and associated high pressure fuel pipelines in the locality.

## 25.5 Potential impacts

### 25.5.1 Potential hazards

Potential hazards during Stage 1 would be temporary and associated with:

- The on-site storage, use and transport of dangerous goods and hazardous substances
- The on-site handling and transport of contaminated soil and hazardous wastes
- Potential impacts to utilities
- Potential interaction with major hazard facilities
- Potential risk of damage to existing building basements and ground support structures due to potential ground movement
- Potential bushfire risks.

These hazards are described further in the following sections.

### 25.5.2 On-site storage, use, handling and transport of dangerous goods and hazardous substances

Construction sites would be planned so that hazardous materials are stored appropriately and at a suitable distance from sensitive receivers, in accordance with the thresholds established under Applying SEPP 33 guidelines. If minimum buffers cannot be maintained, either due to space constraints, the close proximity of sensitive receivers, or a requirement to store volumes of hazardous materials in excess of storage thresholds, a risk management strategy would be developed on a case-by-case basis.

Environmental hazards associated with the on-site storage, use and transport of chemicals, fuels and materials would be managed through standard mitigation measures to be developed as part of the construction environmental management documentation. These measures would include the storage and management of all dangerous goods and hazardous substances in accordance with the *Work Health and Safety Act 2011*, the Work Health and Safety Regulation 2017, the Storage and Handling of Dangerous Goods Code of Practice (WorkCover NSW, 2005) and Applying SEPP 33 (Department of Planning, 2011a).

An indicative list of the types of dangerous goods and potentially hazardous materials anticipated to be used, stored and transported during construction of Stage 1 is provided in Table 25-2, along with the relevant storage and transport thresholds established under the Hazardous and Offensive Development Application Guidelines: Applying SEPP 33 (Department of Planning, 2011a).

Typically, low volumes of potentially hazardous materials would be stored on site, except for the tunnel support sites at Westmead and The Bays, where larger volumes of materials would be required to support tunnel construction. The volume required to be stored on site would largely depend on the anticipated rates of consumption, with deliveries of dangerous goods coordinated to match consumption rates. This could be about one delivery per day if needed to minimise volumes stored on-site to reduce the potential for SEPP 33 storage thresholds being exceeded.

**Table 25-2: Indicative list of hazardous materials potentially required during construction and applicable storage/transport thresholds**

| Material | Australian Dangerous Good Code Class | Storage locations | Storage method | Applying SEPP 33 thresholds | | |
|---|---|---|---|---|---|---|
| | | | | Storage volume | Minimum storage distance from sensitive receivers | Transport (weekly) |
| **Diesel** | C1[1]; 3 PG III[2] | All sites | 5,000 litre drums | Greater than 5 tonnes, if stored with other Class 3 flammable liquids | 5 metres | Not applicable if not transported with Class 3 dangerous goods |
| **Petrol** | C1[1]; 3 PG III[2] | All sites | 500 litre drums | Greater than 5 tonnes, if stored with other Class 3 flammable liquids | 5 metres | Not applicable if not transported with Class 3 dangerous goods |
| **Lubricating and hydraulic oils and greases** | C2 | All sites | 45 gallon drums | N/A | N/A | Not applicable, if not transported with Class 3 dangerous goods |
| **Explosives** | 1.1 | No on-site storage | Delivery of explosives would be timed to avoid the need for on-site storage | N/A | N/A | Subject to consultation with the Department of Planning, Industry and Environment |
| **Industrial grade oxygen** | 2.2 | All sites | Cylinders (up to 55 kilograms) in rack | N/A | N/A | Not subject to Applying SEPP 33 transport thresholds |
| **Acetylene** | 2.1 | All sites | Cylinders (up to 55 kilograms) in rack | Greater than 0.1 tonnes (100kg) | 15 metres | 2 tonnes; 30 times per week |
| **Cement** | N/A | All sites | Bags/pallets (in container) | N/A | N/A | Not subject to Applying SEPP 33 transport thresholds |
| **Premix concrete** | N/A | All sites | Bags/pallets (in container) | N/A | N/A | Not subject to Applying SEPP 33 transport thresholds |
| **Concrete curing compounds** | N/A | All sites | 20 litre drums | N/A | N/A | Not subject to Applying SEPP 33 transport thresholds |
| **Concrete retardant** | 3 PG III | All sites | 205 litre drums | Greater than 5 tonnes | 5 metres | 10 tonnes; 60 times per week |
| **Shotcrete accelerator** | 3 PG II | All sites | 1,000 litre intermediate bulk containers | Greater than 5 tonnes | 5 metres | 3 tonnes; 45 times per week |
| **Epoxy glue** | 3 PG III | All sites | Small containers | Greater than 5 tonnes | 5 metres | 10 tonnes; 60 times per week |
| **Coagulants** | N/A | All sites | 1,000 litre intermediate bulk containers | N/A | N/A | Not subject to Applying SEPP 33 transport thresholds |
| **Acids** | 8 PG II | All sites | 1,000 litre intermediate bulk containers | Greater than 25 tonnes | N/A | 2 tonnes; 30 times per week |
| **Bases** | 8 PG II | All sites | 1,000 litre intermediate bulk containers | Greater than 25 tonnes | N/A | 2 tonnes; 30 times per week |
| **Disinfectant** | 8 PG III | All sites | 500 litre intermediate bulk containers | Greater than 50 tonnes | N/A | 2 tonnes; 30 times per week |
| **Anti-scalent** | N/A | All sites | 100 litre drums | N/A | N/A | Not subject to Applying SEPP 33 transport thresholds |
| **Membrane preservative** | 8 PG III | All sites | 10 litre drums | Greater than 50 tonnes | N/A | 2 tonnes; 30 times per week |
| **De-bonding agents** | N/A | All sites | Drums/containers | N/A | N/A | Not applicable |
| **Paint** | N/A | All sites | 20 litre drums | N/A | N/A | Not subject to Applying SEPP 33 transport thresholds |

*Note 1: Classified as C1 if not stored with other Class 3 flammable liquids.*
*Note 2: Classified as 3PGIII if stored with other Class 3 flammable liquids.*

Dangerous goods would be transported to and from construction sites using the routes identified in Chapter 10 (Transport and traffic – Stage 1). Transport of dangerous goods would be in accordance with the *Dangerous Goods (Road and Rail Transport) Act 2008* and Dangerous Goods (Road and Rail Transport) Regulation 2014, and extended routes would avoid areas (such as road tunnels) prohibited by NSW Road Rule 300-2 (carriage of dangerous goods in prohibited areas).

### 25.5.3 On-site handling and transport of contaminated soil and hazardous wastes

In addition to the materials listed in Table 25-2, Stage 1 may require the handling and transport of contaminated soil, hazardous waste and asbestos waste. The handling and transport of contaminated soils, hazardous waste and asbestos waste would be adequately managed by the measures identified in the following chapters:

- Chapter 18 (Groundwater and ground movement – Stage 1)
- Chapter 19 (Soils and surface water quality – Stage 1)
- Chapter 20 (Contamination – Stage 1)
- Chapter 24 (Spoil, waste management and resource use – Stage 1).

### 25.5.4 Impacts to utilities

The potential risk associated with utility related hazards would be minimised by carrying out utility checks (such as dial before you dig searches and non-destructive digging) and consulting with the relevant utility providers. Construction methodologies for construction works near high pressure gas or petroleum pipelines would be developed to comply with relevant standards in consultation with utility providers to minimise environmental hazards.

A program of ongoing consultation has been established and implemented to further assess requirements for utilities as outlined in Chapter 9 (Stage 1 description).

Damage, rupture and/or failure to shut down, isolate or otherwise appropriately manage underground utilities during construction activities has the potential to result in the following environmental hazards:

- Release of untreated sewage and/or gas from a sewer main
- Release of natural gas from a gas main
- Release of large electrical currents through the ground surface from an underground electricity cable (known as earth potential rise)
- Release of high pressure petroleum or gas products from petroleum, gas or oil pipelines.

Key utilities which would present a potential hazard or risk where located close to construction sites include:

- High voltage power lines (both aboveground and underground) located throughout the Stage 1 footprint
- High pressure gas mains, including secondary mains near the Clyde stabling and maintenance facility construction site
- Gas distribution lines near all construction sites.

The following high pressure petroleum pipelines are near Stage 1 but would not be affected as there is either a sufficient horizontal offset distance from the tunnels and construction sites, or the tunnels pass beneath these pipelines at depth:

- Hunter Gas Pipeline near the Clyde stabling and maintenance facility construction site
- Viva Energy Gore Bay – Clyde pipeline near the Clyde stabling and maintenance facility construction site
- Clyde – Sydney Airport pipeline near the Clyde stabling and maintenance facility construction site
- Kurnell – Banksmeadow pipeline near the Clyde stabling and maintenance facility, Sydney Olympic Park metro station, and North Strathfield metro station construction sites.

### 25.5.5 Interaction with major hazard facilities

The construction of Stage 1 would not interact with any major hazard facilities.

The closest major hazard facility is Viva Energy's Clyde Terminal (classified and regulated as a major hazard facility under the *NSW Work Health and Safety Act 2011* and NSW Work Health and Safety Regulation 2017) which is located about 350 metres to the south-west of the Clyde stabling and maintenance facility construction site.

### 25.5.6 Ground movement risks

An assessment of potential ground movement associated with Stage 1 and identification of management and mitigation measures is provided in Chapter 18 (Groundwater and ground movement – Stage 1). In summary, Stage 1 is considered to have a negligible ground movement risk, with superficial damage to buildings unlikely to occur. Small areas around station sites and the dive structure within the Clyde stabling and maintenance facility may require future assessment. The use of survey data would inform the understanding of potential risks associated with basements and ground support structures and inform the future design process.

The uncertainty about ground conditions may also present potential risks for the construction process. For example, if rock is found to be harder or softer than assumed during the design process, this could lead to a reassessment of tunnelling design. This uncertainty would be addressed through further geotechnical investigation to improve understanding of ground conditions and through the development of an appropriate construction methodology.

Chapter 11 (Noise and vibration – Stage 1) considers potential temporary impacts from vibration and includes measures to address these potential impacts. Detailed assessment of the buildings predicted to be above the cosmetic damage screening criteria would be carried out prior to construction. Attended vibration monitoring would be carried out during construction to ensure vibration levels remain below appropriate limits for the structure.

### 25.5.7 Bushfire risks

Stage 1 would be in a highly developed urban environment that generally lacks substantial areas of bushland. A review of bushfire prone land mapping developed and published by relevant local councils indicated that none of the proposed construction sites would be located on or near bushfire prone land. Therefore, bushfire risks would be negligible.

### 25.5.8 Cumulative impacts

No cumulative impacts in relation to hazards are likely during Stage 1. All potential hazards during construction would be managed to acceptable levels through the implementation of the mitigation measures in Section 25.6.

## 25.6 Management and mitigation measures

### 25.6.1 Approach to management and mitigation

Hazards would be managed in accordance with Sydney Metro's Construction Environmental Management Framework which is described in Chapter 27 (Synthesis of the Environmental Impact Statement).

The Construction Environmental Management Framework includes requirements for the development and implementation of emergency and incident response plans and procedures.

### 25.6.2 Mitigation measures

Specific mitigation measures that would be implemented to address potential hazards are listed in Table 25-3.

**Table 25-3: Mitigation measures – Hazards**

| Reference | Impact/issue | Mitigation measure | Applicable location(s)[1] |
|---|---|---|---|
| **HA1** | Risks to people, property and the environment associated with transport and storage of explosives | The method for delivery of explosives would be developed prior to the commencement of blasting (if proposed) in consultation with the Department of Planning, Industry and Environment and be timed to avoid the need for on-site storage. | All |
| **HA2** | Impacts on underground utilities | Dial before you dig searches and non-destructive digging would be carried out to identify the presence of underground utilities. | All |
| **HA3** | Impacts on underground utilities | Ongoing consultation would be carried out with utility providers for high pressure gas or petroleum pipelines to identify appropriate construction methodologies to be implemented. Any interaction with high pressure gas or petroleum pipelines would comply with the relevant standards, including AS 2885 Pipelines – Gas and Liquid Petroleum. | All |

*Note 1: WMS: Westmead metro station; PMS: Parramatta metro station; CSMF: Clyde stabling and maintenance facility; SSF: Silverwater services facility; SOPMS: Sydney Olympic Park metro station; NSMS: North Strathfield metro station; BNS: Burwood North Station; FDS: Five Dock Station; TBS: The Bays Station; Metro rail tunnels: Metro rail tunnels not related to other sites (e.g. tunnel boring machine works); PSR: Power supply routes.*

### 25.6.3 Interactions between mitigation measures

Mitigation measures in other chapters that are relevant to the management of potential hazards include:

- Chapter 11 (Noise and vibration – Stage 1), specifically measures which address construction vibration impacts and building condition surveys respectively
- Chapter 18 (Groundwater and ground movement – Stage 1), specifically measures which address ground movement and settlement impacts
- Chapter 24 (Spoil, waste management and resource use – Stage 1), specifically measures which address the identification and disposal of hazardous materials.

Together, these measures would minimise the potential hazards of Stage 1.

There are no mitigation measures identified in the assessment of other environmental aspects that are likely to affect the assessment of hazards.