25 Hazard and risk

The construction and operation of the M4-M5 Link (the project) has the potential to create a number of environmental hazards. This chapter identifies potential hazards that could pose a risk to the surrounding community or the environment and outlines measures to avoid, mitigate or manage those risks.

The Secretary of the NSW Department of Planning and Environment (DP&E) has issued environmental assessment requirements for the project. These are referred to as the Secretary's Environmental Assessment Requirements (SEARs). **Table 25-1** sets outs these requirements and the associated desired performance outcomes that relate to hazards, and identifies where they have been addressed in this environmental impact statement (EIS).

Table 25-1 SEARs – hazards

Desired Performance Outcome	SEARs	Where addressed in the EIS
3. Health and safety The project avoids, to the greatest extent possible, risk to public safety.	2. The assessment must: e) assess the likely risks of the project to public safety, paying particular attention to:	Refer below.
	• pedestrian safety	Pedestrian safety during construction and operation is addressed in **Chapter 8** (Traffic and transport).
	• subsidence risks	Subsidence risks are addressed in **Chapter 12** (Land use and property) and **Chapter 19** (Groundwater).
	• bushfire risks	Bushfire risks are addressed in **section 25.1.4** and **section 25.2.7**.
	• the handling and use of dangerous goods.	Handling and use of dangerous goods are addressed in **section 25.1.1**, **section 25.1.2**, **section 25.2.1** and **section 25.2.2**.
9. Socio-economic, land use and property The project minimises impacts on property and business and achieves appropriate integration with adjoining land uses, including maintenance of appropriate access to properties and community facilities, and minimisation of displacement of existing land use activities, dwellings and infrastructure.	6. The Proponent must assess potential impacts on utilities (including communications, electricity, gas, and water and sewerage) and the relocation of these utilities. 7. Where the project is predicted to impact on utilities the Proponent must undertake a utilities management strategy. The strategy must identify proposed management strategies, including relocation or adjustment of the utilities, and their estimated timing and duration. This strategy must be developed in consultation with the relevant utility owners or providers.	**Section 25.1.4** addresses potential impacts on utilities. Potential impacts on utilities are also addressed in **Chapter 12** (Land use and property). A Utilities Management Strategy has been prepared for the project and is included in **Appendix F**. The strategy considers issues associated with the need to relocate utilities, and identifies management strategies.

Desired Performance Outcome	SEARs	Where addressed in the EIS
12. Flooding The project minimises adverse impacts on existing flooding characteristics. Construction and operation of the project avoids or minimises the risk of, and adverse impacts from, infrastructure flooding, flooding hazards, or dam failure.	1. The Proponent must assess and (model where required) the impacts on flood behaviour during construction and operation for a full range of flood events up to the probable maximum flood (taking into account sea level rise and storm intensity due to climate change) including:	Refer below.
	a) how the tunnel entries and cut-and-cover sections of the tunnels would be protected from flooding during construction works;	Hazards associated with flooding, including the risk of flooding in tunnels and cut-and-cover sections, are outlined in **section 25.1.3** and discussed further in **Chapter 17** (Flooding and drainage). An assessment of the compatibility of the project with the flood hazard of the land is provided in **Chapter 17** (Flooding and drainage).
13. Soils Risks arising from the disturbance and excavation of land and disposal are minimised, including disturbance to acid sulfate soils and site contamination.	1. The Proponent must verify the risk of acid sulfate soils (Class 1, 2, 3 or 4 on the Acid Sulfate Soil Risk Map) within the area likely to be impacted by, the project. 2. The Proponent must assess the impact of the project on acid sulfate soils (including impacts of acidic runoff offsite) in accordance with the current guidelines and detail the mitigation measures proposed to minimise the potential impacts 3. The Proponent must assess whether the land is likely to be contaminated and identify if remediation of the land is required, having regard to the ecological and human health risks posed by the contamination in the context of past, existing and likely (or potential) future land uses. Where assessment and/or remediation is required, the Proponent must document how the assessment and/or remediation would be undertaken in accordance with current guidelines.	The risk of acid sulfate soils being present in the project footprint, and the potential impacts from disturbing these materials, are described in **Chapter 15** (Soil and water quality) and **Chapter 16** (Contamination). **Chapter 16** (Contamination) also assesses whether land within the project footprint is contaminated, and whether remedial action is required.
17. Climate change risk The project is designed, constructed and operated to be resilient to the future impacts of climate change.	1. The Proponent must assess the risk and vulnerability of the project to climate change in accordance with the current guidelines. 2. The Proponent must quantify specific climate change risks with reference to the NSW Government's climate projections at 10 km resolution (or lesser resolution if 10 km projections are not available) and incorporate specific adaptation actions in the design.	The risk and vulnerability of the project to climate change and adaptation measures are described in **Chapter 24** (Climate change risk and adaptation) and **Appendix X** (Climate change risk assessment framework).

Desired Performance Outcome	SEARs	Where addressed in the EIS
18. Hazards	1. The Proponent must describe the process for assessing the risk of emissions from ventilation facilities on aircraft operations taking into consideration the requirements of the *Airports Act 1996* (Commonwealth) (Airports Act) and the Airports Regulation 1997.	The process for the assessment of risk of emissions from ventilation facilities on aircraft operation is described in **section 25.1.4** and **section 25.2.7**.

25.1 Assessment of construction impacts

During construction, the following hazards may be associated with the project:

- Potential hazards resulting from accidental releases or improper handling and storage of dangerous goods and hazardous substances within construction ancillary facilities
- Potential hazards resulting from release of hazardous substances from vehicles transporting them to and from the construction ancillary facilities in the event of an accident
- Potential safety hazards, such as dangers to construction workers, road users and the community, associated with the potential risk of tunnel collapse, tunnel fires or explosions, rock falls at cuttings and mobile plant (including plant overturning and plant collisions with workers or other plant)
- Potential hazards associated with encountering acid sulfate soils, asbestos and contaminated soils during construction activities
- Potential accidental spills or leaking of fuels, chemicals or other hazardous substances during construction activities, including during refuelling of construction vehicles and machinery
- Potential hazards associated with mobile construction plant
- Potential hazards relating to flooding
- Potential rupture of, or interference with, utilities
- Potential hazards relating to bushfires.

The following risks have been assessed for the construction of the project:

- Pedestrian safety risks (discussed in **Chapter 8** (Traffic and transport))
- Subsidence (ground settlement) risks (discussed in **Chapter 12** (Land use and property) and **Chapter 19** (Groundwater))
- Bushfire risks
- Risks associated with the storage and handling of dangerous goods
- Potential risk of encountering acid sulfate soils, asbestos and contaminated soils during construction activities (discussed in **Chapter 15** (Soil and water quality) and **Chapter 16** (Contamination))
- Potential risks associated with the impact of project construction and operational activities on aircraft operations
- Potential risks associated with climate change impacts, including changes in the frequency of air temperature extremes, changes in mean and extreme rainfall, and changes in the frequency and intensity of storm events (discussed in **Chapter 24** (Climate change risk and adaption)).

25.1.1 Storage and handling of dangerous goods and hazardous substances

The transport, storage, handling and use of dangerous goods and hazardous substances would be undertaken in accordance with the *Work Health and Safety Act 2011* (NSW) (WHS Act), the Storage and Handling of Dangerous Goods Code of Practice (WorkCover NSW 2005), Environment Protection

Manual for Authorised Officers: Bunding and Spill Management, technical bulletin (NSW Environment Protection Authority (NSW EPA) 1997), *Dangerous Goods (Road and Rail Transport) Act 2008* (NSW), Dangerous Goods (Road and Rail Transport) Regulation 2014 (NSW) and relevant Australian Standards.

The types and estimated quantities of dangerous goods and hazardous substances that would be stored and used within the construction ancillary facilities, and used for construction activities elsewhere in the project footprint, are outlined in **Table 25-2**. The location and purpose of each construction ancillary facility are detailed in **Chapter 6** (Construction work). Minor quantities of other hazardous materials other than those outlined in **Table 25-2** may also be used at the construction ancillary facilities from time to time.

State Environmental Planning Policy No. 33 – Hazardous and Offensive Development (SEPP 33) applies to development that requires consent and is not strictly applicable to infrastructure (refer to **Chapter 2** (Assessment process)). However, the principles which are applied in relation to SEPP 33 have been followed (through the undertaking of a preliminary hazard analysis, as outlined below), to consider potential hazards associated with the use and transport of dangerous goods for the project.

The thresholds specified in *Hazardous and Offensive Development Application Guidelines: Applying SEPP 33* (NSW Department of Planning 2011) (SEPP 33 Guidelines) have been applied to the inventories of dangerous goods to be transported to and stored at each construction ancillary facility. These screening thresholds represent the level at which dangerous goods may present a credible off-site hazard that requires a further, more detailed assessment of risks. Application of the screening thresholds specified in the SEPP 33 Guidelines is included in **Table 25-2**.

Table 25-2 Indicative dangerous goods and hazardous substances used on site during the construction period (quantities are indicative only)

Material and Australian Dangerous Goods (DG) Code class	Wattle Street civil and tunnel site (C1a)	Haberfield civil and tunnel site (C2a)	Northcote Street civil site (C3a)	Parramatta Road West civil and tunnel site (C1b)	Haberfield civil site (C2b)	Parramatta Road East civil site (C3b)	Darley Road civil and tunnel site (C4)	Rozelle civil and tunnel site (C5)	The Crescent civil site (C6)	Victoria Road civil site (C7)	Iron Cove Link civil site (C8)	Pyrmont Bridge Road tunnel site (C9)	Campbell Road civil and tunnel site (C10)	Assessment against inventory thresholds in the SEPP 33 Guidelines
Acetylene (litres) DG class 2.1	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Individual cylinders containing acetylene would not trigger the threshold in the SEPP 33 Guidelines (100 kilograms). Maximum stored inventories (1,040 litres) would also be located more than 50 metres away from the nearest construction ancillary facility boundary and would also not trigger the threshold in the SEPP 33 Guidelines if considered in aggregate.
Ammonium nitrate emulsion DG class 5.1	Y	Y	N	Y	N	N	Y	Y	N	N	N	Y	Y	Ammonium nitrate would not trigger the threshold in the SEPP 33 Guidelines (five tonnes) if considered as individual containers or in aggregate.
Concrete bonding agent base (litres) DG class N/A	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Concrete bonding agent bases are not dangerous goods and therefore do not trigger the thresholds in the SEPP 33 Guidelines.

Material and Australian Dangerous Goods (DG) Code class	Wattle Street civil and tunnel site (C1a)	Haberfield civil and tunnel site (C2a)	Northcote Street civil site (C3a)	Parramatta Road West civil and tunnel site (C1b)	Haberfield civil site (C2b)	Parramatta Road East civil site (C3b)	Darley Road civil and tunnel site (C4)	Rozelle civil and tunnel site (C5)	The Crescent civil site (C6)	Victoria Road civil site (C7)	Iron Cove Link civil site (C8)	Pyrmont Bridge Road tunnel site (C9)	Campbell Road civil and tunnel site (C10)	Assessment against inventory thresholds in the SEPP 33 Guidelines
Concrete bonding agent hardener (litres) DG class 8	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Concrete bonding agent hardener would not trigger the threshold in the SEPP 33 Guidelines (25 tonnes) if considered as individual containers or in aggregate.
Concrete surface retarder (litres) DG class 3 PGIII	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Concrete surface retarder would not trigger the threshold in the SEPP 33 Guidelines (five tonnes) if considered as individual containers or in aggregate.
Construction grout (kilograms) DG class N/A	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Construction grout is not a dangerous good and therefore does not trigger the threshold in the SEPP 33 Guidelines.
Curing compound (litres) DG class N/A	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Curing compounds are not dangerous goods and therefore do not trigger the thresholds in the SEPP 33 Guidelines.
Diesel DG class C1 PGIII	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Diesel would not be stored with Class 3 materials and would therefore not be subject to the thresholds in the SEPP 33 Guidelines.

Material and Australian Dangerous Goods (DG) Code class	Wattle Street civil and tunnel site (C1a)	Haberfield civil and tunnel site (C2a)	Northcote Street civil site (C3a)	Parramatta Road West civil and tunnel site (C1b)	Haberfield civil site (C2b)	Parramatta Road East civil site (C3b)	Darley Road civil and tunnel site (C4)	Rozelle civil and tunnel site (C5)	The Crescent civil site (C6)	Victoria Road civil site (C7)	Iron Cove Link civil site (C8)	Pyrmont Bridge Road tunnel site (C9)	Campbell Road civil and tunnel site (C10)	Assessment against inventory thresholds in the SEPP 33 Guidelines
Epoxy paste part A (litres) DG class 3 PGIII	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Epoxies would not trigger the threshold in the SEPP 33 Guidelines (five tonnes) if considered as individual containers or in aggregate.
Epoxy paste part B (litres) DG class 3 PGIII	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Epoxies would not trigger the threshold in the SEPP 33 Guidelines (five tonnes) if considered as individual containers or in aggregate.
Form oil (litres) DG class C2	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Form oil would not be stored with Class 3 materials and would therefore not be subject to the thresholds in the SEPP 33 Guidelines.
Grease (kilograms) DG class C2	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Grease would not be stored with Class 3 materials and would therefore not be subject to the thresholds in the SEPP 33 Guidelines.
Hydraulic oil (litres) DG class C2	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Hydraulic oil would not be stored with Class 3 materials and would therefore not be subject to the thresholds in the SEPP 33 Guidelines.

Material and Australian Dangerous Goods (DG) Code class	Wattle Street civil and tunnel site (C1a)	Haberfield civil and tunnel site (C2a)	Northcote Street civil site (C3a)	Parramatta Road West civil and tunnel site (C1b)	Haberfield civil site (C2b)	Parramatta Road East civil site (C3b)	Darley Road civil and tunnel site (C4)	Rozelle civil and tunnel site (C5)	The Crescent civil site (C6)	Victoria Road civil site (C7)	Iron Cove Link civil site (C8)	Pyrmont Bridge Road tunnel site (C9)	Campbell Road civil and tunnel site (C10)	Assessment against inventory thresholds in the SEPP 33 Guidelines
Injectable mortar (kilograms) DG class N/A	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Injectable mortar is not a dangerous good and therefore does not trigger the thresholds in the SEPP 33 Guidelines.
Joint sealant (kilograms) DG class N/A	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Joint sealant is not a dangerous good and therefore does not trigger the thresholds in the SEPP 33 Guidelines.
Line marking aerosol (kilograms) DG class 2.1	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Individual cylinders containing line marking aerosol would not trigger the threshold in the SEPP 33 Guidelines (100 kilograms).
Liquid nails (kilograms) DG class 3 PGII	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Liquid nails would not trigger the threshold in the SEPP 33 Guidelines (five tonnes) if considered as individual containers or in aggregate.
Oxygen (litres) DG class 2.2	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Industrial grade oxygen is a Class 2.2 dangerous good and is therefore not subject to the thresholds in the SEPP 33 Guidelines. Oxygen has a subsidiary risk of Class 5.1. Oxygen would not trigger the threshold in the SEPP 33

Material and Australian Dangerous Goods (DG) Code class	Wattle Street civil and tunnel site (C1a)	Haberfield civil and tunnel site (C2a)	Northcote Street civil site (C3a)	Parramatta Road West civil and tunnel site (C1b)	Haberfield civil site (C2b)	Parramatta Road East civil site (C3b)	Darley Road civil and tunnel site (C4)	Rozelle civil and tunnel site (C5)	The Crescent civil site (C6)	Victoria Road civil site (C7)	Iron Cove Link civil site (C8)	Pyrmont Bridge Road tunnel site (C9)	Campbell Road civil and tunnel site (C10)	Assessment against inventory thresholds in the SEPP 33 Guidelines
														Guidelines (five tonnes) if considered as individual containers or in aggregate.
Polyurethane foam (kilograms) DG class 2.1	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Individual cylinders containing polyurethane foam would not trigger the threshold in the SEPP 33 Guidelines (100 kilograms) if considered as individual containers or in aggregate.
Sodium hydroxide (litres) DG class 8 PGII	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Sodium hydroxide would not trigger the threshold in the SEPP 33 Guidelines (25 tonnes) if considered as individual containers or in aggregate.
Sulfuric acid (litres) DG class 8 PGII	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Sulfuric acid would not trigger the threshold in the SEPP 33 Guidelines (25 tonnes) if considered as individual containers or in aggregate.
Unleaded Petrol (litres) DG class 3 PGII	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Epoxies would not trigger the threshold in the SEPP 33 Guidelines (five tonnes) if considered as individual containers or in aggregate.

Table 25-2 demonstrates that the dangerous goods and hazardous substances proposed to be stored and used at each construction ancillary facility and used for construction activities elsewhere in the project footprint would not exceed the inventory thresholds in the SEPP 33 Guidelines. This indicates that the proposed storage of dangerous goods and hazardous substances at construction ancillary facilities would not pose a material off-site hazard, in the unlikely event of an incident at the proposed construction ancillary facility locations.

At each construction ancillary facility:

- Liquid dangerous goods and hazardous chemicals would be stored within a bunded storage container or spill tray
- Gases would be secured and stored in a storage cage in a well ventilated area
- Storage areas would be located away from natural or built drainage lines, to minimise the likelihood of pollutants entering adjacent watercourses in the event of a spill or leak escaping the bunded area
- Self-bunded fuel storage areas would be located within or adjacent to acoustic sheds.

A register and inventory of the dangerous goods and hazardous substances to be stored at each construction ancillary facility would be kept as part of the Incident Response Plan for the project. Material Safety Data Sheets would also be kept on site for each relevant material.

Implementation of environmental management measures for the storage and handling of dangerous goods and hazardous substances, as detailed in **Table 25-7**, would reduce the risk to the environment, construction personnel and the public. Safety hazards associated with the use of hazardous materials during construction, including within enclosed tunnel environments, are discussed in **section 25.1.3**.

25.1.2 Transport of dangerous goods and hazardous substances

Transportation of dangerous goods would not exceed the thresholds in the SEPP 33 Guidelines and would be undertaken in accordance with suppliers' instructions as well as the WHS Act, the Storage and Handling of Dangerous Goods Code of Practice (WorkCover NSW 2005), *Dangerous Goods (Road and Rail Transport) Act 2008* (NSW), Dangerous Goods (Road and Rail Transport) Regulation 2014 (NSW) and relevant Australian Standards.

Table 25-3 outlines the dangerous goods and hazardous substances that would be transported to construction ancillary facilities. Potential hazards and risks associated with the transportation of dangerous goods and hazardous substances have been considered by comparing the type, quantity and frequency of dangerous goods and hazardous substances with the thresholds presented in the SEPP 33 Guidelines.

Table 25-3 Dangerous goods and hazardous substances transported to construction sites

Material and Australian Dangerous Goods Code class	Transport quantity and frequency to each facility (indicative only)	Construction ancillary facility destination	Transportation thresholds in the SEPP 33 Guidelines	Assessment against transportation thresholds in the SEPP 33 Guidelines
Acetylene DG class 2.1	35 litres per month	All construction ancillary facilities	Minimum transport load or transport frequency of two tonnes more than 30 times per week	Industrial grade acetylene would not trigger the transportation thresholds in the SEPP 33 Guidelines.
Ammonium nitrate emulsion DG class 5.1	3,600 litres once during the project	Wattle Street civil and tunnel site (C1a), Haberfield civil and tunnel site (C2a), Parramatta Road West civil and tunnel site (C1b), Darley Road civil and tunnel site (C4), Rozelle civil and tunnel site (C5), Pyrmont Bridge Road tunnel site (C9), Campbell Road civil and tunnel site (C10).	Minimum transport load or transport frequency of two tonnes more than 30 times per week	Ammonium nitrate emulsion would trigger the minimum transport load threshold of two tonnes. However, it would not trigger the threshold for transport frequency and thus is unlikely to be significant.
Concrete bonding agent base DG class N/A	18 litres per month	Wattle Street civil and tunnel site (C1a), Haberfield civil and tunnel site (C2a), Parramatta Road West civil and tunnel site (C1b), Darley Road civil and tunnel site (C4), Rozelle civil and tunnel site (C5), Pyrmont Bridge Road tunnel site (C9), Campbell Road civil and tunnel site (C10).	N/A	Concrete bonding agent base is not subject to the transportation thresholds in the SEPP 33 Guidelines.
Concrete bonding agent hardener DG class 8	18 litres per month	Wattle Street civil and tunnel site (C1a), Haberfield civil and tunnel site (C2a), Parramatta Road West civil and tunnel site (C1b), Darley Road civil and tunnel site (C4), Rozelle civil and tunnel site (C5), The Crescent civil site (C6), Victoria Road civil site (C7), Iron Cove Link civil site (C8), Pyrmont Bridge Road tunnel site (C9), Campbell Road civil and tunnel site (C10).	Minimum transport load or transport frequency of two tonnes more than 30 times per week	Concrete bonding agent hardener would not trigger the transportation thresholds in the SEPP 33 Guidelines.

Material and Australian Dangerous Goods Code class	Transport quantity and frequency to each facility (indicative only)	Construction ancillary facility destination	Transportation thresholds in the SEPP 33 Guidelines	Assessment against transportation thresholds in the SEPP 33 Guidelines
Concrete surface retarder DG class 3 PGIII	180 litres per month	Wattle Street civil and tunnel site (C1a), Haberfield civil and tunnel site (C2a), Parramatta Road West civil and tunnel site (C1b), Darley Road civil and tunnel site (C4), Rozelle civil and tunnel site (C5), The Crescent civil site (C6), Victoria Road civil site (C7), Iron Cove Link civil site (C8), Pyrmont Bridge Road tunnel site (C9), Campbell Road civil and tunnel site (C10).	Minimum transport load or transport frequency of 10 tonnes more than 60 times per week	Concrete surface retarder would not trigger the transportation thresholds in the SEPP 33 Guidelines.
Construction grout DG class N/A	50 kilograms per month	Wattle Street civil and tunnel site (C1a), Haberfield civil and tunnel site (C2a), Parramatta Road West civil and tunnel site (C1b), Darley Road civil and tunnel site (C4), Rozelle civil and tunnel site (C5), The Crescent civil site (C6), Victoria Road civil site (C7), Iron Cove Link civil site (C8), Pyrmont Bridge Road tunnel site (C9), Campbell Road civil and tunnel site (C10).	N/A	Construction grout is not subject to the transportation thresholds in the SEPP 33 Guidelines.
Curing compound DG class N/A	170 litres per month	Wattle Street civil and tunnel site (C1a), Haberfield civil and tunnel site (C2a), Parramatta Road West civil and tunnel site (C1b), Darley Road civil and tunnel site (C4), Rozelle civil and tunnel site (C5), The Crescent civil site (C6), Victoria Road civil site (C7), Iron Cove Link civil site (C8), Pyrmont Bridge Road tunnel site (C9), Campbell Road civil and tunnel site (C10).	N/A	Curing compounds are not subject to the transportation thresholds in the SEPP 33 Guidelines.
Diesel DG class C1 PGIII	1,800 litres[1] per day	Wattle Street civil and tunnel site (C1a), Haberfield civil and tunnel site (C2a), Parramatta Road West civil and tunnel site (C1b), Darley Road civil and tunnel site (C4), Rozelle civil and tunnel site (C5), The Crescent civil site (C6), Victoria Road civil site (C7), Iron Cove Link civil site (C8), Pyrmont Bridge Road tunnel site (C9), Campbell Road civil and tunnel site (C10).	N/A	Diesel would not be transported with Class 3 dangerous goods. Therefore, it would not be subject to the transportation thresholds in the SEPP 33 Guidelines.

Material and Australian Dangerous Goods Code class	Transport quantity and frequency to each facility (indicative only)	Construction ancillary facility destination	Transportation thresholds in the SEPP 33 Guidelines	Assessment against transportation thresholds in the SEPP 33 Guidelines
Epoxy paste part A DG class 3 PGIII	18 litres per month	Wattle Street civil and tunnel site (C1a), Haberfield civil and tunnel site (C2a), Parramatta Road West civil and tunnel site (C1b), Darley Road civil and tunnel site (C4), Rozelle civil and tunnel site (C5), Pyrmont Bridge Road tunnel site, The Crescent civil site (C6), Victoria Road civil site (C7), Iron Cove Link civil site (C8), Pyrmont Bridge Road tunnel site (C9), Campbell Road civil and tunnel site (C10).	Minimum transport load or transport frequency of 10 tonnes more than 60 times per week	Epoxies would not trigger the transportation thresholds in the SEPP 33 Guidelines.
Epoxy paste part B DG class 3 PGIII	18 litres per month	Wattle Street civil and tunnel (C1a), Haberfield civil and tunnel site (C2a), Parramatta Road West civil and tunnel site (C1b), Darley Road civil and tunnel site (C4), Rozelle civil and tunnel site (C5), The Crescent civil site (C6), Victoria Road civil site (C7), Iron Cove Link civil site (C8), Pyrmont Bridge Road tunnel site (C9), Campbell Road civil and tunnel site (C10).	Minimum transport load or transport frequency of 10 tonnes more than 60 times per week	Epoxies would not trigger the transportation thresholds in the SEPP 33 Guidelines.
Form oil (litres) DG class C2	180 litres per month	Wattle Street civil and tunnel site (C1a), Haberfield civil and tunnel site (C2a), Parramatta Road West civil and tunnel site (C1b), Darley Road civil and tunnel site (C4), Rozelle civil and tunnel site (C5), The Crescent civil site (C6), Victoria Road civil site (C7), Iron Cove Link civil site (C8), Pyrmont Bridge Road tunnel site (C9), Campbell Road civil and tunnel site (C10).	N/A	Form oil is not a dangerous good and would not be transported with Class 3 dangerous goods. Therefore, it would not be subject to the transportation thresholds in the SEPP 33 Guidelines.
Grease DG class C2	4 kilograms per month	Wattle Street civil and tunnel site (C1a), Haberfield civil and tunnel site (C2a), Parramatta Road West civil and tunnel site (C1b), Darley Road civil and tunnel site (C4), Rozelle civil and tunnel site (C5), The Crescent civil site (C6), Victoria Road civil site (C7), Iron Cove Link civil site (C8), Pyrmont Bridge Road tunnel site (C9), Campbell Road civil and tunnel site (C10).	N/A	Grease is not a dangerous good and would not be transported with Class 3 dangerous goods. Therefore, it would not be subject to the transportation thresholds in the SEPP 33 Guidelines.

Material and Australian Dangerous Goods Code class	Transport quantity and frequency to each facility (indicative only)	Construction ancillary facility destination	Transportation thresholds in the SEPP 33 Guidelines	Assessment against transportation thresholds in the SEPP 33 Guidelines
Hydraulic oil DG class C2	190 litres per month	Wattle Street civil and tunnel site (C1a), Haberfield civil and tunnel site (C2a), Parramatta Road West civil and tunnel site (C1b), Darley Road civil and tunnel site (C4), Rozelle civil and tunnel site (C5), The Crescent civil site (C6), Victoria Road civil site (C7), Iron Cove Link civil site (C8), Pyrmont Bridge Road tunnel site (C9), Campbell Road civil and tunnel site (C10).	N/A	Hydraulic oil is not a dangerous good and would not be transported with Class 3 dangerous goods. Therefore, it would not be subject to the transportation thresholds in the SEPP 33 Guidelines.
Injectable mortar DG class N/A	8 kilograms per month	Wattle Street civil and tunnel site (C1a), Haberfield civil and tunnel site (C2a), Parramatta Road West civil and tunnel site (C1b), Darley Road civil and tunnel site (C4), Rozelle civil and tunnel site (C5), The Crescent civil site (C6), Victoria Road civil site (C7), Iron Cove Link civil site (C8), Pyrmont Bridge Road tunnel site (C9), Campbell Road civil and tunnel site (C10).	N/A	Injectable mortar is not subject to the transportation thresholds in the SEPP 33 Guidelines.
Joint sealant DG class N/A	5 kilograms per month	Wattle Street civil and tunnel site (C1a), Haberfield civil and tunnel site (C2a), Parramatta Road West civil and tunnel site (C1b), Darley Road civil and tunnel site (C4), Rozelle civil and tunnel site (C5), The Crescent civil site (C6), Victoria Road civil site (C7), Iron Cove Link civil site (C8), Pyrmont Bridge Road tunnel site (C9), Campbell Road civil and tunnel site (C10).	N/A	Joint sealant is not subject to the transportation thresholds in the SEPP 33 Guidelines.
Line marking aerosol DG class 2.1	16 kilograms per month	Wattle Street civil and tunnel site (C1a), Haberfield civil and tunnel site (C2a), Parramatta Road West civil and tunnel site (C1b), Darley Road civil and tunnel site (C4), Rozelle civil and tunnel site (C5), Pyrmont Bridge Road tunnel site (C9), Campbell Road civil and tunnel site (C10).	Minimum transport load or transport frequency of two tonnes more than 30 times per week	Line marking aerosol would not trigger the transportation thresholds in the SEPP 33 Guidelines.

Material and Australian Dangerous Goods Code class	Transport quantity and frequency to each facility (indicative only)	Construction ancillary facility destination	Transportation thresholds in the SEPP 33 Guidelines	Assessment against transportation thresholds in the SEPP 33 Guidelines
Liquid nails DG class 3 PGII	6 kilograms per month	Wattle Street civil and tunnel site (C1a), Haberfield civil and tunnel site (C2a), Parramatta Road West civil and tunnel site (C1b), Darley Road civil and tunnel site (C4), Rozelle civil and tunnel site (C5), Pyrmont Bridge Road tunnel site (C9), Campbell Road civil and tunnel site (C10).	Minimum transport load or transport frequency of three tonnes more than 45 times per week	Liquid nails would not trigger the transportation thresholds in the SEPP 33 Guidelines.
Oxygen DG class 2.2	180 litres per month	All construction ancillary facilities.	N/A	Industrial grade oxygen is not subject to the transportation thresholds in the SEPP 33 Guidelines.
Oxygen subsidiary risk DG class 5.1	180 litres per month	All construction ancillary facilities.	Minimum transport load or transport frequency of two tonnes more than 30 times per week	Oxygen has a subsidiary risk class of 5.1. Oxygen would not trigger the transportation thresholds in the SEPP 33 Guidelines.
Polyurethane foam DG class 2.1	7 kilograms per month	Wattle Street civil and tunnel site (C1a), Haberfield civil and tunnel site (C2a), Parramatta Road West civil and tunnel site (C1b), Darley Road civil and tunnel site (C4), Rozelle civil and tunnel site (C5), The Crescent civil site (C6), Victoria Road civil site (C7), Iron Cove Link civil site (C8), Pyrmont Bridge Road tunnel site (C9), Campbell Road civil and tunnel site (C10).	Minimum transport load or transport frequency of two tonnes more than 30 times per week	Polyurethane foam would not trigger the transportation thresholds in the SEPP 33 Guidelines.
Sodium hydroxide DG class 8 PGII	2,600 litres per month	Wattle Street civil and tunnel site (C1a), Haberfield civil and tunnel site (C2a), Parramatta Road West civil and tunnel site (C1b), Darley Road civil and tunnel site (C4), Rozelle civil and tunnel site (C5), Pyrmont Bridge Road tunnel site (C9), Campbell Road civil and tunnel site (C10).	25 tonnes as individual containers or in aggregate	Sodium hydroxide would not trigger the transportation threshold in the SEPP 33 Guidelines.

Material and Australian Dangerous Goods Code class	Transport quantity and frequency to each facility (indicative only)	Construction ancillary facility destination	Transportation thresholds in the SEPP 33 Guidelines	Assessment against transportation thresholds in the SEPP 33 Guidelines
Sulfuric acid DG class 8 PGII	2,600 litres per month	Wattle Street civil and tunnel site (C1a), Haberfield civil and tunnel site (C2a), Parramatta Road West civil and tunnel site (C1b), Darley Road civil and tunnel site (C4), Rozelle civil and tunnel site (C5), Pyrmont Bridge Road tunnel site (C9), Campbell Road civil and tunnel site (C10).	25 tonnes as individual containers or in aggregate	Sulfuric acid would not trigger the transportation threshold in the SEPP 33 Guidelines.
Unleaded Petrol DG class 3 PGII	180 litres[1] per month	All construction ancillary facilities.	Minimum transport load or transport frequency of three tonnes more than 45 times per week	Unleaded petrol would not trigger the transportation thresholds in the SEPP 33 Guidelines.

Note:

1 For some construction ancillary facilities, the quantity of diesel and unleaded petrol delivered to site would be greater than the quantity stored within the facility at any time, because the delivery volume takes into the account fuel which is brought to the facility by mini-tanker and used to directly refuel plant. As this fuel is 'in use' in the plant it is not classified as 'stored'.

25.1.3 Safety hazards

Factors contributing to safety hazards in tunnelling projects include uncertainty in the nature and variability of ground conditions, the restricted tunnel environment, difficulty in communications and the use of compressed air.

Hazards/risks include:

- Partial or complete tunnel collapse with potential associated surface impacts
- Tunnel fires or explosions
- Rock falls at cut-and-cover tunnels and cuttings
- Exposure to airborne pollutants such as asbestos fibres during demolition work, dust during tunnelling and diesel particulate matter from the operation of diesel fuelled construction equipment within the tunnels
- Exposure of acid sulfate soils to the atmosphere and subsequent acid generation
- Disturbance of contaminated soils
- Incidents involving mobile plant.

Tunnel collapse

The project tunnels would generally be excavated in good quality Hawkesbury sandstone. A number of major design and construction method reviews have been undertaken to better understand historical tunnel collapses, including the collapse of the Lane Cove Tunnel in 2005 during construction and other incidents overseas. Consequently, the risks of a similar incident occurring during a Sydney tunnelling project are extremely low. The reasons for this include:

- Vastly improved geotechnical assessment and modelling
- Improved predictive two dimensional and three dimensional modelling of geology, excavation spans, temporary and permanent loads
- Fit for purpose design to develop the appropriate type of ‘support’ to match the ground conditions as the excavation progresses on a day to day basis
- Continuous independent review of the temporary and permanent works design and construction methods by experts
- Continual construction verification that tunnel support is installed and performing as per design
- Robust change management processes for conditions that are out of the ordinary or unexpected, including probe drilling and ground treatment through suspected poor ground zones
- Continuous assessment of likely excavation and groundwater conditions
- Detailed survey monitoring of surface roads, buildings and structures in the tunnel vicinity.

Construction of the tunnels would be undertaken in sections. A ‘permit to tunnel’ system would be implemented, which would require authorisation from the tunnel construction manager (or authorised delegate) and geotechnical engineer before tunnelling is allowed to continue to the next section. The 'permit to tunnel' authorisation considers the anticipated and observed ground support performance, and geotechnical and groundwater conditions. This would minimise the risk of tunnel collapse.

Tunnel fires or explosions

Combustible materials within a tunnel have the potential to cause tunnel fires and explosions. The rapid consumption of oxygen and production of noxious fumes and gases can make tunnel fires severe. Diesel equipment fire precautions, hot work procedures and electrical equipment procedures would be followed and adequate training would be provided to minimise risks associated with fire and explosion. Construction ancillary facilities would be maintained in a tidy and orderly condition, with the aim of minimising potential fuel loads and isolating fuel sources from ignition sources.

Rock falls at cuttings

Rock falls can occur during excavation of the portals, if the portal breakthrough area is not secured before excavation. Rock falls have the potential to injure construction workers and cause damage to construction equipment. The interchange dive structures have the potential to create rock fall hazards as steep slope sites have the potential to pose slip, fall and unsecured equipment hazards.

Standard construction and mitigation measures would be applied to manage rock fall risk, including the use of appropriate personal protective equipment, frequent tunnel inspections, scaling, progressive installation of properly secured ground support, safety fencing and overhead protection.

Exposure to airborne pollutants

During construction and demolition activities, airborne pollutants have the potential to be generated, including dust and toxic gas. If this were to occur, it may result in oxygen deficient or toxic environments and other potential health risks for construction workers and local community members. The operation of diesel and petrol-fuelled equipment and the use of hazardous materials also have the potential to produce a range of air contaminants, including diesel particulate matter from diesel combustion. Dust generation in the tunnels would be minimised by wetting down the cutting face and the use of temporary fans and dry dust scrubbers. Standard ventilation, dust extraction and monitoring procedures would be carried out when appropriate.

Acid sulfate soils

Acid sulfate soils are naturally occurring soils that contain iron sulphides. When acid sulfate soils are exposed to the air, they oxidise and create sulfuric acid. This increase in acidity can result in the mobilisation of aluminium, iron and manganese from the soils. Other impacts include the de-oxygenation of water. Potential acid sulfate soils are waterlogged soils rich in pyrite that have not been oxidised. Disturbance of potential acid sulfate soils during construction causing exposure to oxygen would lead to the development of actual acid sulfate soil layers.

For construction workers, physical contact with ground and water containing toxic concentrations of acid and metal contaminants is associated with health risks. Standard construction and mitigation measures would be applied to mitigate the potential risks associated with the disturbance of acid sulfate soils, including the use of appropriate personal protective equipment.

Further information regarding acid sulfate soils is provided in **Chapter 15** (Soil and water quality).

Contamination

Asbestos and other contamination is likely to be located within the project footprint. Exposure to asbestos and other contaminants during construction may result in health risks for construction workers and people in neighbouring communities.

Environmental management measures to manage potential risks related to contaminated soil and water are provided in **Chapter 16** (Contamination). Standard construction and mitigation measures would be applied to manage potential risks to the construction workers from exposure to asbestos and other contamination including the use of appropriate personal protective equipment.

Management and disposal of asbestos containing material would be undertaken in accordance with procedures detailed in the Work Health and Safety Plan for the project, which would be developed in accordance with:

- *Work Health and Safety Act 2011* (NSW)
- Code of Practice for the Safe Removal of Asbestos 2nd Edition (National Occupational Health and Safety Commission (NOHSC) 2005a)
- Code of Practice for the Management and Control of Asbestos in Workplaces (NOHSC 2005b)
- Protection of the Environment Operations (Waste) Regulation 2014 (NSW) – Part 7 special requirements relating to the transportation and management of asbestos waste
- National Environment Protection (Assessment of Site Contamination) Measure 1999
- AS2601:2001 Demolition of Structures.

Removal of asbestos containing material would involve suitably qualified experts in accordance with the Work Health and Safety Plan and would include notification requirements to communities and relevant stakeholders.

Refer to **Chapter 16** (Contamination) and **Chapter 23** (Resource use and waste minimisation) for further information on asbestos management.

Spills and leaks from construction vehicles and machinery

There is potential for fuel spills to occur during refuelling of construction vehicles and machinery, and for oil spills or the emission of other hazardous substances to occur as a result of mechanical or other failures of construction plant. For construction workers, physical contact with fuels, oils and other hazardous materials is associated with health risks.

These hazards would be managed by the implementation of standard construction environmental measures, including measures for fuel and chemical handling, spill containment and the use of appropriate personal protective equipment. These measures would form part of the Construction Environmental Management Plan (CEMP) for the project.

Mobile plant

The operation of powered mobile plant during construction would be associated with a number of safety hazards including:

- The plant overturning
- Objects falling on the operator of the plant
- The operator being ejected from the plant
- The plant colliding or coming into contact with any person or object (eg workers, other vehicles or plant, energised powerlines).

In order to manage these hazards, mobile plant on construction sites would be operated in accordance with *Moving Plant on Construction Sites: Code of Practice* (SafeWork NSW 2004).

Flooding

Flooding during construction of the project could potentially impact areas within and near the construction sites. Flood related impacts during construction could include:

- Inundation of excavated tunnels
- Damage to facilities, infrastructure, equipment, stockpiles and downstream sensitive areas caused by inundation from floodwaters
- Increased risk of flooding of adjacent areas due to temporary loss of floodplain storage (due to displacement of water) or impacts on the conveyance of floodwaters.

The project proposes permanent portals at the Rozelle interchange and Iron Cove Link. These would be created using cut-and-cover techniques. Tunnelling would also occur through temporary shafts at the Parramatta Road West civil and tunnel site (C1b), Darley Road civil and tunnel site (C4) and the Pyrmont Bridge Road tunnel site (C9).

Ingress of floodwater into the shafts or portals during construction would pose significant risk to personal safety for those working in the tunnel. Where these facilities occur within the floodplain or other areas that are flood prone, such as at Darley Road and the Rozelle Rail Yards, protection measures such as bunding or floodwater barriers would be provided to ensure floodwaters do not enter shafts or portals. Other flooding impacts during construction, such as flooding of stockpiles and erosion of cleared areas, are expected to be minor.

These impacts would be mitigated by adjusting the ancillary facility designs and planning sites to recognise the identified flood conditions and minimise the potential for off-site flood impacts. The indicative layouts of the construction ancillary facilities have been developed to provide setback from high risk flooding areas to minimise impacts on existing flowpaths, where feasible. Mitigation measures that would be employed are outlined in **Chapter 17** (Flooding and drainage).

25.1.4 Road user and general public hazards

Utilities

The potential rupture or severing of underground utilities due construction activities could pose a hazard in the form of loss of service to local communities, electrocution, release of sewage from a sewer main or fire if a gas main is impacted. The risks associated with these hazards would be minimised by undertaking the following activities during the works:

- Utility checks (such as 'dial before you dig')
- Consulting with the relevant utility service providers
- Service and utility identification works (where possible by non-destructive means, eg vacuum truck)
- Relocating and/or protecting utilities in and around the project before construction begins, if required.

A Utilities Management Strategy (**Appendix F**) has been prepared for the project that identifies management options, including relocation or adjustment of the utilities. This strategy includes a description of the process for confirming utility works within and outside the project footprint, an outline of the consultation that would be undertaken with utility service providers and the local community regarding these works, and a description of how further environmental assessment of the impacts of these utility works would be carried out.

Consultation with utility service providers has commenced and would be ongoing during the detailed design and throughout construction to mitigate the risk of unplanned or unexpected disturbance of utilities. Confirmation of the presence, location and status of subsurface utilities at the Rozelle Rail Yards is being undertaken as part of a separate Roads and Maritime project involving site management works. This would further inform the utilities management for the project.

Bushfire risks

The project would not be located in or near bushfire-prone land. The project footprint is highly urbanised and does not contain large areas of vegetation that are associated with bushfire risk. As such, bushfire risks associated with the project are considered to be minor.

Temporary construction ancillary facilities and construction infrastructure would be generally less sensitive to bushfire risks than operational facilities, given the temporary nature of the construction ancillary facilities and the absence of critical infrastructure within the facilities. Notwithstanding the low likelihood of bushfire events within the project footprint, measures to mitigate and manage bushfire risks would be developed and included as part of site specific hazard and risk management measures within the CEMP.

Temporary construction ancillary facilities would be maintained in a tidy and orderly condition to minimise potential fuel loads in the event that the facilities are affected by fire. Storage and management of dangerous goods and hazardous materials would occur in a safe, secure location consistent with the requirements of applicable Australian Standards.

Construction activities involving flammable materials and ignition sources (for example, welding) would be proactively managed to ensure that fire risks are effectively minimised. High risk construction activities, such as welding and metal work, would be subject to a risk assessment on total fire ban days, and restricted or ceased as appropriate.

Aviation risks

Australia's Civil Aviation Safety Authority (CASA) has determined that exhaust plumes with vertical velocities exceeding 4.3 metres per second may cause damage to aircraft airframes, or upset an aircraft flying at low levels. Light aircraft, including helicopters, are more likely to be affected by a plume than heavier aircraft cruising at the same altitude.

The *Airports Act 1996* (Commonwealth) (Airports Act) and the Airports (Protection of Airspace) Regulations 1996 (Commonwealth) (Airspace Regulations) were established for the protection of airspace at and around regulated airports in Australia including Sydney Airport. The Airspace

Regulations define the 'prescribed airspace' for Sydney Airport as the airspace above any part of either an obstacle limitation surface (OLS) or procedures for air navigation systems operations (PANS-OPS) surface for the airport. Part 139.70 of the Civil Aviation Safety Regulations 1998 (Commonwealth) provides for determination that a plume is a hazardous object if the vertical velocity exceeds 4.3 metres per second.

The OLS is an invisible level that defines the limits to which objects may project into the airspace around an aerodrome so that aircraft operations may be conducted safely. PANS-OPS protection surfaces are imaginary surfaces in space that establish the airspace that is to remain free of any potential disturbance (including physical objects and other disturbances such as emissions from ventilation outlets) so that aircraft operations may be conducted safely. Where structures may (under certain circumstances) be permitted to penetrate the OLS, they would not ordinarily be permitted to penetrate any PANS-OPS surface.

Under the Airports Act, a 'controlled activity' (as defined in section 182(1) of the Act) in relation to a prescribed airspace must not be carried out or caused to be carried out without the approval of the Secretary of the Australian Government Department of Infrastructure and Regional Development (DIRD) or unless it is otherwise exempt under the Airspace Regulations. Controlled activities include:

- The construction of buildings and structures that intrude into prescribed airspace
- Artificial light sources that exceed specified intensity levels
- Activities that result in air turbulence that exceed specified levels
- Activities that involve the emission of smoke, dust, other particulate matter, steam or other gas that exceed specified levels.

The OLS defines the airspace to be protected for aircraft operating during the initial and final stages of flight, or manoeuvring in the vicinity of Sydney Airport. This has been established in accordance with International Civil Aviation Organisation specifications, as adopted by CASA. Construction activities would be carried out to ensure that equipment such as cranes and materials do not intrude into the OLS or PANS-OPS.

CASA and DIRD have been consulted during the development of the project design and would be consulted further prior to commencement of construction to ensure that the construction activities proposed at Rozelle and St Peters, as well as surface road upgrades, are undertaken in line with the Airspace Regulations and the Airports Act, in a manner that satisfies the requirements of CASA.

CASA, under the Civil Aviation Regulations 1998 (Commonwealth), also regulates ground lighting where it has the potential to impact airport operations (such as causing confusion or distraction from glare to pilots in the air). The Sydney Airport Master Plan 2033 outlines the requirements for external lighting. Lighting during construction would adhere to established guidelines including *Lighting in the vicinity of aerodromes: Advice to lighting designer* (CASA 1999) and *National Airports Safeguarding Framework Guideline E: Managing the Risk of Distractions to Pilots from Lighting in the Vicinity of Airports* (DIRD 2012) in relation to the location and permitted intensities of ground lights within a six kilometre radius of Sydney Airport.

25.2 Assessment of operational impacts

During operation, the following potential hazards and risks may be associated with the project:

- Accidental releases or improper handling and storage of dangerous goods and hazardous substances in water treatment facilities
- Releases of hazardous substances from vehicles transporting dangerous goods and hazardous substances to and from the water treatment facilities in the event of an accident
- Releases of hazardous substances from non-project vehicles transporting dangerous goods and hazardous substances in the tunnels
- Crashes and incidents in the mainline tunnels or entry and exit ramps
- Crashes and incidents on surface roads
- Electric and magnetic fields from the project substations
- Potential hazards to road users and the general public relating to:
  - Electric and magnetic fields
  - Bushfires
  - Aviation hazards.

25.2.1 Storage and handling of dangerous goods and hazardous substances

Dangerous goods and hazardous substances stored and used during operation of the project would be limited and may include coagulants, polymers, acid and bases (outlined in **Table 25-4**). Additional small quantities of other hazardous materials may occasionally be required on site to support maintenance activities.

A comparison of the likely types and quantities of dangerous goods and hazardous substances to be stored on site with applicable thresholds in the SEPP 33 Guidelines indicates that operational inventories would not be potentially hazardous.

25.2.2 Transport of dangerous goods and hazardous substances for the project

Dangerous goods and hazardous substances that would be transported for the project during operation are outlined in **Table 25-5**. Additional small quantities of other materials may occasionally be required on site to support maintenance activities.

A comparison of the likely types and quantities of dangerous goods and hazardous materials to be transported within the thresholds in the SEPP 33 Guidelines indicates that the transport of operational inventories would not be potentially hazardous. In the event that thresholds are exceeded, transport frequency is likely to be well below the frequency threshold and as such, risks are unlikely to be significant.

Table 25-4 Indicative dangerous goods and hazardous substances stored on site during operation

Material and Australian Dangerous Goods (DG) Code Class	Storage method (amount stored at any one time)	Inventory thresholds in the SEPP 33 Guidelines	Assessment against SEPP 33 inventory thresholds
Sodium Hydroxide DG class 8 PGII	10,000 litres feed tank in an undercover bunded area on site	25 tonnes	Sodium hydroxide would not trigger the thresholds in the SEPP 33 Guidelines if considered as individual containers or in aggregate.
Coagulant DG class N/A	12,000 litres feed tank in an undercover bunded area on site	N/A	Coagulant is not a dangerous good and does not trigger the thresholds in the SEPP 33 Guidelines.
Polymers DG class N/A	20 kilogram bags stored in a undercover container on site	N/A	Polymers are not a dangerous good and do not trigger the thresholds in the SEPP 33 Guidelines.
Diesel DG class C1 PGIII	Bunded tanks on site	N/A	Diesel would not be stored with Class 3 materials and would therefore not be subject to the thresholds in the SEPP 33 Guidelines.
Acetylene DG class 2.1	Size G cylinders on site	100 kilograms	Individual cylinders containing acetylene would not trigger the thresholds in the SEPP 33 Guidelines. Maximum stored inventories would not trigger the thresholds in the SEPP 33 Guidelines if considered in aggregate.
Oxygen DG class 2.2	Size G cylinders on site	N/A	Industrial grade oxygen is a Class 2.2 dangerous good and is not subject to the thresholds in the SEPP 33 Guidelines.
Oxygen (subsidiary risk) DG class 5.1	Size G cylinders on site	Five tonnes	Oxygen has a subsidiary risk class of 5.1. Oxygen would not trigger the thresholds in the SEPP 33 Guidelines if considered as individual containers or in aggregate.
Grease DG class C2	400 grams cartridge, 20 litre container stored undercover on site	N/A	Grease would not be stored with Class 3 materials and would not be subject to the thresholds in the SEPP 33 Guidelines.
Adhesives DG class 3 PGIII	375 grams cartridge, 20 litre container on site	Five tonnes	Adhesives would not trigger the thresholds in the SEPP 33 Guidelines if considered as individual containers or in aggregate.
Bitumen DG class 9	12,000 litre tanker (brought onto site as required for the days operation)	N/A	Bitumen is a Class 9 dangerous good and not subject to the thresholds in the SEPP 33 Guidelines.

Material and Australian Dangerous Goods (DG) Code Class	Storage method (amount stored at any one time)	Inventory thresholds in the SEPP 33 Guidelines	Assessment against SEPP 33 inventory thresholds
Kerosene DG class 3 PGIII	20 litre container stored undercover in bunded area on site	Five tonnes	Kerosene would not trigger the thresholds in the SEPP 33 Guidelines if considered as individual containers or in aggregate.
Non shrink grout DG class N/A	20 kilogram bags stored under cover on site	N/A	Non shrink grout is not a dangerous good.
Release agent (Lanolin based) DG class N/A	20 litre drums stored undercover on site	N/A	Release agent (Lanolin based) is not a dangerous good and does not trigger the thresholds in the SEPP 33 Guidelines.
Line marking aerosol DG class 2.1	375 millilitre aerosol container stored undercover on site	100 kilograms	Line marking aerosol would not trigger the thresholds in the SEPP 33 Guidelines.

Table 25-5 Dangerous good and hazardous substances transported during operation

Material and Australian Dangerous Goods Code Class	Transport frequency	Transport quantity (indicative only)	Transport thresholds in the SEPP 33 Guidelines	Assessment against Applying SEPP 33 inventory thresholds
Sodium Hydroxide DG class 8 PGII	Six monthly	10,000 litres	Minimum transport load of 25 tonnes	Sodium hydroxide would not trigger the thresholds in the SEPP 33 Guidelines if considered as individual containers or in aggregate.
Coagulant DG class N/A	Quarterly	10,000 litres	N/A	Coagulant is not a dangerous good and does not trigger the thresholds in the SEPP 33 Guidelines.
Polymers DG class N/A	Quarterly	1,000 kilograms	N/A	Polymers are not a dangerous good and do not trigger the thresholds in the SEPP 33 Guidelines.
Diesel DG class C1 PGIII	As required	As required	N/A	Diesel would not be transported with Class 3 dangerous goods. It is not subject to the thresholds in the SEPP 33 Guidelines.
Acetylene DG class 2.1	Weekly	50 cylinders	Minimum transport load or transport frequency of two tonnes,	Industrial grade acetylene would not trigger the thresholds in the SEPP 33 Guidelines for minimum transport load or transport frequency of two tonnes, more than 30 times per

Material and Australian Dangerous Goods Code Class	Transport frequency	Transport quantity (indicative only)	Transport thresholds in the SEPP 33 Guidelines	Assessment against Applying SEPP 33 inventory thresholds
			more than 30 times per week	week.
Oxygen DG class 2.2	Weekly	50 cylinders	N/A	Industrial grade oxygen is a Class 2.2 dangerous good and is not subject to the thresholds in the SEPP 33 Guidelines.
Oxygen (subsidiary risk) DG class 5.1	Weekly	50 cylinders	Minimum transport load or transport frequency of two tonnes more than 30 times per week	Oxygen has a subsidiary risk class of 5.1. Oxygen would not trigger the transportation thresholds in the SEPP 33 Guidelines.
Grease DG class C2	Weekly	50 cartridges (20 kilograms)	N/A	Grease is not a dangerous good and would not be transported with Class 3 dangerous goods. Therefore, it is not subject to the thresholds in the SEPP 33 Guidelines.
Adhesives DG class 3 PGIII	Weekly	50 cartridges (19 kilograms)	Minimum transport load or transport frequency of 10 tonnes, more than 60 times per week	Adhesives would not trigger the thresholds in the SEPP 33 Guidelines.
Bitumen DG class 9	Quarterly	12,000 litres	Minimum transport frequency of more than 60 times per week	Bitumen would not trigger the thresholds in the SEPP 33 Guidelines.
Kerosene DG class 3 PGIII	Monthly	80 litres	Minimum transport load or transport frequency of 10 tonnes, more than 60 times per week	Kerosene would not trigger the thresholds in the SEPP 33 Guidelines.
Non shrink grout DG class N/A	Monthly	1,900 kilograms	N/A	Non shrink grout is not a dangerous good and therefore does not trigger the thresholds in the SEPP 33 Guidelines.
Release agent (Lanolin based) DG class N/A	Two monthly	180 litres	N/A	Release agent (Lanolin based) is not a dangerous good and therefore does not trigger the thresholds in the SEPP 33 Guidelines.
Line marking aerosol DG class 2.1	Quarterly	50 cans	Minimum transport load or transport frequency of two tonnes, more than 30 times per week	Line marking aerosol would not trigger the thresholds in the SEPP 33 Guidelines.

25.2.3 Transport of dangerous goods and hazardous substances in project tunnels

Dangerous goods and hazardous substances are not allowed to be transported within prohibited areas, in accordance with Road Rules 2014 – Regulation 300-2: NSW rule: carriage of dangerous goods in prohibited areas (Regulation 300-2). Prohibited areas are listed under Regulation 300-2 and include Sydney's major tunnels.

The project tunnels would be listed as a prohibited area under Regulation 300-2 prior to the commencement of the operation of the project. Signage would be provided near tunnel entry portals advising of applicable restrictions to ensure compliance with Regulation 300-2.

25.2.4 Incidents in the tunnels

Any road project carries an inherent risk of vehicle collision associated with its operation. The potential for incidents and crashes to occur is a function of:

- The design of the project
- The type and volumes of traffic using the project
- Driving conditions, including light conditions and meteorology
- Human factors, including compliance with road rules, attention to driving conditions, driver behaviour and fatigue
- Vehicle failure and breakdown.

The project has been designed to provide for efficient, free-flowing traffic with physical capacity to accommodate predicted traffic volume. The design has incorporated all feasible and reasonable design measures in relation to geometry, pavement, breakdown bays, lighting and signage. The design is consistent with current Australian Standards, road design guidelines and industry best practice, inherently minimising the likelihood of incidents and crashes.

Tunnel features designed to minimise the disruption caused by incidents and crashes include:

- Height detection system prior to the tunnel entry portals
- Tunnel barrier gates to prevent access in the event of tunnel closure
- Closed-circuit television (CCTV) throughout the tunnel and approaches
- Adjustable speed signs
- Appropriately spaced breakdown bays and emergency telephones.

The project has also been designed to meet appropriate fire and life safety requirements in the event of an incident or accident in the tunnel, as described in **Chapter 5** (Project description). Consultation has been undertaken and would be ongoing with Fire and Rescue NSW and other emergency services to ensure the fire and life safety requirements are achieved.

Each project tunnel would be one-directional, reducing the risk of crashes through head-on collisions and simplifying smoke management and egress requirements. The transport of dangerous goods and hazardous substances would be prohibited through the mainline tunnels and entry and exit ramps, reducing the risk of very large fires or the release of toxic materials in the tunnel.

Other fire and life safety aspects that would be incorporated into the project include:

- State of the art CCTV and audible systems to detect incidents and manage evacuation processes
- Multiple pedestrian cross-passages between the mainline tunnels and longitudinal egress passages along the entry and exit ramps, to allow pedestrians to exit the tunnel and ramps in the event of a major incident (refer to **Chapter 5** (Project description)). Cross-passages would cater for egress for people with disabilities; therefore, stairs or ramps with steep grades would be limited, or alternative safe holding zones would be provided where necessary
- Automatic fire and smoke detection within the tunnels

- Longitudinal ventilation to 'push' smoke in the direction of traffic flow away from the fire source towards a ventilation facility or tunnel portal
- A water deluge system that could be activated manually or automatically at the fire source
- Structures, linings and services that would be fire hardened to protect them from fire damage before the activation of the deluge system, or if the deluge system fails.

The likelihood of a fire during operation of the project cannot be entirely removed. Uncontrollable human factors inherently lead to a residual risk of incidents and crashes, although the likelihood of such events would be low.

In the event of an incident, approaching traffic would be prevented from entering the mainline tunnels. Vehicle occupants at the location of the fire and upstream of the fire source would be instructed to stop their vehicles, and exit in the opposite direction through the section of carriageway that would be protected by the smoke management system, or through an exit door to a cross-passage leading to the other ('non-incident') mainline tunnel.

Occupants downstream of the fire source would be encouraged to continue driving out of the tunnel. If this is not possible and they are forced to evacuate on foot, egress would be provided via an exit door to a cross-passage leading to the non-incident mainline tunnel. Emergency services would be able to reach the fire source via the non-incident tunnel (by vehicle or foot), or from the upstream direction in the affected tunnel (by foot).

25.2.5 Probability of tunnel fires

A summary of available tunnel fire incident data for Australia is provided in **Table 25-6**. A historical tunnel fire frequency based on a vehicle-kilometre basis for two of the tunnels listed in **Table 25-6** has been calculated:

- For the Lane Cove Tunnel, historical fire frequency has been around 0.5 fires per 100 million vehicle kilometres (all vehicles)
- For the CityLink Tunnels (in Victoria), historical fire frequency has been around 0.8 fires per 100 million vehicle kilometres (all vehicles).

Based on traffic forecasts, the mainline tunnels are anticipated to experience around 20 million vehicle kilometres in 2023 and around 40 million vehicle kilometres in 2033. Applying similar tunnel fire frequencies to forecast traffic volumes for the project indicates:

- An expected annual tunnel fire frequency of 0.10 to 0.15 is expected in 2021 (equivalent to about one fire incident every 6.6 to 10 years)
- An expected annual tunnel fire frequency of 0.20 to 0.30 is expected in 2031 (equivalent to one fire incident every 3.3 to five years).

These values are comparable to observed annual tunnel fire incident rates for other Australian tunnels presented in **Table 25-6**, which range from around 0.16 to 0.76 per year, or around 0.5 to 0.8 100 million vehicle kilometres. Details regarding traffic volumes with and without the project are provided in **Chapter 8** (Traffic and transport).

Table 25-6 Tunnel fire frequency based on available data for Australian tunnels (up to 2016)

Tunnel	Length	Opened to traffic	Comments on fire incidents	Traffic volumes	Incident frequency
Sydney Harbour Tunnel (NSW)	Two tunnels, each 2.7 kilometres	August 1992	Around 10 fires since opening (around 0.4 per year).	Around 80,000 vehicles per day Around 86 million vehicle kilometres per annum	0.5 per 100 million vehicle kilometre
M5 East Motorway Tunnel (NSW)	Two tunnels, each four kilometres	December 2001	Around 72 fire and smoke/fume incidents between 2002 and 2009, although this includes non-fire incidents (ie vehicle exhaust/fume events are included in the figure). A heavy vehicle fire in August 2012 led to closure of the tunnel (reopened within two hours), operation of the deluge system and fire brigade response.	Around 90,000 vehicles per day Around 130 million vehicle kilometres per annum	Insufficient data
M2 Motorway Tunnel (Norfolk Tunnel) (NSW)	Two tunnels, each 0.5 kilometres	May 1997	One heavy vehicle fire since opening (around 0.05 per year). A fire in September 2013 led to closure of the tunnel (reopened in three hours), operation of the deluge system and fire brigade response. The fire started in a vehicle's engine compartment.	Around 50,000 vehicles per day Around nine million vehicle kilometres per annum	0.7 per 100 million vehicle kilometres
Cross City Tunnel (NSW)	Two tunnels, each 2.1 kilometres	August 2005	Two fires recorded since the tunnel was opened in 2005 (around 0.16 per year). Of these fire incidents, one required the operation of the deluge system. The second fire was extinguished without the need for deluge.	Around 30,000 vehicles per day Around 23 million vehicle kilometres per annum	0.7 per 100 million vehicle kilometres

Tunnel	Length	Opened to traffic	Comments on fire incidents	Traffic volumes	Incident frequency
CityLink Tunnels (Burnley Tunnel and Domain Tunnel) (VIC)	Burnley Tunnel – two tunnels each 3.4 kilometres Domain Tunnel – two tunnels each 1.6 kilometres	December 2000	A total of 13 fires recorded since the tunnels were opened in late 2000 (around 0.76 per year). Of these fires, seven related to vehicle fires where the vehicle exited the tunnels without incident. Three of the fires required use of the deluge system and the remaining three fires required use of extinguishers. The most significant fire to occur was a result of a major car/truck collision in the Burnley Tunnel in 2007. This incident resulted in three fatalities and required closure of the tunnel for four days.	Around 55,000 (Burnley) and 45,000 (Domain) vehicles per day Around 94 million vehicle kilometres per annum (combined)	0.8 per 100 million vehicle kilometres (fires within the tunnel only)
Lane Cove Tunnel (NSW)	Two, tunnels, each 3.6 kilometres	March 2007	A total of five fires were recorded since the tunnels were opened in 2007 (around 0.5 per year). All of these fires required use of the deluge system.	Around 66,000 vehicles per day Around 87 million vehicle kilometres per annum	0.5 per 100 million vehicle kilometres

25.2.6 Incidents on surface roads

As discussed previously, the design of the project has been developed to inherently minimise the likelihood of incidents and crashes. Surface roads and infrastructure have been designed to provide an efficient and safe road network.

WestConnex provides an underground motorway connection for motorists travelling longer distances. In some cases, this results in fewer vehicles on major surface arterial roads across and in the vicinity of the project footprint. The M4-M5 Link would result in reduced traffic on sections of Parramatta Road, City West Link, and Victoria Road between Iron Cove Bridge (eastern abutment) and City West Link, and would also provide some relief for key north–south corridors such as Southern Cross Drive.

A detailed discussion of the impact of the project on traffic volumes is provided in **Chapter 8** (Traffic and transport).

The traffic reductions would result in the following traffic related benefits:

- Improved traffic flow and intersection performance
- Reduced crash rates
- Improved road safety for pedestrians, cyclists and motorists
- Improved travel times for bus services and motorists.

These traffic-related benefits are expected to result in an improved road safety environment.

Further details of the expected changes in traffic volumes on existing and new road infrastructure and improvements to road safety are provided in **Chapter 8** (Traffic and transport). Impacts and improvements to air quality, noise and human health risks are discussed in **Chapter 9** (Air quality), **Chapter 10** (Noise and vibration) and **Chapter 11** (Human health risk), respectively.

25.2.7 Road user and general hazards

Electric and magnetic fields

The Draft Radiation Standard – Exposure Limits for Magnetic Fields (Australian Radiation Protection and Nuclear Safety Agency December 2006) is based on a large body of scientific research since 1989. It proposes a series of exposure standards to replace the Interim Guidelines on Limits of Exposure to 50/60 Hz Electric and Magnetic Fields (National Health and Medical Research Council 1989).

Although the Draft Radiation Standard has never been finalised and published, the exposure limits presented are typically applied when considering electric and magnetic fields from new development. The project would include the provision of five aboveground substations, located at the Darley Road motorway operations complex (MOC1), Rozelle West motorway operations complex (MOC2), Rozelle East motorway operations complex (MOC3), Iron Cove Link motorway operations complex (MOC4) and Campbell Road motorway operations complex (MOC5). As identified in **Appendix F** (Utilities Management Strategy), the project would also require the provision of new high voltage (132kV) utility infrastructure and the relocation, treatment and/or protection of existing high voltage utility infrastructure, within and outside of the project footprint.

The detailed design of project substations and high voltage utility infrastructure would ensure that the exposure limits for the general public in the Draft Radiation Standard – Exposure Limits for Magnetic Fields (Australian Radiation Protection and Nuclear Safety Agency December 2006) would not be exceeded at the boundary of the substation sites or for high voltage utility infrastructure.

Bushfire risks

As outlined in **Chapter 18** (Biodiversity), vegetation in the project footprint comprises ‘urban exotic’ and ‘native cover’ (NSW Office of Environment and Heritage 2013a). No ‘bushland’ as defined in clause 4 of State Environmental Planning Policy No. 19 – Bushland in Urban Areas (SEPP 19) is considered to be present. Therefore, bushfires would not occur within the project footprint.

Notwithstanding, the operational infrastructure of the project is largely invulnerable to direct bushfire attack due to its incombustible nature (road surface materials, retaining walls, road barriers) and the fact that a lot of the infrastructure is in tunnels underground. Indirect bushfire risks to the project, including risks related to damage to communications networks or power supply are discussed in **Chapter 24** (Climate change risk and adaption). The project would not increase the extent of bushfire-prone land.

Aviation risks

The operational design of the project has considered airspace protection and associated risks and hazards. As discussed in **Chapter 2** (Assessment process) and **section 25.1.4**, under the Airports Act, a 'controlled activity' in relation to a prescribed airspace must not be carried out or caused to be carried out without the approval of the Secretary of DIRD or otherwise exempt under the Airspace Regulations.

CASA stipulates requirements for the construction and operation of new infrastructure that has the potential to influence aviation safety. CASA may determine that a plume, as exhausted from a ventilation outlet, is a hazardous object if the vertical velocity of the exhaust exceeds 4.3 metres per second. The Rozelle interchange and associated local road upgrades, the motorway operations complex at the St Peters interchange, and other ancillary infrastructure for the project would be located near flight paths used for Sydney Airport.

No buildings and structures that form part of the project are designed to intrude into prescribed airspace. The proposed ventilation outlets at the Rozelle interchange (at the Rozelle Rail Yards), Victoria Road (near the eastern abutment of Iron Cove Bridge) and at the St Peters interchange, are designed to be below prescribed airspace heights.

The project would include the construction and operation of ventilation facilities at:

- Haberfield, at the corner of Parramatta Road and Walker Avenue (this ventilation facility is being built as part of the M4 East project. The M4-M5 Link project would undertake the electrical and mechanical fitout of the ventilation outlet for the project)
- Rozelle, within the Rozelle Rail Yards
- Victoria Road, Rozelle, near the Iron Cove Link portals at Terry Street
- St Peters, within the St Peters interchange site near Campbell Road.

The exhaust plumes from all of the ventilation facilities have the potential to penetrate either or both the OLS or PANS-OPS levels. The project has been designed to satisfy requirements set by the DIRD in relation to erected structures (such as ventilation outlets), equipment manoeuvring and lighting. To determine whether plume rise resulting from the operation of these ventilation facilities would be a controlled activity as defined in section 183 of the Airports Act, a plume rise assessment would be carried out in accordance with the CASA *Advisory Circular Plume Rise Assessments AC 139-5(1) November 2012* prior to the operation of the project.

Aviation hazard lighting may be required on ventilation outlets at Haberfield, Rozelle, Iron Cove and St Peters. Surface road lighting would include an 'aeroscreen' type lens to minimise upward light spill. Aviation hazard lighting and surface road lighting would be in accordance with the requirements of CASA and Sydney Airport.

25.3 Environmental management measures

The implementation of environmental management measures for the project would avoid, to the greatest extent possible, risk to public safety and achieve the desired performance outcomes in relation to the hazards identified in **Table 25-1**. Environmental management measures relating to hazards and risk are outlined in **Table 25-7**.

In addition to these measures, a Work Health and Safety Plan would be implemented during construction of the project. This would support the management measures and procedures included in the CEMP for the project and would be supplemented by site and activity specific Safe Work Method Statements.

Table 25-7 Environmental management measures – hazards and risks

Impact	No.	Environmental management measure	Timing
Construction			
Spills and leaks from the storage and transport of dangerous goods and hazardous substances	HR1	Storage of dangerous goods and hazardous materials will occur in accordance with suppliers' instructions and relevant Australian Standards and legislation including the: • *Work Health and Safety Act 2011* (NSW) • Storage and Handling of Dangerous Goods Code of Practice (WorkCover NSW 2005) • Environment Protection Manual for Authorised Officers: Bunding and Spill Management, technical bulletin (NSW EPA 1997). Storage methods may include bulk storage tanks, chemical storage cabinets/containers or impervious bunds.	Construction
	HR2	Secure, bunded areas will be provided around storage areas for oils, fuels and other hazardous liquids. Impervious bunds will be of sufficient capacity to contain at least 110 per cent of the volume of the largest stored container.	Construction
	HR3	Management measures to reduce the potential for spills, reduce potential spill volumes and prevent any contamination will be developed and implemented for activities such as vehicle refuelling, servicing, maintenance, washdown, where there is a potential for spills and contamination.	Construction
	HR4	Safety Data Sheets for dangerous goods and hazardous substances will be stored on site prior to their arrival.	Construction
	HR5	Transport of dangerous goods and hazardous substances will be conducted in accordance with relevant legislation and codes, including the Dangerous Goods (Road and Rail Transport) Regulation 2014 (NSW) and the Australian Code for the Transport of Dangerous Goods by Road and Rail (National Transport Commission 2008).	Construction
	HR6	The project will be constructed in accordance with the design requirements of CASA and the Sydney Airport Master Plan 2033, with respect to lighting used during construction.	Construction
Operation			
Potential impacts from fire and safety incidents	OpHR1	The fire and safety systems and measures adopted for the project will be equivalent to or exceed the fire safety measures recommended by National Fire Protection Association 502 (American), Permanent International Association of Road Congresses (European), AS4825 (Australian) and Roads and Maritime standards.	Construction

Impact	No.	Environmental management measure	Timing
	OpHR2	Ongoing consultation will be undertaken with emergency services regarding fire and safety systems and measures adopted for the project.	Operation
	OpHR3	The transport of dangerous goods and hazardous substances will be prohibited through the mainline tunnels and entry and exit ramps.	Operation
	OpHR4	An Incident Response Plan will be developed as part of the Emergency Response Plan for the project and implemented in the event of an accident or incident.	Operation
	OpHR5	The response to incidents within the motorway will be managed in accordance with the memorandum of understanding between Roads and Maritime and the NSW Police Service, NSW Rural Fire Service, NSW Fire Brigade and other emergency services.	Operation
Spills and leaks from the storage and transport of dangerous goods and hazardous substances	OpHR6	Storage of dangerous goods and hazardous materials will occur in accordance with suppliers' instructions and relevant Australian Standards and legislation including the: • *Work Health and Safety Act 2011* (NSW) • Storage and Handling of Dangerous Goods Code of Practice (WorkCover NSW 2005) • Environment Protection Manual for Authorised Officers: Bunding and Spill Management, technical bulletin (NSW EPA 1997). Storage methods may include bulk storage tanks, chemical storage cabinets/containers or impervious bunds.	Operation
	OpHR7	Secure, bunded areas will be provided around storage areas for oils, fuels and other hazardous liquids. Impervious bunds will be of sufficient capacity to contain at least 110 per cent of the volume of the largest stored container.	Operation
	OpHR8	Management measures to reduce the potential for spills, reduce potential spill volumes and prevent any contamination will be developed and implemented for activities such as vehicle refuelling, servicing, maintenance or washdown, where there is a potential for spills and contamination.	Operation
	OpHR9	Material Safety Data Sheets for dangerous goods and hazardous substances will be stored on site prior to their arrival.	Operation
Exposure to electric and magnetic fields	OpHR10	The detailed design of the project substations will ensure that the exposure limits for the general public suggested by the Draft Radiation Standard (Australian Radiation Protection and Nuclear Safety Agency 2006) will not be exceeded at the boundary of the substation sites.	Construction
Impacts from air emissions	OpHR11	Should the exhaust plumes at any of the M4-M5 Link ventilation outlets be assessed as a 'controlled activity' under the Airports Act and the Airspace Regulations, then the project will be operated in accordance with any	Construction and operation

Impact	No.	Environmental management measure	Timing
		conditions of approval from the Secretary of DIRD.	
	OpHR12	Aviation hazard lighting (if required), building lighting and surface road lighting will be designed and operated in accordance with the requirements of CASA and the Sydney Airport Master Plan 2033.	Construction and operation