Roads and Maritime Services/Sydney Airport Corporation Limited

Sydney Gateway Road Project

Environmental Impact Statement/ Preliminary Draft Major Development Plan

Chapter 27 Approach to environmental management and mitigation

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Chapter 27

Approach to environmental management and mitigation

This chapter, together with Chapter 28, provides the synthesis of the findings of the combined EIS and preliminary draft MDP. This chapter compiles the key potential impacts of the project that have not been avoided and the measures proposed to avoid, minimise, manage or offset the impacts identified in Part B. It also provides a compilation of the performance outcomes for the project, project uncertainties, and the proposed approach to design refinements during future stages.

The SEARs and MDP requirements addressed in this chapter are listed below. Full copies of the SEARs and MDP requirements, and where they are addressed in this document, are provided in Appendices A and B respectively.

Reference	Requirement	Where addressed
General standard SEARs		
2	**Environmental Impact Statement**	
2.1	The EIS must include, but not necessarily be limited to, the following:	
	(l) a statement of the outcome(s) the proponent will achieve for each key issue	Section 27.4
	(q) a chapter[1] that synthesises the environmental impact assessment and provides:	
	- a succinct but full description of the proposal for which approval is sought;	Section 28.1
	- a description of any uncertainties that still exist around design, construction methodologies and/or operational methodologies and how these will be resolved in the next stages of the proposal;	Section 27.5
	- a compilation of the impacts of the proposal that have not been avoided;	Section 27.1
	- a compilation of the proposed measures associated with each impact to avoid or minimise (through design refinements or ongoing management during construction and operation) or offset these impacts;	Section 27.3
	- a compilation of the outcome(s) the proponent will achieve; and	Section 27.4
	- the reasons justifying carrying out the proposal as proposed, having regard to the biophysical, economic and social considerations, including ecologically sustainable development and cumulative impacts	Section 28.2
Major development plan requirements		
91(1)	(j) the airport-lessee company's plans for dealing with the environmental impacts mentioned in paragraph (h) (including plans for ameliorating or preventing environmental impacts)	Sections 27.2 and 27.3

Note: 1. The synthesis is provided in this part across two chapters. Chapter 27 focusses on the approach to environmental management and mitigation, and Chapter 28 provides the project summary, justification for the project and conclusion.

27. Approach to environmental management and mitigation

27.1 Compilation of impacts

Part B of the document provides an assessment of the potential impacts of the project during construction and operation. The key potential impacts of the project overall that require mitigation and management are summarised in Table 27.1 (construction) and Table 27.3 (operation). A summary of the key potential impacts on Sydney Airport land are provided in Table 27.2 (construction) and Table 27.4 (operation).

The identified impacts would be mitigated by implementing the environmental management procedures and plans described in section 27.2 and the mitigation measures compiled in section 27.3. With the implementation of the mitigation and management measures described in sections 27.2 and 27.3, the impacts are not considered significant.

Table 27.1 Summary of key potential construction impacts of the project overall

Issue	Key potential construction impacts
Traffic, transport and access	Increased congestion and delays for commuters, public transport (buses) and freight using Airport Drive/Qantas Drive and O'Riordan Street, and other intersections near Terminals 2/3, from changes to the road network during construction. Temporary lane closures on Canal Road, Qantas Drive, Airport Drive and Lancastrian Road, with the potential for congestion and delays. Temporary changes to active transport routes, including relocation of the existing Alexandra cycleway, would lead to an increase in travel distance of about 580 metres. This would lead to a minor increase in travel times for cyclists, and an increase in travel time for pedestrians of about nine to ten minutes. Impacts to some parking areas used by Sydney Airport as well as other private companies on Sydney Airport land.
Noise and vibration	One residential receiver on Baxter Road in Mascot would be highly noise affected (subject to noise levels of 75 dBA or greater) during 'peak' enabling works. Moderate exceedances of noise criteria predicted at residential receivers outside standard construction hours, including potential sleep disturbance impacts. Moderate (worst-case) impacts are predicted at the nearest commercial receivers when noise-intensive equipment is used. Some hotels may experience moderate worst-case impacts during standard construction hours and possible high worst-case impacts outside standard construction hours. High (worst-case) noise impacts are predicted at the Qantas Flight Training Centre during building demolition activities. High ground-borne noise impacts may be experienced from vibration-intensive equipment at a number of hotels and commercial buildings near the intersection of Qantas Drive, Joyce Drive and O'Riordan Street, and along Qantas Drive.
Airport operations	Large plant and equipment (such as cranes) would temporarily intrude into the OLS. Night lighting would be required to facilitate works within the specified minimum light intensity zones around the main north–south runway. Bodies of standing water within construction areas (eg detention ponds) may attract birds, increasing the risk of wildlife strike.
Air quality	Odour impacts from exposing waste within the former Tempe landfill.

Issue	Key potential construction impacts
Contamination and soils	Disturbance of contaminated soil and groundwater, including within the former Tempe landfill, has the potential to: ■ Mobilise contaminants, affecting nearby soils, surface water and groundwater ■ Increase the risk of exposure to contaminants (direct contact and/or inhalation) by site workers, visitors and the local community. Disturbance of contaminated sediments in Alexandra Canal, which could affect water quality. Ground disturbance activities in areas with existing remediation systems (in the former Tempe landfill and the Sydney Airport northern lands car park) may affect existing infrastructure, including capping layers, leachate management systems and gas venting systems. Disturbance of soils, including acid sulfate soils, resulting in erosion of exposed soil and stockpiled materials with associated water quality impacts and/or the production and mobilisation of sulfuric acid.
Flooding	Minor increase in inundation levels of up to 0.05 metres during a one per cent AEP flood event (ie an event that has a one in 100 chance of being exceeded in a year).
Groundwater	Potential migration of existing contaminants in groundwater during dewatering. The drawdown of groundwater may lead to ground settlement.
Surface water	Changes in overland flows and potential water quality impacts on watercourses and waterbodies from runoff from contaminated soils or untreated (contaminated) groundwater discharge. Potential to disturb and mobilise contaminated Alexandra Canal bed sediments.
Non-Aboriginal heritage	Direct impacts on Alexandra Canal and the Sydney (Kingsford Smith) Airport Group due to the construction of drainage outlets and removal of buildings at the Sydney Airport Jet Base. Subsurface excavations have the potential to impact archaeological remains. Potential vibration impacts on Alexandra Canal.
Aboriginal heritage	Potential impact to two areas with sub-surface Aboriginal archaeological potential as a result of pier construction for the Qantas Drive bridge and a drainage culvert connecting to the western side of Alexandra Canal. This has the potential to impact any items located in these areas.
Land use and property	In total, about 69.1 hectares of land would be required for construction, of which about 32.8 hectares of land would only be required temporarily. The temporary land requirements would include use of land within 54 lots, including about: ■ 16.7 hectares of Commonwealth-owned (Sydney Airport) land ■ 12 hectares of land owned by the NSW or local government (Inner West Council) ■ 4.2 hectares of privately owned land. The temporary and permanent land requirements would affect several properties, with the potential to partially affect a property where part of a site is required, requiring adjustments to/relocation of facilities to other parts of the site or fully affect a property if the entire site on which a property is located is required. The project's temporary and permanent land requirements would affect about 16 properties, three parking areas on Sydney Airport land and a number of advertising structures. Potential interruptions to utilities during utility adjustments and relocations.
Socio-economic impacts	The project's land requirements would require relocation or closure of five businesses. The project would result in the loss of empty storage container capacity on land occupied by Tyne Container Services and at the Cooks River Intermodal Terminal and adjacent overflow storage area. Construction would affect Tempe Lands, with land that is currently occupied by two community facilities (Tempe Golf Range and Academy and the off-leash dog exercise area) required during construction. Impacts on the amenity of the local community in some areas. Impacts on access to, and visibility of, some businesses near the entrance to Terminals 2/3. Benefits to businesses, including increased demand for services or expenditure at businesses within the study area.
Landscape character and visual amenity	It is estimated that there would be a net loss of about 749 trees across the project site. Visual impacts in the vicinity of work areas and from the identified viewpoints as a result of visible elements, such as construction work areas, machinery and equipment, fencing, soil stockpiles, waste materials and partially constructed structures.

Issue	Key potential construction impacts
Biodiversity	About 24 hectares of vegetation would be removed, comprising about 0.9 hectares of native vegetation, which provides limited habitat resources for native fauna. A small number of food trees for the Grey-headed Flying-fox and foraging habitat for microbats would be removed.
Health, safety and hazards	Noise impacts during construction may contribute to construction fatigue for residents in some areas in Mascot and St Peters. Potential public safety risks during modification of major trunk gas pipelines and/or high voltage electrical infrastructure.

Table 27.2 Summary of key potential construction impacts on Sydney Airport land

Issue	Key potential construction impacts – Sydney Airport land
Traffic, transport and access	Potential congestion and delays, particularly at the intersections of Qantas Drive/Sir Reginald Ansett Drive/Joyce Drive/O'Riordan Street and Qantas Drive/Seventh Street/Robey Street, due to temporary traffic changes and road works during construction. Impacts on some car parks with a temporary reduction in the amount of parking available.
Noise and vibration	Potential to affect the amenity of occupants within buildings on Sydney Airport land as a result of the use of noise-intensive equipment, demolition of buildings, and ground-borne noise during vibration-intensive works. High or moderate worst-case noise impacts may occur when noise-intensive equipment is used outside hotels. High worst-case impacts when noise-intensive equipment is used immediately outside the Qantas Flight Training Centre in its existing location.
Airport operations	See Table 27.1
Air quality	Potential dust impacts as a result of the generation of dust during construction. Impacts on the landfill gas venting system within the Sydney Airport northern lands car park.
Contamination and soils	Disturbance of known areas of contamination within the Sydney Airport northern lands car park, land north of the rail corridor, and Sydney Airport land along Alexandra Canal and Qantas Drive, with the potential to mobilise contaminants, impact receiving environments, and expose site users and workers to contaminants. Ground disturbance activities in the Sydney Airport northern lands car park may affect existing infrastructure, including leachate management systems and gas venting systems. Disturbance of soils, including acid sulfate soils, resulting in erosion of exposed soil and stockpiled materials with associated water quality impacts and/or the production and mobilisation of sulfuric acid.
Flooding	Minor increase in inundation levels of between 0.01 and 0.05 metres during a one per cent AEP flood event.
Groundwater	See Table 27.1.
Surface water	Discharges of extracted (contaminated) groundwater have the potential to impact the water quality of Mill Stream (if untreated).
Non-Aboriginal heritage	Direct impacts on elements of the Sydney (Kingsford Smith) Airport Group as a result of the removal of buildings at the Sydney Airport Jet Base. Subsurface excavations have the potential to impact archaeological remains.
Aboriginal heritage	Potential impact to areas with sub-surface Aboriginal archaeological potential (located mainly on Sydney Airport land) as per Table 27.1.
Land use and property	Temporary land requirements would include use of about 16.7 hectares of Sydney Airport land. The project's land requirements would affect six properties during construction. Three car parking areas located near Terminals 2/3 and a number of advertising structures located on Sydney Airport land would also be affected. Potential interruptions to utilities located on Sydney Airport land.

Issue	Key potential construction impacts – Sydney Airport land
Socio-economic impacts	Amenity impacts, such as increases in noise, vibration and dust, and visual impacts, could affect hotels and businesses on Sydney Airport land. Changes to access and traffic, with potential for delays for airline passengers, employees affecting businesses. Impacts on businesses as a result of the project's land requirements.
Landscape character and visual amenity	It is estimated that there would be a net loss of about 276 trees from the project site where it is located on Sydney Airport land. Potential for landscape character impacts as a result of the loss of vegetation that provides screening and contributes to the amenity and character of the local area.
Biodiversity	About 12.9 hectares of vegetation would be removed from the project site where it is located on Sydney Airport land, including 0.7 hectares of native vegetation.

Table 27.3 Summary of key potential operation impacts of the project overall

Issue	Key potential operation impacts
Traffic, transport and access	The average delay at most intersections would substantially decrease in 2026 (decreases of up to 230 seconds). Additional improvements (up to 373 seconds) would occur for the majority of the intersections in 2036. Vehicles travelling between St Peters interchange and Sydney Airport terminals via the project would reduce demand on the existing road network through Mascot. The project would alleviate the travel time increases forecast to occur in 2026 and 2036 without the project on most of the routes that were analysed. The travel time benefits associated with the project would be more pronounced in the morning peak, with improvements of around 30 to 70 per cent forecast across most of the routes. It is predicted that the route through Mascot would experience travel time improvements of up to 10 minutes in 2026 and 2036. Average vehicle speeds would increase by between 26 and 47 per cent with the project, and average trip times would decrease by between 15 and 22 per cent in 2026 and 2036 respectively, indicating a substantial improvement in network conditions. Travel times between St Peters interchange and Foreshore Road (providing access to Port Botany) would substantially reduce with the project. In 2026, travel time improvements of up to 17 minutes would be experienced, increasing to more than 20 minutes in 2036. Daily traffic flows on the Princes Highway would reduce by around 10 per cent (3,500 vehicles) in 2036 and daily traffic flows on Botany Road and O'Riordan Street would reduce by between 26 and 30 per cent (10,000 vehicles on Botany Road and 20,000 vehicles on O'Riordan Street) also in 2036. Relocation of the Alexandra Canal cycleway would increase the overall length by about 160 metres. This would result in less than one minute additional travel time for cyclists, and an additional three to four minutes of travel time for pedestrians.
Noise and vibration	Traffic noise levels at a number of receivers would exceed the operational road traffic noise criteria, and these receivers would be eligible for consideration of reasonable and feasible noise mitigation. Potential increase in aircraft-related ground-based operational noise emissions from Sydney Airport.
Airport operations	Potential for windshear and turbulence effects from the proposed emplacement mounds in Tempe Lands.
Flooding	Potential for substantial inundation, in addition to existing substantial flooding, at the Joint User Hydrant Installation area during a very large flood event. Improvements to the flood immunity of roadways used to access Terminal 1 and Terminals 2/3.
Surface water	A small increase in pollutant loads of Alexandra Canal is expected relative to existing conditions. A reduction in pollutant loads compared to existing conditions is predicted for Mill Stream.
Non-Aboriginal heritage	Potential visual impacts on heritage items - Alexandra Canal and the Sydney (Kingsford Smith) Airport Group - as a result of changes to the landscape and/or the presence of new infrastructure, including new bridges over the canal.

Issue	Key potential operation impacts
Land use and property	About 36.2 hectares of land would be permanently required for the project's functional and operational infrastructure. This would include: ■ 20.6 hectares of Commonwealth-owned (Sydney Airport) land ■ 14.1 hectares of land owned by the NSW or local government (Inner West Council) ■ 1.5 hectares of privately owned land. The project would affect about 18.5 hectares of industrial zoned land (under the relevant LEP), with a permanent change in land use from industrial to transport infrastructure. Of this, about 10 hectares is Sydney Airport land. The project would also affect about 2.7 hectares of land zoned for recreation/open space.
Socio-economic impacts	Closure and/or relocation of the Tempe Golf Range and Academy, Tyne Container Services, Boral Recycling, Visy Recycling and Qantas Flight Training Centre and relocation of the off-leash dog exercise area in Tempe Lands. Removal of advertising signs. Potential change in the amount of land available for open/space recreation uses as noted above. Changes in amenity due to increases in noise in some areas and the presence of permanent project features. This could affect the visibility of some businesses from passing traffic.
Landscape character and visual amenity	Impacts on landscape character and some key viewpoints due to the presence of the project's permanent infrastructure. Loss of vegetation that provides screening and contributes to the amenity and character of the local area.
Health, safety and hazards	Potential for landfill gas from the former Tempe landfill to accumulate in confined spaces such as utility pits.

Table 27.4 Summary of key potential operation impacts on Sydney Airport land

Issue	Key potential operation impacts – Sydney Airport land
Traffic, transport and access	Improved capacity and access to and from Sydney Airport and to the Sydney motorway network. Travel times between St Peters interchange and Sydney Airport's terminals would substantially reduce with the project. In 2026, travel time improvements of up to 23 minutes would be experienced, increasing to up to 30 minutes in 2036. As a result of the predicted intersection improvements, specifically at the Joyce Drive/O'Riordan Street and Qantas Drive/Robey Street intersections, the project would reduce vehicle delays and alleviate congestion that would occur at the main access points to Terminals 2/3 (without the project). Provision of access roads to Sydney Airport land, which would facilitate proposed developments under the Sydney Airport Master Plan.
Noise and vibration	Impacts on some hotels on Sydney Airport land from increased road traffic noise levels. Potential increase in aircraft-related ground-based operational noise emissions from Sydney Airport.
Airport operations	See Table 27.3.
Flooding	Minor increase in inundation levels on Sydney Airport land during a one per cent AEP event. Potential for substantial inundation, in addition to existing substantial flooding, at the Joint User Hydrant Installation area during a very large flood event. Minor changes to peak flows and velocities in areas to the south of the existing low points on Qantas Drive and in the vicinity of the Terminals 2/3 connection.
Surface water	Reduction of pollutant loads entering Mill Stream.
Non-Aboriginal heritage	Changes to the visual appearance of the northern edge of the Sydney (Kingsford Smith) Airport Group as a result of the widened section of Qantas Drive and the removal of existing buildings and associated landscape elements.
Land use and property	About 20.6 hectares of Sydney Airport land would be permanently required. The project's land requirements would permanently affect about four properties located on Sydney Airport land.

Issue	Key potential operation impacts – Sydney Airport land
Landscape character and visual amenity	Changes to the visual environment as a result of the new elevated road infrastructure near Terminals 2/3 would alter views along and from the road corridor.
Socio-economic impacts	The project would provide socio-economic benefits to Sydney Airport, mainly related to improved connectivity and faster travel times. This could result in increased economic productivity and employment opportunity at Sydney Airport. The project would facilitate the delivery of key planning directions in the Sydney Airport Master Plan by delivering additional road capacity to Sydney Airport. It would have the potential to service and/or facilitate growth of airline services, aviation support facilities, freight and commercial services on airport land in accordance with the plan. The project would provide enhanced road connections to Sydney Airport, contributing to the future economic productivity and efficiency of the airport itself, as well as that of businesses on Sydney Airport land.

27.2 Approach to environmental management

Roads and Maritime manages its environmental responsibilities and environmental performance through the implementation of an environmental management framework that is broadly consistent with the principles contained within the ISO 14000 series and standards. This includes establishing a corporate environmental policy, setting environmental direction through objectives and targets, integrating these into work systems, and providing measures for continuous improvement.

Roads and Maritime's Environment Policy Statement outlines the agency's commitment to effectively manage any risks that may lead to an impact on the environment.

This document has been prepared in accordance with Section 91(1) of the Airports Act and Division 5.2 of the EP&A Act, and is consistent with the *Sydney Airport Master Plan 2039* (SACL, 2019a) and the *Sydney Airport Environment Strategy 2019-2024* (SACL, 2019b).

Should the project be approved, Roads and Maritime will ensure the commitments made in this document, including any conditions of approval or legal requirements, are fulfilled.

The construction environmental management framework for the project is shown in Figure 27.1. Further information on the requirements for the CEMP, including an outline of the required sub-plans, is provided in section 27.2.1. The framework provides a guide to how the project as a whole would be managed during construction.

Detailed implementation and administration of management and mitigation measures (guided by the conditions of approval), across land subject to the EP&A Act and Sydney Airport land, would be confirmed at the next stage of the project. This would be subject to project approval (if approved), and in consultation with relevant authorities and agencies in both the Australian and NSW governments and other relevant stakeholders. The majority of plans and strategies shown on Figure 27.1 would apply to the project as a whole (ie to those elements of the project located on Sydney Airport land as well as those located on land subject to the EP&A Act). The exceptions to this are those that relate to the management of specific features (eg the former Tempe landfill).

The management of environmental impacts during operation is best achieved through the project's design. The iterative design and environmental assessment process allows impacts to be avoided or minimised where possible. Where environmental controls have been incorporated into the design there is a program of monitoring and review, including independent auditing, to ensure that the controls comply with stated objectives. Further information is provided in section 27.2.2.

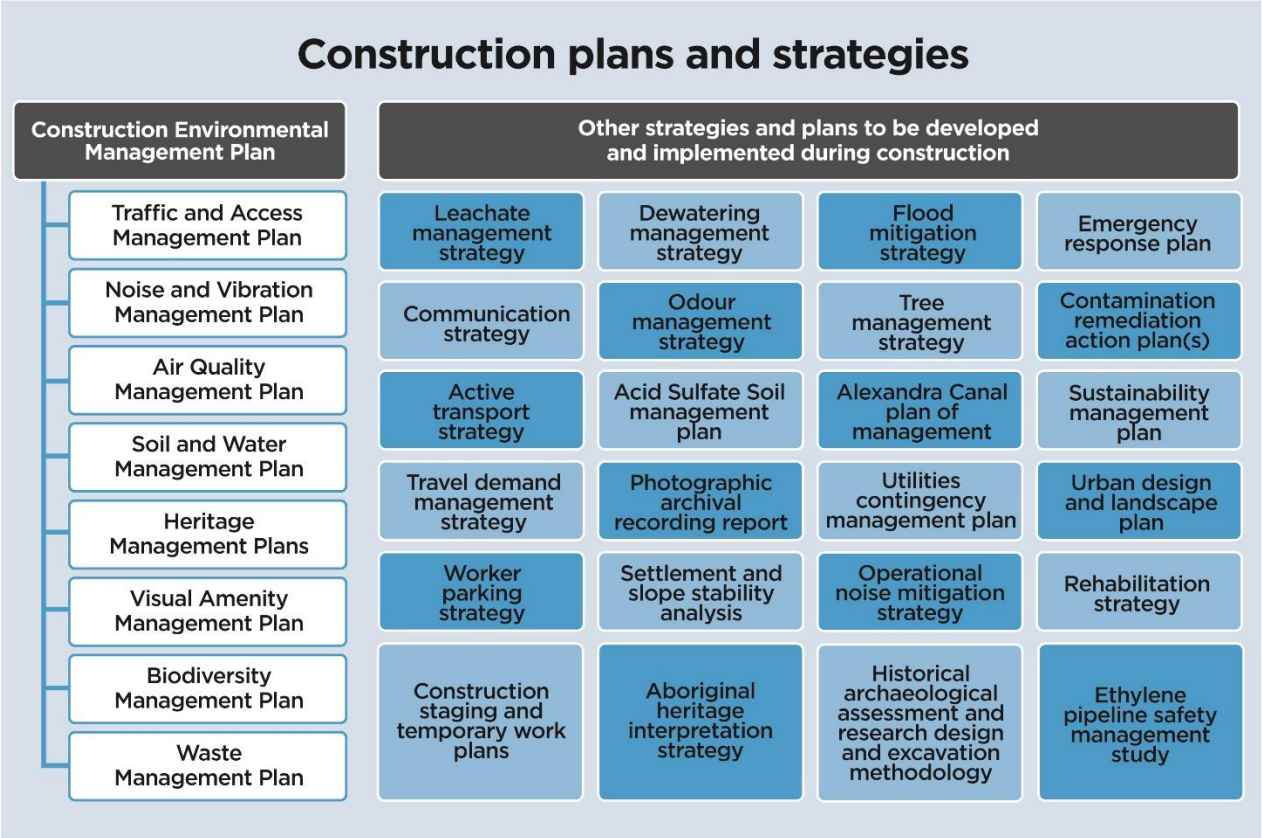

Figure 27.1 Construction environmental management framework

27.2.1 Construction environmental management plan

The management of environmental impacts during construction would be documented in the CEMP, which would be prepared by the construction contractor(s). The CEMP would provide a centralised mechanism through which all potential construction-related environmental impacts would be managed. It would also provide the overall framework for the system and procedures to ensure that environmental impacts are minimised, and that legislative and approval requirements are fulfilled. The CEMP would also include detailed management plans (environmental sub-plans), which would detail how specific environmental issues are to be managed during construction in accordance with the mitigation measures provided in section 27.3 and the project's approval conditions.

The CEMP would include:

- Roads and Maritime's environmental policy, objectives, and performance targets for construction
- Description of activities to be undertaken during construction
- Reference to all relevant statutory and other obligations, including consents, licences, approvals, permits and voluntary agreements required
- Environmental targets and performance indicators
- Specific mitigation measures and controls that would be applied to avoid or minimise negative environmental impacts
- Processes for demonstrating compliance with the commitments made in this document, the submissions/preferred infrastructure report (to be prepared), and relevant approval conditions
- Responsibilities for planning, implementing, maintaining and monitoring environmental controls including the responsibilities of sub-contractors

- An inspection regime to check the adequacy of controls as they are implemented during construction and a monitoring program to validate the impacts predicted for the project, to measure the effectiveness of environmental controls and implementation of the CEMP
- Environmental sub-plans which detail how construction activities would be managed to avoid or minimise impacts, including the type, location and timing of environmental controls – an outline of the minimum requirements for the sub-plans that would form part of the CEMP is provided below
- Requirements for regular inspections to evaluate the effectiveness of controls and compliance with CEMP and sub-plans by Roads and Maritime and Sydney Airport Corporation
- Processes for managing non-conformances, including identifying and implementing corrective and preventative actions to rectify the non-conformance and prevent recurrence
- Procedures for the control of environmental records
- Incident and contingency management procedures to mitigate environmental damage, and procedures for planning restoration activities, consistent with Roads and Maritime's Environmental Incident Classification and Reporting Procedure and Sydney Airport's relevant procedure
- Procedures for complaints handling and ongoing communication with the community, including the preparation of a communications strategy
- Details of training and awareness programs for personnel working on the project, including a compulsory site induction outlining the requirements of the CEMP, regular tool box talks on specific environmental issues, and daily pre-start meetings
- A compliance tracking and auditing program.

Environmental performance

The management measures detailed in the CEMP would be monitored during construction to confirm their effectiveness and whether any additional measures are required. Site inspections would be regularly undertaken to check and update erosion and sediment control measures as necessary. Environmental site monitoring would also be undertaken to confirm project impacts and existing environmental values in accordance with monitoring commitments made in this document.

The CEMP would provide for an internal compliance monitoring program where the construction contractor(s) would periodically monitor and report on project performance against conditions of approval. Independent external audits would also be carried out in accordance with *ISO 19011:2003 - Guidelines for Quality and/or Environmental Management Systems Auditing* every six months.

An environmental representative is likely to be engaged by Roads and Maritime to undertake an independent compliance monitoring role of the project on land subject to the EP&A Act.

Non-conformance and corrective action

For any environmental issues that arise, corrective and preventative actions must be implemented. Corrective and preventative actions might be developed to address issues or initiate environmental management improvement opportunities identified as a result of incidents, inspections and monitoring, and audit findings and other reviews.

The CEMP would document the corrective and preventative action procedures that will be implemented during construction of the project.

Continual improvement

The CEMP and sub-plans would be reviewed and updated as required in response to audit findings, compliance monitoring results, incidents and inspections that identify corrective and preventative actions. This would include regular management reviews by the construction contractor(s) and an annual review conducted by the contractor(s) as part of the continual improvement process.

Outline of CEMP sub plans

The CEMP would comprise a main CEMP document, issue-specific sub plans, activity-specific procedures, and site-based control maps. An outline of the required plans, and a guide to the general construction management measures required in each, is provided in Table 27.5 to Table 27.12. The requirement to prepare these plans is specified by the mitigation measures in relevant chapters, which have been compiled into section 27.3. It is noted that the conditions of approval may require different and/or additional matters to be addressed in the CEMP or sub plans.

Table 27.5 Construction Traffic and Access Management Plan outline

Construction Traffic and Access Management Plan	
Objectives	■ Ensure appropriate controls and procedures are implemented to minimise potential traffic impacts ■ Identify appropriate traffic management measures and establish a framework for coordinating their implementation ■ Maintain network journey times and congestion at acceptable levels ■ Ensure access to Sydney Airport is maintained
Purpose and requirements	The plan will detail processes and responsibilities to minimise traffic and access delays and disruptions, and identify and respond to changes in road safety. The plan will be prepared in accordance with relevant guidelines and standards, including *Traffic Control at Work Sites Technical Manual* (Roads and Maritime, 2018), Roads and Maritime *Specification G10 – Traffic Management*, and the guidelines listed in section 9.1. The plan will be prepared in consultation with Sydney Airport Corporation, the Sydney Coordination Office and relevant council(s). The plan will include measures to: ■ Ensure all relevant stakeholders are considered during all stages of the project ■ Communicate changes in traffic conditions and access arrangements to road users, emergency services, public transport operators and other affected stakeholders, including the use of variable message signage ■ Maintain access to Sydney Airport, local roads and properties ■ Provide safe routes for pedestrians and cyclists during construction ■ Minimise the number of changes to road users' travel paths and, where changes are required, implement a high standard of traffic controls that effectively warn, inform and guide ■ Stage construction in consultation with relevant traffic and transport stakeholders ■ Manage the movements of construction-related traffic to minimise traffic and access disruptions in the public road network ■ Manage temporary access arrangements where required ■ Minimise the loss of on-road parking for local residents and manage worker parking in accordance with the worker parking strategy ■ Identify haulage routes and minimise the use of local roads by the project's heavy vehicles ■ Provide a mechanism for the monitoring, review and amendment of this plan.
Example management measures	Management measures to be included in the plan and implemented during construction will include (but not be limited to): ■ Adequate road signage will be provided to inform drivers of the work, timing and alternative access arrangements ■ Heavy vehicle movements will be minimised during peak traffic times ■ Heavy vehicles will only use designated haulage and access routes ■ Bus transport will be provided to work sites from the nearest public transport hub by contractors ■ Designated queuing and idling areas will be determined near work areas to minimise disruption to the local community ■ Appropriate controls will be established where vehicles are required to cross footpaths to access construction sites. This may include manual supervision, physical barriers or temporary traffic signals as required ■ Construction vehicles will park within the construction compound where practicable

Construction Traffic and Access Management Plan	
	■ The timing of deliveries accessing the site will be programmed to ensure there is sufficient space within the project site to accommodate deliveries.
Related strategies, plans or requirements (see Chapter 9)	■ Communication strategy ■ Travel demand management strategy ■ Construction staging and temporary work plans ■ Active transport strategy ■ Worker parking strategy

Table 27.6 Construction Noise and Vibration Management Plan outline

Construction Noise and Vibration Management Plan	
Objectives	■ Minimise potential adverse noise and vibration impacts on the environment and community ■ Minimise unreasonable noise and vibration impacts on receivers ■ Avoid structural damage to buildings or heritage items as a result of construction vibration
Purpose and requirements	The plan will detail processes, responsibilities and measures to manage noise and vibration and minimise the potential for impacts during construction. It will provide the framework and mechanisms for the management and feasible and reasonable mitigation of potential noise and vibration impacts. The plan will be prepared in accordance with relevant guidelines and standards, including the *Interim Construction Noise Guideline* (DECC, 2009), *Construction Noise and Vibration Guideline* (Roads and Maritime, 2016), and the guidelines listed in section 10.1. The plan will be prepared in consultation with Sydney Airport Corporation and relevant government agencies, where relevant. It will: ■ Identify noise and vibration performance criteria ■ Confirm sensitive receptors and features in the vicinity of the project site, including a detailed land use survey and map ■ Include standard and additional mitigation measures from the *Interim Construction Noise Guideline*, *Construction Noise and Vibration Guideline* and details about when each will be applied ■ Consider cumulative construction noise impacts, construction noise fatigue and opportunities for early noise mitigation ■ Include protocols that will be adopted to manage works required outside standard construction hours, in accordance with relevant guidelines including for management of respite periods ■ Describe the process(es) that will be adopted for carrying out location and activity specific noise and vibration impact assessments to assist with the selection of appropriate mitigation measures ■ Include details for ongoing consultation with receivers and procedures for handling complaints ■ Include measures to manage vehicle movements outside standard construction working hours ■ Provide a mechanism for the monitoring, review and amendment of this plan.
Example management measures	Management measures to be included in the plan and implemented during construction will include (but not be limited to): ■ Maximise offset distances between receivers and noisy plant or activities ■ Minimise the number of consecutive nights of works adjacent to any particular set of receivers ■ Restrict heavy vehicle movements, heavy deliveries and loading and unloading processes to daytime periods and to areas away from receivers where practicable ■ Non-tonal reversing beepers (or an equivalent mechanism) must be fitted and used on all construction vehicles and mobile plant regularly used on site and for any out of hours work

Construction Noise and Vibration Management Plan	
	■ Use structures to shield residential receivers from noise such as site shed placement; earth bunds; fencing; erection of operational stage noise barriers (where practicable) and consideration of site topography when situating plant ■ No dropping of materials from height, throwing of metal items and slamming of doors ■ Use quieter and less vibration emitting construction methods where feasible and reasonable ■ Limit the use of engine compression brakes at night and in residential areas ■ Regularly maintain and monitor plant and equipment to ensure noise emissions are not excessive.
Related strategies, plans or requirements (see Chapter 10)	■ Operational noise mitigation strategy

Table 27.7 Construction Air Quality Management Plan outline

Construction Air Quality Management Plan	
Objectives	■ Minimise gaseous and particulate pollutant emissions from construction activities as far as feasible and reasonable ■ Identify and control potential dust and air pollutant sources ■ Minimise odour and landfill gas generation from the former Tempe landfill and Sydney Airport northern lands car park
Purpose and requirements	The plan will detail processes, responsibilities and measures to manage air quality and minimise the potential for impacts during construction. The plan will be prepared in accordance with relevant guidelines and standards, including the *Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales* (DEC, 2007a) and the guidelines listed in section 12.1. The plan will be prepared in consultation with Sydney Airport Corporation and relevant government agencies, where relevant. The plan will include measures to: ■ Minimise project and cumulative dust generation from stockpiles, demolition activities, haulage routes, work activities, exposed ground surfaces and ancillary facilities ■ Minimise emissions from construction plant, vehicles and machinery ■ Minimise odour impacts from the former Tempe landfill in accordance with the odour management strategy ■ Minimise and manage landfill gas during construction ■ Provide a mechanism for the monitoring, review and amendment of this plan.
Example management measures	Management measures to be included in the plan and implemented during construction will include (but not be limited to): ■ Temporarily stabilise exposed soils and stockpiles of loose materials (for example by dampening, covering or applying soil binders) during weather conditions conducive to dust generation and prior to extended periods of inactivity to prevent dust generation ■ Any exposed surfaces will be stabilised as soon as possible ■ Dust generation will be monitored visually, and where required, dust control measures such as water spraying, dust screens and surface treatments will be implemented to control the generation of dust. ■ Install wheel washing systems and rumble grids at compound egress points to prevent deposition of loose material on sealed surfaces outside project sites to reduce potential dust generation ■ Monitor site access points regularly and remove sediment as required to avoid dust generation ■ Processes and procedures will be developed to manage landfill gas in the former Tempe landfill and Sydney Airport northern lands car park ■ Modify or cease construction activities with the potential to generate dust during unfavourable weather conditions as required to reduce the potential for amenity impacts on adjacent sensitive receivers ■ All vehicles loads will be covered to prevent escape of loose materials during transport

Construction Air Quality Management Plan	
	■ All plant and machinery will be fitted with emission control devices complying with relevant Australian Standards ■ Minimise the duration which excavated waste materials from the former Tempe landfill are exposed to prevent odour generation.
Related strategies, plans or requirements (see Chapter 12)	■ Odour management strategy

Table 27.8 Construction Soil and Water Management Plan outline

Construction Soil and Water Management Plan	
Objectives	■ Appropriate controls and procedures are implemented during construction activities to avoid or minimise erosion and sedimentation impacts and potential impacts on water quality in surrounding watercourses ■ Appropriate measures are implemented to address the relevant conditions of approval, legislation and mitigation measures provided in this document.
Purpose and requirements	The plan will detail processes, responsibilities and measures to manage potential soil and water quality impacts during construction, including potential impacts associated with the presence of existing contamination, stockpile management, saline soils and acid sulfate soils. The plan will be prepared in accordance with relevant guidelines and standards, including the Blue Book *a*nd the guidelines listed in sections 13.1, 15.1 and 16.1. The plan will be prepared in consultation with Sydney Airport Corporation and government agencies, where relevant. The plan will: ■ Develop stockpile management procedures to prevent cross-contamination of clean soil with contaminated soil by including location restrictions, separate of waste types, stabilisation and sediment controls ■ Develop a water quality monitoring program to monitor potential surface water and groundwater quality impacts, including discharge criteria ■ Describe measures to minimise and/or manage sediment and erosion within the project footprint, including overland flow, including requirements for erosion and sediment control plans ■ Describe measures to manage actual and potential acid sulfate soil and sediment disturbed during construction by preparing an acid sulfate soils management plan ■ Describe measures to manage saline soils disturbed during construction ■ Describe measures to manage leachate at the former Tempe landfill ■ Describe procedures for managing unexpected contamination finds ■ Describe procedures for managing groundwater impacts including treatment requirements ■ Describe procedures for dewatering accumulated water on site and within sediment basins, including discharge criteria ■ Describe spill management procedures including requirements for locating and maintaining spill response materials such as spill kits ■ Provide a mechanism for the monitoring, review and amendment of this plan.
Example management measures	Management measures to be included in the plan and implemented during construction will include (but not be limited to): ■ Erosion and sediment control measures will be implemented in accordance with the Blue Book and maintained to: — Prevent sediment moving off site and sediment laden water entering any water course, drainage lines, or drain inlets — Reduce water velocity and capture sediment on site — Minimise the amount of material transported from site — Divert clean water around the site ■ Erosion and sediment controls will be inspected and maintained on a regular basis and records kept and provided on request

Construction Soil and Water Management Plan	
	■ Clearing of vegetation and site stabilisation of disturbed areas will be undertaken progressively to limit the time disturbed areas are exposed ■ Stockpile topsoil separately for potential reuse in landscaping and rehabilitation works ■ Protect stockpiles to prevent erosion during rainfall ■ Permanent surface water drains will be installed to act as diversion drains during the construction phase, where practicable ■ All potentially contaminating, contaminated and hazardous substances will be stored in secured, bunded and impervious locations. Storage locations will be isolated from surface water runoff ■ Refuel construction plant and equipment using dedicated refuelling equipment to reduce the potential for spills. Ensure that stocked spill kits and personnel trained in their use are present during all refuelling ■ Vehicle washdowns and/or concrete truck washouts will be undertaken within a designated area or undertaken at a suitable location off site ■ Site facilities will be located outside flood hazard areas or be elevated above the ground, where possible ■ Awareness training will be provided for all onsite staff to assist in the identification of potentially contaminated material ■ Spill containment kits will be present and maintained on site during all activities where potential spills could occur ■ Develop site shutdown procedures and implement them before forecast inclement weather and before planned site shutdowns of more than 48 hours. Update the procedures as the project site develops and changes.
Related strategies, plans or requirements (see Chapters 13 to 16)	■ Contamination remediation action plan(s) ■ Acid Sulfate Soil management plan ■ Alexandra Canal plan of management ■ Settlement and slope stability analysis ■ Leachate management strategy ■ Dewatering management strategy ■ Flood mitigation strategy ■ Rehabilitation strategy ■ Groundwater monitoring program ■ Surface water monitoring program

Table 27.9 Construction Heritage Management Plans outline

Construction Heritage Management Plans	
Objectives	■ Ensure appropriate controls and procedures are implemented during construction to avoid or minimise potential adverse impacts on items of heritage value ■ Avoid accidental impacts on heritage items ■ Maximise worker's awareness of heritage.
Purpose and requirements	Plans will be prepared to manage non-Aboriginal heritage and Aboriginal heritage and minimise the potential for impacts during construction. The Heritage Management Plan will take into account relevant conservation and heritage management policies in the Alexandra Canal Conservation Management Plan and the Sydney Airport Heritage Management Plan. The plan will be prepared in accordance with the guidelines listed in section 17.1. It will include: ■ Identification of heritage items in the vicinity of the project site ■ Measures to manage potential impacts on heritage items ■ Heritage awareness and management training for relevant personnel involved in site works ■ Details regarding the conservation and curation of any historical artefacts recovered during works ■ Procedures for the reinstatement of areas of heritage value that would be temporarily impacted by construction following the completion of construction

Construction Heritage Management Plans	
	■ Procedures to manage unexpected items of potential heritage significance or human remains in accordance with the *Standard Management Procedure Unexpected Heritage Items* (Roads and Maritime, 2015e). ■ Procedures for photographic archival recording in accordance with the NSW Heritage Office's *How to Prepare Archival Records of Heritage Items* (1998), and *Photographic Recording of Heritage Items Using Film or Digital Capture* (2006) ■ Heritage monitoring and auditing requirements to determine the effectiveness of measures ■ Management guidelines consistent with NSW heritage guidelines and the Sydney Airport Heritage Management Plan. The Aboriginal Heritage Management Plan will be prepared in accordance with relevant guidelines and standards, including the Aboriginal Cultural Heritage Assessment Report (as part of this document), the Sydney Airport Heritage Management Plan and the guidelines listed in section 18.1. It will include: ■ Relevant requirements as listed above ■ The salvage excavation methodology as described in Technical Working Paper 10 (Aboriginal Cultural Heritage Assessment Report) ■ Process for additional consultation with Aboriginal stakeholders in accordance with *Aboriginal Cultural Heritage Consultation Requirements for Proponents* (DECC, 2010c).
Example management measures	Management measures to be included in the plans and implemented during construction will include (but not be limited to): ■ Impacts on heritage items will, to the greatest extent practicable, be avoided and minimised ■ All identified items within and in the immediate vicinity of the proposal site would be marked on the environmental control maps, site plans, fenced off where appropriate, and avoided
Related strategies, plans or requirements (see Chapters 17 and 18)	■ Historical archaeological assessment and research design and excavation methodology ■ Photographic archival recording report ■ Aboriginal heritage interpretation strategy

Table 27.10 Construction Visual Amenity Management Plan outline

Construction Visual Amenity Management Plan	
Objectives	■ Ensure appropriate controls and procedures are implemented during construction to minimise potential adverse visual impacts on receivers ■ Minimise the duration and extent of temporary visual and landscape character impacts ■ Minimise visual impacts from ancillary facilities ■ Retain and protect existing trees not required to be removed ■ Ensure progressive rehabilitation of disturbed areas and appropriate site remediation at the completion of construction.
Purpose and requirements	The plan will detail processes, responsibilities and measures to minimise the potential for visual impacts during construction. The plan will be prepared in accordance with relevant guidelines and standards, including those listed in section 21.1. The plan will: ■ Identify tree protection locations ■ Identify responsibility for ongoing tree management ■ Include measures from the tree management strategy ■ Describe measures to minimise visual and landscape character impacts during construction ■ Describe measures to reduce visual impacts from ancillary facilities ■ Describe requirements for construction site remediation, taking into account the project's urban design and landscape plan ■ Provide a mechanism for the monitoring, review and amendment of this plan.

Construction Visual Amenity Management Plan	
Example management measures	Management measures to be included in the plan and implemented during construction will include (but not be limited to): ■ Construction programming will ensure progressive rehabilitation of disturbed areas to minimise the duration and extent of temporary visual and landscape character impacts ■ Provide barriers to screen views from visually sensitive nearby areas such as residential and recreational areas ■ The design and maintenance of construction compound hoardings will aim to minimise visual impacts and landscape character impact, including the prompt removal of graffiti ■ The design of temporary lighting will avoid unnecessary light spill on adjacent residents or sensitive receivers and be designed in accordance with the *Manual of Standards Part 139 – Aerodromes* (CASA, 2017) and the *National Airports Safeguarding Framework* (Guideline E) ■ Existing trees to be retained within construction areas will be identified, protected and maintained in accordance with *AS4970 Trees on Development Sites* and the project's tree management strategy ■ Any tree pruning will be undertaken in accordance with the project's tree management strategy, guided by a qualified arborist ■ Temporary impacts on public open space will be rehabilitated in consultation with the relevant local council and/or landowner.
Related strategies, plans or requirements (see Chapter 21)	■ Tree management strategy ■ Urban design and landscape plan

Table 27.11 Construction Biodiversity Management Plan outline

Construction Biodiversity Management Plan	
Objectives	■ Ensure controls and procedures are implemented during construction to avoid, minimise or manage potential adverse impacts on biodiversity within and adjacent to the project site ■ Retain and protect existing flora and fauna habitat wherever possible ■ Appropriately manage the spread of weeds and plant pathogens.
Purpose and requirements	The plan will detail processes, responsibilities and measures to assess, monitor, minimise and mitigate biodiversity impacts. The plan will be prepared in accordance with relevant legislation, guidelines and standards, including the *Biodiversity Conservation Act 2016*, EPBC Act, the *Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects* (Roads and Traffic Authority, 2011), and the guidelines listed in section 22.1. The plan will be prepared in consultation with Sydney Airport Corporation and government agencies, where relevant. The plan will include: ■ Vegetation maps ■ Tree assessment and management protocols consistent with the tree management strategy ■ A process for vegetation clearing including the establishment of exclusion zones at the limit of clearing to protect vegetation to be retained ■ An unexpected threatened species finds procedure ■ A process for identifying and managing priority and environmental weeds and other pests prior to, during, and after construction (including within vegetation exclusion zones) ■ A protocol to minimise the potential for the spread of pathogens such as Chytrid or Phytophthora fungus into and out of the site during construction ■ Provide a mechanism for the monitoring, review and amendment of this plan.

Construction Biodiversity Management Plan	
Example management measures	Management measures to be included in the plan and implemented during construction will include (but not be limited to): ■ Biodiversity awareness training will be incorporated into the site induction and relevant toolbox talks and pre-starts ■ Identify and locate habitat features on site, and mark those to be protected during clearing ■ Clear vegetation so as not to mix topsoil with debris and to avoid impacts on surrounding native vegetation ■ The *AS 4373-2007 Pruning of amenity trees* will be followed for all pruning works ■ The unexpected threatened species finds procedure will include the requirement to stop work, notify the environment manager and seek the advice of an ecologist and relevant regulatory agencies before recommencing construction.
Related strategies, plans or requirements (see Chapter 22)	n/a

Table 27.12 Construction Waste Management Plan outline

Construction Waste Management Plan	
Objectives	■ Ensure measures are identified and implemented to minimise waste, manage waste and conserve energy throughout the construction of the project ■ Implement the preferred waste management hierarchy of avoidance, minimisation, reuse, recycling and finally disposal is followed ■ Maximise awareness of waste and resource use management issues ■ Minimise waste throughout the project
Purpose and requirements	The plan will detail processes, responsibilities and measures to minimise waste generation and conserve energy during construction. The plan will be prepared in accordance with relevant guidelines and standards, including the *NSW Waste Avoidance and Resource Recovery Strategy 2014-21* (NSW EPA, 2014b) and the guidelines listed in section 24.1. The plan will be prepared in consultation with Sydney Airport Corporation and government agencies, where relevant. The plan will include: ■ Training and awareness requirements ■ Expected waste types and volumes ■ Proposed waste reuse, recovery and recycling and disposal measures ■ Specific measures to manage vegetation waste ■ Procedures for managing office and project waste materials including separation, treatment and disposal in accordance with relevant guidelines ■ The process for identifying waste reuse sites including approval requirements ■ Emplacement mound locations, onsite spoil management and off site transport protocols (if required) ■ Procedures for the identification, handling and disposal of hazardous materials including potential asbestos waste ■ Waste tracking, record keeping and reporting requirements, including the implementation of a waste register ■ A mechanism for the monitoring, review and amendment of the plan.
Example management measures	Management measures to be included in the plan and implemented during construction will include (but not be limited to): ■ Waste management strategies will be implemented in accordance with the *Waste Avoidance and Resource Recovery Act 2001* management hierarchy ■ All wastes, including contaminated wastes, will be identified and classified in accordance with the *Waste Classification Guidelines: Part 1 Classifying Waste* (NSW EPA, 2014a) ■ Where possible and fit for purpose, spoil will be beneficially reused by the project before off-site reuse or disposal options are pursued

Construction Waste Management Plan	
	■ Excavated material that is not suitable for on-site reuse or recycling will be transported to a site that may legally accept that material for reuse or disposal ■ Waste segregation bins/stockpiles will be located at various locations within the project site, if space permits, to facilitate segregation and prevent cross contamination ■ Trees and weed free plant material will be mulched or chipped on site and used in landscaping where practicable to stabilise disturbed soils ■ Identify recycled materials (such as recycled aggregates in road pavement and surfacing; steel with recycled content) for use in construction or operation of the project where they are cost, quality and performance competitive.
Related strategies, plans or requirements (see Chapter 24)	■ n/a

27.2.2 Operational environmental management

The iterative design and environmental impact assessment process has enabled Roads and Maritime to avoid and minimise environmental impacts from the project, where feasible and reasonable. Where environmental controls have been incorporated into the design, there is a program of monitoring and review including independent auditing, to ensure the controls comply with stated objectives.

Operational environmental management would be undertaken in consultation with Sydney Airport Corporation and other relevant stakeholders. The environmental management of the project would be consistent with the *Sydney Airport Master Plan 2039* and *Sydney Airport Environment Strategy 2019-2024*. Once construction of the project has been completed, the responsibility for ongoing operational management of the road infrastructure would be handed back to Roads and Maritime from the construction contractor(s). The ongoing operational management of residual land would be handed back to relevant authorities, such as Inner West Council and Sydney Airport Corporation.

Roads and Maritime manage their legislative and environmental management obligations through the use of a number of procedures, guidelines, guidance notes, and technical notes to provide guidance and set expectations in environmental planning and management of the road network and assets. Specifications, including but not limited to, Routine Services Specification (M3), General Specification – Environmental Protection (Management Systems) Maintenance (G36M) and General Specification – Soil and Water Management (G38) are used to outline the environmental planning and management expectations and requirements of the stewardship maintenance contractors. The stewardship maintenance contractors are also required to operate under an environmental management system, have a program environmental management plan, and have specific construction environmental management plans for activities that are undertaken on the network. Ongoing maintenance of the project on Sydney Airport land would be confirmed with the Australian Department of Infrastructure, Transport, Cities and Regional Development.

The mitigation measures that would be implemented during operation are listed in Table 27.15.

27.3 Compilation of mitigation measures

Table 27.13 to Table 27.15 provide a compilation of the measures proposed to mitigate and manage the potential impacts of the project, as detailed in Part B. Table 27.13 provides those measures relevant to the design of the project, which would be implemented as part of the detailed design stage to guide how the project is designed. Table 27.14 provides those measures relevant to construction, including construction planning and the development of the recommended strategies and plans that would be implemented during construction – some of which would be developed pre-construction. Table 27.15 provides those measures relevant to operation, which would be implemented during the operational stage and would guide how the project is operated and maintained in the long-term.

The measures listed may be revised in response to submissions raised during public exhibition of the EIS/preliminary draft MDP and/or any design changes made following exhibition. The final list of mitigation measures would be provided in the submissions/preferred infrastructure report and final MDP.

If the project is approved, the conditions of approval, which would include reference to the finalised mitigation measures, would guide the preparation and content of relevant plans for all phases of the project. The project would be undertaken in accordance with the conditions of approval and the final list of mitigation measures.

The measures are broadly grouped according to the main stage of implementation and apply to an issue or impact rather than specific jurisdictions (land subject to either the Airports Act or EP&A Act). It is noted that the implementation of some measures may occur across a number of stages. The majority of measures will apply to the project as a whole (ie to those elements of the project that are located on Sydney Airport land as well as those located on land subject to the EP&A Act). The exceptions to this are those measures that relate to specific features such as Alexandra Canal and the former Tempe landfill.

Table 27.13 Compilation of mitigation measures for detailed design

Ref	Issue	Mitigation measures – detailed design
Noise and vibration		
NV3	Potential operational noise impacts	An operational noise mitigation strategy will be developed and implemented as part of the design, including investigating the need for low noise pavements, noise barriers and at-property mitigation.
NV14	Noise impacts due to ground-based airport activities	Investigate reasonable and feasible options to reduce the propagation of noise from ground-based airport activities following removal of buildings as part of the project. This will include options to retain screening provided by existing buildings.
NV15	Operational noise and vibration impacts of the project	Operational noise and vibration mitigation measures will be identified during detailed design. Requirements for at-property noise treatments in properties identified as 'eligible' in the noise and vibration assessment will be reviewed. The implementation of treatments will be undertaken in accordance with the *At-Receiver Noise Treatment Guideline* (Roads and Maritime, 2017b).
Airport operations		
AS1	Windshear and turbulence	The road infrastructure and final landforms (including the emplacement mounds) will be reviewed and refined during detailed design to: ■ Address aviation matters ■ Minimise the volume of material excavated from the former Tempe landfill ■ Maximise open space and community use opportunities ■ Avoid disturbance outside the project boundary. To achieve the above requirements, alternative mound locations, heights and shapes will be considered. With respect to aviation, any changes to road infrastructure and final landforms will be assessed in relevant wind directions, in accordance with the *National Airports Safeguarding Framework* (Guideline B), to identify an optimal design. The optimisation process will address Sydney Airport operational requirements, and will occur in consultation with Sydney Airport Corporation, aviation stakeholders, and Australian, NSW and local government agencies.
AS2	Runway public safety areas	A risk assessment in accordance with the principle of 'as low as reasonably practicable' (ALARP) will be undertaken to confirm the risk associated with operating the project within the public safety area to the north of the main north–south runway. The assessment will include consideration of the *National Airports Safeguarding Framework* (Guideline I). The results of the assessment will inform the design of the project.
AS3	Permanent intrusions of Sydney Airport's prescribed airspace	The project will continue to be designed to avoid intrusions of Sydney Airport's prescribed airspace by permanent project infrastructure.
AS4	Wildlife attraction as a result of drainage and flooding management infrastructure	All drainage and flood management infrastructure (including the flood mitigation basin) will be designed in accordance with Sydney Airport's Wildlife Management Plan to minimise the risk of attracting wildlife. Appropriate

Ref	Issue	Mitigation measures – detailed design
		measures will be developed and implemented, including designing the infrastructure to ensure that water does not pond for more than five days.
AS5		The urban design and landscape plan for the project will include consideration of appropriate landscape designs and species lists to minimise opportunities to attract wildlife at levels likely to present a hazard to aviation operations. The plan will have regard to relevant requirements and species lists under Sydney Airport's Wildlife Management Plan and other relevant guidelines, including the *National Airports Safeguarding Framework* (Guideline C) and *Recommended Practices No. 1 – Standards for Aerodrome Bird/Wildlife Control* (International Birdstrike Committee, 2006).
AS6	Pilot distraction as a result of street lighting and headlight glare	Lighting will continue to be designed in accordance with *AS/NZS 1158.1.1:2005 Lighting for roads and public spaces Part 1.1: Vehicular traffic (Category V) lighting – Performance and design requirements.*
AS7		The project will continue to be designed to minimise the risk of headlight glare and pilot distraction. This will include providing glare screens in those locations where there is an unacceptable risk of pilot distraction.
AS8	Interference with communication, navigation and surveillance equipment	The detailed design will be referred to Airservices Australia to confirm that there will be no impacts to navigations aids, communications or surveillance equipment.
AS9		The utilities contingency management plan (measure HS2) will include measures to respond to any unplanned outages of services to critical Sydney Airport infrastructure, including navigations aids, communications and surveillance equipment.
Air quality		
AQ2	Avoiding odour impacts	Detailed design will seek to minimise odour impacts at the former Tempe landfill by: ■ Minimising the need to expose waste, and/or the area exposed at any one time ■ Where there is the potential to generate odour, managing this in accordance with the odour management strategy.
Contamination and soils		
CS1	Investigation of data gaps and potential for unidentified asbestos containing materials	Additional soil and groundwater investigations will be undertaken to inform detailed design, construction planning, and preparation of remediation action plan(s) (RAP(s)). The investigations will include: ■ Further characterising the existing contamination status of the project site, including the potential for unidentified asbestos containing materials ■ Groundwater investigations for all assessment areas and any indirectly affected areas. ■ Soil and groundwater testing to address data gaps for land north of the rail corridor and Sydney Airport land.
CS2	High salinity potential	Soil salinity will be considered in the design of subsurface structures.
CS3	Management of contaminated sites	Where the project has the potential to affect the remediation systems in the former Tempe landfill and Sydney Airport northern lands car park, the controls and protocols outlined in the existing EMP will be implemented such that the systems continue to operate effectively during operation. A RAP (or multiple RAPs) will be prepared (as required) to describe the remediation strategy to be implemented to ensure that existing contamination does not pose a future risk to human health or the environment during operation. The RAP(s) will be prepared by a suitably qualified and experienced consultant, as defined in Schedule B9 of the *National Environment Protection (Assessment of Site Contamination) Measure 1999*. The RAP(s) will be prepared and implemented in accordance with the following requirements:

Ref	Issue	Mitigation measures – detailed design
		■ The voluntary remediation proposal, EMP and any RAPs in place for the former Tempe landfill ■ The requirements of the existing Sydney Airport RAP and EMP (if applicable) ■ *National Environment Protection (Assessment of Site Contamination) Measure 1999* ■ Airports (Environment Protection) Regulations 1997 (for Sydney Airport land) ■ *Environmental Guidelines: Solid waste landfills* (NSW EPA, 2016a) (for reinstatement of the capping layer and/or design of the new capping layer and final road pavement at the former Tempe landfill). The RAP(s) will be: ■ Prepared in consultation with the Airport Environmental Officer and NSW EPA (as relevant) ■ For works on land subject to the EP&A Act – approved by an independent site auditor accredited under the site auditor scheme under the CLM Act ■ For works on Sydney Airport land – approved by Sydney Airport Corporation and endorsed by the Airport Environment Officer. If Sydney Airport Corporation and/or the Airport Environment Officer consider a site assessor is required, the site assessor will be nominated by the Secretary (as defined by Regulation 6.10 of the Airports (Environment Protection) Regulations 1997) and will endorse the RAP(s).
CS8	Impacts on the former Tempe landfill	An assessment will be undertaken of the potential hazards associated with landfill gas during construction and operation. The assessment will consider the potential for ingress and build-up of gases that may pose a risk to safety. Where the need for measures to manage landfill gases post-construction is identified, such measures will be described in the RAP(s) (measure CS3). Measures could include the design and installation of a landfill gas management system to provide a preferential flow path for landfill gas below the road infrastructure and emplacement mounds.
CS9		A settlement and slope stability analysis will be undertaken to ensure that the emplacement mounds are designed to suitable engineering standards such that the long-term stability of the capping layer is maintained. The design and construction of the emplacement mounds will be described in the RAP(s) (measure CS3) and will be in accordance with *Environmental Guidelines: Solid waste landfills* (NSW EPA, 2016a). The design will be prepared in consultation with the NSW EPA.
CS10		The location of all existing landfill management infrastructure, including the bentonite wall, leachate collection system and passive gas collection system, will be confirmed and (if required) the design will be further refined to avoid impacts on this infrastructure. Measures will be developed, and included in the RAP (if required) to protect the landfill management infrastructure during construction, or reinstate the infrastructure such that it continues to operate effectively after construction is finished.
Flooding		
HF1	Management of the potential for flooding impacts during construction	A flood mitigation strategy will be prepared and relevant measures will be implemented as part of the design and during construction. The strategy will include undertaking additional flood modelling taking into account detailed design and proposed construction planning and methodologies.
HF2	Impacts on flood behaviour from construction	Hydrologic and hydraulic assessments will be carried out for all temporary and permanent project components (including ancillary facilities) that have the potential to affect flood levels in the vicinity of the project. The results of the assessment will inform the preparation of the Flood Mitigation Strategy (measure HF1) as well as the design of temporary construction facilities and design development.

Ref	Issue	Mitigation measures – detailed design
HF3	Impacts on property	Where flood levels in the one per cent AEP event are predicted to increase at any residential, commercial and/or industrial buildings as a result of construction or operation of the project, a floor level survey will be carried out. If the survey indicates existing buildings would experience above floor inundation during a one per cent AEP event, further refinements will be made (as required) to the design of temporary and permanent project components to minimise the potential for impacts.
HF4	Impacts on drainage systems	Further modelling will be undertaken based on the detailed design to determine the ability of the receiving drainage systems to effectively convey drainage discharges from the project once operational. The modelling will be undertaken in consultation with Sydney Airport Corporation and relevant council(s). It will include, but not be limited to: ■ Confirming the location, size and capacity of all receiving drainage systems affected by operation ■ Assessing the potential impacts of drainage discharges from the project drainage systems on the receiving drainage systems ■ Identifying all feasible and reasonable mitigation measures to be implemented where drainage from the project is predicted to adversely impact on the receiving drainage systems.
HF5	Potential impacts of climate change on flooding	The potential impacts of climate change on flooding behaviour will be considered during further modelling, in accordance with the procedures set out in *Floodplain Risk Management Guideline: Practical Considerations of Climate Change* (DECC, 2007) and *Australian Rainfall and Runoff* (Geoscience Australia, 2019). An approach to integrating the identified effects into the design and operation of the infrastructure will be determined and implemented.
Groundwater		
GW1	Avoiding impacts on groundwater	Detailed design and construction planning will seek to minimise impacts on groundwater by: ■ Avoiding the need to extract groundwater ■ Minimising groundwater inflows and volumes into excavations.
GW2	Settlement of unconsolidated sediments	Modelling of settlement induced by groundwater drawdown will be undertaken in accordance with relevant guidelines, based on detailed geotechnical information obtained from the site investigations and the proposed construction approach. Should modelling identify any settlement issues, measures to reduce settlement will be confirmed.
GW3	Impacts on existing groundwater well	A survey of GW024036 will be undertaken to confirm the use of this bore. If this bore is in use, alternative water sources will be considered to ensure ongoing water supply as required.
Surface water		
SW1	Sedimentation and scour protection at Alexandra Canal	The potential for scour at bridge abutments will be considered for flow events up to and including the one per cent annual exceedance probability event. Scour protection will be included in the detailed design as required.
SW2		Discharge outlets will be designed with appropriate energy dissipation and scour protection measures to minimise the potential for scour. Scour protection will be developed in consultation with relevant stakeholders, including Sydney Water.
SW4	Water sensitive urban design	Appropriate treatment measures, including water sensitive urban design, will be considered in the detailed design with the aim of improving water quality within Alexandra Canal and/or achieving the targets outlined in the *Botany Bay and Catchment Water Quality Improvement Plan* (Sydney Metropolitan Catchment Management Authority, 2011).
SW5		Surface water drains and associated infrastructure will be designed to prevent scour of soil, erosion and associated sedimentation impacts.

Ref	Issue	Mitigation measures – detailed design
Non-Aboriginal heritage		
NAH1	Avoiding impacts on heritage	The design will avoid impacts on non-Aboriginal heritage items, significant heritage fabric, locally and State significant archaeological remains and landscapes (including mature trees) as far as reasonably practicable. This includes significant fabric associated with Alexandra Canal and the Sydney (Kingsford Smith) Airport Group.
NAH2	Minimising impacts on heritage	The design will be prepared in accordance with the urban design and landscape plan for the project, and will minimise the potential for visual impacts on heritage items by incorporating sympathetic fabric, colour and form in the design.
NAH3	Design of the bridges over Alexandra Canal	The bridges over Alexandra Canal will be designed to: ■ Be sympathetic to the heritage sensitivity and industrial landscape of the canal ■ Minimise physical impacts on the canal ■ Incorporate a high quality architectural design using suitable material and forms ■ Integrate with the bridges for the New M5 ■ Retain the open character of the canal as far as possible ■ Have regard to the Alexandra Canal Conservation Management Plan. An appropriately qualified and experienced heritage architect or engineer will provide independent review of the designs, and the Heritage Council of NSW and Sydney Water will be consulted.
NAH4	Design of the drainage outlets at Alexandra Canal	The drainage outlets at Alexandra Canal will be designed to: ■ Minimise impacts on significant original fabric and highly visible areas ■ Be sympathetic to the industrial landscape of the canal and its existing fabric ■ Use suitable material and forms ■ Have regard to the Alexandra Canal Conservation Management Plan. An appropriately qualified and experienced heritage architect or engineer will provide independent review of the designs, and the Heritage Council of NSW and Sydney Water will be consulted.
NAH5	Reuse of significant fabric at Alexandra Canal	Where significant fabric is to be removed, consideration will be given to reusing the fabric for interpretation or repair and maintenance of other sections of the canal, in consultation with Sydney Water.
NAH6	Heritage interpretation	Appropriate heritage interpretation will be incorporated into the design in accordance with the *NSW Heritage Manual* (NSW Heritage Office and Department of Urban Affairs and Planning, 1996), *Interpreting Heritage Places and Items: Guidelines* (NSW Heritage Office, 2005), and the NSW Heritage Council's Heritage Interpretation Policy. This will focus on recognising the historical significance of the following items: ■ Alexandra Canal ■ Sydney (Kingsford Smith) Airport Group ■ Cooks River Container Terminal ■ Mascot (Shea's Ck) Underbridge ■ Botany Rail Line.
Aboriginal heritage		
AH1	Archaeological investigation areas impacted by the project	Detailed design and construction planning will avoid direct impacts on Investigation Area 1 and Investigation Area 2 where practicable.
AH3	Aboriginal heritage interpretation	An Aboriginal heritage interpretation strategy will be developed in consultation with registered Aboriginal parties and other relevant stakeholders. The interpretation strategy will have regard to *Sydney Airport Master Plan 2039* and the Sydney Airport Heritage Management Plan.

Ref	Issue	Mitigation measures – detailed design
		Appropriate Aboriginal heritage interpretation will be incorporated into the project design in accordance with the interpretation strategy.
Land use and property		
LU1	Impacts on property and land use	The design will continue to be refined to minimise land requirements and potential impacts on existing land uses and properties as far as possible. Consultation with landholders will be ongoing to identify opportunities to minimise impacts on onsite operations where practicable.
LU2	Impacts on advertising structures	The approach to mitigating impacts on advertising structures (including adjusting, relocating or providing new structures at locations along project infrastructure) will be confirmed during detailed design.
LU3	Use of residual land	Roads and Maritime will continue to consult with Inner West Council regarding the future use of residual land in the Tempe Lands and adjoining area. This will include opportunities for open space and recreation uses, and provision for a new off-leash dog exercise area and council depot. Roads and Maritime will support and assist Inner West Council with the master planning process for these areas as appropriate, and will ensure that the urban design and landscape plan for the project is consistent with the outcomes of this process.
LU4	Impacts on utilities	The location of all utilities, services and other infrastructure will be identified prior to construction to determine requirements for access to, diversion, protection and/or support. This will include (as required), undertaking utilities investigations, including intrusive investigations, and consultation and agreement with service providers.
Socio-economic		
SE3	Permanent land requirements at Tempe Lands	Roads and Maritime will continue to consult with Inner West Council to ensure: ■ Impacts on open space and recreational facilities in Tempe Lands will be offset ■ Consistency between the project's urban design and landscape plan and Council's master plan for Tempe Lands.
SE4	Safety of active transport links	Temporary and operational active transport links will be designed to ensure the safety of the users in accordance with crime prevention through environmental design principles.
Landscape character and visual amenity		
LV1	General visual impacts	An urban design and landscape plan will be prepared to provide a consistent approach to project design and landscaping.
LV2		Further design refinements of structures including bridges and the Terminals 2/3 access viaduct will be undertaken to minimise visual impacts as far as possible.
LV3	Managing the loss of trees	A tree management strategy will be developed including measures to offset the loss of trees and achieve a net increase in tree canopy. The final location of replacement trees will be confirmed in consultation with Inner West Council and Sydney Airport Corporation. The strategy will also include on-site processes and protective measures to ensure trees identified for retention are appropriately protected during construction.
LV4	Noise barriers	Where feasible and reasonable, the proposed noise barrier in the Tempe Lands will be designed to provide new active transport connectivity across the Terminal 1 connection and between the western and eastern portions of open space, and maximise passive surveillance of open space from the road.
LV5		Noise barriers will be designed to minimise their visual prominence as much as possible.

Ref	Issue	Mitigation measures – detailed design
LV6	Minimising light spill	Lighting for the project will be designed in accordance with *AS 4282 Control of the Obtrusive Effects of Outdoor Lighting*. Lighting will be designed to minimise glare and light spill into adjoining areas.
Biodiversity		
BD1	Avoiding impacts on biodiversity	Detailed design will avoid or minimise the need to remove and/or disturb native vegetation and fauna habitat, including impacts on mapped areas of mangrove forest and Tempe Wetlands.
BD2		Vegetation clearing will be limited to the minimum necessary to construct the project. Micro-siting of infrastructure will be undertaken during detailed design to further minimise or avoid impacts on native vegetation where practicable. Exclusion areas will be established and maintained around any native vegetation adjoining the project site in close proximity to work locations to be retained.
Waste management		
WM1	Waste generation and recycling	Detailed design will include measures to minimise excess spoil generation. This will include a focus on optimising the design to minimise spoil volumes, and the reuse of material on site.
Sustainability		
SU1	Achieving the target sustainability rating	A sustainability management plan will be developed to ensure that sustainability considerations are implemented during the detailed design, construction and operation phases of the project. The plan will include project-specific sustainability initiatives and implementation protocols to support achievement of the project's target excellent 'Design' and 'As Built' rating under the Infrastructure Sustainability rating tool (v1.2) and to ensure ongoing consistency with the *Environmental Sustainability Strategy 2019–2023* (Roads and Maritime, 2019b)
Climate change and greenhouse gas		
CC1	Climate change risk assessment	A detailed climate change risk assessment, considering both direct and indirect risks, will be undertaken during detailed design in accordance with *AS 5334-2013 Climate change adaptation for settlements and infrastructure – A risk based approach* and the draft *Technical Guide: Climate Change Adaptation for the Road Network* (Roads and Maritime, 2015c). Adaptation measures will be confirmed and actions implemented to address extreme and high risks where reasonable and feasible. Adaptation measures for medium risks will be considered and implemented where reasonable and feasible. Progress against implementation of confirmed adaptation measures and actions will be tracked. The assessment will include further modelling to optimise the design and reduce the impacts of climate change scenarios.
CC2	Climate change related flood risks	The flood mitigation strategy (measure HF1) will include consideration of future climate change related flood risks, the potential impacts of future climate change on flooding, and adaptive measures for implementation.
CC3	Urban heat island effect	The urban design and landscape plan for the project will include consideration of appropriate landscape designs and species to reduce the impacts of urban heat island effect. Other measures to mitigate the impacts of the urban heat island effect will be investigated during detailed design and included in the urban design and landscape plan. Measures will include using light coloured pavements and shading structures for public spaces.

Ref	Issue	Mitigation measures – detailed design
GHG1	Greenhouse gas emissions	The sustainability management plan (measure SU1) will include measures and targets to reduce greenhouse gas emissions during construction and operation. The plan will include targets to reduce the project's carbon footprint during construction and operation considering scope 1, scope 2 and scope 3 emissions.
GHG2		The final design will incorporate LED lighting in preference to fluorescent fittings or high-pressure sodium lights where fit for purpose, feasible and cost-effective.
GHG3		The surface road network will be designed for long term performance and durability of materials, increasing asset design lives and reducing the frequency of maintenance activities.

Table 27.14 Compilation of mitigation measures for construction

Ref	Issue	Mitigation measures – construction (including pre-construction)
Environmental management		
EM1	Construction environmental management	A CEMP will be prepared to detail the approach to environmental management during construction, as described in section 27.2.1 and in accordance with the conditions of approval.
Traffic, transport and access		
TT1	Potential for traffic, transport and access impacts during construction	A Construction Traffic and Access Management Plan will be prepared prior to construction and implemented as part of the CEMP. The plan will detail processes and responsibilities to minimise traffic and access delays and disruptions, and identify and respond to changes in road safety during construction.
TT2		The Construction Traffic and Access Management Plan will include proposed road staging of construction works along Airport Drive, Qantas Drive and key accesses to Sydney Airport's terminals to ensure these key roads maintain satisfactory capacity and minimum levels of service. The proposed road staging plans and mitigation measures will be developed in conjunction with Transport for NSW (various divisions), ARTC, the Transport Management Centre, Sydney Coordination Office, Sydney Airport Corporation, emergency services, and any contractors working in the vicinity of the airport.
TT3		The communications strategy (measure SE1) will include a mechanism to inform the community of the dates and durations of specific phases within the project, including information about specific lane and road closures and the times of day and night when works will be carried out.
TT4		A travel demand management strategy will be prepared to provide: ■ A comprehensive set of travel mode options to minimise use of roads affected by construction ■ Communication strategies to reduce the number of people using the road network in the project study area during construction, where practicable.
TT5	Impacts on road network performance (delays) and safety	Construction staging and temporary work plans will be prepared to: ■ Ensure access to Sydney Airport is maintained at all times during operational hours ■ Stage the construction works on key parts of the network, such as Qantas Drive, Airport Drive and access to Sydney Airport terminals, to enable these roads to continue to function with as minimal impact as possible ■ Minimise conflict with the existing road network ■ Maximise spatial separation between work areas and travel lanes.

Ref	Issue	Mitigation measures – construction (including pre-construction)
TT6		Further consideration of the construction phase road geometry and construction area operations will be undertaken with the aim of optimising road performance during construction. This will include the following considerations: ■ Maintain a posted speed of 50 to 60 km/h along the construction zones ■ Maintain three lanes in each direction at the Airport Drive and Link Road intersection ■ Provide three lanes into Terminals 2/3 at Sir Reginald Ansett Drive through to Keith Smith Avenue.
TT7		Where reasonable and feasible, work areas, activities and construction access arrangements will be modified to address any traffic flow issues identified by key stakeholders, including the Sydney Coordination Office, Sydney Airport Corporation and the Transport Management Centre.
TT8		A mechanism will be provided for the community to report incidents and delays, such as a project phone number. The contact mechanism will be communicated in accordance with the project's communication strategy (measure SE1).
TT9	Impacts on access to Terminals 2/3	Further traffic management in the vicinity of the Qantas Drive/Seventh Street/Robey Street intersection will be planned and undertaken with consideration of the following potential re-routing options: ■ Divert westbound traffic from General Holmes Drive (via Joyce Drive) onto Robey Street (via the new Wentworth Avenue link provided by the Airport East Upgrade project) and Botany Road instead of using the right turn from Qantas Drive to Robey Street ■ Consolidate and support the function of the left turn from Qantas Drive onto Robey Street and traffic out of Seventh Street through the re-allocation of signal green time taken away from the diverted or banned right turn movement (from Qantas Drive to Robey Street) during peak periods or potentially ban the right turn movement in the peak periods ■ Introduce an additional left turn lane into Robey Street from Qantas Drive to improve traffic flows based on traffic modelling analyses.
TT10		Access to Sydney Airport will be maintained at all times during the airport's operational hours. Any temporary changes in access arrangements will be developed, communicated and implemented in consultation with Sydney Airport Corporation.
TT11	Property, cyclist and pedestrian access	Access to properties, including residences, businesses and community infrastructure, will be maintained. Where disruption to access cannot be avoided, consultation will be undertaken with the owners and occupants of affected properties, to confirm their access requirements and to determine alternative arrangements.
TT12		Safe pedestrian and cyclist access will be maintained around or through work areas. Where disruption to access cannot be avoided, alternative routes that comply with relevant accessibility standards and guidelines will be provided, signposted and communicated.
TT13	Impacts on the availability of parking on streets surrounding construction work areas	A worker parking strategy will be developed to identify measures to minimise worker parking on local streets. Measures to be implemented during construction will include provision of designated parking areas within the project site, encourage use of public transport and implement shuttle bus arrangements.
TT14	Impacts on bus stops and passengers	Where required, changes to existing bus stops and/or changes to bus service patterns will be undertaken in accordance with the following requirements: ■ Changes will be designed and implemented in consultation with Transport NSW and bus operators ■ The community will be informed in advance of changes.

Ref	Issue	Mitigation measures – construction (including pre-construction)
TT15	Impacts of construction haulage vehicles	Construction haulage vehicles will be managed to: ■ Adhere to the nominated haulage routes and speeds identified in the Construction Traffic and Access Management Plan ■ Minimise idling and queuing on public roads ■ Minimise movement of vehicles during peak periods.
TT16	Cumulative construction traffic impacts	The potential for cumulative construction traffic impacts will be reviewed and co-ordinated with other projects. The review will include: ■ Considering other projects with the potential to affect access and capacity, particularly in the vicinity of Terminals 2/3 ■ Detailed reviews of programs for traffic staging, lane and road closures for all projects ■ Co-ordinating works and identifying efficient re-routing options during periods of road and lane closures.
Noise and vibration		
lNV1	Managing the potential for noise and vibration impacts during construction	A Construction Noise and Vibration Management Plan will be prepared as part of the CEMP and implemented during construction. The plan will detail processes, responsibilities and measures to manage noise and vibration and minimise the potential for impacts during construction, consistent with the management approach and mitigation measures in Roads and Maritime's *Construction Noise and Vibration Guideline*.
NV2		Location and activity specific noise and vibration impact assessments will be undertaken prior to those works (as a minimum): ■ With the potential to result in noise levels above 75 dBA at any receiver ■ That need to occur outside standard construction hours and are likely to result in noise levels greater than the relevant noise management levels ■ With the potential to exceed relevant performance criteria for vibration. The assessments will confirm predicted impacts at relevant receivers in the vicinity of the activities to assist with the selection of appropriate management measures. Monitoring will be carried out at the start of new noise and vibration intensive activities to confirm that actual levels are consistent with the predictions.
NV4	Potential impacts at hotels	The facades of hotels likely to be affected by construction will be assessed to confirm existing façade performance (external to internal noise transmission) in consultation with the hotel operators. Location and activity-specific noise and vibration impact assessments undertaken for works in the vicinity of hotels will adopt the results of the assessment for each affected hotel to assess potential internal noise levels within the hotel rooms more accurately (see Technical Working Paper 2).
NV5	Potential impacts on the Qantas Flight Training Centre	A construction strategy will be developed in consultation with Qantas to minimise potential impacts on training operations at the Qantas Flight Training Centre in its current location. It will include: ■ Confirming appropriate internal noise criteria for sensitive areas in the facility ■ Confirming building and simulator cabin acoustic performance ■ External criteria for noise and vibration ■ Working distances for noise and vibration intensive plant and activities ■ Alternative work methods that generate less noise and vibration and minimise vibration transmission ■ Real-time monitoring requirements.

Ref	Issue	Mitigation measures – construction (including pre-construction)
NV6	Construction management and scheduling	Investigate and implement alternative methods of demolition to avoid hydraulic/pneumatic hammering where high noise impacts are anticipated. Alternative methods could include shears, pulveriser or ripper attachments fitted onto the excavators.
NV7		Noisy work and vibration intensive activities (those activities that exceed the vibration criteria) will be scheduled during standard construction hours as far as possible. Works or activities that cannot be undertaken during standard construction hours will be scheduled as early as possible during the evening and/or night-time periods. Respite measures will be implemented for noisy work and vibration intensive activities in a manner consistent with Roads and Maritime's *Construction Noise and Vibration Guideline*.
NV8		Hoarding, or other shielding structures, will be used where receivers are impacted near fixed works areas. The barriers should be of solid construction with minimal gaps.
NV9	Management of the potential for vibration impacts during construction	Vibration generating activities will be managed to minimise the potential for impacts on structures and sensitive receivers, including maximising minimum working distances where practicable, or alternate methods to minimise vibration where minimum working distances cannot be achieved. Where alternatives cannot be implemented, vibration monitoring will be undertaken and receptors notified in advance of works. Vibration monitors will provide real-time notification of exceedances of levels approaching cosmetic damage and human comfort criteria.
NV10	Potential vibration impacts on pipelines	Prior to vibration intensive works in the vicinity of pipelines, the owners of each potentially affected pipeline will be consulted to confirm the potential for impacts from vibration and any appropriate criteria. Management protocols to protect the integrity of each affected pipeline, including monitoring requirements, will be developed in consultation with each asset owner as required, and implemented for all vibration intensive works in the vicinity of pipelines.
NV11	Potential impacts on buildings and structures	Building condition surveys will be completed before and after construction works where buildings or structures are within the minimum vibration working distances for cosmetic damage.
NV12	Potential vibration impact to heritage items	Prior to the commencement of vibration intensive works within the minimum working distances for cosmetic damage for heritage items, the potential for damage to the item will be assessed. Where there is potential for damage, alternative methods that generate less vibration will be investigated and substituted where practicable. Where residual cosmetic damage risks remain, condition surveys will be carried out and vibration monitoring with real-time notification of exceedance will occur during the activity. Site activities will be modified where practicable to avoid exceeding the cosmetic damage criteria. Any identified vibration-related damage to the items will be rectified.
NV13	Cumulative noise and vibration impacts	The likelihood of cumulative and consecutive construction noise impacts, particularly when undertaken outside standard construction hours, will be reviewed prior to construction and coordinated with other nearby projects to minimise impacts, where possible.

Ref	Issue	Mitigation measures – construction (including pre-construction)
Airport operations		
AS4	Wildlife attraction as a result of drainage and flooding management infrastructure	Drainage and flood management infrastructure will be managed during construction to minimise the risk of attracting wildlife.
AS10	Construction lighting	Construction lighting will be selected and located to meet Sydney Airport's restricted lighting zone requirements. For locations where it is not possible to achieve the required intensity levels, works requiring lighting will be undertaken in accordance with the requirements of Sydney Airport Corporation, which may involve restricting the timing of works to outside Sydney Airport's operational hours. Construction lighting will comply with section 9.21 of the Manual of Standards (CASA 2017) and the *National Airports Safeguarding Framework* (Guideline E).
AS11	Temporary intrusions of Sydney Airport's prescribed airspace	Construction planning will ensure that intrusions of Sydney Airport's prescribed airspace are minimised as far as practicable. Where temporary intrusions of the prescribed airspace cannot be avoided, works likely to result in intrusions will be undertaken in accordance with the requirements of Sydney Airport Corporation (for short-term works less than three months) or the Department of Infrastructure, Transport, Cities and Regional Development for long-term works (more than three months) and any controlled activity approvals for these works. This will include timing works to avoid Sydney Airport's operational hours.
Air quality		
AQ1	Managing air quality impacts during construction	A Construction Air Quality Management Plan will be prepared as part of the CEMP and implemented during construction. The plan will detail processes, responsibilities and measures to manage air quality, odour and landfill gas and minimise the potential for impacts during construction. The plan will include an air quality, odour and landfill gas monitoring program, and will detail the measures that will be implemented to compare the actual performance of construction against the predicted performance. Monitoring will be undertaken for the duration of construction.
AQ2	Avoiding odour impacts	Odour impacts at the former Tempe landfill will be minimised as far as possible by: ■ Construction planning to minimise the need to expose waste, and/or the area exposed at any one time ■ Where there is the potential to generate odour, this will be managed in accordance with the odour management strategy (measure AQ3). Further modelling will be carried out to demonstrate that the proposed excavation methodology for the former Tempe Landfill can comply with the 2 OU criterion
AQ3	Monitoring and controlling odour at the former Tempe landfill	An odour management strategy will be developed prior to construction and implemented for the duration of works involving ground disturbance at the former Tempe landfill. The strategy will include: ■ Proposed work methods and mitigation measures that aim to limit odour at sensitive receptors to no more than the 2 OU criterion ■ Routine observation of weather conditions ■ Regular odour surveys at receptor locations by appropriately qualified professionals (see AQ4) ■ Measures to minimise the generation of odour at the end of each work day/shift ■ Mechanisms for investigating odour complaints, including conduct of additional odour surveys ■ Contingency and rectification measures (eg use of deodorisers) should significant odour issues occur at sensitive receivers in the vicinity of the project site.

Ref	Issue	Mitigation measures – construction (including pre-construction)
AQ4		Odour surveys will be undertaken at downwind receptors for the duration of works involving ground disturbance at the former Tempe landfill in accordance with *Determination of odorants in ambient air by field inspection* (VDI 3940, 1993). The odour surveys will be undertaken: ■ Daily, for one hour when works commence, and prior to works completing ■ If wind conditions drop below three metres per second ■ If an odour complaint is received. If significant odour issues are observed in the vicinity of sensitive receptors, the contingency and rectification measures defined by the odour management strategy will be implemented (see AQ3).
AQ5	Impacts on air quality as a result of demolition	Demolition activities, including removal of hazardous building materials, will be planned and carried out in a manner that minimises the potential for dust generation.
AQ6	Cumulative dust impacts arising from concurrent construction of the Gateway road project and the Botany Rail Duplication project	The detailed construction program will be developed in consultation with the contractors constructing the Botany Rail Duplication project. Consultation will be maintained over the duration of both projects to plan activities in a manner that reduces the potential for air quality-related impacts. Where practicable, activities with a high potential to generate dust will be programmed so that they do not occur at the same time.
Contamination and soils		
CS4	Demolition of structures containing hazardous substances	Hazardous materials surveys will be undertaken to inform construction planning, including demolition activities and utility adjustments.
CS5	Potential impacts of soil disturbance	A Construction Soil and Water Management Plan will be prepared as part of the CEMP and implemented during construction. The plan will detail processes, responsibilities and measures to manage potential soil and water quality impacts during construction, including potential impacts associated with the presence of existing contamination, stockpile management, saline soils and acid sulfate soils. The Construction Soil and Water Management Plan will be prepared in accordance with relevant guidelines and standards, including *Managing Urban Stormwater – Soils and Construction*, Volume 1 (Landcom, 2004) Volume 2B Waste landfills (DECC, 2008a) and Volume 2D (DECC, 2008b) (the Blue Book).
CS6	Acid sulfate soils	An Acid Sulfate Soils Management Plan will be prepared as part of the Construction Soil and Water Management Plan in accordance with the *Acid Sulfate Soils Assessment Guidelines* (ASSMAC, 1998). The plan will define the process and measures to manage actual and potential acid sulfate soil and sediment disturbed during construction. The plan will include a summary of available acid sulfate soil information relevant to the project site and identify any further soil/water analysis required as a precursor to implementing the management plan. Acid sulfate soils will be disposed off site (where required) in accordance with the *Waste Classification Guidelines - Part 1 and Part 4: Acid sulfate soils* (NSW EPA, 2014a).
CS7	Impacts on sediments in Alexandra Canal during construction	A plan of management will be developed in accordance with the remediation order and implemented to manage work within Alexandra Canal and minimise the disturbance and migration of contaminated sediments. The plan will identify specific methodologies to minimise disturbance and dispersion of potentially contaminated sediments. The plan will be prepared in consultation with Sydney Water Corporation and submitted for the NSW EPA's approval in accordance with the remediation order requirements.

Ref	Issue	Mitigation measures – construction (including pre-construction)
CS11	Impacts on the former Tempe landfill	The potential for settlement will be considered as part of the siting and layout of construction compounds and work areas in the former Tempe landfill. Where required, ground treatment (eg foundation layers or sheet piling) will be provided to minimise this risk.
CS12		Landfill material will be appropriately handled and stockpiled, to ensure minimal impact to the surrounding community, on-site workers and the environment. Landfill waste will be managed in accordance with the requirements of *Environmental Guidelines: Solid waste landfills* (NSW EPA, 2016a). Excavated landfill waste to be disposed of will be classified in accordance with the *Waste Classification Guidelines Part 1: Classifying waste* (NSW EPA, 2014a) before being disposed of at an appropriately licensed waste facility.
CS13	Landfill gas intrusion	Protocols to address and manage landfill gases within the construction footprint in the former Tempe landfill and Sydney Airport northern lands car park will be developed and implemented during construction. The protocols will consider confined and/or enclosed spaces and appropriate controls as required (eg forced ventilation), and will include appropriate occupational monitoring.
CS14		Hot works within the former Tempe landfill and Sydney Airport northern lands car park will be restricted where there is a potential for fire or explosion. Monitoring for potentially flammable gases will occur during all hot works.
CS15	Works within Sydney Airport land	Any material imported and used within Sydney Airport land will be tested prior to use to ensure it does not exceed the acceptable limits in the PFAS National Environmental Management Plan (HEPA, 2018) and Schedule 3 of the *Airports (Environment Protection) Regulations* 1997.
CS16	Stockpile management and handling	Storage and containment systems for the stockpiling of contaminated material during construction will be designed to be impervious to the materials stored, resistant to fire (where required), covered to prevent contact with rainfall, and managed and maintained to prevent any release of liquids and contaminated run-off to stormwater drains, waters and land.
CS17	Management of previously unidentified contaminated material	The discovery of previously unidentified contaminated material will be managed in accordance with an unexpected contaminated finds procedure, as outlined in the *Guideline for the Management of Contamination* (Roads and Maritime, 2013b) and detailed in the CEMP. Awareness training will be provided for all on-site staff to assist in the identification of potentially contaminated material as per the unexpected contaminated finds procedure. In the event that unexpected indicators of contamination are encountered during construction (such as odours or visually contaminated materials), work in the area will cease, and the finds will be managed in accordance with the unexpected contaminated finds procedure.
CS18	PFAS impacted soil and groundwater	PFAS contaminated materials will be managed in accordance with the risk-based framework presented in the *PFAS National Environmental Management Plan* (HEPA, 2018). If soil and/or water containing PFAS is proposed for reuse, the proposed reuse must not result in an unacceptable or increased risk to human health and/or the environment. A health and environmental risk assessment and consultation with the NSW EPA (and the Airport Environment Officer where the works are on Sydney Airport land) will be required before any reuse of PFAS contaminated soil and/or water.
CS19	Remediation/ management of existing contamination	Validation of remediation will be undertaken during construction and a validation report prepared by a suitably qualified environmental consultant as defined in Schedule B9 of the NEPM to confirm the requirements of the RAP(s) have been met. For works on land subject to the EP&A Act, the validation report will be reviewed by a site auditor accredited in accordance with the site auditor scheme under the CLM Act. For works on Sydney Airport land, Sydney Airport Corporation and the Airport Environmental Officer will review the report.

Ref	Issue	Mitigation measures – construction (including pre-construction)
CS21	Erosion impacts post construction	A rehabilitation strategy will be prepared to guide the approach to rehabilitation of disturbed areas following the completion of construction.
Flooding		
HF1	Management of the potential for flooding impacts during construction	A flood mitigation strategy will be prepared and relevant measures will be implemented as part of the design and during construction. The strategy will include undertaking additional flood modelling taking into account detailed design and proposed construction planning and methodologies.
HF2	Impacts on flood behaviour from construction	Hydrologic and hydraulic assessments will be carried out for all temporary and permanent project components (including ancillary facilities) that have the potential to affect flood levels in the vicinity of the project. The results of the assessment will inform the preparation of the Flood Mitigation Strategy (measure HF1) as well as the design of temporary construction facilities and design development.
HF6	Potential flood impacts on ancillary construction facilities	As a minimum, site facilities will be located outside high flood hazard areas based on a one per cent AEP flood. For site facilities located within the floodplain, the flood mitigation strategy will identify how risks to personal safety and damage to construction facilities and equipment will be managed.
Groundwater		
GW4	Dewatering of excavation	A dewatering management strategy will be developed to confirm the approach to managing dewatering of excavations during construction. The strategy will: ■ Outline measures to minimise groundwater inflow ■ Describe likely groundwater quality based on sampling data ■ Estimate potential groundwater inflow rates and volumes for proposed excavations ■ Identify proposed methods for managing extracted water, which could include reuse, infiltration, reinjection, discharge to stormwater, disposal to the wastewater system, and collection for off-site disposal ■ Include a feasibility assessment of each proposed management option for extracted groundwater ■ Identify any groundwater treatment requirements and methods for any of the proposed management options ■ Describe any applicable monitoring requirements.
GW5	Managing leachate within the former Tempe landfill	A leachate management strategy will be developed to manage leachate at the former Tempe landfill during construction and ensure that the objectives of the site's voluntary remediation agreement continue to be met. The strategy will: ■ Identify predicted changes in leachate volumes due to the project, based on the detailed construction methodology ■ Identify any required changes to the existing leachate management system due to predicted changes in leachate volume and concentration and any other changes due to the project ■ Describe a framework for monitoring leachate levels and quality to ensure that no leachate migrates into Alexandra Canal. The strategy will be developed in consultation with relevant stakeholders, including Inner West Council, Sydney Water and the NSW EPA.

Ref	Issue	Mitigation measures – construction (including pre-construction)
GW6	Monitoring of construction impacts	The existing groundwater monitoring program will continue during construction, and will be supplemented as required, to: ■ Confirm groundwater quality to inform the selection management options for extracted groundwater, including treatment requirements for discharge ■ Monitor potential migration contaminants due to groundwater extraction (if it is a credible risk) ■ Confirm if acidification of groundwater is occurring due to exposure of acid sulfate soils ■ Confirm local groundwater levels to inform estimation of potential inflows and dewatering rates ■ Monitor drawdown levels and radii of influence to allow comparison against predictions ■ Confirm any changes to groundwater levels due to the cumulative impacts of other projects.
Surface water		
SW3	Sedimentation and scour protection at Alexandra Canal	All works within or adjacent to Alexandra Canal will be managed in accordance with *Guidelines for Controlled Activities on Waterfront Land – Riparian corridors* (Department of Industry, 2018).
SW6	Monitoring water quality	A water quality monitoring program will be developed and implemented as part of the Construction Soil and Water Management Plan to monitor potential surface water quality impacts. The program will define: ■ Monitoring parameters ■ Monitoring locations ■ Frequency and duration of monitoring. The monitoring program will include ongoing baseline monitoring to determine the water quality of potential receiving waters prior to commencement of construction. Proposed discharge will be updated as required prior to construction based on the baseline data at the time. Water quality monitoring will continue for a minimum of 12 months following the completion of construction, or until affected watercourses are certified by a suitably qualified and experienced independent expert as being rehabilitated to an acceptable condition (or as otherwise required by any project conditions of approval).
SW7	Discharge to stormwater network	The performance of treatment systems required to treat construction water before discharge will be verified in relation to the established discharge criteria.
SW8	Release of sediment-laden water during works in northern ponds	Construction planning will ensure that operation of the sluice gate at the northern ponds outlet to Alexandra Canal is not affected by the works.
Non-Aboriginal heritage		
NAH7	Managing heritage impacts during construction	A Heritage Management Plan will be prepared prior to construction and implemented as part of the CEMP. It will include measures to manage non-Aboriginal heritage and minimise the potential for impacts during construction. The plan will take into account relevant conservation and heritage management policies in the Alexandra Canal Conservation Management Plan and the Sydney Airport Heritage Management Plan.

Ref	Issue	Mitigation measures – construction (including pre-construction)
NAH8	Impacts on archaeology	A Historical Archaeological Research Design and Excavation Methodology will be prepared for, and implemented at, the following locations within the project site: ■ Intact sections of Alexandra Canal along the western bank of the canal on either side of the existing pedestrian and rail bridges ■ Vacant land at 30 Canal Road (Lot 4 DP 555771 and Lot 3 DP 825649) ■ Land located north of Canal Road that is currently used for the construction (stockpiling) of the New M5 (Lot A DP 391775, Lot B DP 394647 and Lot 2 DP1168612) ■ Sydney Airport land considered to contain low or moderate archaeological potential ■ Land along Qantas Drive considered to contain low or moderate archaeological potential ■ Sydney Airport land located east of Sydney Airport northern lands car park and west of Botany Rail Line (Lot 1 DP 826101) ■ Land to the west of Boral's St Peters facility and east of the Botany Rail Line. The Historical Archaeological Assessment and Research Design and Excavation Methodology will identify the specific features of archaeological significance that could be present at these locations, provide a scope for further investigations to confirm and specify appropriate archaeological management for any remains identified.
NAH9	Archival recording	Photographic archival recording will be carried out for affected sections of the following items: ■ Alexandra Canal ■ Sydney (Kingsford Smith) Airport Group ■ Cooks River Container Terminal ■ Mascot (Shea's Ck) Underbridge ■ Botany Rail Line. Photographic archival recording will be carried out prior to works commencing in the vicinity of the item, and in accordance with *How to Prepare Archival Records of Heritage Items* (NSW Heritage Office, 1998) and *Photographic Recording of Heritage Items Using Film or Digital Capture* (Heritage Office, 2006b). Once complete, a report will be prepared detailing the history and significance of the item, relevant findings from the archival recording and an overview of the project. This document would subsequently be held by the appropriate local council(s), local library, local historical society and the owner of the asset.
NAH10	Avoiding impacts during construction	Heritage items and landscaping located outside the project site and associated with the following items will be marked on site plans contained within the CEMP as areas to be avoided during construction, where works are proposed within 10 metres of: ■ Alexandra Canal (significant fabric and gazetted curtilage as detailed in the conservation management plan for Alexandra Canal) ■ Sydney (Kingsford Smith) Airport Group – fabric of high significance (as identified in the Sydney Airport Heritage Management Plan), trees and plantings ■ Cooks River Container Terminal – fabric of high significance, trees and plantings ■ Mascot (Shea's Ck) Underbridge – fabric associated with the bridge. Protective barriers will be established prior to works at these locations.
NAH11	Potential vibration impacts on heritage items	Potential vibration impacts on features of heritage significance will be managed in accordance with the Construction Noise and Vibration Management Plan (measure NV1) and noise and vibration mitigation measure NV12.

Ref	Issue	Mitigation measures – construction (including pre-construction)
NAH12	Unexpected finds	Any items of potential heritage conservation significance or human remains discovered during construction will be managed in accordance with the *Standard Management Procedure Unexpected Heritage Items* (Roads and Maritime, 2015e).
Aboriginal heritage		
AH2	Archaeological investigation areas impacted by the project	Archaeological salvage excavation will be undertaken prior to construction within those parts of Investigation Area 1 and Investigation Area 2 where deep sediments would be directly impacted by the project. Archaeological salvage excavation (including post-excavation analysis and reporting) will be completed prior to any activities that may result in harm to Aboriginal objects in these areas.
AH4	Managing heritage impacts during construction	An Aboriginal Heritage Management Plan will be prepared prior to construction and implemented as part of the CEMP. The plan will include measures to manage Aboriginal heritage and minimise the potential for impacts during construction. It will include the proposed salvage methodology, unexpected find procedure (see measure AH6) and process for additional consultation with Aboriginal stakeholders.
AH5	Aboriginal consultation	Aboriginal stakeholder consultation will continue to be undertaken in accordance with the *Procedure for Aboriginal cultural heritage consultation and investigation* (Roads and Maritime, 2011b) and *Aboriginal cultural heritage consultation requirements for proponents 2010* (DECCW, 2010c).
AH6	Unexpected finds	If suspected Aboriginal heritage items or human remains are uncovered during construction they will be managed in accordance with the *Standard Management Procedure: Unexpected Heritage Items* (Roads and Maritime Services, 2015e).
Land use and property		
LU5	Impacts on privately-owned land or land owned by the NSW or local government	Acquisition will be undertaken in accordance with: ■ *The Land Acquisition (Just Terms Compensation) Act 1991* (NSW) ■ *Determination of compensation following the acquisition of a business* (NSW Government, undated).
LU6	Impacts on Commonwealth-owned land subject to a lease with Sydney Airport Corporation	Sydney Airport, as the leaseholder of the land, will notify tenants that their sub-lease agreements will be concluded. Termination of leases will be undertaken in accordance with the contract terms with Sydney Airport Corporation and the tenant. Sydney Airport will provide support to manage the return of lands and handover to Roads and Maritime.
LU7	Impacts on Qantas Flight Training Centre	Consultation with Qantas will occur throughout construction planning and construction to minimise impacts on the Qantas Flight Training Centre until the relocation process is complete.
Socio-economic		
SE1	Potential social and community impacts during construction	A communications strategy will be prepared to detail the process of communicating and engaging with the community and stakeholders in the lead up to, and during, construction. It will ensure that: ■ The community and stakeholders have a high level of awareness and forewarning of all processes and activities ■ Accurate and accessible information is made available ■ A timely response is given to issues and concerns raised by the community ■ Feedback from the community is encouraged ■ Opportunities for input are provided. In relation to the potential for socio-economic impacts, the strategy will include: ■ Communication with potentially affected residents, other community members, businesses and other key stakeholders to provide information

Ref	Issue	Mitigation measures – construction (including pre-construction)
		about the project, and the likely nature, extent and duration of amenity and access changes during construction ■ Protocols to identify and engage with vulnerable persons that might be affected by construction ■ Protocols for communicating information about potential access delays in and around Sydney Airport and other relevant project information.
SE2	Potential impacts on businesses	Business management plans will be prepared and implemented for businesses affected by the project. The plans will be developed on a case by case basis and will detail specific measures, developed in consultation with the business operator. These will include: ■ Protocols to identify, in consultation with each affected business, feasible and reasonable measures to maintain vehicular and pedestrian access during business hours, and visibility of the business to potential customers during construction, including alternative arrangements for times when access and visibility cannot be maintained ■ Measures to respond to identified impacts as far as possible.
SE5	Impacts on the off-leash dog exercise area	A temporary off-leash dog exercise area will be provided. Access to this area will be maintained throughout construction, and temporary parking spaces will be provided. The location of the off-leash dog exercise area and the number of temporary parking spaces will be confirmed in consultation with Council. The condition of the temporary off-leash dog exercise area will be regularly monitored and maintained.
SE6	Impacts on community facilities and infrastructure	Access to community facilities and infrastructure will be maintained during construction. Where alternative access arrangements need to be made, these will be developed in consultation with relevant service providers and communicated to users. Any changes to access arrangements will be managed in accordance with the Construction Traffic and Access Management Plan.
Landscape character and visual amenity		
LV7	Visual impacts during construction	The design and maintenance of construction compound hoardings will aim to minimise visual amenity and landscape character impacts.
LV8		The selection of materials and colours for hoardings will aim to minimise their visual prominence.
LV9		Lighting of work areas, compounds, and work sites will be oriented to minimise glare and light spill impact on adjacent receivers.
LV10	Tree protection during construction	Trees to be retained will be protected prior to the commencement of construction in accordance with *AS4970-2009 Protection of trees on development sites* and the project's tree management strategy. Any tree pruning will be undertaken in accordance with the project's tree management strategy, guided by a tree report prepared by a qualified arborist.
LV11	Site rehabilitation	Following completion of construction, site restoration will be undertaken in accordance with the rehabilitation strategy (measure CS22). Temporary impacts on public open space will be rehabilitated in consultation with the relevant local council and/or landowner.
Biodiversity		
BD3	Managing the potential for biodiversity impacts during construction	A Construction Biodiversity Management Plan will be prepared prior to construction and implemented as part of the CEMP. It will include measures to manage biodiversity and minimise the potential for impacts during construction. The plan will be prepared in accordance with relevant legislation, guidelines and standards.

Ref	Issue	Mitigation measures – construction (including pre-construction)
Health, safety and hazards		
HS1	Spill response	A spill response procedure will be developed as part of the project's incident management protocols. The procedure and incident management protocols will detail processes, responsibilities and measures to manage hazardous substances and dangerous goods, including storage, handling and spill response, in accordance with legislative requirements.
HS2	Utility management	A utilities contingency management plan will be prepared and will include measures to manage any utility service disruptions during construction. This will include procedures to respond to and unplanned outages of services, particularly for critical Sydney Airport infrastructure.
HS3	Alterations to the ethylene pipeline	A safety management study will be prepared for any proposed alterations to the ethylene pipeline in accordance with *AS 2885 Pipelines – Gas and liquid petroleum*. The outcomes of the safety management study will be incorporated in construction planning.
HS4	Emergency response	An emergency response plan will be prepared and will include measures to manage emergency situations during construction, including those associated with fires, flooding or other threats to public safety.
HS5	Fire risk	All works involving potential ignition sources within the former Tempe landfill will be subject to a risk assessment or ban on total fire ban days.
HS6	Transport of dangerous goods and hazardous materials	The transport of dangerous goods will be undertaken in accordance with the Dangerous Goods (Road and Rail Transport) Regulation 2009 and the *Australian Code for the Transport of Dangerous Goods by Road & Rail* (National Transport Commission, 2017).
Waste management		
WM2	Construction waste and spoil management	A Construction Waste Management Plan will be prepared as part of the CEMP and implemented during construction. The plan will adopt the waste hierarchy principles contained in the *Waste Avoidance and Resource Recovery Act 2001* and will detail processes, responsibilities and measures to manage waste and minimise the potential for impacts during construction.
WM3		Construction waste will be minimised by accurately calculating materials brought to the site and limiting materials packaging where possible.
WM4		All waste disposal will be in accordance with the *Waste Classification Guidelines* (NSW EPA, 2014a)
WM5	Attraction of wildlife at the former Tempe landfill	The following measures would be implemented during works at the former Tempe landfill to avoid attracting wildlife: ■ Staging the excavation to minimise the amount of exposed waste at any one time ■ Minimising the size and area of exposed stockpiles ■ Ensuring material that has been disturbed, uncapped, or temporarily stockpiled is suitably covered at the end of each day.
WM6	Management of unexpected waste materials	Suitable areas will be identified to allow for contingency management of unexpected waste materials, including contaminated materials. Areas will be hardstand or lined areas that are appropriately stabilised and bunded, with sufficient space for stockpile storage.
Climate change and greenhouse gas		
GHG4	Greenhouse gas emissions	An appropriate portion of construction phase energy will be purchased from an accredited GreenPower product.

Table 27.15 Compilation of mitigation measures for operation

Ref	Issue	Mitigation measures – operation
Traffic, transport and access		
TT17	Operational road network performance including potential increased traffic on some parts of the network	A review of operational network performance will be undertaken 12 months and five years from the commencement of operation to confirm the operational traffic impacts on surrounding arterial roads and major intersections. The review will identify measures (as required) to address impacts on road network performance. The results of the review will be considered in future operational network performance planning carried out by Roads and Maritime.
TT18	Active transport opportunities	Roads and Maritime and Sydney Airport Corporation will prepare an active transport strategy to integrate and enhance accessibility opportunities. The strategy will be prepared in conjunction with relevant stakeholders and provide a guide for future active transport infrastructure provision.
Noise and vibration		
NV16	Operational noise and vibration impacts of the project	Operational noise mitigation performance will be documented in an Operational Noise and Vibration Review conducted within 12 months of the commencement of operation. The need for additional mitigation or management measures to address identified operational performance issues and meet relevant operational noise criteria will be assessed and implemented where feasible and reasonable.
Airport operations (hazards and risks)		
AS4	Wildlife attraction as a result of drainage and flooding management infrastructure	Drainage and flood management infrastructure will be managed during operation to minimise the risk of attracting wildlife.
Contamination and soils		
CS20	Remediation/ management of existing contamination	The requirements for ongoing monitoring and maintenance of any installed or reinstated remediation systems will be documented in EMP(s) prepared for the respective areas. The EMP(s) will be prepared and implemented in accordance with the following requirements: ■ The voluntary remediation proposal, EMP and any RAPs in place for the former Tempe landfill, including requirements for ongoing gas monitoring ■ The requirements of the Sydney Airport RAP and EMP (if applicable) ■ *National Environment Protection (Assessment of Site Contamination) Measure 1999* ■ *Environmental Guidelines: Solid waste landfills* (NSW EPA, 2016a) (for reinstatement of the capping layer and/or design of the new capping layer and final road pavement at the former Tempe landfill). The EMP(s) will be: ■ Prepared in consultation with the Airport Environmental Officer and NSW EPA (as relevant) ■ For works on land subject to the EP&A Act – approved by an independent site auditor accredited under the site auditor scheme under the CLM Act ■ For works on Sydney Airport land – approved by Sydney Airport Corporation and endorsed by the Airport Environment Officer Following implementation and validation of the RAP(s) (if required by the existing EMP), and approval of the EMP(s), the site auditor will prepare a Site Audit Statement confirming the suitability of the project site for the proposed development (for works on land subject to the EP&A Act). For works on Sydney Airport land, the Airport Environmental Officer will confirm the objectives of the remediation have been met.

Ref	Issue	Mitigation measures – operation
CS22	Contamination during operation	Spills and leaks of vehicles or maintenance plant and equipment will be managed in accordance with Roads and Maritime's standard operating procedures.
CS23		Ongoing management measures will be implemented for any areas where contamination remains following construction, and has the potential to cause an ongoing risk to maintenance works, the community and/or the receiving environment. These management measures will be documented in the EMP(s).
Flooding		
HF7	Adaptive management of infrastructure	Roads and Maritime and Sydney Airport Corporation will review measures to maintain or improve over time the flood immunity of the infrastructure resulting from the effects of climate change.
Land use and property		
LU8	Future management of residual land	The ongoing management of residual land, and Roads and Maritime's role in this process, will be confirmed in consultation with Inner West Council.
Waste management		
WM7	Operational waste management	Operational waste, including general litter clean up, will be managed in accordance with existing operational maintenance requirements for the project and the waste hierarchy principles contained in the *Waste Avoidance and Resource Recovery Act 2001*.
Sustainability		
SU2	Sustainability management plan	Prior to the commencement of operation, the sustainability management plan and sustainability initiatives will be reviewed and updated.
Climate change and greenhouse gas		
CC4	Emergency management planning	Operational procedures for emergency planning and management will be prepared to consider the increased risk of flooding and storm surges on the road and active transport link.
CC5		Emergency management planning will be undertaken in consultation and collaboration with other key agencies and surrounding stakeholders, including Sydney Airport Corporation.
GHG5	Greenhouse gas emissions	A minimum of six per cent of operational phase energy will be purchased from an accredited GreenPower product.

27.4 Compilation of performance outcomes

The SEARs identify desired performance outcomes to be achieved during design, construction and operation of the project (see Table 27.16) and include a requirement for an EIS to include 'a statement of the outcome(s) the proponent will achieve for each key issue'.

Based on the outcomes of the environmental impact assessment summarised in Part B, and implementation of the mitigation measures compiled in section 27.3, project-specific environmental performance outcomes have been established and are listed in Table 27.16. The first and second columns of the table provide the key issue and desired performance outcome from the SEARs, and the third column provides the project-specific environmental performance objectives to achieve the desired outcome.

Future design development and any design changes would be considered against these environmental performance outcomes.

Table 27.16 Compilation of environmental performance outcomes

Key issue (as listed in the SEARs)	SEARs desired performance outcomes	Project-specific environmental performance outcomes
Environmental impact assessment process	The process for assessment of the proposal is transparent, balanced, well focussed and legal.	This assessment is prepared in consultation with relevant stakeholders through a transparent process and in accordance with Part 3 of Schedule 2 of the EP&A Regulation, the Airports Act, and the EPBC Act.
Environmental impact statement	The proposal is described in sufficient detail to enable clear understanding that the proposal has been developed through an iterative process of impact identification and assessment and proposal refinement to avoid, minimise or offset impacts so that the proposal, on balance, has the least adverse environmental, social and economic impact, including its cumulative impacts.	The project is described in detail in Chapter 7 (Project description) and Chapter 8 (Construction). Chapter 6 (Project alternatives and options) outlines the iterative process of project refinements to avoid, minimise or offset project impacts at the concept stage.
Assessment of key issues	Key issue impacts are assessed objectively and thoroughly to provide confidence that the proposal will be constructed and operated within acceptable levels of impact.	Impacts are assessed objectively and thoroughly. The implementation of environmental management and mitigation measures ensures the project is constructed and operated within acceptable levels of impact (see section 27.3).
Consultation	The proposal is developed with meaningful and effective engagement during proposal design and delivery.	Consultation to date is described in Chapter 4 (Consultation). The project is developed with meaningful and effective engagement. A communication strategy is implemented to guide effective engagement during project delivery.
Transport and traffic	Network connectivity, safety and efficiency of the transport system in the vicinity of the proposal are managed to minimise impacts. The safety of transport system customers is maintained. Impacts on network capacity and the level of service are effectively managed. Works are compatible with existing infrastructure and future transport corridors.	Impacts on traffic and transport is minimised. Safe access to properties is maintained. Access to Sydney Airport is maintained. The project is integrated with existing and future local and regional transport infrastructure and planning strategies. Motorist, pedestrian and cyclist safety is maintained or improved.
Noise and vibration - amenity	Construction noise and vibration (including airborne noise, ground-borne noise and blasting) are effectively managed to minimise adverse impacts on acoustic amenity. Increases in noise emissions and vibration affecting nearby properties and other sensitive receivers during operation of the proposal are effectively managed to protect the amenity and well-being of the community.	The project minimises impacts on the local community by controlling noise and vibration. Feasible and reasonable mitigation measures are implemented to minimise the noise and vibration impacts on sensitive receivers.
Noise and vibration - structural	Construction noise and vibration (including airborne noise, ground-borne noise and blasting) are effectively managed to minimise adverse impacts on the structural integrity of buildings and items including Aboriginal places and environmental heritage. Increases in noise emissions and vibration affecting environmental heritage as defined in the *Heritage Act 1977* during operation of the proposal are effectively managed.	The project minimises impacts on structures by controlling vibration through construction planning. Feasible and reasonable mitigation measures are implemented to minimise the structural vibration impacts. Vibration intensive construction work is managed to avoid or minimise adverse impacts on the structural integrity of buildings and heritage items.

Key issue (as listed in the SEARs)	SEARs desired performance outcomes	Project-specific environmental performance outcomes
Place making and urban design	The proposal design complements the amenity, character and quality of the surrounding environment. The proposal contributes to the accessibility and connectivity of communities. The proposal contributes to an increase in tree canopy for greater Sydney.	The project provides a sense of arrival and contributes positively to the surrounding urban environment. Connectivity within the community is enhanced through pedestrian and cyclist access. Vegetation is retained where feasible and reasonable. Trees removed as part of the project are replaced in accordance with the tree management strategy.
Visual amenity	The proposal minimises adverse impacts on the visual amenity of the built and natural environment (including public open space) and capitalises on opportunities to improve visual amenity.	The project is designed to have regard to the surrounding landscape and visual environment and to minimise the potential for visual impacts. The project is visually integrated with its surroundings, where possible.
Socio-economic, land use and property	The proposal minimises adverse social and economic impacts and capitalises on opportunities potentially available to affected communities. The proposal minimises impacts to 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.	The project minimises impacts on the local community, community infrastructure, and businesses. Impacts to existing land use and properties are minimised. The project is appropriately integrated with adjoining land uses and access to private properties is maintained. The project is appropriately integrated with local and regional land use planning strategies. Construction of the project has a positive impact on the local and greater Sydney economy. During operation, the project improves access to services and destinations, supporting opportunities for community interaction.
Heritage	The design, construction and operation of the proposal facilitates, to the greatest extent possible, the long-term protection, conservation and management of the heritage significance of items of environmental heritage and Aboriginal objects and places. The design, construction and operation of the proposal avoids or minimises impacts, to the greatest extent possible, on the heritage significance of environmental heritage and Aboriginal objects and places.	Aboriginal heritage objects with the potential to be impacted by the project are salvaged and retained. Key Aboriginal heritage values are incorporated into the final urban design and landscaping outcomes. The design is sympathetic to the historic significance of Sydney Airport and the heritage significance of surrounding listed heritage items, and where practicable, avoids and minimises impacts on heritage. Visual impacts on heritage items are mitigated through individually tailored landscape treatments. Impacts on heritage are managed in accordance with relevant legislation, including the EP&A Act, the *Heritage Act 1977* (NSW), Airports (Environment Protection) Regulation 1997 and relevant guidelines.
Biodiversity	The proposal design considers all feasible measures to avoid and minimise impacts on terrestrial and aquatic biodiversity. Offsets and/or supplementary measures are assured which are equivalent to any remaining impacts of proposal construction and operation.	The project is designed to minimise impacts on biodiversity. Where practicable, the design minimises the need to clear vegetation. Potential impacts on biodiversity are managed in accordance with relevant legislation, including the EP&A Act, BC Act, EPBC Act and the *Biosecurity Act 2015* (NSW).

Key issue (as listed in the SEARs)	SEARs desired performance outcomes	Project-specific environmental performance outcomes
Flooding	The proposal minimises adverse impacts on existing flooding characteristics. Construction and operation of the proposal avoids or minimises the risk of, and adverse impacts from, infrastructure flooding, flooding hazards, or dam failure.	Construction is undertaken in a manner that minimises the potential for adverse flooding impacts, through staging of works and implementation of mitigation measures. Construction compounds and work sites are designed such that flows are not significantly impeded. The project maintains or reduces flood levels within and adjacent to the project site.
Water - hydrology	Long term impacts on surface water and groundwater hydrology (including drawdown, flow rates and volumes) are minimised. The environmental values of nearby, connected and affected water sources, groundwater and dependent ecological systems including estuarine and marine water (if applicable) are maintained (where values are achieved) or improved and maintained (where values are not achieved). Sustainable use of water resources.	The project avoids long term impacts on surface water and groundwater hydrology. Opportunities to reuse water resources during construction are considered during the design process. The use of water during construction is minimised.
Water - quality	The proposal is designed, constructed and operated to protect the NSW Water Quality Objectives where they are currently being achieved, and contribute towards achievement of the Water Quality Objectives over time where they are currently not being achieved, including downstream of the proposal to the extent of the proposal impact including estuarine and marine waters (if applicable).	Impacts to water quality during construction and operation are minimised. Erosion and sediment controls during construction are implemented in accordance with the Blue Book. The project protects or contributes to achieving the water quality objectives, during construction and operation by establishing discharge criteria that protect the environmental values of the receiving waters.
Soils	The environmental values of land, including soils, subsoils and landforms, are protected. Risks arising from the disturbance and excavation of land and disposal of soil are minimised, including disturbance to acid sulfate soils and site contamination.	Site-specific soil characteristics are taken into consideration during detailed design and construction. Soils excavated from potential acid sulfate areas are subject to the provisions of an acid sulfate soil management plan. Once acid sulfate soils have been treated, depending on the results of testing, they are either reused on site or disposed of at an appropriate facility. Existing contamination is managed in accordance with relevant regulatory requirements. Any spoil for off-site disposal is assessed, classified, managed and disposed of in accordance with the *Waste Classification Guidelines* (NSW EPA, 2014a).
Air quality	The proposal is designed, constructed and operated in a manner that minimises air quality impacts (including nuisance dust and odour) to minimise risks to human health and the environment to the greatest extent practicable.	Potential air quality/dust impacts from the construction of the project are minimised and managed. Odour impacts are minimised through the implementation of the former Tempe landfill odour management plan. Dust and exhaust emissions of plant and equipment are controlled from construction activities. Adverse impacts on existing air quality are minimised.

Key issue (as listed in the SEARs)	SEARs desired performance outcomes	Project-specific environmental performance outcomes
Health and safety	The proposal avoids or minimises any adverse health impacts arising from the proposal. The proposal avoids, to the greatest extent possible, risk to public safety.	Potential air quality/dust impacts, traffic impacts and noise and vibration impacts from construction of the project are minimised and managed. Utilities are managed in consultation with utility providers to minimise impacts on the community and Sydney Airport. Traffic management during construction is implemented to minimise the risk to public safety. The majority of potential impacts on amenity and community wellbeing, and access and connectivity during construction is temporary and short term. Safe and efficient road user movements is achieved through the project design and care is taken to minimise incidents and crashes during construction.
Sustainability	The proposal reduces the NSW Government's operating costs and ensures the effective and efficient use of resources. Conservation of natural resources is maximised.	Sustainability considerations are integrated throughout design, construction and operation. The project is carried out in accordance with the *Environmental Sustainability Strategy 2019–2023* (Roads and Maritime, 2019b). Water and electricity efficiency measures are implemented where practicable. Opportunities are taken to reduce material use and maximise the use of materials with low embodied environmental impact where practicable.
Waste	All wastes generated during the construction and operation of the proposal are effectively stored, handled, treated, reused, recycled and/or disposed of lawfully and in a manner that protects environmental values.	The preferred waste management hierarchy of avoidance, minimisation, reuse, recycling and disposal is implemented. Measures to minimise waste, manage waste and conserve resources throughout the construction of the project are implemented. Construction staff have an increased level of understanding and awareness of waste and resource use management issues. Uncontaminated spoil is recycled or reused either on or off site. Reuse of waste is managed in accordance with relevant NSW EPA requirements. Waste is disposed of at appropriately licensed facilities.
Climate change risk	The proposal is designed, constructed and operated to be resilient to the future impacts of climate change.	Resilience to future extreme rainfall and sea level rise as a result of climate change. Surrounding asset owners are engaged for a coordinated approach to address potential future climate change related impacts. Design standards are applied for resilience to extreme heat conditions. Workplace health and safety aspects are considered, such as future climate change related heat stress.

27.5 Project uncertainties and approach to design refinements

27.5.1 Project uncertainties

The design presented in this document is indicative and subject to further detailed design which may further minimise impacts. The design serves to:

- Confirm that the proposed performance and technical requirements can be achieved
- Validate the feasibility and potential methodologies of the construction
- Identify key risks, constraints and potential environmental impacts.

There remain some uncertainties relating to technical requirements and how the project would be constructed. These would be resolved during detailed design. A summary of the uncertainties that have the potential to impact on the environment, and how these would be resolved, is provided in Table 27.17. Considering the implementation of the proposed resolutions, the uncertainties listed are not expected to result in significant or unacceptable impacts on the environment that would not be capable of mitigation or management.

Table 27.17 Resolution of key project uncertainties

Key uncertainties	Category	How uncertainties will be resolved
Hydrology and flooding – requirement for flood storage basin	Design	Further flood modelling will be undertaken incorporating the detailed design, construction planning information, and additional information such as development floor levels of potentially impacted properties. This will provide further guidance on potential flood risks and confirm the required mitigation requirements.
Groundwater levels and fluctuations	Design	While monitoring has been conducted to date, groundwater level and quality monitoring will continue to be undertaken to provide a more reliable and robust dataset. This will allow for future predictions of groundwater drawdown (including settlement).
Water quality of surface waterbodies	Design	Surface water quality monitoring will continue to be undertaken in Alexandra Canal and Mill Stream to augment the existing dataset. This will facilitate establishing discharge criteria for surface water discharges (if proposed) to protect the environmental values of the watercourses.
The location and extent of likely ground settlement	Design	Further assessment will be undertaken of potential ground settlement associated with likely groundwater drawdown, including numerical modelling (if required).
Minimising groundwater interception	Design	The construction methodology will be refined, where practicable, to minimise interception of groundwater.
Groundwater dewatering methods and management	Design	A dewatering management strategy will be prepared, which will include proposed methods, procedures, testing and disposal of extracted groundwater.
	Design	The feasibility of options proposed in Chapter 15 (Groundwater) for discharging and managing extracted groundwater will be further investigated. This will include on-site reuse, infiltration, reinjection, discharge to stormwater, disposal to the wastewater system and collection for off-site disposal, including water accounting procedures.
Noise barriers – location, height and type.	Design	The noise barrier recommended in Chapter 10 (Noise and vibration) will be subject to further reasonable and feasible considerations during detailed design including construction limitations, aviation safety (turbulence) and urban design. Further noise modelling will be required to confirm the requirements of the noise barrier including the location, height and type.

Key uncertainties	Category	How uncertainties will be resolved
Emplacement mounds – location, design and configuration of the emplacement mounds in Tempe	Design	The location, design and configuration of the emplacement mounds at Tempe would be confirmed during detailed design in consultation with key stakeholders including Inner West Council and Sydney Airport Corporation. The mounds will be designed and managed as described in section 7.10.2. Key considerations include existing and future land uses, aviation safety (turbulence) requirements and the master plan for the Tempe Lands area being prepared by Inner West Council.
Contamination and waste management	Design	The expected volume of contaminated or unsuitable material to be managed and/or disposed of would be confirmed during detailed design.
Existing contamination and need for remediation	Design	Additional intrusive environmental site investigations will be undertaken to identify and confirm existing contamination levels across the project site. The need for and type of remediation to address specific areas of contamination will be confirmed following further intrusive investigations and identification of the construction methods proposed by the construction contractor(s).
Extent of odour impacts from the former Tempe landfill	Design	Further odour modelling and impact assessment will be undertaken, including of the construction contractor(s) preferred construction method, considering all potential odour sources.
Construction compounds, worksites and laydown facilities	Construction	The final location and layout of construction compounds, worksites and facilities will be confirmed based on the detailed design and final construction methodology, including flood risk assessment.
Relocation of Inner West Council Depot	Design	The need to relocate the existing council depot and identification of a preferred location will be confirmed in consultation with Inner West Council.
Communications, navigation and surveillance equipment effects at Sydney Airport	Design	Further advice from CASA and Airservices Australia is required to determine the extent of any operational impacts on communications, navigation and surveillance equipment and the mitigation that may be required.
Utilities – the nature and extent of utility works	Construction	The location, nature and extent of utility changes will be confirmed during detailed design in consultation with utility providers. Further consultation will be undertaken with utility providers to refine and confirm changes and manage the proposed staging of work.

27.5.2 Approach to design refinements

The concept design defines a project that provides a sound basis for developing the detailed design to the standard required to support project delivery. Sufficient flexibility has been provided to allow for the design to be refined during the detailed design stage, where relevant, to improve the road network and safety performance, minimise impacts on the community and the environment, and in response to feedback from the community and stakeholders. As a result, the final design may vary from the concept design described in this chapter.

Any proposed variations would be reviewed for consistency with the assessment contained in this document, including relevant mitigation measures, performance outcomes and any future conditions of approval. If any proposed variations are not consistent with the approvals, appropriate modifications to the project approval would be sought in accordance with legislative requirements, noting that only minor modifications can be made to approved MDPs under the Airports Act.

The design of the project as described in this document would be subject to ongoing refinements during the detailed design phase. Refinements may be made to:

- Avoid services that present significant construction difficulties in terms of logistics, time and/or cost
- Reduce the construction timeframe

- Avoid areas of environmental sensitivity identified following approval
- Reduce impacts on the community
- Improve operation without increasing the potential environmental impacts.

Such refinements may include (for example) minor changes to:

- The location of construction compounds and work area accesses
- The location of key infrastructure, refinement or reorientation of site boundaries
- Technology or the features of key project components.

Refinements would not include significant changes to the project.

A consistency review would be undertaken for design refinements to consider whether the refinement would:

- Comply with the conditions of approval
- Be consistent with the objectives and operation of the project as described in this document
- Result in a change to the approved project which is not considered significant
- Result in any potential environmental or social impacts of a similar scale and nature as those considered by this document.

If the proposed change is inconsistent with the above, it would be considered a project modification. Approval for any modifications would be sought in accordance with the requirements of Division 5.2 of the EP&A Act and Section 95 of the Airports Act.