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ABBREVIATIONS

ACM	asbestos containing material
AECs	areas of environmental concern
AEP	annual exceedance probability
AMP	asbestos management plan
ARTC	Australian Rail Track Corporation
AS/NZS 2885.6	*AS/NZS 2885.6, Pipelines – gas and liquid petroleum, part 6: Pipeline safety management* (Standards Australia, 2018)
ASS	acid sulfate soils
ASSMP	acid sulfate soils management plan
Australian Government	Government of the Commonwealth of Australia
the Blue Book	*Managing Urban Stormwater: Soils and Construction Volume 1* (Landcom, 2004)
CASA	Civil Aviation Safety Authority
CEMP	Construction Environmental Management Plan
CLM Act	NSW *Contaminated Land Management Act 1997*
CNVMP	Construction Noise and Vibration Management Plan
CTTAMP	Construction Traffic, Transport and Access Management Plan
DECCW	Department of Environment, Climate Change and Water
DIRDC	Australian Government Department of Infrastructure, Regional Development and Cities
DPIE	NSW Department of Planning, Industry and Environment
EEC	endangered ecological community
EES	Department of Planning, Industry and Environment – Environment, Energy and Science Group (formerly NSW Office of Environment and Heritage)
EIS	environmental impact statement
EMPs	environmental management plans
EP&A Act	NSW *Environmental Planning and Assessment Act 1979*
EPA	NSW Environment Protection Authority

EPL	environment protection licence
ER	Environmental Representative
G2S JV	Gateway to Sydney Joint Venture
HAARD	*Historical Archaeological Assessment and Research Design*
HIP	Heritage Interpretation Plan
ICNG	Interim Construction Noise Guideline
km	kilometres
km/h	kilometres per hour
km^2	square kilometres
LEP	local environmental plan
LGA	local government area
LOCs	rail location cabinets
m	metres
m^3	cubic metres
MFN	Metropolitan Freight Network
NCA	noise catchment area
NEPC	National Environmental Protection Council
NEPM 2013	*National Environmental Protection (Assessment of Site Contamination) Measure 2013* (NEPC, 2013)
NMLs	noise management levels
NSW	New South Wales
ONVR	Operational Noise and Vibration Review
OOHW	out-of-hours work
PANS-OPS	Procedures for Air Navigational Services – Aircraft Operations Surface
PFAS	per- and poly-fluoroalkyl substances
PMF	probable maximum flood
POEO Act	NSW *Protection of the Environment Operations Act 1997*
the project	Botany Rail Duplication project
RAP	remediation action plan

RING	*Rail Infrastructure Noise Guideline* (EPA, 2013)
RMS or Roads and Maritime	Roads and Maritime Services
SACL	Sydney Airport Corporation Limited
Sydney Coordination Office	Transport for NSW Sydney Coordination Office
SEARs	Secretary's Environmental Assessment Requirements (for the EIS)
SEPP	state environmental planning policy
SEPP 55	State Environmental Planning Policy No 55 – Remediation of Land
SEPP 64	State Environmental Planning Policy No 64 – Advertising and Signage 2018
SHR	State Heritage Register
SMS	Safety Management System
SSI	State significant infrastructure
SWMP	Soil and Water Management Plan
VPAs	Voluntary planning agreements

DEFINITIONS

Aboriginal object	Defined by the *National Parks and Wildlife Act 1974* as: 'any deposit, object or material evidence (not being a handicraft made for sale) relating to the Aboriginal habitation of the area that comprises New South Wales, being habitation before or concurrent with (or both) the occupation of that area by persons of non-Aboriginal extraction, and includes Aboriginal remains'.
Aboriginal site	A place where physical remains or modification of the natural environment indicate past and 'traditional' activities by Aboriginal people. Site types include artefact scatters, isolated artefacts, burials, shell middens, scarred trees, quarries and contact sites. Includes sites listed on the *National Parks and Wildlife Act 1974* (also known as Aboriginal 'objects').
Acid sulfate soils	Naturally occurring soils, sediments or organic substrates (e.g. peat) that are formed under waterlogged conditions. These soils contain iron sulfide minerals (predominantly as the mineral pyrite) or their oxidation products. In an undisturbed state below the water table, acid sulfate soils are benign. However, if the soils are drained, excavated or exposed to air by a lowering of the water table, the sulfides react with oxygen to form sulfuric acid.
Alignment	The geometric layout (e.g. of a road or railway) in plan (horizontal) and elevation (vertical).
Annual exceedance probability	The chance of a flood of a nominated size occurring in a particular year. The chance of the flood occurring is expressed as a percentage and, for large floods, is the reciprocal of the ARI. For example, the one percent AEP flood event is equivalent to the 100 year ARI flood event.
Aquifer	A layer of soil or rock with sufficient porosity and permeability to enable usable quantities of water to be extracted from it.
Botany Line	A dedicated freight rail line (operated by ARTC) that forms part of the Metropolitan Freight Network. The line extends from near Marrickville Station to Port Botany.
Climate change	A change in the state of the climate that can be identified (e.g. by statistical tests) by changes in the mean and/or variability of its properties, and that persists for an extended period of time, typically decades or longer.
Classified road	A road that meets the definition of a classified road and is listed as such under the *Roads Act 1993* – includes main roads, highways, freeways etc.
Construction compound	An area used as the base for construction activities, usually for the storage of plant, equipment and materials, as well as construction site offices and worker facilities.
Construction environmental management plan (CEMP)	A site-specific plan developed for the construction phase of the project to ensure that all contractors and sub-contractors comply with the environmental conditions of approval for the project and that the environmental risks are properly managed.

Cumulative impacts	Impacts that, when considered together, have different or more substantial effects than a single impact assessed on its own.
Dangerous goods	Dangerous goods are substances or articles that pose a risk to people, property or the environment due to their chemical or physical properties. They are usually classified with reference to their immediate risk.
Detailed design	The stage of design where project elements are design in detail, suitable for construction.
Detour	An alternative route, using existing roads, made available to traffic.
Drainage	Natural or artificial means for the interception and removal of surface or subsurface water.
Earthworks	All operations involved in loosening, excavating, placing, shaping and compacting soil or rock.
Embankment	A raised area of earth or other materials used to carry a rail line in certain areas.
Emission	A substance discharged into the air
Enabling works	Works which are required before the start of the main construction works.
Erosion	A natural process where soil or rock is worn away by the action of wind or water.
Existing rail corridor	The corridor within which the existing rail infrastructure is located. In the study area, the existing rail corridor is the Botany Line.
Feasible and reasonable	Consideration of best practice taking into account the benefit of proposed measures and their technological and associated operational application in the NSW and Australian context. 'Feasible' relates to engineering considerations and what is practical to build. 'Reasonable' relates to the application of judgement in arriving at a decision, taking into account mitigation benefits and cost of mitigation versus benefits provided, community expectations and nature and extent of potential improvements.
Flood	Relatively high stream flow which goes over the top of the natural or artificial banks in any part of a stream, river, estuary, lake or dam. It also includes local overland flooding associated with major drainage before entering a watercourse or coastal inundation resulting from super-elevated sea levels or waves overtopping coastline defences excluding tsunami.
Flood prone land	Land susceptible to flooding by the probable maximum flood. Note that the flood prone land is also known as flood liable land.
Flood storage area	Those parts of the floodplain that are important for the temporary storage of floodwaters during the passage of a flood. The extent and behaviour of flood storage areas may change with flood severity, and loss of flood storage can increase the severity of flood impacts by reducing natural flood attenuation. It is necessary to investigate a range of flood sizes before defining flood storage areas.

Floodplain	Area of land which is inundated by floods up to and including the probable maximum flood event (i.e. flood prone land).
Freight	Goods transported by truck, train, ship, or aircraft.
Groundwater	Water that is held in rocks and soil beneath the earth's surface.
Heavy vehicles	A heavy vehicle is classified as a Class 3 vehicle (a two axle truck) or larger, in accordance with the Austroads Vehicle Classification System.
Hydrology	The study of rainfall and surface water runoff processes.
Impact	Influence or effect exerted by a project or other activity on the natural, built and community environment.
L_{Amax}	The maximum sound level recorded during the measurement period.
Level of service	Defined by Austroads as a measure for ranking operating road and intersection conditions, based on factors such as speed, travel time, freedom to manoeuvre, interruptions, comfort and convenience.
Local road	Road used primarily to access properties located along the road.
Localised flooding	Localised flooding occurs when components of the drainage system are undersized or blocked and cannot accommodate the incoming overland surface flows, resulting in the flooding of a localised area.
Metropolitan Freight Network	A network of dedicated railway lines for freight in Sydney, linking NSW's rural and interstate rail networks with Port Botany. The Metropolitan Freight Network is managed by ARTC.
Obstacle limitation surface	An invisible surface that defines the airspace surrounding an airport that must be protected from obstacles to ensure that aircraft flying in good weather during the initial and final stages of flight, or in the vicinity of the airport, can do so safely.
PFAS	Per-and poly-fluoroalkyl substances, which are manufactured chemicals used in products that resist heat, oil, stains and water. There are many types of PFAS, with the best-known examples being perfluorooctane sulfonate (PFOS) and perfluorooctanoic acid (PFOA), which were used in some fire-fighting foams.
Pollutant	Any measured concentration of solid or liquid matter that is not naturally present in the environment.
Possession	A period of time during which a rail line is blocked to trains to permit work to be carried out on or near the line.
Probable maximum flood	The largest flood that could conceivably occur at a particular location, usually estimated from probable maximum precipitation coupled with the worst flood producing catchment conditions. Generally, it is not physically or economically possible to provide complete protection against this event. The probable maximum flood defines the extent of flood prone land (i.e. the floodplain).

Procedures for Air Navigational Services – Aircraft Operations	The PANS-OPS surface protects aircraft flying into and out of the airport when the flight is guided solely by instruments in conditions of poor visibility. The PANS-OPS surface is generally situated above the obstacle limitation surface.
Project	The construction and operation of the Botany Rail Duplication.
Project site	The area that would be directly affected by construction (also known as the construction footprint). It includes the location of operational project infrastructure, the area that would be directly disturbed by the movement of construction plant and machinery, and the location of the storage areas or compounds that would be used to construct that infrastructure.
Proponent	The person or organisation that proposes to carry out the project or activity.
Rail corridor	The corridor within which the rail tracks and associated infrastructure are located.
Residual land	Acquired land not required during operation of the project.
Risk	Chance of something happening that will potentially have an undesirable effect. It is measured in terms of consequence and likelihood.
Runoff	The amount of rainfall that ends up as streamflow, also known as rainfall excess.
Secretary's environmental assessment requirements	Requirements and specifications for an environmental assessment prepared by the Secretary of the Department of Planning, Industry and Environment under section 115Y of the *Environmental Planning and Assessment Act 1979* (NSW).
Spoil	Material generated by excavation.
Sensitive receiver	Land uses and activities that are sensitive to potential noise, vibration, air and visual impacts, such as residential dwellings, schools and recreation areas.
Slewing (track)	Relocation of an existing track sideways from its original location to a new location.
Staging	Refers to the division of the project into multiple contract packages for construction purposes, or the construction or operation of the overall project in discrete phases.
Stockpile	Temporary stored materials such as soil, sand, gravel and spoil/waste.
Study area	The study area is defined as the wider area including and surrounding the project site, with the potential to be directly or indirectly affected by the project (e.g. by noise and vibration, visual or traffic impacts). The actual size and extent of the study area varies according to the nature and requirements of each assessment and the relative potential for impacts but which is sufficient to allow for a complete assessment of the proposed project impacts to be undertaken.
Surface water	Water flowing or held in streams, rivers and other wetlands in the landscape.
Track	The structure consisting of the rails, fasteners, sleepers and ballast, which sits on the formation.

Visual amenity	The value of a particular area or view in terms of what is seen.
Waste	Waste is defined by the EPA as any matter (whether liquid, solid, gaseous or radioactive) that is discharged, emitted or deposited in the environment in such volume, constituency, or manner as to cause an alteration to the environment.
Waste management hierarchy	The waste management hierarchy is a set of priorities for the efficient use of resources, which underpins the objectives of the *Waste Avoidance and Resource Recovery Act 2001*. The waste management hierarchy progresses from avoidance (most preferred), to re-use/recycling, to disposal (least preferred).
Watercourse	Any flowing stream of water, whether natural or artificially regulated (not necessarily permanent).
Work area	Individual areas within the project site that are subject to construction at any one time.

EXECUTIVE SUMMARY

Botany Rail Duplication project

The Botany Rail Duplication project is one of a number of initiatives proposed to improve road and freight transport through the important economic gateways of Sydney Airport and Port Botany. The majority of the existing rail corridor on the Botany Line has twin tracks with the exception of the section between Mascot and Botany, where there is currently only one track. This single line section currently constrains the ability for freight to enter and depart from Port Botany concurrently. Additional demand arising from the predicted growth in container freight has the potential to create a bottleneck along the line, impacting on reliability and restricting the efficient movement of freight across the broader Sydney freight rail network.

Key features of the Botany Rail Duplication project would involve:

- Track duplication – including construction of a new track within the rail corridor for a distance of about three kilometres.
- Track realignment (slewing) and upgrading – including moving some sections of track sideways (slewing) and upgrading some sections of track to improve the alignment of both tracks and minimise impacts on adjoining land uses.
- New crossovers – including construction of new rail crossovers to maintain and improve access at two locations (totalling four new crossovers).
- Bridge works – including construction of new bridge structures at Mill Stream, Southern Cross Drive, O'Riordan Street and Robey Street (adjacent to the existing bridges at these locations), and re-construction of the existing bridge structures at Robey Street and O'Riordan Street.
- Embankment/retaining structures – including construction of new embankment and retaining structures adjacent to Qantas Drive between Robey Street and O'Riordan Street and a new embankment between the Mill Stream and Botany Road bridges.

Planning approvals process

The Botany Rail Duplication project has been classified as State Significant Infrastructure (SSI) in accordance with Division 5.2 of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act). As SSI, the project requires approval from the NSW Minister for Planning. ARTC has also requested that the project be declared as Critical SSI.

An Environmental Impact Statement (EIS) for the project was placed on public exhibition by NSW Department of Planning, Industry and Environment (DPIE) between 16 October 2019 and 13 November 2019. During this period, government agencies, interested stakeholders and the community were invited to make written submissions on the project to the DPIE.

Following the conclusion of the public exhibition period, ARTC have prepared a Submissions Report (this document) for the project to address the issues raised in community and stakeholder submissions, and to document proposed design changes and additional environmental assessment undertaken since exhibition of the EIS.

The Minister for Planning and Public Spaces (as delegated to the Secretary of the DPIE) will subsequently decide whether to grant approval, or to refuse the project, under the EP&A Act. Approval from the Minister is required before ARTC can proceed with the project.

Purpose of this Submissions Report

This Submissions Report considers the issues raised in community and stakeholder submissions received during the public exhibition of the EIS, as well as ARTC's response to these issues. It also provides:

- an overview of the project and the key findings of the EIS
- a summary of the consultation activities undertaken prior to, and during, the public exhibition of the EIS, as well as activities proposed during the pre-construction, construction and commissioning phases
- a description and assessment of changes made to the project as presented in the EIS
- revised consolidated environmental mitigation and management measures for the project, adjusted in response to the submissions received and the proposed design changes.

Overview of submissions

Submissions from government agencies, key stakeholders, businesses and the community were received by DPIE. All submissions received were provided to ARTC for consideration. A total of 32 submissions were received, comprising 12 submissions from government agencies and key stakeholders, and 20 community submissions (where 'community' includes individuals, businesses and special interest groups).

Of the 12 government agency and key stakeholder submissions received, seven provided comments on the project and five gave support to the project. Concerns typically included, but were not limited to:

- construction and operational noise
- traffic impacts during construction
- impacts due to the removal of vegetation.

Of the 20 submissions received from the community, 12 submissions provided comment on the project and eight submissions objected to the project. For the community submissions received, the key issues raised as concerns were:

- noise and vibration, with both construction and operational noise being a key concern
- project justification and need, due to the lack of active transport infrastructure in the design
- air quality, associated with the potential for airborne pollutants and diesel emissions.

A detailed breakdown of these issues is provided in section 5.4 of this Submissions Report.

Design refinements to the project

Since the exhibition of the EIS, four key design changes have been made to the project in response to further design investigations, submissions received and/or outstanding issues identified in the EIS. The proposed changes and their justifications are summarised in Table ES.1 below.

Table ES.1 Summary of design refinements to the project

PROPOSED DESIGN CHANGE/ REFINEMENT	JUSTIFICATION FOR CHANGE / REFINEMENT
Track and drainage changes at Myrtle Street including: • the height of the new track has been slightly raised compared to the project EIS design to match the height of the existing track • the proposed drainage along the new section of track adjacent to Myrtle Street has been modified to match the existing drainage that currently exists along the track corridor.	The project EIS identified that during a one per cent AEP event, operation of the drainage design assessed in the project EIS would result in an increase in peak flood levels upstream of the inlet that crosses the rail corridor at Myrtle Street. The EIS project design was also identified as resulting in potential to impact the existing adjoining developments at this location. To minimise the identified flooding impacts, the EIS project design has been modified to reduce/mitigate the potential flooding impacts.
Refinement of the Mill Stream bridge abutment. The proposed design change would include: • extension of the proposed bridge deck (western span) by around seven metres and relocation of the western abutment to support the proposed design change • set back of the western abutment in order to increase the overall cross section area of the flow path of flood waters beneath the proposed underbridge.	The project EIS identified that peak 1% AEP flood levels upstream of Mill Stream bridge would be increased by a maximum of around 0.1 metres. This would lead to an increase in the rate (and therefore depth) of flow that overtops the western bank of Mill Stream and is conveyed along the travel lanes of Southern Cross Drive and Botany Road. The increase in peak flood levels upstream of Mill Stream would also lead to an increase in the frequency with which flow overtops the western bank of Mill Stream onto the travel lanes of Southern Cross Drive. The proposed design change were identified as being required to mitigate the impacts of excessive water flows observed as part of the 1% AEP flood modelling outputs that were identified for the EIS project design.
Removal of proposed construction access tracks between: • Banksia Street and Bay Street on the eastern side of the rail corridor • Myrtle Street and Mill Stream on the eastern and western side of the rail corridor.	Ongoing refinement of the construction methodology following exhibition of the project EIS, identified that the previously proposed access tracks between Banksia Street and Bay Street and between Myrtle Street and Mill Stream were no longer required during construction of the project as dedicated access tracks. These tracks are therefore no longer proposed to be constructed or utilised as part of the revised project.
Removal of additional asbestos containing material (ACM)	As a result of ongoing design development of the EIS project design and ongoing refinement of the proposed construction methodology, additional earthworks are proposed to be undertaken within the area of identified ACM between Bay Street and Mill Stream.

A full assessment of the design changes is presented in Chapter 4. The impacts associated with the proposed design changes would be manageable through the application of the environmental mitigation and management measures presented in Chapter 8 of this Submissions Report. Overall, the benefits of the changes to the community and the environment, and the benefits for construction and operation of the project, are expected to outweigh the potential impacts of these changes.

Conclusions and next steps

This Submissions Report considers and documents the issues raised in community and stakeholder submissions on the project, as well as ARTC's response to these issues. It is proposed that the project, as described in Chapters 6 and 7 of the project EIS, and as amended by this Submissions Report, should be submitted for determination by the Minister for Planning and Public Spaces.

The Minister will subsequently decide whether to grant approval, or to refuse the project, under Section 5.19 of the EP&A Act. Should the project be approved by the Minister, ARTC would continue to consult with community members, government agencies and other stakeholders during the pre-construction, construction and commissioning phases (refer Chapter 3 of this Submissions Report for further details).

1. INTRODUCTION

This chapter provides an introduction to the project, the assessment and approval process and the purpose and structure of this report.

1.1 Background

1.1.1 The Botany Rail Duplication project

Australian Rail Track Corporation (ARTC) proposes to construct and operate a new second rail track largely within the existing Botany Line rail corridor between Mascot and Botany, in the Bayside local government area. The Botany Rail Duplication ('the project') aims to increase freight rail capacity to and from Port Botany.

ARTC is an Australian Government owned statutory corporation that manages more than 8,500 kilometres of rail track in NSW, Queensland, South Australia, Victoria and Western Australia.

The project is one of a number of initiatives proposed to improve road and freight transport through the important economic gateways of Sydney Airport and Port Botany. Port Botany is one of Australia's and NSW's most important infrastructure assets, with Port Botany being the second largest container port in Australia by volume (and only container port in NSW), as well as NSW's largest bulk liquid and gas port.

1.1.2 Project need and benefits

Efficient access to Port Botany is critical for the economic growth and prosperity of Sydney, NSW and Australia. The amount of container freight handled by Port Botany is predicted to significantly increase in the future. Transporting more freight to and from Port Botany by rail will place additional demands on the existing Botany Line, particularly the single line section of track, which is already an existing constraint to this section of the wider freight network.

The majority of the existing Botany Line has twin tracks with the exception of the section between Mascot and Botany, where there is currently only one track. This single line section currently constrains the ability for freight to enter and depart from Port Botany concurrently. Additional demand arising from the predicted growth in container freight has the potential to create a bottleneck along the line, impacting on reliability and restricting the efficient movement of freight across the broader Sydney freight rail network.

The project would reduce the potential for a bottleneck by duplicating the remaining section of single rail track to allow for increases to the capacity on the Botany Line, which is vital to meet the long-term freight demands to Port Botany.

1.1.3 Project objectives

The primary objective of the project is to increase capacity along the Botany Line to meet the forecast growth in demand for container freight transport to and from Port Botany. Secondary objectives of the project are to:

- provide increased operational efficiency, flexibility and reliability for freight customers
- increase rail mode share for containerised freight relative to road freight from Port Botany
- support connection to, and operation of, current and future intermodal terminals within the Sydney metropolitan area to meet their targeted freight capacity.

1.2 The assessment and approval process

The project has been classified as SSI in accordance with Division 5.2 of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act). As SSI, the project requires approval from the NSW Minister for Planning. ARTC has also requested that the project be declared as Critical SSI.

An Environmental Impact Statement (EIS) was prepared to support ARTC's application for approval of the project in accordance with the requirements of Division 5.2 of the EP&A Act. The EIS was placed on public exhibition by the NSW Department of Planning, Industry and Environment (DPIE) for a period of 28 days, commencing 16 October 2019 and concluding on 13 November 2019.

During the exhibition period, interested stakeholders and members of the community were able to review the EIS online or at display locations, participate in consultation and engagement activities, and make a written submission to the DPIE for consideration in its assessment of the project (refer to section 3).

1.3 The purpose and structure of this report

The Planning Secretary of the DPIE provided copies of the submissions received to ARTC. This Submissions Report has been prepared in accordance with the requirements for SSI under Division 5.2, Section 5.17(6) of the EP&A Act, which specifies that:

'The Secretary may require the proponent to submit to the Secretary:

> *a) a response to the issues raised in those submissions, and*
>
> *b) a preferred infrastructure report that outlines any proposed changes to the State significant infrastructure to minimise its environmental impact or to deal with any other issue raised during the assessment of the application concerned.'*

The report is structured as follows:

- an introduction to the report (Chapter 1)
- an overview of the project as exhibited (Chapter 2)
- a description of the consultation that was undertaken for the exhibition of the EIS and ongoing consultation activities planned (Chapter 3)
- project changes and further environmental assessment (Chapter 4)
- an overview analysis of the submissions received, including numbers, types of submitters and key issues raised (Chapter 5)
- a summary of the issues raised in community, government agency and key stakeholder submissions (Chapters 6 and 7) and responses to the issues raised
- updated mitigation measures and performance outcomes for the proposal (Chapter 8)
- an updated project evaluation and conclusion (Chapter 9)
- an overview of the community submissions, and where they have been responded to in the report (Appendix A).

2. OVERVIEW OF EXHIBITED PROJECT

This chapter provides an overview of the project as described in the EIS, including the key features and proposed timing of the project and a summary of the key potential impacts.

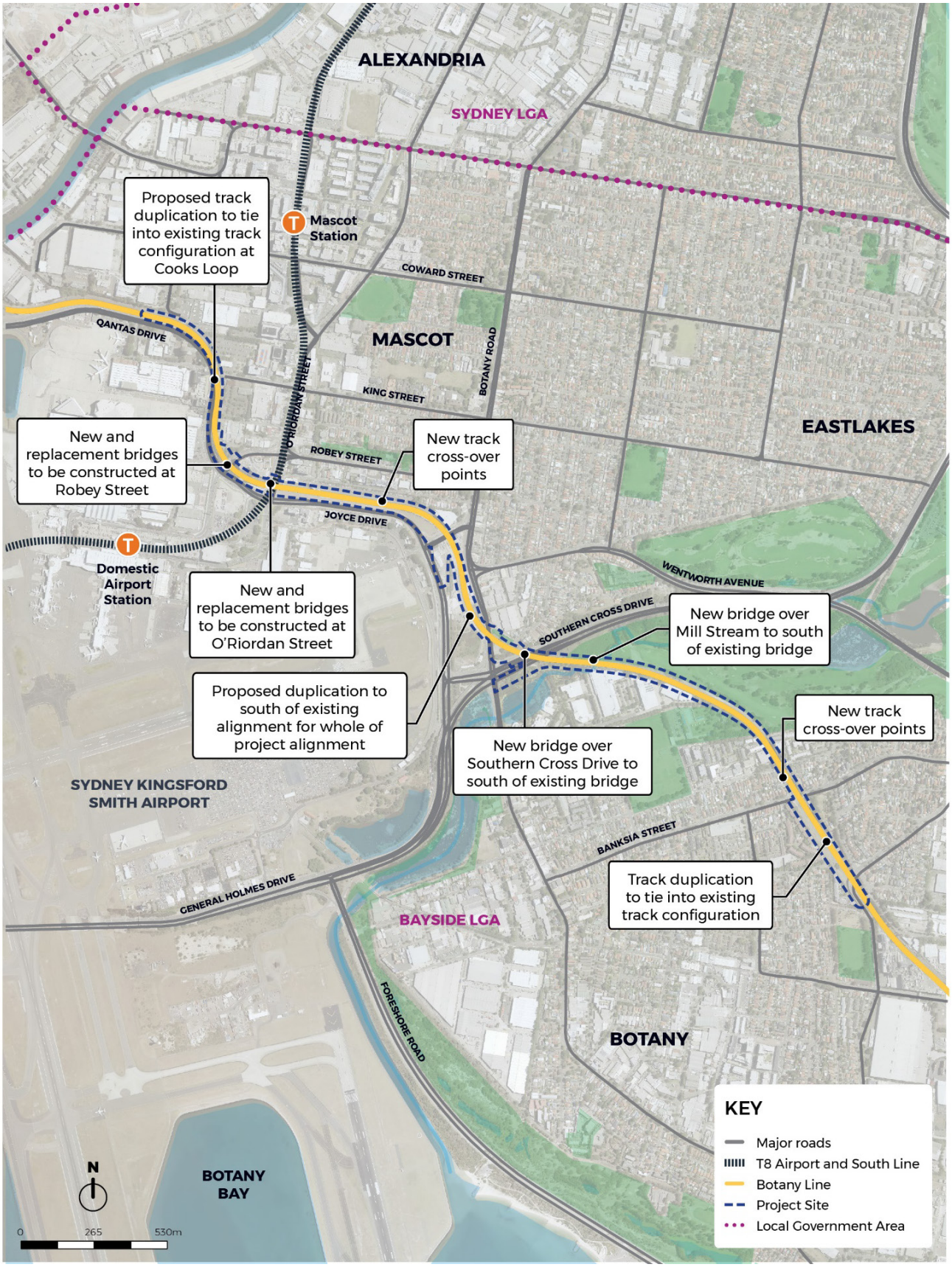
2.1 Key features of the project

The project would involve:

- Track duplication – including construction of a new track within the rail corridor for a distance of about three kilometres.
- Track realignment (slewing) and upgrading – including moving some sections of track sideways (slewing) and upgrading some sections of track to improve the alignment of both tracks and minimise impacts on adjoining land uses.
- New crossovers – including construction of new rail crossovers to maintain and improve access at two locations (totalling four new crossovers).
- Bridge works – including construction of new bridge structures at Mill Stream, Southern Cross Drive, O'Riordan Street and Robey Street (adjacent to the existing bridges at these locations), and re-construction of the existing bridge structures at Robey Street and O'Riordan Street.
- Embankment/retaining structures – including construction of new embankment and retaining structures adjacent to Qantas Drive between Robey Street and O'Riordan Street and a new embankment between the Mill Stream and Botany Road bridges.

Ancillary work would also include bi-directional signalling upgrades, drainage work and protecting/relocating utilities along the length of the project. The project would also require temporary facilities during construction, including compounds, laydown areas and site access.

The key features of the project are shown on Figure 2.1. Further description of the project and the construction methodology is provided in Chapters 6 and 7 of the EIS.



Note: Indicative, subject to detailed design

Figure 2.1 Key features of the project

2.2 Timing and operation

The EIS proposed commencement of construction at the end of 2020 and completion of construction in late 2023 with demobilisation and commissioning in mid-2024. However, further design refinement and a review of the procurement strategy to more closely align with the anticipated date of Planning Approval and internal processes such as Board meetings, has resulted in revised indicative key program milestones as follows:

- 2021 (Q2) – commencement of construction
- 2024 (Q2) – completion of construction
- 2024 (Q4) – commissioning.

Timeframes proposed in the EIS and discussed here are indicative. They are highly reliant on a range of variables including, but not limited to:

- further development of the design and construction planning which may result in the identification of more possession and road closure reliant activities
- availability of access to operational areas of the rail corridor including utilisation of the anticipated four planned possessions per year and any additional possessions established by the relevant rail operators
- timeframes around consultation with key stakeholders and government agencies
- the management of potential impacts associated with the project.

The anticipated period for main construction works remains about three years as per the EIS.

The project would form part of the Botany Line, which is a section of the Metropolitan Freight Network that is managed and maintained by ARTC. Train services are currently, and would continue to be, provided by a variety of operators who utilise the ARTC network to transport goods.

2.3 Key impacts of the project

Key impacts (positive and negative impacts) during construction and operation of the project identified in the EIS are summarised below in Table 2.1.

Table 2.1 Summary of key potential impacts of the project as per the EIS

ISSUE	KEY IMPACTS AS IDENTIFIED IN THE EIS
Traffic, transport and access	During construction of the project there would be delays in the road network within the project area. The key construction impacts of the project on traffic, transport and access would include: • traffic delays as a result of proposed road closure periods at Robey Street, O'Riordan Street and Southern Cross Drive to enable bridge works, and localised temporary lane closures to facilitate day-to-day construction activities, resulting in potential delays, increased travel times and impacts on bus services • minor impacts on road traffic and active transport from the movement of construction vehicles on the general road network and accessing the project site. Following completion of construction, no changes to the road network, pedestrian footpaths or bus networks are proposed.

ISSUE	KEY IMPACTS AS IDENTIFIED IN THE EIS
Noise and vibration	The nearest receivers to the project are relatively close in some areas. The worst-case construction noise impacts for the project are likely to be 'high' at certain times. During operation, the project is predicted to result in increased rail noise levels in the study area. The increased noise levels result in a number of areas where receivers are predicted to exceed the noise criteria levels. These areas are generally near to curved track and include: • around King Street • near Baxter Road • near Botany Road and McBurney Avenue • along Myrtle Street.
Air quality	In general, air quality impacts are expected to be minor and manageable through established mitigation and management measures. Potential impacts would result from the generation of dust from construction works and the movement of equipment and machinery. Operational air quality impacts are not anticipated for any pollutants. Operational air quality impacts from the project were not deemed to be significant.
Biodiversity	The project would remove small areas of native vegetation which could provide some nesting and foraging habitat. This would not result in a significant impact on threatened species. The project would remove about 0.72 hectares of native vegetation. Potential effects on foraging habitat for these species in the project site would be offset. The project crosses the Botany Wetlands and Mill Stream. There would be minor removal of riparian vegetation. There would be no blockage of fish passage along Mill Stream or impact on mapped Coastal Wetlands as a result of the project, and no threatened aquatic species are anticipated to be impacted.
Contamination	There are existing areas of contamination within the project site. This includes ACM. Acid sulfate soils (ASS) are also likely to be present within the project site. Erosion and sedimentation during construction could result in the contamination of soils and surface waters. This may impact on downstream water quality. Leaks and spills during construction and operation may cause contamination impacts on soil and water.
Hydrology, flooding	The majority of construction activities and the presence of construction compounds and work sites have the potential to impact local overland flows and flood behaviour. Runoff or rainfall within the project site has the potential to cause localised flooding issues and adverse downstream impacts. There may be impacts on downstream water quality as a result of key activities such as earthworks. During operation the project would have no significant impact on the extent of the floodplain or its hazard categorisation. Changes in flooding patterns would not result in a significant change to the Flood Planning Area or the future development potential of land located outside the project footprint, or the social and economic costs of flooding.
Water quality and soils	Construction of the project has the potential to result in surface water impacts such as increased sedimentation, erosion, pollutants and contaminants, which could reduce the existing water quality and harm the aquatic ecosystems. However, these potential impacts are likely to be temporary and negligible compared to the existing poor water quality of surrounding waterways. Operation of the project may slightly increase the magnitude or frequency of existing surface water impacts from the Botany Line, including spills or leaks and surface water runoff. Negligible adverse groundwater impacts are expected during construction and operation of the project, providing management and mitigation measures are implemented.

ISSUE	KEY IMPACTS AS IDENTIFIED IN THE EIS
Non-Aboriginal heritage	Construction of the project would require the demolition and replacement of two locally listed heritage items (O'Riordan Street Underbridge and Robey Street Underbridge) within the project site, resulting in a major impact to the fabric of the items. The project would also require remediation works to one locally listed item (Botany Road Underbridge). Construction of the project would have a moderate potential to impact local and state significant archaeological remains throughout the project site. The project is not expected to have any operational impact to Non-Aboriginal Heritage.
Aboriginal heritage	No Aboriginal places or objects were identified within the project site. Furthermore, due to the highly disturbed nature of the ground, intact archaeological deposits are not likely to be present below the ground surface. Therefore, the project is unlikely to impact any Aboriginal heritage items or places, potential Aboriginal archaeology, or intangible cultural heritage values.
Land use and property	To allow for the construction and operation of the project, a number of land use and property impacts are expected. These include temporary occupation of land for site compounds, permanent property acquisitions, the removal and replacement of advertising billboards, and disruptions to access of private properties in the vicinity of the project site. Impacts associated with land use and property would be mitigated through consultation with affected land owners and businesses.
Landscape character and visual amenity	As a result of construction activities, there would be adverse impacts on landscape character and to viewpoints during the day within the study area. This is due to several bridge replacements, the removal of trees along the southern side of the rail corridor, and the location of site compounds. At night there would be minor visual impacts from potential lighting of the night works. During operation, the project would be largely absorbed into the character of views, due to the existing highly urban character of areas to the west of the site, and the reinstatement of the billboards, which largely screen views of the bridges at Robey Street and O'Riordan Street.
Social	Social benefits that may result from the construction of the project include an increase in construction-related employment opportunities and potentially an increase in expenditure at local business. There would however be some reduced amenity of the local area during construction. Overall, the project is expected to result in long-term benefits to local and Greater Sydney communities. These mainly relate to increased rail freight efficiency and capacity across the regional and national freight network and less congestion on the roads due to reduced freight movements made by trucks.
Risks, health and safety	Adjustments or protection works would be carried out to some utilities within the project site. Any works required would be carried out with the involvement of the asset owner. Potential impacts are considered to be manageable through established mitigation and management measures. During construction, there would be public health and safety risks due to the proximity of sensitive receivers to the project site. This may result in traffic confusion, injury, potential exposure to contaminated land, access issues, air quality impacts and noise and vibration impacts. During construction and operation, the storage and handling of dangerous goods and hazardous materials could cause leaks and spills. These risks would be minimised and managed through implementation of mitigation measures. Where work is required that may impact Sydney Airport obstacle limitation surface, consultation would be carried out with Sydney Airport Corporation Limited to seek relevant approval exemptions and crane permits (as required).
Climate change	No extreme climate change risks were identified in the climate risk assessment. One high risk was identified in relation to the failure of communications and signalling systems caused by flooding, as a result of an increase in rainfall intensity combined with sea level rise. This risk would be minimised through ongoing design development.

3. CONSULTATION UNDERTAKEN DURING AND AFTER EIS EXHIBITION

This chapter describes the community and stakeholder consultation activities undertaken during the exhibition of the EIS for the project, and the consultation that would be undertaken during future project stages. ARTC believes that effective communication and engagement are important to minimising environmental and community impacts which could occur as a result of the project.

3.1 Overview of consultation activities to date

The EIS was exhibited by DPIE between 16 October 2019 and 13 November 2019. During the public exhibition period, consultation activities were carried out to engage key stakeholders and the community on information in the EIS, encourage participation in exhibition activities and provide guidance on the submissions process.

Submissions on the EIS were made directly to the DPIE. Submissions were accepted by the DPIE via electronic submission (online at www.planningportal.nsw.gov.au/major-projects/10206 or by post. A link to the Major Projects website was available on the ARTC project webpage (https://www.artc.com.au/projects/botany-rail-duplication-project/).

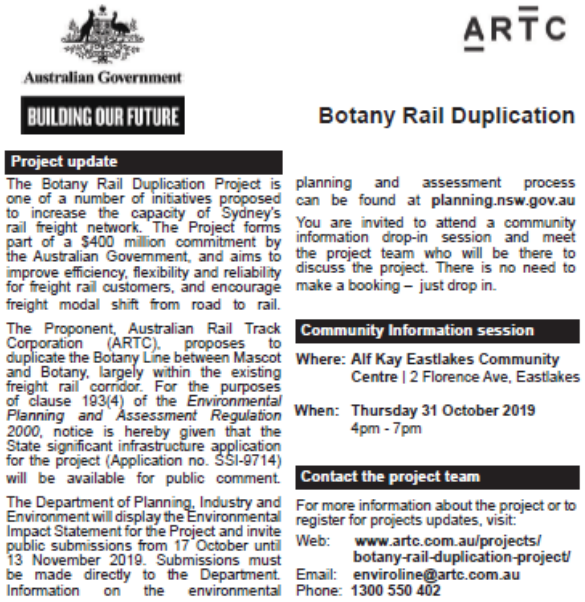
The exhibition was advertised in the Sydney Morning Herald on 1 October 2019, including details on the community information drop-in session and how to make a submission.

Additional engagement activities and tools used to encourage community and stakeholder participation during exhibition included:

- providing hardcopies of the EIS available to the public at the following locations:
    - Mascot Library, 2 Hatfield Street, Mascot
    - Eastgardens Library, 152 Bunnerong Road, Eastgardens
    - Marrickville Library, 313 Marrickville Library, Marrickville
- providing an electronic copy of the EIS at Service NSW Botany, 5 Lord Street, Botany
- a community information drop-in session at Alf Kay Eastlakes Community Centre, 2 Florence Ave, Eastlakes on 31 October 2019 between 4 pm and 7 pm. The session provided the local community the opportunity to speak to a member of the project team and seek information about the EIS. Two representatives from the DPIE attended the drop-in session
- pop-up conversation booths were held on Botany Road outside Fresh @ 1 Café on 22 October 2019 between 7 am and 10 am, and inside South Point Shopping Centre on 24 October 2019 between 3 pm and 6 pm
- a Guide to the EIS was posted to the community around the project site. The 20-page document provided a plain English guide to navigating the EIS, and was available at all events and at static display locations
- community notification flyers were posted to 22,500 properties at the start of the exhibition period. The flyer provided the community with information on the public exhibition, community information drop-in session, and contact details for more information

- stakeholder briefings and meetings with government agencies, local council, Federal and State MPs and other stakeholders
- door knocking properties in close proximity to the project site was completed on 28–30 October 2019. Members of the project team door knocked to provide project information, invite residents to the community information drop-in session, and provide details on how to make a submission. Where no one was available to speak to, Sorry We Missed You flyers were left with contact details for the project team
- E-News was sent to stakeholders who provided an email address to be kept informed about the project. The newsletter detailed information about the EIS, invited to the community information drop-in session and provided details on how to make a submission
- translation services were available throughout the exhibition period. A language translation symbol was provided on all public documents.

Examples of the public information produced for the exhibition of the project are shown in Figure 3.1 to Figure 3.4.



Australian Government

BUILDING OUR FUTURE

ARTC

Botany Rail Duplication

Project update

The Botany Rail Duplication Project is one of a number of initiatives proposed to increase the capacity of Sydney's rail freight network. The Project forms part of a $400 million commitment by the Australian Government, and aims to improve efficiency, flexibility and reliability for freight rail customers, and encourage freight modal shift from road to rail.

The Proponent, Australian Rail Track Corporation (ARTC), proposes to duplicate the Botany Line between Mascot and Botany, largely within the existing freight rail corridor. For the purposes of clause 193(4) of the *Environmental Planning and Assessment Regulation 2000*, notice is hereby given that the State significant infrastructure application for the project (Application no. SSI-9714) will be available for public comment.

The Department of Planning, Industry and Environment will display the Environmental Impact Statement for the Project and invite public submissions from 17 October until 13 November 2019. Submissions must be made directly to the Department. Information on the environmental planning and assessment process can be found at **planning.nsw.gov.au**

You are invited to attend a community information drop-in session and meet the project team who will be there to discuss the project. There is no need to make a booking – just drop in.

Community Information session

Where: **Alf Kay Eastlakes Community Centre** | 2 Florence Ave, Eastlakes

When: **Thursday 31 October 2019** 4pm - 7pm

Contact the project team

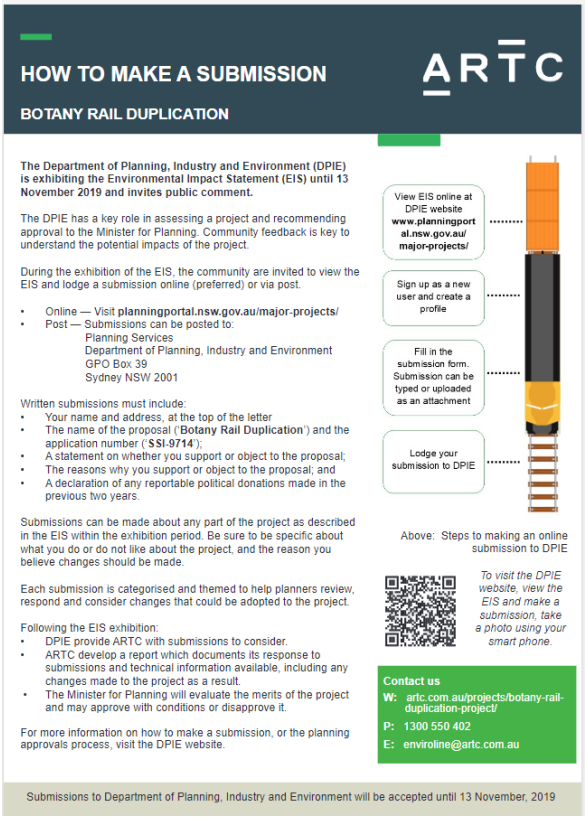
For more information about the project or to register for projects updates, visit:

Web: **www.artc.com.au/projects/botany-rail-duplication-project/**

Email: **enviroline@artc.com.au**

Phone: **1300 550 402**

Figure 3.1 Newspaper advert



HOW TO MAKE A SUBMISSION

ARTC

BOTANY RAIL DUPLICATION

The Department of Planning, Industry and Environment (DPIE) is exhibiting the Environmental Impact Statement (EIS) until 13 November 2019 and invites public comment.

The DPIE has a key role in assessing a project and recommending approval to the Minister for Planning. Community feedback is key to understand the potential impacts of the project.

During the exhibition of the EIS, the community are invited to view the EIS and lodge a submission online (preferred) or via post.

- Online — Visit **planningportal.nsw.gov.au/major-projects/**
- Post — Submissions can be posted to:
  Planning Services
  Department of Planning, Industry and Environment
  GPO Box 39
  Sydney NSW 2001

Written submissions must include:

- Your name and address, at the top of the letter
- The name of the proposal ('**Botany Rail Duplication**') and the application number ('**SSI-9714**');
- A statement on whether you support or object to the proposal;
- The reasons why you support or object to the proposal; and
- A declaration of any reportable political donations made in the previous two years.

Submissions can be made about any part of the project as described in the EIS within the exhibition period. Be sure to be specific about what you do or do not like about the project, and the reason you believe changes should be made.

Each submission is categorised and themed to help planners review, respond and consider changes that could be adopted to the project.

Following the EIS exhibition:

- DPIE provide ARTC with submissions to consider.
- ARTC develop a report which documents its response to submissions and technical information available, including any changes made to the project as a result.
- The Minister for Planning will evaluate the merits of the project and may approve with conditions or disapprove it.

For more information on how to make a submission, or the planning approvals process, visit the DPIE website.

View EIS online at DPIE website **www.planningportal.nsw.gov.au/major-projects/**

Sign up as a new user and create a profile

Fill in the submission form. Submission can be typed or uploaded as an attachment

Lodge your submission to DPIE

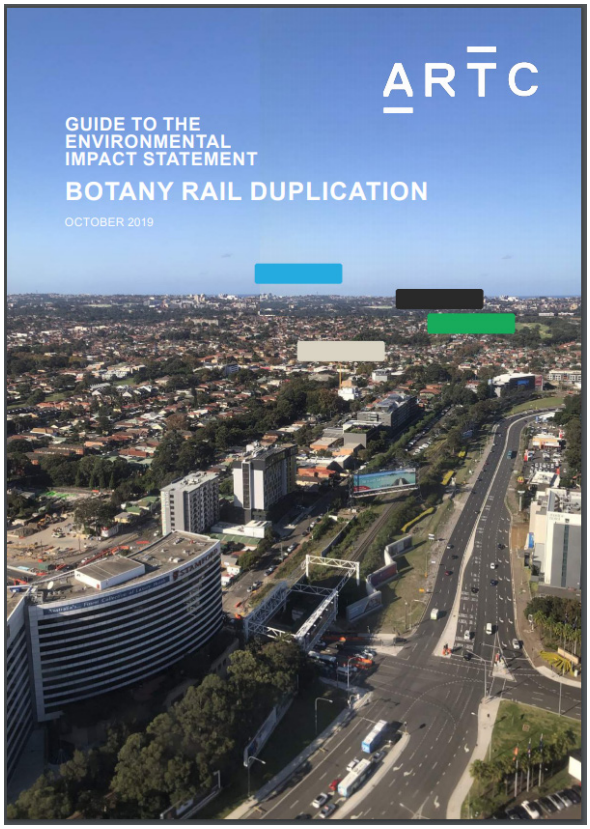
Above: Steps to making an online submission to DPIE

To visit the DPIE website, view the EIS and make a submission, take a photo using your smart phone.

Contact us
W: artc.com.au/projects/botany-rail-duplication-project/
P: 1300 550 402
E: enviroline@artc.com.au

Submissions to Department of Planning, Industry and Environment will be accepted until 13 November, 2019

Figure 3.2 How to make a submission flyer



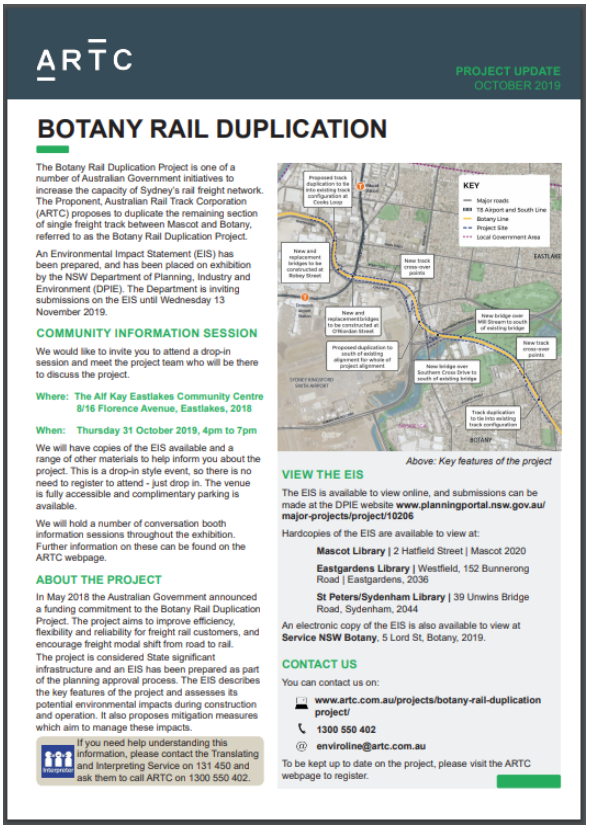
ARTC

GUIDE TO THE ENVIRONMENTAL IMPACT STATEMENT

BOTANY RAIL DUPLICATION

OCTOBER 2019

Figure 3.3 Guide to the EIS



ARTC

PROJECT UPDATE
OCTOBER 2019

BOTANY RAIL DUPLICATION

The Botany Rail Duplication Project is one of a number of Australian Government initiatives to increase the capacity of Sydney's rail freight network. The Proponent, Australian Rail Track Corporation (ARTC) proposes to duplicate the remaining section of single freight track between Mascot and Botany, referred to as the Botany Rail Duplication Project.

An Environmental Impact Statement (EIS) has been prepared, and has been placed on exhibition by the NSW Department of Planning, Industry and Environment (DPIE). The Department is inviting submissions on the EIS until Wednesday 13 November 2019.

COMMUNITY INFORMATION SESSION

We would like to invite you to attend a drop-in session and meet the project team who will be there to discuss the project.

Where: **The Alf Kay Eastlakes Community Centre 8/16 Florence Avenue, Eastlakes, 2018**

When: **Thursday 31 October 2019, 4pm to 7pm**

We will have copies of the EIS available and a range of other materials to help inform you about the project. This is a drop-in style event, so there is no need to register to attend - just drop in. The venue is fully accessible and complimentary parking is available.

We will hold a number of conversation booth information sessions throughout the exhibition. Further information on these can be found on the ARTC webpage.

ABOUT THE PROJECT

In May 2018 the Australian Government announced a funding commitment to the Botany Rail Duplication Project. The project aims to improve efficiency, flexibility and reliability for freight rail customers, and encourage freight modal shift from road to rail.

The project is considered State significant infrastructure and an EIS has been prepared as part of the planning approval process. The EIS describes the key features of the project and assesses its potential environmental impacts during construction and operation. It also proposes mitigation measures which aim to manage these impacts.

If you need help understanding this information, please contact the Translating and Interpreting Service on 131 450 and ask them to call ARTC on 1300 550 402.

Above: Key features of the project

VIEW THE EIS

The EIS is available to view online, and submissions can be made at the DPIE website **www.planningportal.nsw.gov.au/major-projects/project/10206**

Hardcopies of the EIS are available to view at:

Mascot Library | 2 Hatfield Street | Mascot 2020

Eastgardens Library | Westfield, 152 Bunnerong Road | Eastgardens, 2036

St Peters/Sydenham Library | 39 Unwins Bridge Road, Sydenham, 2044

An electronic copy of the EIS is also available to view at **Service NSW Botany**, 5 Lord St, Botany, 2019.

CONTACT US

You can contact us on:

www.artc.com.au/projects/botany-rail-duplication project/

1300 550 402

enviroline@artc.com.au

To be kept up to date on the project, please visit the ARTC webpage to register.

Figure 3.4 Community notification flyer

3.2 Ongoing consultation

Consultation with the community and key stakeholders will be ongoing in the lead up to and during construction. The consultation activities would ensure that:

- the community and project stakeholders have a high level of awareness of all processes and activities associated with the project
- 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.

Table 3.1 outlines the consultation tools and activities to be implemented in future stages of the project.

Table 3.1 Consultation tools and activities to be implemented in future stages of the project

	DETAILED DESIGN	CONSTRUCTION	OPERATION
1300 telephone number and project email address	✓	✓	✓
24-hour construction response line	✓	✓	✓
Face-to-face meetings with key stakeholders	✓	✓	✓
Project website updates	✓	✓	✓
Social media	✓	✓	✓
Targeted letters, notifications and project updates	✓	✓	✓
Project signage		✓	

Consultation with key stakeholders will be ongoing throughout the project phases. The consultation will:

- ensure that key stakeholders, including Authorities are kept suitably informed to facilitate understanding of emerging detailed design
- facilitate detailed design development, including the provision of detailed design documentation to relevant stakeholders for obtaining formal approval or for information purposes only.

A community and stakeholder engagement plan would be prepared prior to commencement of the enabling works to guide the management and coordination of consultation activities during construction including (see Table 3.1):

- a 1300 phone number and project email address
- a 24-hour construction response line for general community enquiries and feedback
- targeted consultation methods, such as letters, notifications, signage and face-to-face communications
- updates on the progress of the project on ARTC's project website and social media platforms.

The plan would aim to detail the approach to communicate between ARTC, its Construction Contractors, the community and government authorities. Further detail is provided in section 4.4 of the EIS.

4. PROJECT CHANGES AND DESIGN REFINEMENTS

This chapter documents and assesses the changes that ARTC propose to make to the project since the public exhibition of the EIS. It also provides a comparative assessment of the environmental impact of those proposed changes compared to that of the exhibited project.

4.1 Overview of proposed changes to the project

Following exhibition of the EIS, ARTC has identified a series of proposed design changes and refinements in order to further minimise the environmental impact of the project or to respond to issues raised by respondents in submissions. The proposed design changes that have been assessed include:

- track and drainage changes at Myrtle Street – minor changes to the proposed design of the track and drainage structures within the vicinity of Myrtle Street during detailed design to reduce potential flooding impacts to adjacent properties (refer to section 4.3)
- Mill Stream bridge abutment – change to the design of the proposed new bridge structure over Mill Stream bridge (refer to section 4.4)
- removal of proposed access tracks – removal of the need for the proposed construction access tracks generally to the south of Myrtle Street, Botany (refer to section 4.5)
- removal of additional asbestos containing material (ACM) – removal of additional ACM following design refinement and ongoing development of the preferred construction methodology (refer to section 4.6).

Details of each project design change and a comparative assessment of the potential change in environmental impacts are provided in the following sections. For the purposes of this chapter, the project as described and assessed in the EIS is referred to as the 'EIS project' and the project including the proposed changes is referred to as the 'revised project'.

4.2 Assessment approach

Consideration of the potential environmental impacts of each proposed design change was undertaken as part of the development of the revised project. Consideration of key and non-key environmental, social and economic issues was undertaken and an assessment made of the potential changes as compared to the environmental impacts described in the EIS. Evaluation of the proposed design changes for the revised project also provided an opportunity to identify potential reduction in environmental impact and other benefits.

A summary of the potential environmental aspects potentially affected by each of the proposed design changes is provided in Table 4.1. The aspects selected were those considered to have a change in impact from those described in the EIS. Impacts associated with other aspects would be unchanged from those assessed in the EIS.

As part of the revised project, an additional assessment of the potential flooding impacts was also undertaken (Lyall and Associated, 2020). This assessment considered the proposed design changes to the EIS project including remodelling the flood impacts of the revised track design and drainage adjacent to Myrtle Street and the changed design for the Mill Stream bridge. The full assessment is provided as Appendix B of this report.

Table 4.1 Summary of environmental aspect potentially affected by the proposed design changes

DESIGN CHANGE	ENVIRONMENTAL ASPECT															
	Traffic and Transport	Noise and Vibration	Air Quality	Biodiversity	Contamination	Hydrology and Flooding	Water Quality and Soils	Non-Aboriginal Heritage	Aboriginal Heritage	Land Use and Property	Landscape and Visual	Social	Resources and Waste Management	Risks, Health and Safety	Climate Change Risk	Cumulative and Residual Impacts
Track and drainage changes at Myrtle Street						×				×		×				
Mill Stream bridge abutment	×			×		×					×					
Removal of access proposed tracks	×	×		×												
Removal of additional asbestos containing material	×				×								×			

4.3 Track and drainage changes at Myrtle Street

4.3.1 Description in the Environmental Impact Statement

Section 6.2.4 of the project EIS identified that as part of the construction of the duplicated track and associated track formation, the existing track drainage system within the rail corridor would be adjusted as required to suit the new or revised track levels and address any drainage issues identified.

As described in section 13.4 of the project EIS, it was identified that during a one per cent Annual Exceedance Probability (AEP) event, operation of the project based on the drainage design assessed in the project EIS would result in an increase in peak flood levels upstream of the inlet that crosses the rail corridor at Myrtle Street. The EIS project design was also identified as resulting in potential to impact the existing adjoining developments at this location. In particular, it was predicted that peak flood levels at:

- 104 Bay Street would be increased by a maximum of around 0.02 metres (i.e. two centimetres). Impacts would occur in the northern portion of the development over an area that includes several residential units that front Myrtle Street
- 15 Begonia Street would be increased by a maximum of around 0.02 metres (i.e. two centimetres). Impacts would occur in the north eastern portion of the residential development and what appears to be the entry to basement car parking from Myrtle Street.

It was also noted in section 6.2.4 of the project EIS that the final drainage design for the project would be further developed during detailed design.

4.3.2 Description of the proposed design change for the revised project

Following exhibition of the project EIS, further development of the drainage design was undertaken with the intention to reduce the potential flooding impact to the identified properties in Myrtle Street. In minimising the identified flooding impacts, the EIS project design has been modified as follows:

- the height of the new track has been slightly raised compared to the project EIS design to match the height of the existing track
- the proposed drainage along the new section of track adjacent to Myrtle Street has been modified to match the existing drainage that currently exists along the track corridor.

Overall, the proposed design changes would remove the potential increase in flood impacts along Myrtle Street that were identified in the project EIS. The remainder of the revised project design in this location would remain consistent with the design assessed in the project EIS.

4.3.3 Changes to impacts

Hydrology and flooding

The assessment of the potential flooding impacts undertaken by Lyall and Associates, 2020 (Appendix B) included remodelling the flood impacts of the revised track design and drainage adjacent to Myrtle Street. The key findings of the assessment with regards to the impact that the revised design would have on flood behaviour are outlined below.

With respect to changes to peak flood levels:

- The revised design identified that there would be either no change or a slight reduction in peak flood levels in residential properties that are located to the north (upstream) of the rail corridor between Banksia Street and Myrtle Street. The removal of proposed works along the existing section of track between Banksia Street and Myrtle Street under the revised design would reduce the impact that the project would have in altering flooding patterns in this area. As a result, increases in peak flood levels that were predicted to be experienced at 104 Bay Street and 15 Begonia Street under the EIS design would be mitigated under the revised design.
- There would be minor changes in peak flood levels within the section of the Eastlake golf course to the north of Myrtle Street for all events up to the PMF. For example, during a 10% and 2% AEP event there would be an increase in peak flood levels in an area of the golf course immediately east of the rail corridor by a maximum of 0.05 metres (i.e. five centimetres), whereas during a 1% and 0.2% AEP event and the PMF there would be either no change or a slight reduction in peak flood levels in the same area. The changes in peak flood levels are considered minor given the existing depths of inundation and the nature of the areas that would be impacted.
- The upgrade of the drainage system and the provision of a barrier wall along the southern side of the rail corridor between Banksia Street and Myrtle Street would result in either no change or a slight reduction in the depth and extent of inundation in areas to its south (downstream) for events up to the PMF.

In addition, it is expected that the revised design would be generally consistent with the predicted flow velocities described in the project EIS.

Local property and land use

The design change to the proposed drainage arrangement would not result in any additional land use or property impacts compared to those identified in the project EIS. The proposed design change would continue to be confined to the existing rail corridor at this location.

Social

Minimising potential impacts to existing residences along project corridor is an important consideration of the project design. The revised project would result in an improved overall outcome for the residences of the two previously affected properties compared to the EIS project. This would occur through the removal of the previously proposed flood impact associated with the EIS project.

4.3.4 Additional or changed mitigation and management measures

Given that there is a reduction of the potential impact, no additional mitigation and management measures to those identified for the EIS project are proposed to manage the revised project. The previously identified mitigation and management measures are not proposed to be revised and are considered to be sufficient to manage the potential impacts of the revised design.

4.4 Mill Stream bridge abutment

4.4.1 Description in the Environmental Impact Statement

As identified in section 6.3.5 of the project EIS, the proposed bridge works at Mill Stream would include the construction of a new two-span bridge located south of the existing bridge. The new bridge was identified as being around 25 metres long and about 4.4 metres wide. The eastern span of the bridge was described as being around 15.3 metres wide to allow the proposed bridge pier to be sited outside of the banks of Mill Stream. The western span was described as being be around 8.6 metres wide.

Some minor excavation of material adjacent to Mill Stream was also proposed along with scour protection along the eastern and western banks of Mill Stream, where required.

A plan of the proposed design of the EIS project for the Mill Stream bridge is shown in Figure 4.1 with an indicative elevation shown in Figure 4.2.

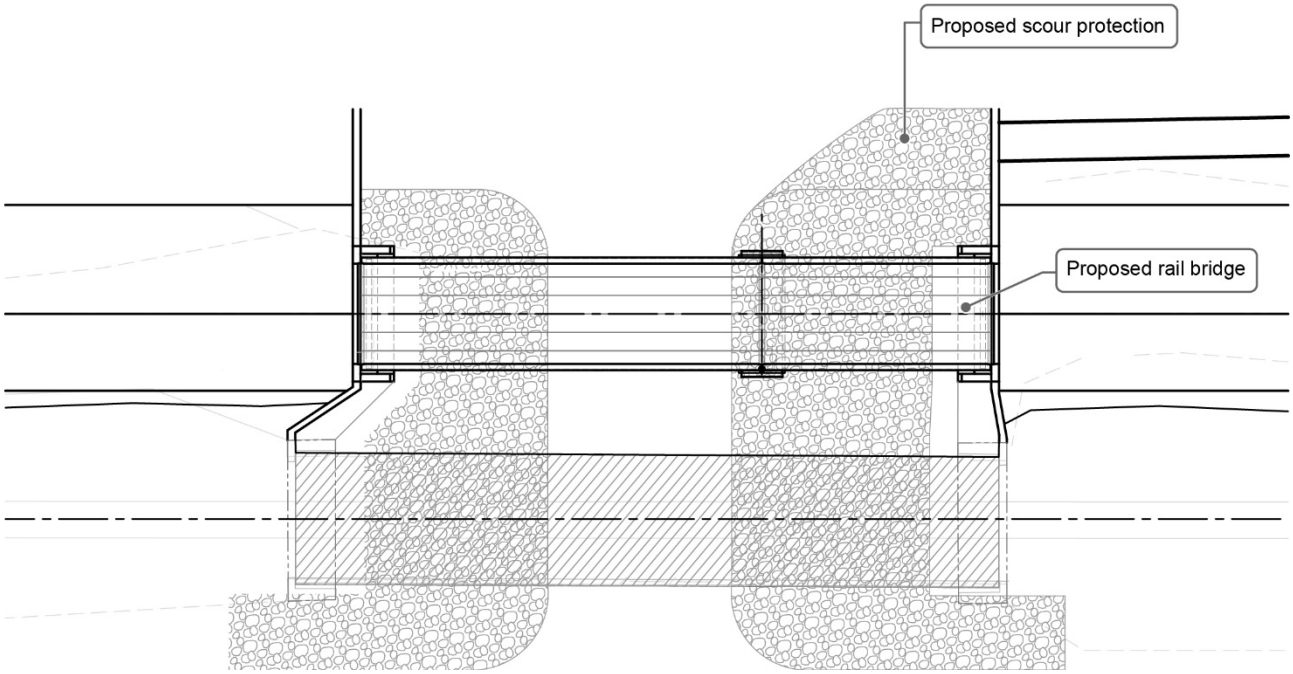


Figure 4.1 Plan of the proposed Mill Stream bridge design as described in the project EIS

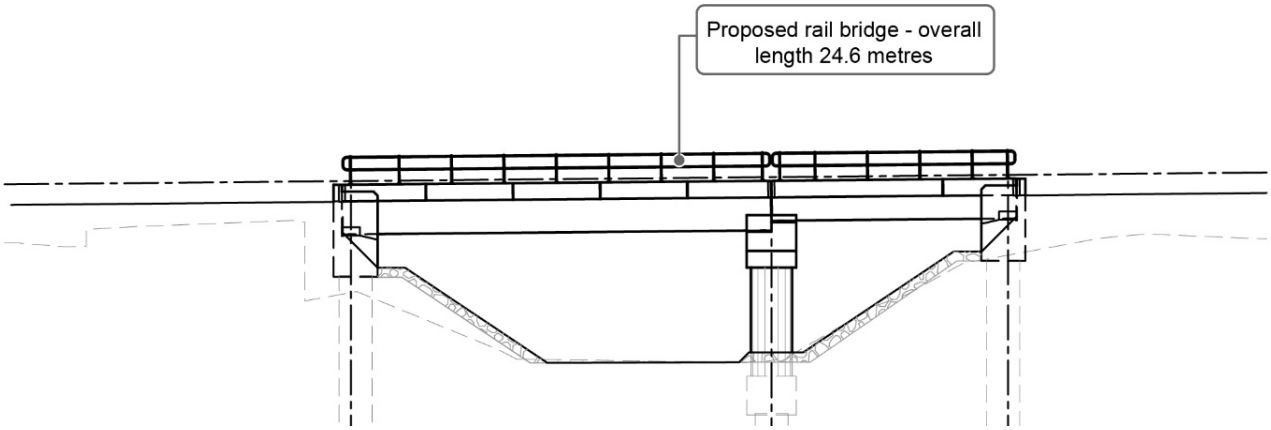


Figure 4.2 Elevation of the proposed Mill Stream bridge design as described in the project EIS

The key impacts identified for the proposed additional bridge structure included biodiversity impacts associated with the vegetation clearing required to accommodate the proposed structure and a minor increase in peak flood levels during the 1% AEP event upstream of the bridge.

Specifically, section 13.4.2 of the project EIS identified that flood levels during the peak 1% AEP event upstream of Mill Stream bridge would be increased by a maximum of around 0.1 metres. This would lead to an increase in the rate (and therefore depth) of flow that overtops the western bank of Mill Stream and is conveyed along the travel lanes of Southern Cross Drive and Botany Road. The increase in peak flood levels upstream of Mill Stream would also lead to an increase in the frequency with which flow overtops the western bank of Mill Stream onto the travel lanes of Southern Cross Drive. This would change from about a 1% AEP event under pre-project conditions to about a 2% AEP event under post-project conditions for the EIS project (i.e. twice as frequent). The road would be impacted (affecting traffic flow) approximately once every 50 years, instead of once every 100 years which occurs in the current situation without the project.

The assessment also found that the EIS project would have only a minor impact on the extent and duration of inundation of flooding within Mill Stream.

4.4.2 Description of the proposed design change for the revised project

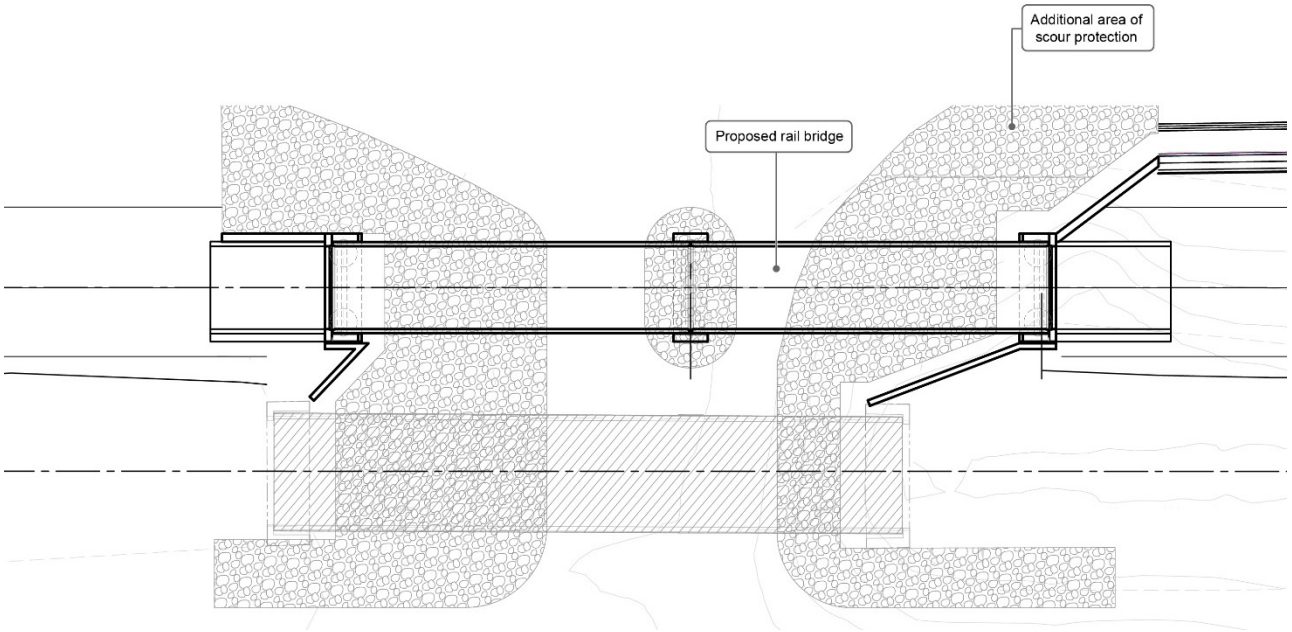
The proposed design change would include extension of the proposed bridge deck (western span) by around seven metres and relocation of the western abutment to support the proposed design change. The western abutment would be set back in order to increase the overall cross section area of the flow path of flood waters beneath the proposed underbridge. This was identified as being required to mitigate the impacts of excessive water flows observed as part of the flood modelling results during the 1% AEP event that were identified for the EIS project design (refer above).

The design change would also result in:

- excavation of the same amount of spoil from under the bridge at this location, with an import of around 500 cubic metres less fill to be placed behind the abutment and retaining wall
- provision of additional scour protection on the southern side of the new bridge structure, however there would be less protrusion into the existing stream than the EIS project. The additional scour protection would be provided within the area under the western bridge span to minimise the potential for erosion within Mill Stream.

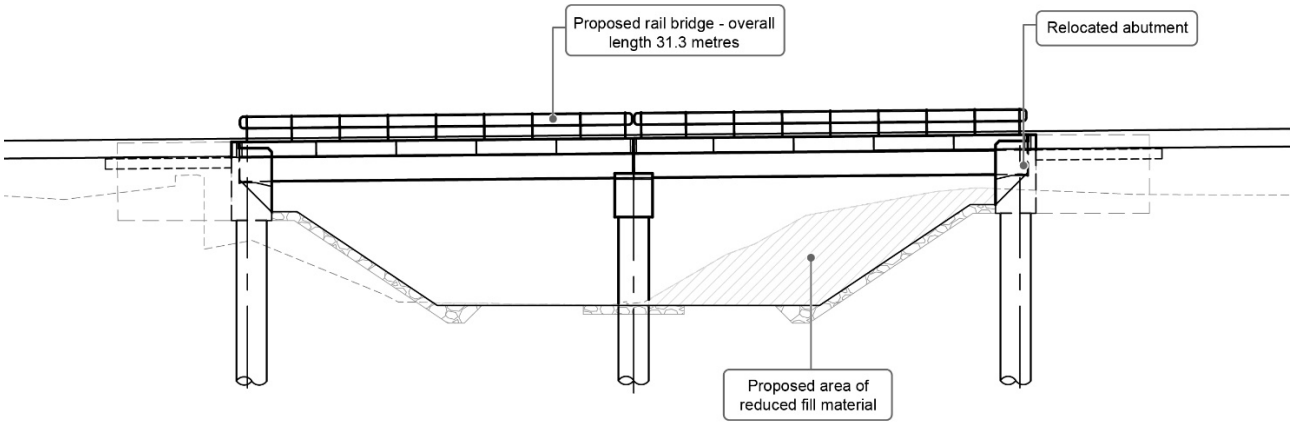
As part of the revised project design, the location of the proposed bridge pier would not change, the design of the eastern span and associated abutment would remain consistent with the EIS project.

An indicative plan for the revised bridge design is shown in Figure 4.3 with an indicative section shown in Figure 4.4.



Note: Indicative design shown. Subject to detailed design.

Figure 4.3 Revised plan of the proposed Mill Stream bridge



Note: Indicative design shown. Subject to detailed design.

Figure 4.4 Revised elevation of the proposed Mill Stream bridge for the revised project

4.4.3 Changes to impacts

Traffic and transport

The works associated with the reduction in the amount of infill spoil delivery required would result in a minor, temporary reduction in daily construction traffic volumes in comparison to the number of vehicle movements assessed as part of the project EIS. This reduction would only occur during the period when the additional spoil was previously proposed to be delivered. This decrease would however be expected to have a negligible impact to increasing traffic within the Botany area during this period. It is considered that the proposed change would generally be consistent with the overall traffic and transport impacts assessed as part of the project EIS.

Biodiversity

The area of impact associated with the design change would be consistent with the area of impact that was assessed as part of the project EIS. The revised project would therefore be consistent with the biodiversity impacts identified in the project EIS.

Hydrology and flooding

The assessment of the potential flooding impacts undertaken by Lyall and Associated, 2020 (Appendix B) included remodelling the flood impacts of the revised bridge design at Mill Stream. The key findings of the assessment with regards to the impact that the revised design would have on flood behaviour are outlined below.

The revised assessment identified that there would be minor changes in peak flood levels upstream of Mill Stream bridge for all events up to the probable maximum flood (PMF). The increase in the length of the proposed bridge for the duplicated track (as a result of the reduced fill material) would reduce its obstruction on flow in Mill Stream. As a result, the increase in peak flood levels upstream of Mill Stream bridge that were predicted to occur as a result of the EIS project, and the associated impact that this would have on an increase in the frequency, rate and depth of flow that is conveyed along the travel lanes of Southern Cross Drive and Botany Road would be mitigated under the revised design.

With respect to peak flood levels:

- The revised design would result in a reduction in the peak 10% AEP flood levels upstream of the rail corridor from a peak flood level of 0.14 metres based on the EIS design to a revised maximum of 0.012 metres. The residual impact of the revised design is considered to be minor given that increases would be confined to an area between Mill Stream and Southern Cross Drive that is owned by Sydney Water where existing depths of inundation range between 0.6 and 1.2 metres.
- There would be a slight reduction in peak 1% AEP flood levels upstream of Mill Stream bridge by a maximum of 0.02 metres. The obstruction to flow caused by the western abutment of the proposed bridge over Mill Stream is offset by the new drainage culvert that is proposed to cross the rail line about 250 metres to its east. The new drainage culvert would control overland flow that surcharges Mill Stream and discharges through the southern portion of the Eastlake golf course during events greater than about 10% AEP.

  As described for the EIS project, there would be an increase in the peak 1% AEP flood level upstream of Mill Stream of 0.10 metres, which would also lead to an increase in the rate and therefore depth of flow that surcharges the western bank of Mill Stream and is conveyed along the travel lanes of Southern Cross Drive and Botany Road. These impacts have now been mitigated under the revised design.
- There would be either no change or a slight reduction in peak flood levels upstream of Mill Stream bridge for storms with AEP's of 50%, 2% and 0.5%, in addition to the PMF.
- In peak 0.5% AEP flood levels, there would be an increase in peak flood levels in three commercial type properties in Lord Street, as well as an area of Booralee Park and the carpark of the Botany Aquatic Centre. The anticipated PMF levels would be increased by a maximum of 0.13 metres (i.e. around 13 centimetres) but typically less than 0.08 metres (i.e. eight centimetres) on existing depths of about 0.6 metres (i.e. 60 centimetres). The relative increase in the depth of inundation during a PMF event is considered to have a minor impact on the flood hazard in the area.

In addition, the proposed design change would also reduce the impact that the project would have on an increase in scour potential along the section of Mill Stream downstream of the rail corridor. Specifically, the EIS design identified an increase in the peak one per cent AEPs flow velocities along the section of

Mill Stream downstream of the rail corridor by a maximum of around 0.9 metres per second. Under the revised design, there would continue to be minor increases in peak flow velocities, however the velocities would be reduced to a maximum of around 0.2 metres per second.

Remaining flood impacts identified as part of the project would be considered as part of the detailed hydrologic and hydraulic (flood) assessment of the impacts of the project on flood behaviour outlined in mitigation measures DFL5 (refer to Table 8.1).

Landscape and visual

The revised project would result in minimal additional adverse landscape impacts during construction compared to the EIS project. Based on the limited visibility of the bridge location from adjoining areas, it is expected that any proposed change would not be noticeable. During operation, the proposed design change would not be noticeable compared to the previously identified impacts identified in the project EIS.

4.4.4 Additional or changed mitigation and management measures

No additional mitigation and management measures to those identified for the EIS project are proposed to manage the revised project, nor are any mitigation measures proposed to be revised or removed. The previously identified mitigation and management measures are considered to be sufficient to manage the potential impacts of the design change.

4.5 Removal of proposed construction access tracks

4.5.1 Description in the Environmental Impact Statement

As identified in Chapter 7 of the project EIS, construction access would be required along the rail corridor to provide access to worksites, compound and storage areas and for construction of the new track and associated infrastructure. Figure 7.7 of the project EIS identified that new access tracks were proposed between:

- Banksia Street and Bay Street on the eastern side of the rail corridor accessed from the existing Banksia Street access gate
- Myrtle Street and Mill Stream on the eastern side of the rail corridor accessed from the existing access gate from Myrtle Street (east).

4.5.2 Description of the proposed design change for the revised project

Ongoing refinement of the construction methodology following exhibition of the project EIS, identified that the previously proposed access tracks between Banksia Street and Bay Street and between Myrtle Street and Mill Stream were no longer required during construction of the project as dedicated access tracks. These tracks are therefore no longer proposed to be constructed or utilised as part of the revised project.

The remaining access tracks proposed associated with the project as outlined in Chapter 7 of the project EIS would continue to be required as part of the revised project.

4.5.3 Changes to impacts

Traffic and transport

The removed sections of access track may result in a minor reduction in overall construction traffic travelling along this section of the construction footprint. However, trucks would continue to access the proposed compound sites at this location, in particular the proposed Banksia Street compound.

Additionally, Table 5.3 of *Technical Paper 1 – Traffic and Transport Impact Assessment* stated that the two access gates along the eastern side of the track (identified as Gate 10 and Gate 11) would provide for the following vehicle access:

- around eight light vehicle movements and around ten heavy vehicle movements in the morning peak period
- around four light vehicle movements in the afternoon peak period.

It is expected that the proposed removal of the access track along the eastern side of the corridor between these two gates would remove the need for vehicles to access the site from these two locations. As such, it is expected that the revised project would result in a corresponding reduction in the number of vehicles travelling to access these gates during construction. This would result in a minor benefit to the residents along adjacent streets such as Bay Street and Banksia Street (for the portions of these streets to the east of the rail corridor) as well as Begonia Street and Ocean Street.

Noise and vibration

The removal of the proposed access tracks would not result in a substantial change to the previously identified noise impacts associated with the project. Some negligible benefit may however be experienced by residents on the eastern side of the corridor due to the minor reduction in potential vehicle movements accessing the site from the east (as described above).

Biodiversity

As shown in Figure 11.1d of the project EIS, vegetation along the section of previously proposed track consists of urban exotic/native landscape plantings some of which is highly disturbed. The removed sections of access track may result in a minor reduction in the overall amount of vegetation that may be removed along this section of the construction footprint. This would result in a minor overall benefit compared to the project as assessed in the project EIS in terms of vegetation retention. The retained vegetation may also result in some minor visual benefits to adjacent residents.

4.5.4 Additional or changed mitigation and management measures

No additional mitigation and management measures to those identified for the EIS project are proposed to manage the revised project. The previously identified mitigation and management measures are considered to be sufficient to manage the potential impacts of the design change.

4.6 Removal of additional asbestos containing material

4.6.1 Description in the Environmental Impact Statement

Section 6.4.1 of the EIS identified that an area of existing asbestos containing material (ACM) had been identified within the existing rail corridor, generally between Bay Street, Botany and the existing Mill Stream bridge. In order to allow for the additional track at this location, some of this material was proposed to be removed with the remaining portion of the material to remain in-situ and be encapsulated with a layer of capping material (refer to Figure 6.4 of the project EIS).

As described in section 6.4.1 and section 20.2 of the project EIS, it was estimated that around 4,000 cubic metres of potential ACM would be excavated for off-site disposal.

4.6.2 Description of the proposed design refinement for the revised project

As a result of ongoing refinement of the EIS project design and ongoing refinement of the proposed construction methodology, additional earthworks are proposed to be undertaken within the area of identified ACM between Bay Street and Mill Stream. It is estimated that the revised project design would result in the removal of around 11,700 cubic metres of potential ACM at this location. This would represent an increase of around 7,700 cubic metres from the estimated amount of ACM that was proposed to be removed and described for the EIS project (around 4,000 cubic metres).

The revised project design would still include a capping layer to be placed over ACM as previously described in section 6.4.1 of the project EIS.

4.6.3 Changes to impacts

Traffic and transport

The works associated with the removal of additional ACM would result in a minor, temporary increase in daily construction traffic volumes in comparison to the number of vehicle movements assessed as part of the EIS project. This increase would only occur during the period in which the ACM is proposed to be removed. This increase would have a minor flow on impact as a result of increased traffic within the Botany area during this period. The proposed change would however be generally consistent with the overall traffic and transport impacts assessed as part of the project EIS.

The final traffic volumes and management measures for construction traffic would be determined as part of the finalisation of the construction methodology and the construction traffic and transport management plan (CTTAMP) to be prepared for the project (refer to revised mitigation and management measure CTT1 in Chapter 8 of this Submissions Report).

Contamination

As identified in section 12.2 of the project EIS, there is potential for contamination to be encountered at a number of locations throughout the project's construction footprint. In particular, the EIS identified the area north of Bay Street as containing known areas of contamination consisting of uncontrolled fill with materials including ACM. The project EIS assessed this as a high risk. The proposed design change would be consistent with this previously identified risk.

The proposed removal of additional ACM as part of the revised project would result in a minor benefit due to the removal, and appropriate disposal of additional contaminated material from the rail corridor.

Resources and waste management

As described in section 20.2 of the project EIS, it was estimated that around 4,000 cubic metres of potential ACM would be excavated and require disposal at an appropriately licensed facility. While the amount of contaminated material required to be removed is greater than that identified in the project EIS, it is considered that the potential risks/impacts of removing this material would be consistent with those assessed as part of the project EIS. During detailed design, opportunities for re-use or cap and containment of ACM will be investigated to minimise the requirement for off-site disposal, in accordance with the *Waste Classification Guidelines* (EPA, 2014).

4.6.4 Additional or changed mitigation and management measures

No additional mitigation and management measures to those identified for the EIS project are proposed to manage the revised project. The previously identified mitigation and management measures are considered to be sufficient to manage the potential impacts of the design change.

5. OVERVIEW OF SUBMISSIONS

This chapter provides an overview of the submissions received, including a breakdown of the types of submitters, the number of submissions received, and the key issues raised in submissions.

5.1 Submissions received

During the public exhibition of the EIS, submissions from government agencies, key stakeholders, organisations, businesses and the community were received by the DPIE. All submissions received were provided to ARTC for review and consideration.

A total of 32 submissions were received and registered by the DPIE. A breakdown of the submissions by type of stakeholder is provided in Table 5.1.

Table 5.1 Breakdown of submissions received by submitter type

SUBMITTER TYPE	NUMBER OF SUBMISSIONS RECEIVED
Community submissions	
Community member/individual	13
Organisation/business	7
Total community submissions	**20**
Government agency and key stakeholder submissions	
State government departments/agencies	8
Councils	3
Key stakeholders (Sydney Airport)	1
Total government agency and key stakeholder submissions	**12**

5.2 Approach to analysis of submissions

An assessment of each community submission received during exhibition of the EIS was undertaken, with each submission individually reviewed to understand the issues raised. Government agency and key stakeholder submissions were considered separately to community submissions (including submissions from organisations and businesses). Where relevant, input to the responses was sought from the specialists who assisted with preparation of the EIS.

The content of each community submission was reviewed and categorised according to the key issues (e.g. noise and vibration) and sub-issues (e.g. construction noise) raised. A full list of the categories used is provided in Table 5.2. These categories formed the basis for the structure of responses to the submissions, which are issue-specific. Each issue identified in Chapter 6 is presented as a summary of similar issues raised by individual submissions. This means that, while the exact wording of a particular submission may not be presented in the summary of the issue, the intent of each individual issue raised has been captured. A response has been provided to each grouped issue summary in Chapter 6 of this report.

The content of each government agency and key stakeholder submission was reviewed and a summary of each key issue raised provided in this submissions report. Issues raised by government agencies and key stakeholders were not grouped, as the issues raised were largely dependent on each stakeholder's technical discipline area and/or assets. Responses to each government agency and key stakeholder issue is provided in Chapter 7 of this report.

5.3 Support/objection

Of the 20 submissions received from the community, 12 submissions provided comments on the project and eight submissions objected to the project

Of the 12 government agency and key stakeholder submissions, seven provided comments on the project and five supported the project.

5.4 Review of community submissions

A summary of the issues raised in the community submissions (including submissions from individuals, businesses and organisations) is provided in Table 5.2 and Figure 5.1. It is noted that four of the submissions were almost identical, which suggests that they were a version of a sample submission.

As most of the submissions raised more than one issue, the number of issues identified is greater than the total number of submissions received. The percentages in Figure 5.1 were calculated by determining the number of times a key issue was raised in a submission compared to the total number of issues raised in the submissions. This shows that the noise and vibration was the most frequently raised issue, accounting for almost half of the issues raised.

Table 5.2 Summary of key community issues raised

KEY ISSUE CATEGORY	SUB-ISSUE	# TIMES ISSUE RAISED
Project justification and need	Strategic planning and policy context	3
	Project options considered	5
Construction methodology	Out-of-hours works	1
Traffic and transport	Construction traffic and transport impacts	3
	Assessment of active transport infrastructure	2
Noise and vibration	Noise and vibration assessment approach	6
	Construction noise impacts	4
	Construction noise mitigation	7
	Construction vibration mitigation	1
	Operational noise and vibration impacts	8
	Operational noise and vibration mitigation	10
Air quality	Air quality impacts during operation	5
Contamination	Contamination impacts during construction	4
Water quality and soil	Soil and water quality pollution and mitigation	5
Landscape and visual	Lighting impacts	1
Hazards and risk	Impacts on existing utilities	1
Cumulative impacts	Cumulative traffic impacts	1
Other	Stakeholder consultation	1
	Identification of sensitive receivers	4
	Other issues	2

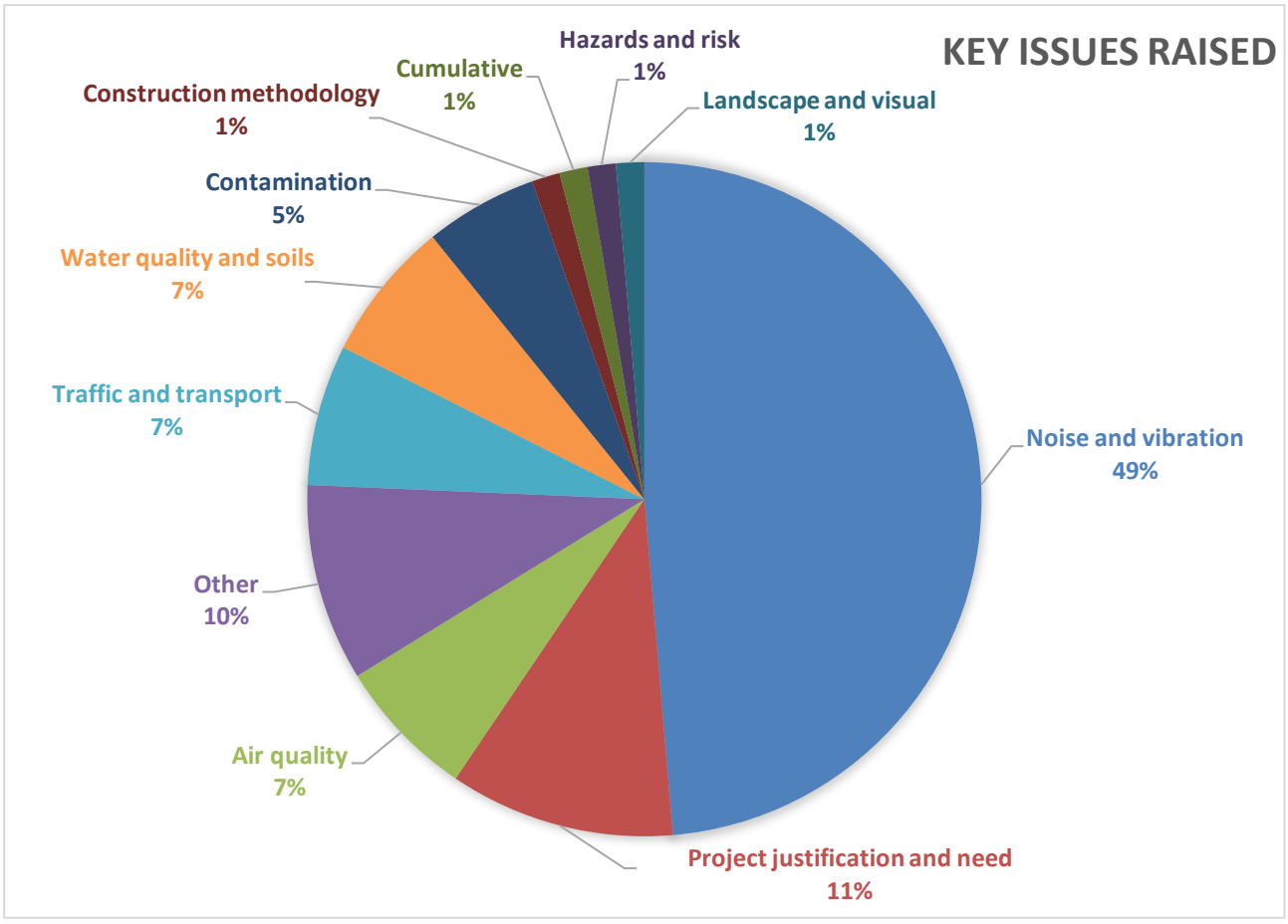


Figure 5.1 Breakdown of the key issues raised in community submissions

5.5 Review of government agency, council and key stakeholder submissions

Each government agency submission was reviewed in detail, and the issues raised were categorised according to the main issue categories identified (as described in Chapter 7). Summaries of the key issues raised in each submission in relation to the project, and responses to the issues raised, are provided in Chapter 7 of this report.

Submissions have been received from the following agencies and councils:

- Heritage Council of NSW
- NSW Environmental Protection Authority (EPA)
- Transport for NSW
- Department of Planning Industry & Environment – Environment, Energy and Science Group (EES)
- Roads and Maritime Services (RMS) (RMS is part of Transport for NSW, but for the purpose of this report is referenced separately)
- NSW Ports Authority
- Bayside Council
- Inner West Council
- Randwick City Council.

A submission was also received from key stakeholder SACL Ltd (SACL).

In addition, following a review of the submission no issues were raised by:

- Department of Planning Industry & Environment - Crown Lands
- Department of Planning Industry & Environment – Department of Primary Industries.

6. RESPONSE TO COMMUNITY SUBMISSIONS

This chapter provides a summary of the issues raised by community submissions, and a response to the issues raised. As described in section 5.2, the issues raised were summarised and grouped according to the identified key issues and sub-issues, and responses are provided according to these categories.

Appendix A provides an overview of the community submissions and a reference to where the issues raised in each submission have been addressed in this chapter.

6.1 Project justification and need

6.1.1 Strategic planning and policy context

Submission numbers

14, 15

Summary of issues raised

Two submissions raised concerns regarding the alignment of the project with existing government strategies including *Future Transport Strategy 2056* (Transport for NSW, 2018a) and other policies and objectives related to the provision of active transport infrastructure for pedestrians and cyclists. It was also suggested that the state government should work closely with Bayside Council and key active transport groups to improve community access for walking and cycling.

Response

As described in Appendix E of the EIS (Strategic planning review), when considered in the context of the objectives of the project (i.e. to increase capacity along the Botany Line to meet the forecast growth in demand for container freight transport to and from Port Botany), the project is considered to be consistent with a number of government strategies including the following:

- *Inquiry into National Freight and Supply Chain Priorities* (Commonwealth of Australia, 2018)
- *Australian Infrastructure Plan* (Infrastructure Australia, 2016) and the *Infrastructure Priority List* (Infrastructure Australia, 2018)
- *National Ports Strategy* (Infrastructure Australia and the National Transport Commission, 2011)
- *Future Transport Strategy 2056* (Transport for NSW, 2018)
- *State Infrastructure Strategy 2018–2038* (Infrastructure NSW, 2018)
- *NSW Freight and Ports Plan 2018–2023* (Transport for NSW, 2018)
- *Sydney Metropolitan Freight Strategy 2015–2024* (ARTC, 2015)
- *NSW Ports' 30 Year Master Plan* (NSW Ports, 2015)
- *A Metropolis of Three Cities – the Greater Sydney Region Plan* (Greater Sydney Commission, 2018)
- *Eastern City District Plan* (Greater Sydney Commission, 2018)
- *Greater Sydney Services and Infrastructure Plan* (Transport for NSW, 2018).

While the opportunity to include an active transport corridor as part of the project was considered following early consultation during the design and development phase of the project, the existing rail corridor was identified to have limited space to safely accommodate an active transport path. The provision of an active transport route was also not considered to be consistent with the objectives of the project. However, the project does not prevent the State government from working closely with Bayside Council and other stakeholder groups to provide new active transport infrastructure in the area.

6.1.2 Project options considered

Submission numbers

8, 9, 10, 14, 15

Summary of issues raised

Five submissions raised issues regarding the lack of active transport corridors included in the project scope. The issues raised included that:

- the project is a missed opportunity to provide new local and regional active transport links and enhance Sydney's active transport network
- there are sections of the rail corridor that would be wide enough to include an active travel facility, such as between Wentworth Avenue and O'Riordan Street
- ARTC should be responsible for providing active transport infrastructure as part of the project to link active transport corridors included in nearby projects (such as Sydney Gateway and Airport North) and align with the *Future Transport Strategy 2056* (Transport for NSW, 2018)
- there needs to be more detailed evaluation of the potential for active transport to be included in the project
- the project should not impact future development of a bike route adjacent to the rail corridor between General Holmes Drive and Airport Drive.

Response

The rail corridor is highly constrained by limited space, and the little existing space is being optimised for the proposed rail line duplication. The duplication of the remaining single line track has been a long term plan, and will complete the missing link on the network, allowing trains to travel bidirectionally to and from Port Botany.

The development of the project would not preclude the provision of an active transport path (or similar) in the area by others in the future, such as Bayside Council or Transport for NSW.

Although not directly aligned with the objectives of the project (refer to Section 1.2.1 of the EIS), opportunities to include an active transport corridor as part of the project were considered during the design and development phase due to community interest. However, the existing rail corridor was identified to have limited space to safely accommodate an active transport path for pedestrians and cyclists. An active transport path within the rail corridor would also constrain ARTC's operations, as the remaining space next to the Botany Line is generally allocated to access paths used for routine inspection and maintenance activities.

6.2 Construction methodology

6.2.1 Out-of-hours works

Submission numbers

5

Summary of issues raised

One submission raised an issue with the statement in the EIS that "the majority of work would be undertaken during recommended standard construction work hours" as several construction activities for the project are proposed to be undertaken outside of standard construction work hours.

Response

Construction would be planned to be undertaken during standard construction work hours, where possible. However, due to the positioning of the project site in an operational rail corridor, over busy roadways and adjacent to Sydney Airport, several construction activities would be required to be undertaken outside of standard working hours, including during existing pre-arranged rail possession periods (refer to section 7.3.3 of the EIS). This would minimise potential traffic and transport impacts and improve the safety of construction workers and the public, however it may result in some noise and vibration impacts to nearby receivers (refer to section 6.4.2).

A series of mitigation measures would be implemented (in particular measures CNV4 and CNV5, see Table 8.2) to reduce noise generated from out-of-hours work including preparation of an out-of-hours work protocol.

6.3 Traffic and transport

6.3.1 Construction traffic and transport impacts

Submission numbers

16, 18, 20

Summary of issues raised

Three submissions raised queries and concerns regarding potential traffic and transport impacts associated with construction of the project including:

- how the Banksia Street compound would be accessed by construction vehicles as:
  - the gate near the corner of Morgan St and Victoria St is close to residential apartments and involves travelling down a narrow and quiet street
  - the gate at the end of Railway Road requires vehicles travelling down a narrow corridor near residential apartments and where children play
- queries regarding how changing traffic conditions near residential properties would be managed during construction
- queries regarding where construction workers would park, as there is limited street parking on Victoria Street and Railway Road near the Banksia Street compound
- comment that ARTC should consult with Qantas to ensure that construction vehicles accessing the rail corridor via King Street do not impact on the new Flight Training Centre once operational.

Response

During construction of the project, construction vehicles would need to use the local road network to access the project site as the existing access tracks within the rail corridor do not have sufficient connectivity to facilitate the required movement of vehicles. In addition, due to the limited space available, the existing access tracks within the rail corridor would be regularly obstructed due to construction activities, particularly during civil works in any given area. As such, it is acknowledged that the construction of the project may result in a temporary decrease in the local neighbourhood amenity as a result of increased construction traffic along local streets. In particular, the increase in heavy vehicle traffic may be noticeable to local residents due to increased noise resulting from braking or travelling over existing speed control measures (such as speed bumps). However, as the volume of construction traffic is low compared to existing traffic volumes on the local road network, the additional construction vehicles are not expected to substantially impact the local neighbourhood in the study area.

Where space is available, parking would be provided for construction workers within the construction compounds and work areas within the existing rail corridor (refer to sections 7.6.5 and 8.3.1 of the EIS). Further development of the proposed areas for parking would be determined during detailed design by the construction contractor. Where possible, carpooling (or other forms of shuttle transportation) would be used to move construction workers from the main construction compounds to the smaller compounds and individual work areas. The construction contractor would restrict the use of on-street parking around compounds and work sites for both the projected workforce and construction vehicles at all times. As such, the impact on the demand and availability of existing on-street parking in the vicinity of the construction sites and compounds is expected to be negligible.

To manage these potential traffic and transport impacts during construction, a CTTAMP would be developed and implemented by the construction contractor (see mitigation measure CTT1, Table 8.2) that would include, as a minimum:

- identification of haulage routes
- notification and consultation strategy with public and relevant authorities/stakeholders
- special event and emergency services management
- parking restrictions
- protocol for monitoring cumulative traffic impact.

6.3.2 Assessment of active transport infrastructure

Submission numbers

7, 14

Summary of issues raised

Two submissions raised issues associated with the assessment of active transport infrastructure in the EIS, including:

- the description of existing cyclist infrastructure in the traffic and transport impact assessment being incomplete
- lack of consideration of planned links identified as a result of the Sydney Gateway project concept design by BIKEast and local councils.

Response

The identification of existing routes of active transport infrastructure within and surrounding the project site in Section 4.3.7 of the EIS was based on the publicly available information during preparation of the EIS.

An assessment of potential impacts on active transport during construction of the project is provided in Section 5.2 of the EIS. This identifies that temporary impacts on pedestrian and cyclist routes may occur during road closures and near construction compound gate locations. Since preparation of the EIS, no additional active transport corridors have been identified that would be temporarily impacted by construction of the project. As per mitigation measure CTT6 (see Table 8.2), potential impacts on active transport infrastructure would be minimised during construction by providing appropriate detours (such as by maintaining access on at least one side of the road) and providing safe access across site gates.

The project is largely located in an existing rail corridor and is not expected to result in any permanent changes to the existing road network, pedestrian footpaths or bus networks. Additionally, the project would not preclude planned active transport links from being constructed by local councils.

6.4 Noise and vibration

6.4.1 Noise and vibration assessment approach

Submission numbers

1, 2, 3, 4

Summary of issues raised

Four submissions raised issues with the location of noise monitoring device (L03) and suggested that it should have been located within a residential area.

Response

Noise monitoring location L03 was located at a residential property (105 Baxter Road). This location was used to set background noise levels for assessing construction noise impacts and is considered representative of existing noise levels of the most affected receivers in the NCA03 noise catchment area (NCA). It is not feasible or necessary to monitor noise levels at all receivers in the study area as background noise levels are generally similar in a catchment.

Location V03 (which is in front of L03) was used to measure existing operational noise from trains. The data from the 'V' validation locations was used to validate the operational noise model against existing noise levels and were generally positioned near to the rail corridor to reduce the likelihood of other sources of noise influencing the measurements in order that the recordings were of the trains. Validation locations do not necessarily need to be near to receivers. Once a noise model has been validated it is then used to predict noise at the individual receiver locations within the project area.

Submission numbers

16

Summary of issues raised

One submission had an opinion that increasing the quantity/frequency of train movements would proportionately increase the noise and vibration experienced at nearby residences, which was not reflected in the noise assessment results.

Response

The operational noise assessment includes the predicted increase in rail traffic movements from the project and assesses the potential impacts against the requirements of the NSW EPA *Rail Infrastructure Noise Guideline*, at project opening in 2024 and in the design year in 2034. Double the volume of trains does not necessarily correspond to double the noise and vibration pollution, as there are many factors that influence potential noise and vibration levels.

Submission numbers

20

Summary of issues raised

One submission raised issues related to the assessment of noise and vibration for the project, including:

- concern that the new Qantas Flight Training Centre location has not been assessed as a sensitive receiver as it is not currently approved
- the maximum predicted noise level for the new Qantas Flight Training Centre should be clearly stated to allow Qantas to review impacts
- concern that the construction vibration assessment did not include an assessment of building contents, such as the simulators within the new Qantas Flight Training Centre.

Response

The vibration assessment within *Technical Report 2 – Noise and Vibration Impact Assessment* did not identify operational impacts related to vibration.

Since exhibition of the EIS, the new Qantas Flight Training Centre has been approved. As such, it has been included in additional construction noise and operational noise modelling, which provides greater detail on the potential impacts (refer to Appendices C and D). It is noted that the additional operational noise modelling has been carried out using a more refined train speed profile. This refined train speed profile features a maximum operational speed of 50 km/h for a 1.5 km section of the full project alignment. It has been developed in consideration of greater information of the expected average freight train length and load, track curve, and acceleration and deceleration from speed restrictions either side of the project.

The assessment of the new Qantas Flight Training Centre predicts the following:

- With project' noise levels at the north-western end of the project near the Centre are predicted to marginally decrease by around 1 dB, due to train speeds being reduced in this area.
- The Centre is predicted to have exceedances of the noise trigger levels at 73 dBA. It is noted that the design of the facades of the new Centre are high-performance and assume an external L_{Aeq} noise level of 74 dBA in Assessment of Noise and Vibration Emissions – Qantas Flight Training & Simulator Centre, May 2019.
- Ground-borne noise levels at the Centre are predicted to comply with the 40 dBA internal noise level criteria.

6.4.2 Construction noise impacts

Submission numbers

5, 16

Summary of issues raised

Two submissions raised concerns that 24-hour use of the Banksia Street site as a main construction compound would result in sleep disturbance for nearby residences for several years.

Response

Construction impacts have been assessed against the requirements of the NSW EPA *Interim Construction Noise Guideline* (ICNG). *Technical Report 2 – Noise and Vibration Impact Assessment* predicted that there are a number of key activities which would require consecutive days of works out of hours, which could result in sleep disturbance impacts at nearby receivers. These include key activities such as bridge construction at Southern Cross Drive, work immediately adjacent to the active rail line and preparation for bridge demolition at Robey and O'Riordan Streets. However, the noise assessment presented a conservative approach, where it was assumed that works would occur at all locations at the same time. This assessment shows that the 'Peak' scenarios, which generally result in the highest impacts, would mostly be completed during one or two possession periods.

To minimise the potential for sleep disturbance impacts, the need for consecutive night-time works and likelihood for sleep disturbance impacts will be reviewed during detailed design (refer to mitigation measure DNV1, Table 8.1). The use of the Banksia Street compound site during out of hours works associated with the road closures at Robey Street and O'Riordan Street will be avoided as far as practicable. Where impacts are considered likely, appropriate noise mitigation will be developed which takes into consideration factors such as the existing facade performance of affected residential receivers. Appropriate respite will be provided to affected receivers to limit impacts from night-time works in the same location. This measure is included in CNV2 (see Table 8.2) where the CNVMP will provide details on how respite will be applied at certain receivers..

Submission numbers

16

Summary of issues raised

One submission commented that noise has worsened since construction works began for the rail duplication.

Response

It is noted that construction works have not begun for the project, so any current construction noise impacts as referenced in the submission are not associated with this project.

Submission numbers

20

Summary of issues raised

One submission raised concern that the existing Qantas Flight Training Centre is predicted to be subject to 'high' impacts during the worst-case scenarios when noise intensive equipment is being used nearby.

Response

Additional modelling of construction scenarios has been completed as part of the Submissions Report. This considered the duration of worst case and typical noise impacts. The assessment also contains information regarding noise levels and impacts as they move away from a particular location. The assessment concluded that works outside of the worst-case scenarios are expected to result in noise levels and impacts that are significantly lower than worst-case, with much fewer receivers being impacted. Similarly, when works move away from a particular receiver the impacts would reduce substantially and the highest impacts would be limited to the area surrounding the works. Further detail is provided in Appendix C.

It is noted that the existing Qantas Flight Training Centre is predicted to experience high impacts during the 'Peak' noise level scenarios. This assessment shows that the 'Peak' scenarios, which generally result in the highest impacts, would mostly be completed during one or two weekend possession periods. This also indicates the reduction in noise level as linear sections of works progress and move away from a given receiver.

Impacts from works outside of standard construction hours would be managed by the measures defined in the Construction Noise and Vibration Management Plan, (CNVMP) for the main construction works and the site environmental management plans for enabling works. These plans would identify a process that considers the risk of activities, proposed mitigation, management, and coordination for works outside of standard hours to be approved by the independent ER.

Further assessment of noise and vibration impacts during construction has been carried out and is provided in Appendix C which discusses impacts to the new Qantas Flight Training Centre.

6.4.3 Construction noise mitigation

Submission numbers

1, 2, 3, 4, 10, 18, 20

Summary of issues raised

Seven submissions provided comments and raised queries regarding the approach to noise management and mitigation during construction of the project, including:

- how potential construction noise and vibration would be managed, including during out-of-hours works
- whether there would be sound remediation installed at directly affected nearby residences prior to construction
- whether noise monitoring data would be independently collected 6 months prior to construction, halfway through the project and 6 months after construction to demonstrate the mitigation of sleep disturbance impacts
- a suggestion for real time noise and vibration monitoring and implementation of maximum noise and vibration limits that reflect the internal noise criteria during construction to protect Qantas' operational requirements.

Response

Construction impacts have been assessed against the requirements of the NSW EPA ICNG. Where impacts are predicted, feasible and reasonable mitigation has been recommended to minimise the impacts as far as practicable, however temporary construction noise impacts are often inevitable where major infrastructure projects are located in urban areas. Potential mitigation includes measures such as completing work during standard construction work hours, where possible, minimising noise intensive works during the night-time, using hoardings or structures at compound sites to shield noisy works and minimising the use of these compounds as far as practicable.

Construction noise would be managed through site environmental management plans (site EMPs) during enabling works and a construction noise and vibration management plan (CNVMP) during main construction works (see mitigation measures DNV1 to DNV4 in Table 8.1 and CNV1 to CNV10 in Table 8.2). These measures include the following activities to reduce construction impacts to residences:

- Where feasible and reasonable, construction will be carried out during standard construction hours.
- Where noise intensive equipment is to be used near sensitive receivers, the works will be scheduled for standard construction hours, where possible. If it is not possible to restrict the works to daytime then they will be scheduled so noise intensive equipment is not used after 11:00 pm, where feasible.
- Monitoring will be carried out at the start of noise and vibration intensive activities which are near to receivers to confirm that actual levels are consistent with the predictions.
- Hoardings, or other shielding structures, will be used where receivers are near compounds or worksites
- Noise generating activities in compounds will be positioned away from receivers where possible. Items such as sheds can also be used to shield receivers from noise generated in other parts of the compound.

At property treatments are not proposed for residences impacted by construction noise. Where property treatments are proposed in relation to operational noise, this would be provided prior to the project becoming operational. Unless subject to an Environment Protection License, an Out-of-Hours Work Protocol will be prepared and included as part of the CNVMP for main construction works and for enabling works as part of the site environmental management plans. It will identify a process for the consideration, management and approval of works which are outside standard hours. The protocol will be prepared in consultation with the EPA and approved by the independent Environmental Representative before the commencement of main construction works. The protocol will include processes for:

- the consideration of out of hours work against the relevant noise and vibration criteria
- the identification of mitigation measures for residual impacts, including respite periods in consultation with the community at affected locations
- consideration of the risk of activities, proposed mitigation, management and coordination for works outside of standard hours to be approved by the independent ER.

Monitoring was carried out during preparation of the EIS and will be carried out at the start of noise and vibration intensive activities that are near receivers, to confirm that actual levels are consistent with the predictions. Where mitigation measures have been specified, the monitoring results will confirm their effectiveness. Mitigation measure CNV2 (see Table 8.2) notes that a CNVMP will be prepared as a sub plan to the CEMP and this will include requirements for noise and vibration monitoring during construction.

Operational noise monitoring and the type of noise monitoring required (i.e. real-time or unattended monitoring) will be determined through the ONVR. Noise monitoring and analysis would be carried out by the contractor supported by an acoustic specialist.

6.4.4 Construction vibration mitigation

Submission numbers

20

Summary of issues raised

One submission noted that use of vibratory rollers greater than 12 tonnes may result in vibration related impacts to the new Qantas Flight Training Centre, and queries whether this could be restricted.

Response

When construction works are adjacent to the new Qantas Flight Training Centre, the works would be within the minimum working distance (20 metres) referenced in *Technical Report 2 – Noise and Vibration Impact Assessment* for cosmetic damage to residential and light commercial buildings for a 13–18 tonne vibratory roller.

As noted in *Technical Report 2 – Noise and Vibration Impact Assessment*, where works are required within the minimum working distance and considered likely to exceed the cosmetic damage criteria:

- Different construction methods with lower source vibration levels will be investigated and implemented, where feasible (such as smaller vibratory rollers)
- Attended vibration measurements will be undertaken at the start of the works to determine actual vibration levels at the item. Works will cease if the monitoring indicates vibration levels are likely to, or do, exceed the relevant criteria.

Building condition surveys will also be completed before and after the works where buildings or structures, including heritage items, are within the minimum working distances and considered likely to exceed the cosmetic damage criteria during the use of vibration intensive equipment. Appropriate criteria would be confirmed for each item before the works begin, based on the surveys.

6.4.5 Operational noise and vibration impacts

Submission numbers

1, 2, 3, 4, 5, 11, 12, 13

Summary of issues raised

Eight submissions raised concerns about any increases in noise and vibration as the existing situation already results in high noise and vibration impacts at surrounding residential receivers including:

- wheel squeal and train braking noise
- vibration causing walls and doors to jolt and shake
- sleep disturbance resulting to impacts on wellbeing
- impacts despite already having installed Magnetite noise reduction on several windows.

Response

The potential operational noise and vibration impacts of the project have been assessed against the requirements of the *Rail Infrastructure Noise Guideline* (RING) (EPA, 2013), which contains criteria for rail infrastructure upgrade projects and requires mitigation to be investigated where a project results in exceedances of the criteria. Noise and vibration levels from the project have been predicted following which feasible and reasonable mitigation has been recommended for all receivers which are identified as being above the noise criteria.

Validation noise loggers were deployed for two weeks near to the project to capture the various sources of freight noise in the project area, which includes braking, bunching, horns, etc. The analysis of the existing noise data included consideration of potential braking/bunching/horn noise, however, the investigation found that these sources did not significantly contribute to the measured levels (which were controlled by wheel-rail noise including curving noise and exhaust noise) and did not require specific corrections in the noise model to account for them. The vibration assessment within *Technical Report 2 – Noise and Vibration Impact Assessment* did not identify operational impacts related to vibration.

The operational impacts from the project have been reassessed using an updated speed profile for the project alignment (refer to Appendix D), which has reduced rates of acceleration and braking in the north-western portion of the project area. On this basis, and when considering trains are not required to stop in passing loops in the project area as part of typical operations, bunching/stretching/braking noise is not expected to be a significant contributor to future noise levels in the project area.

The potential impacts to the new Qantas Flight Training Centre, which has recently been approved, have also been included in this assessment (see Appendix D). The assessment of the new Qantas Flight Training Centre predicts the following: ‘

- With project’ noise levels at the north-western end of the project near the Centre are predicted to marginally decrease by around 1 dB, due to train speeds being reduced in this area.
- The Centre is predicted to have exceedances of the noise trigger levels at 73 dBA. It is noted that the design of the facades of the new Centre are high-performance and assume an external LAeq noise level of 74 dBA in Assessment of Noise and Vibration Emissions – Qantas Flight Training & Simulator Centre, May 2019.
- Ground-borne noise levels at the Centre are predicted to comply with the 40 dBA internal noise level criteria.

Noise and vibration from the existing operations is managed in accordance with the requirements as per the existing Environment Protection Licence (EPL) (EPL 3142), though existing operations are outside of the project scope. The public can contact ARTC to make complaints about existing infrastructure or impact via the ARTC Enviroline phone number (1300 550 402) or email (enviroline@artc.com.au). Enviroline is a telephone and email account that can receive environmental enquires and complaints. If using the telephone service, the caller is prompted to leave their contact information and details regarding the enquiry and a return call is then made by the Enviroline Administrator to discuss the enquiry in more detail. ARTC aims to respond to all queries within two days. Where this is not possible, contact will be made with the caller to provide an indicative response timeframe.

6.4.6 Operational noise

Submission numbers

1, 2, 3, 4, 5, 6, 11, 12, 16, 17

Summary of issues raised

Ten submissions provided suggestions and raised queries regarding how noise and vibration from operation of the project would be managed, including:

- suggestions that a noise barrier should be constructed along the entire length of the rail line in front of residential apartment buildings
- suggestions that all residential properties that face the rail line should be provided with double glazing
- what mitigation measures would be implemented for surrounding residential receivers, and whether noise mitigation options such as earth mounds and plastic railway sleepers would be considered
- why Sydney Airport has a night time curfew to minimise the potential for sleep disturbance impacts but there is no night time curfew for freight train operations.

Response

The operational impacts from the project have been assessed against the requirements of the NSW EPA *Rail Infrastructure Noise Guideline* (RING). The RING contains criteria for rail infrastructure upgrade projects and requires mitigation to be investigated where a project results in exceedances of the criteria. The need to consider mitigation measures is triggered when the results are above the threshold noise levels and if existing (i.e. no build) level of rail noise already exceeds the RING trigger levels, the project needs to contribute 2dB (L_{eq}) or 3 dB (L_{max}) on top of the no build rail noise levels.

Noise levels from the project have been predicted and feasible and reasonable noise mitigation has been recommended for all receivers which are identified as being above the noise criteria. Additional operational noise modelling has also been carried out using a more refined train speed profile (see Appendix D). The additional assessment does not alter the recommendation that a modern track lubrication system is used on curves as the primary method to mitigate noise impacts. The specification of the noise control system for each curve would be determined as part of the Operational Noise and Vibration Review (ONVR), following an investigation of each curve. Consistent with *Technical Report 2*, a number of approaches to mitigating operational noise impacts would be further reviewed as the project progresses. This review would be completed as part of the ONVR and would include:

- review of the use of track lubrication as the primary source of noise control for operational noise impacts
- review of the feasibility and reasonableness of using noise barriers to provide path control mitigation to nearby receivers, noting the specific constraints that are applicable to the project
- review of the locations where at-property treatment should be considered (after the use of source and path control measures) to mitigate residual impacts at individual receivers.

The ONVR (see measure ONV1, Table 8.3) would be prepared in consultation with affected stakeholders and the community, and would be made publicly available once complete. The ONVR would:

- be based on the operational noise and vibration objectives identified in the EIS
- confirm the predicted operational noise and vibration impacts at the surrounding receivers based on the final design
- review the suitability of the operational noise mitigation measures and any other measures which may be considered appropriate to manage additional impacts identified as a result of design changes and include the timing of implementation
- include a consultation strategy to seek feedback from directly affected landowners on the noise and vibration mitigation measures
- define procedures for the management of operational noise and vibration complaints.

Several different noise mitigation options would be considered as part of this ONVR, including noise barriers (noise walls or earth mounds) and upgraded glazing and façade elements at surrounding properties to minimise potential operational noise impacts. No vibration impacts were predicted during operation so no mitigation was required.

Four noise barriers were considered in the noise and vibration assessment for the EIS, where clustered receivers were predicted to be above the RING criteria. The analysis found that two of these barriers were not feasible due to the barriers penetrating the Sydney Airport obstacle limitation surface and associated visual impact issues. Two barriers (one in NCA03 near Baxter Road and one in NCA08 near Myrtle Street) would be investigated further during detailed design taking account of issues raised during the consultations and design refinements. Further assessment provided in Appendix D has shown that noise levels at the south-eastern end of the project near NCA07 and NCA08 are predicted to decrease by around 2 dB, due to train speeds being reduced. This may remove the need to consider a noise barrier near Myrtle Street.

The design strategy already considers track lubrication, which if well maintained has been proven to substantially reduce wheel squeal and other curve related noise. Use of alternative rail sleepers, such as plastic railway sleepers, has not been demonstrated to effectively mitigate operational rail noise.

Where residual impacts are apparent, they would likely be mitigated using at-property treatment, which aims to achieve suitable internal noise levels by increasing facade performance of items such as glazing and doors.

The final mitigation approach would consider that several receivers are already subject to high existing noise levels from road, rail and aircraft noise and may already have been mitigated with at-property treatments to windows and facades.

The Botany Line is currently operational 24 hours a day and the continued 24/7 operation is essential to meet the demand of the supply chain and support the operations of Port Botany (refer to section 7.6), As such, the existing Botany Line does not have a curfew. No changes are proposed as part of the project.

6.5 Air quality

6.5.1 Air quality impacts during operation

Submission numbers

1, 2, 3, 4, 10

Summary of issues raised

Four submissions raised concerns regarding the increased level of diesel particulates that would be released into the air due to operation of the project and queried how this would be monitored and managed.

One submission also suggested that the level of emissions from trains should be checked, documented and trains decommissioned if harmful emissions are recorded. Findings should be made publicly available online.

Response

Air quality modelling has predicted low increases in pollutant concentrations (relevant to emissions from diesel locomotives) from operation of the project, which are not considered to be of significance or of concern in relation to community health (refer to Section 21.4.4 of the EIS).

ARTC is not responsible for the management or operation of rolling stock (trains and wagons) along the Botany Line. Train services are currently, and would continue to be, provided by a variety of operators who utilise the ARTC network to transport goods. ARTC will continue to work closely with its customers about issues that may be associated with their trains and wagons, including the ongoing management of emissions. While ARTC does not have the authority to regulate emissions from locomotives, any locomotives of concern can be reported to ARTC to investigate disproportionate or irregular activity via Enviroline on 1300 550 402, which operates 24 hours a day. From May 2020, the NSW EPA will also introduce licensing specifically for rolling stock operators in NSW.

6.6 Contamination

6.6.1 Contamination impacts during construction

Submission numbers

1, 2, 3, 4

Summary of issues raised

Four submissions raised issues relating to the potential for soil contamination to be encountered during construction of the project, including asbestos, and how this would be remediated during construction for worker safety. Three of these submissions also raised concerns that disturbing contaminated soil during construction may result in airborne contaminants and associated health effects (such as asthma) and queried how this potential impact would be managed.

Response

Widespread existing soil contamination has been identified within the project site, including asbestos within fill material and on the site surface (refer to sections 12.2 and 12.3 of the EIS).

A Soil and Water Management Plan (SWMP) would be developed to manage all soil and water risks during construction of the project, including risks associated with encountering existing and potential soil contamination (refer to Section 12.6.1 of the EIS). This would include an Asbestos Management Plan (AMP) that would be prepared in accordance with NSW EPA guidelines (including the *Waste Classification Guidelines* (EPA, 2014)), *Managing Asbestos in or on Soil* and relevant industry codes of practice. Asbestos containing soil will be handled and managed in accordance with the AMP at all times during construction. It would also include an unexpected finds procedure, which will identify the process to follow in the event that indicators of contamination are encountered during construction in areas that are not expected to be contaminated.

To remediate areas where contamination has been identified, the preferred hierarchy of options for site clean-up and management presented in the *National Environment Protection (Assessment of Site Contamination) Measure 2013* (NEPC, 2013) would be adopted. The remediation would be undertaken in accordance with a Remediation Action Plan (RAP) prepared by a suitably qualified environmental consultant. The final elevation of residual contaminated soils will be surveyed prior to the installation of a marking layer and capping layers and included in the SWMP and ARTC asbestos register. Following this, a validation report will be prepared by a suitably qualified environmental consultant to validate the suitability of the project site for its proposed use.

Several other mitigation measures will be implemented to minimise potential risks associated with encountering contamination during construction (refer to mitigation measures CCT1 to CCT10 in Table 8.2).

Technical Report 13 – Health Impact Assessment predicted that air quality impacts from construction would meet the adopted air quality criteria within seven metres of the site boundary (refer to Section 12.3.4 of the EIS). As such, the potential for health impacts associated with dust and airborne contaminants is expected to be low and would be minimised through several mitigation measures, including (refer to Sections 10.6.2 of the EIS):

- dust suppression through watering of construction areas and covering construction vehicles and stockpiles
- visual dust monitoring and/or installation of a short-term dust monitoring device in the instance of ongoing dust issues
- identifying areas that are at high risk for contamination in the site induction so all personnel are aware of the importance of dust management in these areas.

However, while health impacts are expected to be low, there may still be some nuisance dust generated by construction that may be noticeable by the community on occasions.

6.7 Water quality and soil

6.7.1 Water quality and soil pollution and mitigation

Submission numbers

1, 2, 3, 4, 10

Summary of issues raised

Four submissions raised issues related to the potential for pollution due to construction and operation of the project. In particular, the submissions queried how soil disturbances would be managed during construction to avoid runoff into stormwater channels.

In addition, one submission suggested that water samples should be collected from Mill Pond by an independent contractor prior to, during and after construction to monitor water quality impacts.

Response

A SWMP would be developed to manage the potential for water quality and soil pollution during construction of the project (refer to Section 14.6.1 of the EIS), including the risk of sediment-laden runoff into surrounding waterbodies. The SWMP would be prepared in accordance with the 'Blue Book' (Landcom, 2004) and include:

- water quality objectives for the project as outlined in Appendix C of *Technical Report 8 – Surface Water Impact Assessment*
- an Erosion and Sediment Control Plan that allows for site-specific erosion and sediment controls at all work sites. Physical controls may include sediment fences and basins, containment bunds, silt traps, turbidity barriers and diversions, dust suppression and earth compaction around stockpiles and earthworks area
- specific plans required to address identified contamination risks.

A surface water quality monitoring program would also be prepared and implemented for specific construction works (see section 6.2.3 of *Technical Report 8 - Surface Water Impact Assessment*). This monitoring would be undertaken by the construction contractor with support from a suitably qualified person engaged by the construction contractor (as required). An independent Environmental Representative would oversee the approach to environmental mitigation and management during construction and act as a key contact point for DPIE (refer to section 8.1).

The potential for soil or water pollution during operation of the project would be managed through ARTC's existing Environmental Management System.

6.8 Landscape and visual

6.8.1 Lighting impacts

Submission numbers

16

Summary of issues raised

One submission queried how construction compounds would be lit at night and how potential light glare impacts would be managed.

Response

Temporary lighting required during the construction period would be sited and designed to avoid light spill into residential properties. Particular consideration would be given to works near Baxter Road, McBurney Avenue and between Myrtle Street and Stephen Road, which are located close to residential properties and hotels. This would be managed through mitigation measure CLV2 (see Table 8.2).

In addition, mitigation measure CHS6 (see Table 8.2), states that management plans would be developed and implemented for the project to ensure the lights proposed for use during construction comply with the Civil Aviation Safety Authority (CASA) Manual of Standards 139 section 9.21 and *National Airports Safeguarding Framework Guideline E* (DIRDC, n.d.).

6.9 Hazards and risks

6.9.1 Impacts on existing utilities

Submission numbers

19

Summary of issues raised

One submission provided several comments and suggestions for mitigation measures to ensure the protection of an existing ethane pipeline during construction, and the safety of the design with respect to underground utilities.

Response

The relocation and/or protection of all existing utilities within the project site, including the existing ethane pipeline, would form a critical and complex part of the construction process (refer to Section 7.2.1 of the EIS for more detail).

Where an existing utility has been identified, an interface agreement to identify the required management of the utility during construction and operation will be developed in close co-operation with the utility asset owner. Once finalised, these agreements would be incorporated into the design and delivery of the project. Management of this interface would help ensure relocation and/or protection of utilities can be designed, agreed and constructed in an efficient manner, and ongoing maintenance and access arrangements can be agreed for the construction and operation phases.

6.10 Cumulative impacts

6.10.1 Cumulative traffic impacts

Submission numbers

20

Summary of issues raised

One submission raised issues regarding the assessment of cumulative traffic impacts from the project and the new Qantas Flight Training Centre, including:

- the basis for the cumulative assessment in the main EIS, as the discussion of cumulative impacts in the Traffic and Transport Impact Assessment does not include the new Qantas Flight Training Centre
- that some cumulative construction traffic impacts are likely, given both projects would rely on construction vehicles using King Street, and that these impacts should be minimised through consultation.

Response

The potential cumulative impacts associated with the construction of the project and the proposed new Qantas Flight Training Centre were addressed in section 23.2.2 of the EIS. As shown in Table 23.4 of the EIS, the indicative construction programs for the new Qantas Flight Training Centre and Botany Rail Duplication projects identified that these programs are not currently expected to overlap. As such, it is expected that potential impacts, such as traffic impacts, would be minimal for both the new Qantas Flight Training Centre and the wider community (with the exception of potentially extended construction traffic fatigue due to ongoing traffic impacts associated with the consecutive construction programs for the new Qantas Flight Training Centre and the project).

Regardless, ARTC understands that the existing Mascot Area Projects Coordination group, established and overseen by the Sydney Coordination Office, will regularly convene throughout early works and main construction to address project interface issues. This would include the cumulative traffic impact of concurrent projects within the area, such as Sydney Gateway road project, WestConnex St Peters Interchange and this project. ARTC would attend the Mascot Area Projects Coordination group to coordinate with other projects in the area, including weekend road closures and cumulative traffic impact.

6.11 Other

6.11.1 Stakeholder consultation

Submission numbers

20

Summary of issues raised

One submission raised an issue that there is no formal commitment in the EIS for ongoing consultation to occur between ARTC and Qantas.

Response

Qantas will continue to be engaged in future stages of the project as a project stakeholder (refer to Section 3.20). Targeted consultation methods, such as letters, notifications, signage and face-to-face communications, will continue to occur.

6.11.2 Identification of sensitive receivers

Submission numbers

1, 2, 3, 4

Summary of issues raised

Four submissions raised an issue with the use of the word ‘receivers’ to refer to people who live and work in Sydney.

Response

The use of the term 'receiver' is a general term typically used in technical reports and guidelines, such as the *Interim Construction Noise Guideline* (DECC, 2009) and draft *Preparing an Environmental Impact Statement* (NSW Department of Planning & Environment, 2017), to denote an individual or group of people that may experience potential impacts as a result of the project. Receivers are also commonly categorised into groups including residential, commercial and industrial receivers, to reflect the different ways in which they may be sensitive to impacts such as noise and vibration and visual impacts.

6.11.3 Other issues

Submission numbers

10

Summary of issues raised

One submission suggested that the project should include provision for future electrification of the corridor.

Response

The primary objective of the project is to increase capacity along the Botany Line to meet the forecast growth in demand for container freight transport to and from Port Botany, by duplicating a section of single line track between Botany and Mascot. The freight trains that transport goods from Port Botany are diesel locomotives, as such the existing line is not electrified and no change is proposed as part of the project. As such, electrification of the rail corridor is outside the scope of the project. ARTC may consider opportunities to include provision for future electrification as part of detailed design or future projects.

Submission numbers

10

Summary of issues raised

One submission suggested that the project should have a workforce consisting of at least 10 per cent local residents and 10 per cent Indigenous people.

Response

A mitigation measure has been added, mitigation measure CSO3, which states that ARTC would work with the nominated construction contractor to seek opportunities, where possible, to use local and Indigenous labour as part of the workforce requirements for the construction of the project (see Table 8.2).

7. RESPONSE TO GOVERNMENT AGENCY AND KEY STAKEHOLDER SUBMISSIONS

This chapter provides responses to the issues raised in submissions provided by government agencies and key stakeholders, including local councils and NSW State government departments and agencies.

7.1 Heritage Council of NSW

7.1.1 Built Heritage and Historical Archaeology

Issue

Heritage Council raised the following concerns:

- *Technical Report 9 – Statement of Heritage Impact* has not clearly explained why management of areas of low or moderate locally significant archaeology would provide meaningful and substantive research questions. This would be needed to justify the argument for an archaeological program under this project. The management of 'archaeology' without a clear research agenda and meaningful outcomes, is not consistent with the relevant Heritage Council Guidelines. *Technical Report 9 – Statement of Heritage Impact* also tends to describe potential landscape features, which would not be 'relics' requiring management if the *Heritage Act 1977*, applied to the project area.
- A further Historical Archaeological Assessment and Research Design (HAARD) and associated monitoring and salvage does not appear to be necessary for this project. Heritage NSW recommends that if approved, the project proceeds with a site induction and an Unexpected Finds Protocol established within a Heritage Management Plan to cover historical archaeological 'relics' within the meaning of the *Heritage Act 1977.*

Response

Technical Report 9 – Statement of Heritage Impact assessed the significance of potential archaeological remains to inform recommendations for archaeological management throughout the project. This assessment took a conservative approach to mitigation measures and the recommendations relating to HAARD. The submission provided by Heritage Council is noted and the mitigation measures have been refined to take account of this. Changes have been made to mitigation measures (refer to section 8.2):

- CNH7 to remove the requirement for a HAARD to be prepared for areas containing low or moderate potential for State and locally significant Phase 1 and 2 Resources
- CNH9 has broadened the unexpected finds procedure so it relates to all areas of archaeological potential.

Mitigation measures would be included within the Construction Environmental Management Plan (CEMP) and any site management plan for the enabling works. Measure CNH8 (see Table 8.2) states that a project environmental induction will include making contractors aware of areas of archaeological potential and heritage features. The requirement for an unexpected finds procedure relating to non-Aboriginal heritage is provided for in mitigation measures CNH9 and CNH10 and for Aboriginal heritage in mitigation measures CAH1 and CAH2 (see Table 8.2).

7.2 Environmental Protection Agency NSW

7.2.1 Noise – construction

Issue

The NSW EPA notes that the community will be affected by noise and vibration at different times during construction of the project. NSW EPA also noted that it would be important to keep the community informed about construction activities as the project progresses, and to seek input to identify the community's preference to mitigation, including work scheduling, and consideration of respite periods.

Response

Ongoing communication with the community is proposed to be undertaken throughout construction in order to keep the community informed of works and progress as it relates to the project. Mitigation measures CNV1, CNV2 and CNV3 (see Table 8.2) outline the preparation of plans to manage community consultation in accordance with the community and stakeholder engagement plan (see section 8.1).

Issue

NSW EPA noted that no indication was given as to the extent and duration of the noise impact of the worst-case construction scenario as it approaches and then travels past each NCA. The NSW EPA required additional information of the extent of non-worst-case construction noise at receivers considered to be above the 'noise affected' level for the project.

Response

Additional modelling of non-worst case scenarios has been completed as part of the Submissions Report. The assessment also contains information regarding noise levels and impacts as they move away from a particular location. The assessment concluded that works outside of the worst-case scenarios are expected to result in noise levels and impacts that are significantly lower than worst-case, with much fewer receivers being impacted. Similarly, when works move away from a particular receiver the impacts would reduce substantially and the highest impacts would be limited to the area surrounding the works. Further detail is provided in Appendix C.

Impacts from works outside of standard construction hours would be managed by the measures defined in the Construction Noise and Vibration Management Plan, (CNVMP) which would include details on how respite would be applied where ongoing high impacts are seen at certain receivers near long term works.

Unless subject to an Environment Protection Licence, an Out-of-Hours Work Protocol would also be prepared and be included as part of the CNVMP for main construction works. It will identify a process for the consideration, management and approval of works which are outside standard hours. The Protocol would also include:

- a process for the consideration of out of hours works against the relevant noise and vibration criteria
- provide a process for the identification of mitigation measures for residual impacts, including respite periods in consultation with the community at each affected location
- identify a process that considers the risk of activities, proposed mitigation, management, and coordination for works outside of standard hours to be approved by the independent ER.

Table 7.1 also provides greater detail on the indicative duration of key work scenarios. The above shows that the 'Peak' scenarios, which generally result in the highest impacts, would mostly be completed during one or two possession periods.

Table 7.1 Indicative duration of works

SCENARIO	ACTIVITY	INDICATIVE DURATION OF WORKS			
		Near Baxter Road	**Near McBurney Avenue**	**Near Myrtle Street**	**Near Banksia Street**
Enabling Works	Utilities – Peak	1 x 48hr possession	n/a	2 x 48hr possessions	2 x 48hr possessions
	Utilities – Typical	40 days	n/a	40 days	40 days
	Veg. Clearing & Property Adjust. – Peak	1 x 48hr possession	n/a	n/a	n/a
	Veg. Clearing & Property Adjust. – Typical	10 days	n/a	10 days	10 days
Bridge Works	Demolition (inc. breaker) – Peak	2 x 54hr possessions	n/a	n/a	n/a
	Demolition – Typical	10 days	n/a	n/a	n/a
	Construction – Peak	248 days	180 days	n/a	n/a
	Construction – Typical	249 days	180 days	n/a	n/a
Track Works – Peak		2 x 48hr possessions	n/a	2 x 48hr possessions	2 x 48hr possessions
Track Works – Typical		58 days	17 days	46 days	46 days
Testing, Commissioning & Finishing – Peak		2 x 48hr possessions	2 x 48hr possessions	2 x 48hr possessions	2 x 48hr possessions
Testing, Commissioning & Finishing – Typical		40 days	40 days	40 days	40 days

Impacts can be 'high' for the nearest receivers to the work (i.e. within around 20 metres of high impacts works during the daytime and 50 metres during the night-time), the impacts for receivers which are further away are substantially lower. Where 'high' or 'moderate' worst-case impacts are predicted from noisy works, they are generally limited to the receivers around the work site, with more distant receivers being subject to much lower noise levels and impacts. This also indicates the reduction in noise level as linear sections of works progress and move away from a given receiver.

As per mitigation measure DNV1 (see Table 8.1), the need for consecutive night-time works and likelihood for sleep disturbance impacts will be reviewed during detailed design. Unless subject to an Environment Protection License, an Out-of-Hours Work Protocol will be prepared and included as part of the CNVMP for main construction works and site management plans for enabling works. It will identify a process for the consideration, management and approval of works which are outside standard hours. The protocol will be prepared in consultation with the NSW EPA and approved by the Independent Environmental Representative before the commencement of main construction works. Measures would consider the need for respite periods.

7.2.2 Noise – construction out of hours

Issue

NSW EPA raised the concern that due to the significant out of hours noise impacts expected at all NCAs, a detailed assessment is required to consider all feasible and reasonable mitigation, preferably developed in consultation with affected receivers, and including options for alternative accommodation where there are residual noise impacts.

Response

Additional modelling of the construction scenarios has been completed as part of the Submissions Report to further predict the potential impacts, including those associated with Out of Hours Works. This is provided in Appendix C.

However, at this early stage of the project, information regarding how the project would be constructed is indicative in nature. The expected duration of the various work phases will not be finalised until a construction contractor is engaged and detailed construction planning information is determined.

As per mitigation measure DNV1 (see Table 8.1), the need for consecutive night-time works and likelihood for sleep disturbance impacts will be reviewed during detailed design. The use of the Banksia Street compound site during out of hours works associated with the road closures at Robey Street and O'Riordan Street will be avoided as far as practicable. Where impacts are considered likely, appropriate noise mitigation will be developed which takes into consideration factors such as the existing facade performance of affected residential receivers. Alternative accommodation is a way that projects may consider as an opportunity for receivers to obtain respite from consecutive night works. Construction planning including linear progression of a workfront away from receivers may also offer some respite. Appropriate respite will be considered for affected receivers to limit impacts from night-time works in the same location.

In addition, unless subject to an Environment Protection License, an Out-of-Hours Work Protocol will be prepared and included as part of the CNVMP for main construction works and site management plans for enabling works. It will identify a process for the consideration, management and approval of works which are outside standard hours, as suggested in this submission. The protocol will be prepared in consultation with the NSW EPA and approved by the Independent Environmental Representative before the commencement of main construction works. ARTC's existing Site EMP template will be used to develop site or activity specific EMPs for enabling works. The protocol will include processes for:

- the consideration of out of hours work against the relevant noise and vibration criteria
- the identification of mitigation measures for residual impacts, including respite periods in consultation with the community at affected locations
- consideration of the risk of activities, proposed mitigation, management and coordination for works outside of standard hours to be approved by the Independent Environmental Representative.

Issue

The NSW EPA noted that the current rail line will continue to be operational 24/7 and maintenance works will still occur during construction of the duplicated track. The NSW EPA highlighted that the CNVMP will need to consider operation and maintenance works in managing impacts during construction.

Response

Consideration of cumulative noise impacts from operation and maintenance of the existing rail infrastructure during the construction period will be included in the CNVMP and has been added to mitigation measure CNV2 (see Table 8.2).

Operation and maintenance tasks would be managed through ARTC's environmental management system and obligations under the existing EPL 3142 – which is an existing structured framework for the management of the operational rail corridor. The management system manages the evaluation, regulatory compliance and reporting of environmental issues. The timing and duration of these activities will be considered cumulatively with the construction activities.

7.2.3 Noise – operation

Issue

NSW EPA noted that *Technical Report 2 – Noise and Vibration Impact Assessment* states that the project would increase train speeds to up to 45 km/h, yet the EIS states in Section 6.9.1 that the design speed is 50 km/hr. NSW EPA requested that the technical report should indicate if trains travelling at the design speed (50 km/hr) are likely to change the predicted operational impacts.

Response

As a result of design development and additional modelling, the operational train speed profile has been revised from a previous maximum operational speed of 45 km/h (as assessed in the EIS) to a refined speed profile comprising a maximum operational speed of 50 km/h for a 1.5 km section of the full project alignment, in consideration of average freight train length and load, track curve, and acceleration and deceleration from speed restrictions either side of the project.

Additional noise modelling has been undertaken, incorporating the revised speed profile. This assessment is provided in Appendix D. The results of this revised assessment show the following for residential receivers:

- Noise levels in the project area are predicted to change as a result of the revised speed profiles. The changes are generally relatively small, however, they are sufficient to result in changes to the number of triggered receivers in some locations.
- 'With project' noise levels at the north-western end of the project near NCA01 are predicted to marginally decrease by around 1 dB, due to train speeds being reduced on the Up track from 45 km/h in *Technical Report 2 to* 30 km/h in the revised modelling.
- 'With project' noise levels near NCA03 and NCA04 (between O'Riordan Street and Southern Cross Drive) are predicted to marginally increase by around 1 to 2 dB, due to train speeds increasing in this area from 45 km/h to 50 km/h on both tracks.
- 'With project' noise levels at the south-eastern end of the project near NCA07 and NCA08 are predicted to decrease by around 2 dB, due to train speeds being reduced from 45 km/h to 30 km/h on both tracks.
- Additional residential receivers are predicted to be triggered in NCA03 and NCA04 when compared to *Technical Report 2*. Fewer receivers are predicted to be triggered in NCA07 and NCA08.

The revised predicted impacts on non-residential receivers (i.e. hotels) near the project are generally consistent (i.e. within 1 to 2 dB) of the predictions in *Technical Report 2 – Noise and Vibration Impact Assessment*. The only additionally identified 'other sensitive' trigger is the New Qantas Flight Training Centre in NCA01. Since exhibition of the EIS, the new Qantas Flight Training Centre has been approved. As such, it has been included in additional construction noise and operational noise modelling, which provides greater detail on the potential impacts (refer to Appendices C and D).

Issue

NSW EPA noted that *Technical Report 2 – Noise and Vibration Impact Assessment*, does not include a discussion around braking locations and horn noise, in accordance with the *Rail Infrastructure Noise Guideline* (EPA 2013). NSW EPA requested that the use of horns and the impact from braking should be incorporated into the model where applicable.

Response

Validation noise loggers were deployed for two weeks near to the project to capture the various sources of freight noise in the project area, which includes braking, bunching, horns, etc. The analysis of the existing noise data included consideration of potential braking/bunching/horn noise, however, the investigation found that these sources did not significantly contribute to the measured levels (which were controlled by wheel-rail noise, including curving noise, and exhaust noise) and did not require specific corrections in the noise model to account for them.

The future operational impacts from the project have been reassessed using an updated speed profile for the project alignment, which has reduced rates of acceleration and braking in the north-western portion of the project area (see Appendix D). On this basis, and when considering trains are not required to stop in passing loops in the project area as part of typical operations, bunching/braking noise is not expected to be a significant contributor to future noise levels in the project area.

Issue

NSW EPA noted that feasible and reasonable mitigation for operation such as barriers and at-receiver treatments, should be installed early where possible, to maximise the noise benefit during construction.

Response

Noise mitigation measures will be considered early in the project design and construction phases. An ONVR will be prepared to confirm the noise and vibration impacts from the project and to define the mitigation measures used to control the impacts. Implementation of noise mitigation source controls, path controls and/or receiver controls, where feasible and reasonable, will be determined during detailed design. The ONVR will be prepared in consultation with affected stakeholders and the community and is outlined in mitigation measures ONV1 and ONV2 (see Table 8.3).

Issue

NSW EPA requested a copy of the ARTC *Noise Prediction and Mitigation Guideline* (ARTC, 2018) to be published with the ONVR.

Response

ARTC's *Noise Prediction and Mitigation Guideline* (ARTC, 2018) is an internal ARTC document and forms part of the ARTC Environmental Management System which manages the evaluation, regulatory compliance and reporting of environmental issues on the existing operating network across Australia. It has been provided to the DPIE. Only supporting reference is made to the *Noise Prediction and Mitigation Guideline*. The assessment which informs the EIS and discussion in this report is not based on any information such as assumptions or calculation procedures from the *Noise Prediction and Mitigation Guideline* which are not explicitly stated.

Issue

NSW EPA requested clarification on the assumptions used for the noise model (Note 1 to Table 30 and Note 2 to Table 31 in *Technical Report 2 – Noise and Vibration Impact Assessment*) which are based upon the ARTC *Noise Modelling and Mitigation Guideline* (ARTC, 2018).

Response

The corrections used in the modelling are as detailed in Table 30 and Table 31 in the *Technical Report 2 – Noise and Vibration Impact Assessment*. These are standard corrections that are taken from the NSW Rail Noise Database. This is the most comprehensive database of freight and passenger rail noise data and is owned by Transport for NSW. This database is appropriate for NSW infrastructure projects and is utilised for most noise impacts assessment relating to rail noise. The *Noise Prediction and Mitigation Guideline* (ARTC, 2018) provides guidance on the assessment and design of mitigation for ARTC rail projects. This is an ARTC internal document that forms part of the ARTC Environmental Management System.

7.2.4 Vibration – operation

Issue

The NSW EPA requested that a rail vibration validation take place that is of similar detail to that undertaken for noise validation.

Response

Source vibration data from measurements on the Botany Line collected and validated as part of a recent project (SSI-8256 – Sydenham to Bankstown Metro EIS (Sydney Metro, 2017)) was used in the vibration assessment as outlined in Section 4.5 of *Technical Report 2 – Noise and Vibration Impact Assessment*. This rail line has similar trains and is within the same rail network. These measurements and associated validation are considered appropriate for this assessment.

7.2.5 Air quality

Issue

The NSW EPA noted that following a review of *Technical Report 3 – Air Quality Impact Assessment* it concluded that significant air quality impacts are unlikely to result from either the construction or operational phases of the project. NSW EPA recommended conditions relating to preparation of a construction and operation Air Quality Management Plan which includes compliance reporting and an improvement plan and that ARTC will adopt best practice locomotive emissions performance, are included in conditions of approval.

Response

The NSW EPA conclusion that significant air quality impacts are unlikely to result from either the construction or operational phases of the project are noted.

Mitigations measures are proposed to manage the level of impact anticipated as part of this assessment. Measures to minimise minor residual impacts are outlined in measures CAQ1 to CAQ6 for construction (see Table 8.2) and OAQ1 and OAQ2 for operation (see Table 8.3).

During construction, measures to manage dust and emissions from plant and equipment will be managed through the:

- existing Site EMP template will be used to develop site or activity specific EMPs for enabling works
- project specific CEMP will be prepared to guide the approach to environmental management during the main construction works.

Operational maintenance activities will continue to be managed in accordance with manufacturer specifications and ARTC's Safety Management System and Environment Management System. This system considers the regulatory requirements that apply to ARTC's entire network across Australia, including and beyond the project. This system manages the evaluation, regulatory compliance and reporting of environmental issues. Given the level of impact anticipated from the project and the Environmental Management System which applies to the infrastructure it is not considered reasonable to develop an Air Quality Management Plan for this section of duplicated track which forms the project. Similarly, the maintenance of an Environmental Management System is important for the efficient and consistent management across the network.

ARTC is not responsible for the management or operation of rolling stock (trains and wagons) along the Botany Line. Train services are currently, and would continue to be, provided by a variety of operators who utilise the ARTC network to transport goods. ARTC will continue to work closely with its customers about issues that may be associated with their trains and wagons. While ARTC does not have the authority to regulate air quality, any locomotives of concern can be reported to ARTC to investigate disproportionate or irregular activity via Enviroline on 1300 550 402, which operates 24 hours a day. Since May 2020, the NSW EPA will introduce licensing specifically for rolling stock operators in NSW.

7.2.6 Water quality

Issue

The NSW EPA stated that if the contractor deems that groundwater discharge is necessary, then the proponent would prepare a discharge impact assessment, consistent with section 45 of the *Protection of the Environment Operations Act 1997* (POEO Act). The NSW EPA can be contacted regarding the assessment requirements for this.

Response

Noted. Any discharge of waters during construction and operation of the project would be undertaken in accordance with the requirements of the NSW *Protection of the Environment Operations Act 1997* (POEO Act). Construction techniques would be adopted to minimise groundwater disturbance where practicable. Bridge piling works will adopt cast in-situ techniques that do not require groundwater dewatering. Other non-dewatering techniques, in line with normal construction practice, will be adopted for other infrastructure such as the track foundations, the CSR and the Qenos pipeline if intersection occurs.

7.2.7 Contamination assessment

Issue

NSW EPA requested that the following management plans be provided as part of the proponent's Response to Submissions:

- Asbestos Management Plan
- Acid Sulphates Soils Management Plan
- Remediation Action Plan (including per- and poly-fluoroalkyl substances (PFAS)))
- Unexpected Finds Protocol (The protocol should include detailed procedure for identifying and dealing with unexpected contamination, asbestos and other unexpected finds and the roles and responsibilities of all parties involved).

Response

Existing contamination within the rail corridor of the project area will be managed through mitigation measures CCT1 to CCT5 (see Table 8.2). The following activities will be carried out prior to construction commencing:

- preparation of a RAP
- additional sampling
- preparation of an acid sulfate soils management plan (ASSMP) and AMP
- manual collection of identified asbestos surface fragments.

It is noted that while concentrations of PFAS was reported in soil samples collected near Southern Cross Drive, the concentrations were below the relevant criteria for commercial/industrial land uses (refer to Section 8.1 in *Technical Report 5 – Contamination Assessment*). Therefore, no remediation of PFAS contaminated soil is expected to be required.

These plans are developed with the detailed design and would require input from the contractor relating to the preferred construction methodology. Therefore these have not been prepared as part of this response to submissions. The plans and/or other supporting documents will be provided to the NSW EPA as required.

An unexpected finds procedure will be prepared prior to commencement of enabling works and included as part of the SWMP (see mitigation measure CCT10 Table 8.2) and the site environmental management plans for the enabling works. This procedure would identify the process to follow in the event that indicators of contamination are encountered during construction (such as odours, ACM or visually contaminated materials).

Issue

The NSW EPA made recommendations for conditions of approval relating to management of contamination. The NSW EPA recommends the proponent to:

- prepare a Construction Soil and Water Management Plan.
- engage an NSW EPA accredited site auditor, adhere to the management measures accepted by the Auditor, use certified consultants, submit all report to the NSW EPA
- follow the processes outlined in State Environmental Planning Policy 55 – Remediation of Land (SEPP55).
- ensure the proposed development does not result in a change of risk in relation to any pre-existing contamination on the site and notify the NSW EPA under section 60 of the Contaminated Land Management Act 1997 for any contamination identified which meets the triggers in the Guidelines for the Duty to Report Contamination.

Response

Several mitigation measures have been proposed in the EIS and refined in section 8.2 of this report to manage contamination during construction and operation of the project, which will be adhered to. The mitigation measures have been developed to consider the project and site specific potential environmental impacts which have been anticipated as a result of the assessment conducted to inform the EIS.

Mitigation measure CWQ1 (see Table 8.2) outlines that a Soil and Water Management Plan would be developed to manage soil and water risks during the projects main construction works, including risks associated with encountering existing and potential soil contamination (refer to Section 12.6.1 of the EIS).

The management of contamination would be carried out under the supervision of a suitably qualified and experienced contamination consultant, and in accordance with plans specified in mitigation measures CCT1 to CCT10 (see Table 8.2).

As the Botany Rail Duplication project is a duplication of an existing rail line, sources of contaminants are already likely to be present and entering the receiving environment and the proposed development is not expected to result in a change of risk in relation to any pre-existing contamination on the site. Reporting and processes would be carried out as required by SEPP55 and the *Contaminated Land Management Act 1997*. It is considered that a site auditor is not necessarily required by SEPP55, as the land is not going to be redeveloped for a more sensitive land use.

7.2.8 Waste

Issue

NSW EPA noted that the development should comply with standard requirements regarding waste management.

Response

Site Management Plans will be prepared for the enabling works and a CEMP will be prepared for the main construction works. These plans will outline how waste and resources will be managed and minimised. This will include classification of waste streams in accordance with the *Waste Classification Guidelines (EPA, 2014*) and the following:

- applicable resource recovery orders and exemptions including the existing 'The Australian Rail Track Corporation excavated material order 2019' and 'The Australian Rail Track Corporation excavated material exemption 2019'
- waste identification, handling and segregation procedures
- proposed waste reuse, recovery and recycling and disposal measures
- waste tracking, record keeping and reporting requirements.

Mitigation measures CRW2 to CRW5 (see Table 8.2) and ORW1 (see Table 8.3) relate to management of waste.

7.3 Transport for NSW

7.3.1 Traffic – construction traffic management

Issue

Transport for NSW noted the following concerns in relation to construction traffic:

- Works that have the potential to impact on the operations of the road network require a Construction Traffic and Transport Management Plan (CTTMP). The CTTMP needs to be developed and to consider gate access, detour routes, responsibilities, haul routes. This should involve advice from stakeholders and agencies and be approved by Transport Management Centre (TMC) prior to the commencement of works.
- Pedestrian/Cycle Traffic detours need to be approved by or agreed to by TMC prior to implementation. Alternative routes need to be of a similar standard and meet all Disability Discrimination Act 1992 (DDA) requirements including safety and lighting.
- Consultation should be made with Sydney Coordination Office and other key stakeholders such as Transport for NSW and Sydney Airport to co-ordinate weekend road closures.

Response

Ongoing consultation with key stakeholders through detailed design, construction and operation of the project will continue, including in seeking traffic and access approvals required. Mitigation measure CTT1 (see Table 8.2) states that a CTTAMP will be prepared for the main construction works and relevant mitigation measures will form part of the site EMPs for the enabling works. This will include a notification and consultation strategy with the public and relevant authorities/stakeholders.

ARTC understands that the existing Mascot Area Projects Coordination group, established and overseen by the Sydney Coordination Office, will regularly convene throughout early works and main construction to address project interface issues. This would include the cumulative traffic impact of concurrent projects within the area, such as Sydney Gateway road project, WestConnex St Peters Interchange and this project. ARTC intends to attend the Mascot Area Projects Coordination group to coordinate with other projects in the area, including weekend road closures and cumulative traffic impact.

Mitigation measures CTT5, CTT6 and CTT7 (see Table 8.2) outline the measures to be taken to manage road closures and detours during the construction phase.

Mitigation measures CCT2 and CTT6 (see Table 8.2) are provided to manage active transport safety and facilities including safety around construction site access and appropriate detours.

The community and stakeholder engagement plan (refer to section 8.1) will identify people, organisations and government authorities to be consulted during the works and set out the procedures and mechanisms for consulting with relevant councils and government authorities.

7.3.2 Parking – construction

Issue

Transport for NSW requested that all staff parking should be accommodated on-site to minimise the impact to the local residential and business community.

Response

Mitigation measure CCT4 (see Table 8.2) aims to manage parking for construction workers. This measure requires the following:

- maximise parking at each site and compound
- encourage carpooling/cycling/public transport
- providing shuttle buses between off-site parking locations
- providing shuttle buses between the two main on-site compounds and smaller construction compounds.

As detailed in section 7.6.5 and section 8.3.1 of the EIS, where space is available, parking would be provided for construction workers within the construction compounds and work areas within the existing rail corridor. Further development of the proposed areas for parking would be determined during detailed design by the construction contractor. Where possible, carpooling (or other forms of shuttle transportation) would be used to move construction workers from the main construction compounds to the smaller compounds and individual work areas. The construction contractor would restrict the use of on-street parking around compounds and work sites for both the projected workforce and construction vehicles at all times. As such, the impact on the demand and availability of existing on-street parking in the vicinity of the construction sites and compounds is expected to be negligible.

7.3.3 Noise – operation

Issue

Transport for NSW requested an assessment of operational noise impacts on existing residences surrounding the Botany Line, Metropolitan Freight Network (MFN) and Southern Sydney Freight Line. Transport for NSW advised that ARTC should consider noise impacts across their broader rail network, resulting from the proposed capacity upgrades on the Botany Line.

Response

The project is one of a number of initiatives proposed to improve freight rail transport from Port Botany through the Sydney Metropolitan Freight Network in response to a growing economy and policy objectives to increase the rail modal share for container freight. Each project will consider potential noise impacts generated from that project.

The scope of *Technical Report 2 – Noise and Vibration Impact Assessment* covered the approximate area where physical works associated with the project would occur, extending around 500 m in either direction to the north and south of the rail corridor. The western extent of the study area extends to near Alexandra Canal in Mascot and the eastern extent finishes to the south of the Stephen Road bridge in Botany. This is considered sufficient for the purposes of the assessment and the nature of the works proposed for this project.

Issue

Transport for NSW recommended conditions of approval to DPIE. This included:

- quantifying rail noise levels at residences on an ongoing basis
- treatments (either at premises or at lineside) to existing residences exposed to high levels of freight rail noise
- investigating treatments to rolling stock and track to reduce rail noise at source
- working with planning authorities and local councils to ensure rail noise is properly addressed in the design of future developments near ARTC's Botany Line.

Response

Operational impacts to sensitive receivers as a result of the project, including residences, were assessed in *Technical Report 2 – Noise and Vibration Impact Assessment* and summarised in section 9.4 of the EIS. The assessment quantified rail noise through consideration of the following operational aspects of the project:

- increased train speeds through the project site, which increases rail noise levels adjacent to the project and also increases the resulting occurrence and noise level of trains going around curves
- a higher volume of trains predicted to use the project site
- the new track being closer to certain receivers. This is generally limited to receivers to the south of the alignment near Myrtle Street in Botany.

An ONVR will be prepared to confirm the noise and vibration impacts from the project and to define the mitigation measures used to control the impacts. Implementation of noise mitigation source controls, path controls and/or receiver controls, where feasible and reasonable, will be determined during detailed design. The ONVR will be prepared in consultation with affected stakeholders and the community and is outlined in mitigation measures ONV1 and ONV2 (see Table 8.3).

The mitigation measures proposed in the EIS and refined in section 8.2 of this report will become part of the various management plans. There will be ongoing monitoring and auditing to confirm compliance and environmental performance outcomes for the project. This process will be managed by an independent environmental representative, as described in section 8.1.

Noise levels quantified in EIS can be considered for existing and future developments, residential or other receivers such as commercial. Any new developments would likely be subject to the *Department of Planning NSW (2008) Development near rail corridors and busy roads – interim guideline*. ARTC is often invited to comment on development applications from Councils.

ARTC is not responsible for the management or operation of rolling stock (trains and wagons) along the Botany Line. Train services are currently, and would continue to be, provided by a variety of operators who utilise the ARTC network to transport goods. ARTC will continue to work closely with its customers about issues that may be associated with their trains and wagons, including noise impacts. Existing operations are currently managed in accordance with requirements as per the existing EPL 3142 and are outside of the scope of the project. While ARTC does not have the authority to regulate noise impacts from wagons, any locomotives of concern can be reported to ARTC to investigate disproportionate or irregular activity via Enviroline on 1300 550 402, which operates 24 hours a day. From May 2020, the NSW EPA has also introduced licensing specifically for rolling stock operators in NSW. These are likely to include locomotive noise emission criteria.

Issue

Transport for NSW raised the concern that an assessment of noise impacts from braking freight trains associated with the proposed line duplication is not included in *Technical Report 2 – Noise and Vibration Impact Assessment*. Transport for NSW also noted that the noise and vibration impact assessment suggested brake noise/wagon bunching may occur around chainage 10.000 kms to 11.000 kms where speed changes from 45 km/h to 30 km/h.

Response

Validation noise loggers were deployed for two weeks near to the project to capture the various sources of freight noise in the project area, which includes braking, bunching, horns, etc. The analysis of the existing noise data included consideration of potential braking/bunching/horn noise, however, the investigation found that these sources did not significantly contribute to the measured levels (which were controlled by wheel-rail noise, including curving noise, and exhaust noise) and did not require specific corrections in the noise model to account for them.

The future operational impacts from the project have been reassessed using an updated speed profile for the project alignment, which has reduced rates of acceleration and braking in the north-western portion of the project area (refer to Appendix D). On this basis, and when considering trains are not required to stop in passing loops in the project area as part of typical operations, bunching/braking noise is not expected to be a significant contributor to future noise levels in the project area.

Issue

Transport for NSW noted that modern track lubrication systems are recognised as a cost-effective means of minimising curve noise. Transport for NSW also noted that it had identified a greater noise reduction than that stated in section 8.3.1.1 of the *Technical Report 2 – Noise and Vibration Impact Assessment*. It therefore requested that the applicant be conditioned to carry out track lubrication in combination with other at-source treatments such as improved wagon steering to reduce the noise levels.

Response

Track lubrication will be provided as part of the project. The lubrication system was discussed in section 6.4.2 of the EIS. The assumed benefit of the recommended track lubrication system was based on a detailed review of the available Transport for NSW literature and the assumed noise reduction is considered achievable and realistic in context with the project-specific limitations and track configurations. This literature review considered numerous studies to identify the more likely or average results and did not base predicted results on the study showing the greatest noise reduction.

ARTC is not responsible for the management or operation of rolling stock (trains and wagons) along the Botany Line. Train services are currently, and would continue to be, provided by a variety of operators who utilise the ARTC network to transport goods. ARTC are unable to influence or control bogie steering. ARTC will continue to work closely with its customers about issues that may be associated with their trains and wagons, including the ongoing management of emissions. While ARTC does not have the authority to regulate emissions from locomotives, any locomotives of concern can be reported to ARTC to investigate disproportionate or irregular activity via Enviroline on 1300 550 402, which operates 24 hours a day. From May 2020, the NSW EPA will also introduce licensing specifically for rolling stock operators in NSW.

7.3.4 Noise – monitoring and mitigation

Issue

Transport for NSW requested the following in relation to noise monitoring and mitigation:

- A noise monitoring program needs to be in place prior to the commencement of the project operation.
- The Applicant shall submit for the approval of the Secretary prior to operation, justification supporting the appropriateness of the location for rail noise monitoring, including details of any alternative options considered and reasons for these being dismissed.
- A rail noise monitoring system should be installed on a tight radius curve near sensitive receivers to continuously monitor the noise from rail operations on the Botany Line including performance of track lubrication over time.
- The Applicant shall provide an annual report to the Secretary with the results of monitoring for a period of 10 years, or as otherwise agreed with the Secretary. Certificates of calibration in accordance with the relevant standards and the monitoring results shall be publicly accessible on an ARTC website.

Response

An ONVR would be prepared to confirm the operational noise and vibration impacts from the project and to define the mitigation measures used to control the identified noise and vibration impacts due to operation of the project. The ONVR would be prepared prior to the commencement of the project operation. Generally it would:

- be based on the operational noise and vibration objectives identified in *Technical Report 2 – Noise and Vibration Impact Assessment*
- confirm the predicted operational noise and vibration impacts at the surrounding receivers based on the final design, through a monitoring program
- review the suitability of the operational noise mitigation measures identified below and any other measures which may be considered appropriate to manage additional impacts identified as a result of design changes and include the timing of implementation
- include a consultation strategy to seek feedback from directly affected landowners on the noise and vibration mitigation measures
- define procedures for the management of operational noise and vibration complaints and reporting requirements.

Issue

Transport for NSW raised the concern that section 6.4.2 of the EIS is not consistent with section 8.3.1.1 of the *Technical Report 2 – Noise and Vibration Impact Assessment*, which discusses noise barriers and stated that the feasibility and reasonableness of noise barriers would be considered further as the project progresses.

Response

Section 6.4.2 of the EIS identified mitigation which are known to be feasible for including as part of project, where needed. This includes track lubrication and where track lubrication for noise mitigation treatment would not result in suitable noise mitigation, at receiver treatment measures would be implemented. The final application of appropriate noise mitigation infrastructure would be determined during detailed design.

Technical Report 2 – Noise and Vibration Impact Assessment, section 8.3.1.1 has considered the effectiveness of all noise control mechanisms in accordance with the RING. The RING requires that preference is given to source control measures, followed by path controls. Section 8.3.1.1 recommends further measures to track lubrication and at receiver treatment which may also reduce potential noise impacts. Other considerations such as visual impacts or constructability would need to be considered to identify the feasibility of these options.

The noise and vibration impact assessment states that an ONVR would be prepared to confirm the noise and vibration impacts from the project (based on the final detailed design) and define the operational mitigation measures that would be implemented. This would ensure that the operational mitigation measures would be suitable to effectively control operational noise and vibration impacts. This review may identify further mitigation measures that could be incorporated into the project.

7.4 Environment, Energy and Science Group

7.4.1 Biodiversity – vegetation clearance

Issue

EES recommended that all attempts are made to first avoid and then to minimise the clearing of native vegetation and the urban tree canopy.

Response

Potential impacts to vegetation and biodiversity value have been avoided where possible and minimised through mitigation measures. Section 7.1.1 of the EIS outlined measures taken during the development of the project design to avoid impacts. This included construction compounds and other construction areas being selected to avoid impacts on area of significant ecological communities and species. Where possible these areas have been positioned within previously disturbed areas; such as the use of the current (Roads and Maritime Services) Airport East project site located adjacent to General Holmes Drive. In addition, the space constraints for construction in and around the rail corridor have been considered.

While a realistic assessment of the need to remove vegetation to facilitate construction and operation of the project has been considered in the EIS, mitigation measure CBD4 (see Table 8.2) states that disturbance of vegetation will be limited to the minimum necessary to construct the project. The contractor will design the layout of the work areas to locate infrastructure, where practicable, to previously cleared areas or areas of exotic vegetation to minimise or avoid impacts on native vegetation (and particularly endangered ecological communities (EECs)). Equipment storage and stockpiling of resources will be restricted to designated areas on cleared land. Mitigation measure CBD6 (see Table 8.2) aims to protect vegetation that is to be retained.

Issue

EES raised the concern that the following concerns regarding the new rail bridge over Mill Stream:

- It should be designed to avoid/minimise the clearing/disturbance of native vegetation and the compound site at this location is relocated to avoid removing native vegetation or the impact footprint is reduced.
- To assist in maintaining or improving riparian connectivity and plant growth under the bridge, the bridge design should be an elevated structure and spans the full width of the riparian corridor to avoid, or reduce the need to clear and/or disturb remnant native vegetation along Mill Stream.
- The design should maximise light and moisture penetration under the structure to encourage native plant growth.
- A gap should be provided between the new bridge crossing and the existing bridge to assist in allowing light and moisture penetration under the two structures.

Response

The design for the proposed bridge over Mill Stream has aimed to minimise potential impacts to the existing riparian corridor associated with Mill Stream at this location. The current design of the bridge would include a number of the desired design elements identified by EES including:

- providing an elevated structure that spans the full width of the riparian corridor
- a design which would aim to minimise/disturb existing remnant native vegetation
- maximises light and moisture penetration under the structure to encourage native plant growth through provision of a gap between the new bridge and the old bridge.

The development of the final bridge design, and construction methodology, during detailed design would also aim to minimise potential impacts to existing vegetation and Mill Stream.

Issue

EES supported the rehabilitation of temporarily disturbed riparian areas and recommended that a vegetation management plan is prepared and implemented which provides details on how the riparian corridor is to be protected and rehabilitated.

EES also recommended that any native trees that are required to be cleared are salvaged and placed in the riparian corridor to enhance habitat.

Response

Rehabilitation of disturbed areas has been considered through mitigation measure CBD8 (see Table 8.2) which states that revegetation of riparian areas along Mill Stream, Mill Pond and New Pond following construction will be undertaken by a bush regeneration contractor. Disturbed areas will be stabilised as soon as possible following construction and locally endemic species typical of Swamp Oak swamp forest and Coastal freshwater wetlands will be used to revegetate these disturbed riparian areas. This measure will be included within the CEMP (refer to section 8.1) prior to commencement of the main construction works. There are limited opportunities for ornamental landscaping within the project site due to space restrictions, therefore a landscape plan is not considered necessary.

7.4.2 Biodiversity and landscape – mitigation

Issue

EES recommended:

- conditions of approval to DPIE to mitigate impacts to biodiversity through provision of a landscape plan, tree replacement, and a vegetation management plan
- a plant species list for any landscaping associated should use a diversity of local provenance species (trees, shrubs and groundcovers) from the native vegetation community that occurred in this locality rather than use non-endemic native species and exotic species
- the urban tree canopy and local habitat should be enhanced through replacing any removed trees at a ratio greater than 1:1 of local provenance with enough space to grow to maturity.

Response

Revegetation of riparian areas along Mill Stream, Mill Pond and New Pond will occur following construction using locally endemic species typical of Swamp Oak swamp forest and Coastal freshwater wetlands. Mitigation measure CBD8 has been revised to include preparation of a plant species list for rehabilitation of disturbed areas in proximity to Mill Stream, Mill Pond and New Pond, which will be included in the CEMP and outline the specific species that would be suitable to meet these requirements (see Table 8.2). A minimum 12 month maintenance period would follow the revegetation of Mill Stream riparian areas and any other disturbed areas. This will aim to ensure plants are growing appropriately through the establishment phase. It is noted that this revegetation is not considered landscaping but rather bush regeneration/rehabilitation works, to mitigate potential impacts to biodiversity.

There are limited existing trees within the rail corridor. Trees removed from the rail corridor will not be replaced due to constraints on space and the safety implications that can arise from falling trees and branches. On this basis, tree replacement or offset within the project site is not considered feasible or reasonable for the project.

Similarly, there are limited opportunities for ornamental landscaping within the project site due to space restrictions, therefore a landscape plan is not considered necessary. It is noted that there will be some impact to existing landscaping outside the rail corridor which would be reinstated in accordance with relevant agreements with landowners, however to ensure clarity in this commitment, a mitigation measure has been added (see CLV3 in Table 8.2), which states that, where landscaping is impacted outside the rail corridor during construction, opportunities for reinstatement will be identified (where possible) in consultation with affected property owners to minimise visual impacts.

7.4.3 Flood risk

Issue

EES noted that *Technical Report 6 – Flooding Impact Assessment* concluded that further assessment will be undertaken during the detailed design phase of the project. EES supported the above conclusion and recommends that consultation with impacted residents should also be undertaken in the detailed design phase.

Response

Further flood impact assessment has been carried out since completion of the EIS and is presented in Chapter 4. This concludes that as a result of the proposed design refinements that have been undertaken since exhibition of the EIS (refer to Chapter 4) that the identified residual flooding impacts have been mitigated.

In addition, mitigation measures DFL1 and DFL5 (see Table 8.1) state that a detailed hydrologic and hydraulic (flood) assessment of the impacts of the project on flood behaviour and potential mitigation measures are to be further investigated during detailed design. These mitigation measures are required to mitigate any additional flooding impacts from the project.

The community and stakeholder engagement plan (refer to section 8.1) will identify people, organisations and government authorities to be consulted during the works and set out the procedures and mechanisms for consultation.

7.5 Roads and Maritime Service

7.5.1 Traffic management – approvals

Issue

Roads and Maritime requested the following in relation to approvals:

- Prior to commencing any works within a classified road reserve area, the developer/proponent must obtain Section 138 consent under the *Roads Act 1993* from Roads and Maritime.
- The construction of the bridge works, embankment/retaining structures and all ancillary works over and within the Roads and Maritime corridor (e.g. O'Riordan Street and Southern Cross Drive) shall be in accordance with Roads and Maritime requirements.
- Detailed design plans and checking fee for the proposed works are to be submitted to Roads and Maritime for approval prior to the issue of a Construction Certificate and approval obtained prior to commencement of any road works that impact upon Roads and Maritime road corridors.
- A Road Occupancy Licence shall be obtained from Transport Management Centre for any works that may impact on traffic flows on the surrounding Roads and Maritime road network during construction activities.

Response

As outlined in section 3.3.1 of the EIS, all relevant statutory and other obligations, including consents, licenses, approvals, voluntary agreements required will be obtained at the appropriate time and any associated fees provided. This would include Roads and Maritime requirements, Section 138 consent under the *Roads Act 1993* and Road Occupancy Licences where required.

Additionally, where required, ARTC will provide detailed design plans (and pay associated fees) to RMS for approval and prior to the issue of a construction certificate.

Mitigation measure CTT1 (see Table 8.2) states that a CTTAMP will be prepared for the main construction works and relevant mitigation measures will form part of the site EMPs for the enabling works. This will include a notification and consultation strategy with public and relevant authorities/stakeholders including for elements such as the development of activity specific traffic control plans. It is also acknowledged that some construction works, such as bridge works, embankment/retaining structures and all ancillary works over and within the Roads and Maritime corridor (e.g. O'Riordan Street and Southern Cross Drive) would need to be undertaken be in accordance with relevant Roads and Maritime requirements.

Issue

Roads and Maritime requested that a CTTAMP be submitted as part of the CEMP and that this is to be prepared in consultation with the Sydney Coordination Office, Roads and Maritime and Bayside Council prior to the issue of a Construction Certificate.

Response

Consultation with key stakeholders will be ongoing through detailed design, construction and operation of the project and gaining all approvals required, including issue of a Construction Certificate. Mitigation measure CTT1 (see Table 8.2) states that a CTTAMP will be prepared for the main construction works and relevant mitigation measures will form part of the site EMPs for the enabling works. This will include a notification and consultation strategy with public and relevant authorities/stakeholders.

The community and stakeholder engagement plan (refer to section 8.1) will identify people, organisations and government authorities to be consulted during the works and set out the procedures and mechanisms for consulting with relevant councils and government authorities.

7.6 Ports Authority

7.6.1 Project justification and need

Issue

The Ports Authority noted that:

- The growth of containers on rail is a key objective in Navigating the Future, NSW Ports' 30 Year Master Plan, to sustainably cater for the forecast trade growth. NSW Ports have set a target to move three million TEU per year by rail by 2045 – around 40 per cent of forecast container volumes. To achieve this target critical rail infrastructure projects such as the Botany Rail Duplication need to be completed to improve the efficiency and capacity of the freight rail network. The optimisation of port operations and associated supply chains is vital for the NSW and Australian economy more broadly.
- The Botany Rail Duplication is critical to support the efficient movement of freight to and from the Port and will add value to other infrastructure investments including the St Marys Intermodal and the Cabramatta Rail Loop projects. Given recent developments in the freight rail infrastructure sector such as the Moorebank Intermodal and Enfield Intermodal Logistics Centre, the Botany Rail Duplication is urgently required in order to ensure the efficient operation of the recently completed and proposed freight rail projects.
- The Botany Rail Duplication will alleviate the bottleneck congestion between Mascot and Botany which is currently experienced by trains coming to or from Port Botany. As trade volume grows and more intermodal terminals come online, this single track on the Botany Line will experience further strain. The Botany Rail Duplication is urgently needed to efficiently cater for increased freight rail volume on the rail network.
- The Botany Rail Duplication is a critical freight rail infrastructure project and should be rapidly dealt with by DPIE.

Response

ARTC has noted the high importance of the Botany Rail Duplication to NSW Ports, the freight rail infrastructure sector and the broader economy, as it is critical to efficiently cater for the forecast increased freight rail volume. Accordingly, ARTC has requested that the project be declared as Critical SSI by the Minister based on the project being considered essential to the State for economic, environmental and/or social reasons.

7.6.2 Construction methodology

Issue

The Ports Authority noted that the Botany Line is currently operational 24 hours a day and that the continued 24/7 operation is essential to meet the demand of the supply chain. Rail is a critical component of the supply chain and any increase in the capacity of freight moved by rail to and from Port Botany provides significant improvements to the overall efficiency of the supply chain. The Ports Authority also noted that given the significance of the Botany Line, it is critical that the proposed construction of the Botany Rail Duplication does not impact the existing operation of the line.

Response

Construction of the project would be carefully planned and staged, including taking full advantage of rail track possessions periods, to minimise the potential for disruptions to the operation of the Botany Line (refer to Section 7.3.2 of the EIS). As such, it is anticipated that rail operations would continue on either or both the existing Botany Line or the new track (once built) throughout construction, and the impact to capacity and operation would be minimal (see Table 7.2 of the EIS).

7.7 Bayside Council

7.7.1 Noise and vibration – operation and mitigation

Issue

Bayside Council raised concerns around the increase in noise and vibration impact on the amenity of residents due to an increase in freight movements. Council requested details of proposed mitigation measures to adequately manage the identified impacts on surrounding residents and businesses needs to be provided. Council also requested a detailed scope of works is provided for the proposed location of specific noise insulation mitigation measures.

The noise impacts from altered patterns of locomotive idling during and after completion of the project should be detailed.

Response

Operational impacts were assessed in *Technical Report 2 – Noise and Vibration Impact Assessment* and summarised in section 9.4 of the EIS. The assessment considered the following operational aspects of the project:

- increased train speeds through the project site, which increases rail noise levels adjacent to the project and also increases the resulting occurrence and noise level of trains going around curves
- a higher volume of trains predicted to use the project site
- the new track being closer to certain receivers. This is generally limited to receivers to the south of the alignment near Myrtle Street in Botany.

In order to mitigate potential impacts from operational noise, noise mitigation infrastructure options have been investigated to reduce potential impacts. These include track lubrication systems.

Train motions through curves can cause major damage to wheels and rail, causing a series of impacts such as noise pollution and resulting in increased maintenance requirements and costs. In order to reduce the impact of rail curve damage, track lubricators can be placed ahead of rail curves in the track in order to lubricate the track as a train passes through. The final locations of any proposed track lubricators would be determined during detailed design.

As discussed in section 8.3.1.1 of Technical Report 2, the use of a modern track lubrication system on curves is likely to remove all maximum noise levels triggers within the noise assessment study area. Track lubrication is also expected to reduce the average measured noise levels by up to 1 dB.

An ONVR will be prepared to confirm the noise and vibration impacts from the project and to define the mitigation measures used to control the impacts. Implementation of noise mitigation source controls, path controls and/or receiver controls, where feasible and reasonable, will be determined during detailed design. The ONVR will be prepared in consultation with affected stakeholders and the community and is outlined in mitigation measures ONV1 and ONV2 (see Table 8.3).

7.7.2 Air quality

Issue

Bayside Council requested a description of the impacts of PFAS emissions, and details of proposed mitigation measures regarding the generation and emissions of dust and air pollutants for construction and operation.

Response

There is potential for odorous and pollutant (including PFAS dust) emissions to occur during the construction of the project from the disturbance of contaminated land (refer to section 5.1.1 of the EIS). Previously contained contamination (covered by topsoil) may be agitated resulting in the release of contamination into the air. Identified areas which may have detectable PFAS concentrations in soil are limited to small areas shown in the *Technical Report 5 – Contamination Assessment*, however these concentrations were found below the relevant assessment criteria. PFAS concentrations have been recorded in surface water and ground water samples located near the rail corridor. However, no significant dewatering is anticipated during construction. Therefore the risk of encountering and subsequent management of PFAS impacted groundwater is considered minimal. If the need for significant dewatering is identified during detailed design or construction, further groundwater testing should be undertaken to inform appropriate management and discharge options (refer to mitigation measure CCT6 in Table 8.2).

Dust management measures are considered sufficient to manage dust from areas potentially containing PFAS, however high risk areas will be identified in the site induction so all personnel are aware of the importance of dust management in these areas. Mitigation measure CAQ6 (see Table 8.2) outlines the dust management measure to prevent PFAS becoming airborne and dispersing.

7.7.3 Climate change risk

Issue

Bayside Council raised concerns about potential impacts of climate change and requests the inclusion of tree canopy or non-bird attracting trees to be incorporated into the project.

Response

An assessment of climate change risks was carried out and provided in *Technical Report 16 – Climate Change Assessment* and summarised in Chapter 22 of the EIS. No extreme climate change risks were identified in the climate risk assessment. One high risk was identified in relation to the failure of communications and signalling systems caused by flooding, as a result of an increase in rainfall intensity combined with sea level rise. This risk would be minimised through ongoing design development.

The majority of vegetation being removed for the project is located around Mill Stream. Mitigation measure CBD8 (see Table 8.2) states that revegetation of riparian areas along Mill Stream, Mill Pond and New Pond following construction will be with locally endemic species typical of Swamp Oak swamp forest and Coastal freshwater wetlands.

Trees removed from the rail corridor are not proposed to be replaced due to constraints on space and the safety implications that can arise from falling trees and branches.

7.7.4 Social – construction impacts

Issue

Bayside Council raised concerns regarding construction fatigue faced by residents of Pagewood, Botany and Mascot. Council also requested an impact assessment to occur regarding cumulative impacts of the project for construction fatigue and mitigation measures for the issue.

Response

The potential for construction fatigue was assessed and reported within sections 19.5.2 and 21.5.2 of the EIS. It was identified that in the event project construction occurs after construction of other major developments, there is a potential for the affected community to experience construction fatigue. This is likely to impact the residents and workers in Mascot, who may have the highest exposure to construction related activities from consecutive or concurrent projects in their area. There is potential for these social impacts to be greater on vulnerable groups, who may be more sensitive to changes.

Mitigation measure CSO1 (see Table 8.2) outlines the measures to minimise construction fatigue experienced by residents, businesses and general community members (such as construction respite periods associated with out of standard construction hours works, if required). Mitigation measure CNV2 (see Table 8.2) states that the CNVMP will also consider cumulative construction impacts and the likelihood for ‘construction fatigue’ from consecutive projects in the area and define a suitable management approach.

7.7.5 Traffic – construction

Issue

Bayside Council requested an impact assessment for construction impacts on Bayside Council's roads and the mitigation measures for these.

Response

Section 7.5 of the EIS outlines the proposed routes to be used for heavy and light construction vehicles. The routes have been developed to minimise impacts on residential streets as far as possible, while providing the most direct route to the arterial road network and meeting specific road requirements (such as specified routes for heavy vehicles). These preliminary haulage routes would be reviewed during detailed design and confirmed following appointment of the construction contractor.

The EIS has considered the following principle impacts to council managed roads and the receivers surrounding these:

- Impact to traffic flows and intersections on council roads – see *Technical Report 1 – Traffic and Transport Impact Assessment.*
- Noise impacts from construction traffic – see *Technical Report 2 – Noise and Vibration Impact Assessment.*
- Air quality impacts from construction traffic – see *Technical Report 3 – Air Quality Impact Assessment*
- Social and amenity impacts from construction traffic and changes to access – see *Technical Report 12 – Social Impact Assessment.*
- Risks to health and safety from noise, air quality and the safety use of roads – see *Technical Report 13 – Health Impact Assessment* and *Technical Report 14 – Hazard and Risk Assessment*.

Mitigation measures outlined in section 8.2 provide a range of management measures related to traffic and transport, noise, dust, amenity and safety risks which would minimise impacts to council roads and the receivers surrounding them.

A process for pre-construction and post-construction condition surveys, and rectification of local roads used for construction vehicle routes has been added to mitigation measure CTT1 (see Table 8.2).

Issue

Bayside Council required enforcement penalties to be included in contracts to assure that workers will not park in residential streets.

Response

Mitigation measure CTT4 (see Table 8.2) aims to manage the parking needs for construction workers. This measure requires the following:

- maximise parking at each site and compound
- encourage carpooling/cycling/public transport
- providing shuttle buses between off-site parking locations
- providing shuttle buses between the two main on-site compounds and smaller construction compounds.

The additional control has been added to this mitigation measure:

- develop a parking review protocol for if complaints are received about employees who use on-street parking.

Issue

Bayside Council raised concerns relating to the use of a number of access gates into the rail corridor or compound sites which are located on residential streets. These are Gate 17 Baxter Road, Gate 11 McBurnley Avenue, Gate 11 Banksia Street North, Gate 10 off Begonia Street, Gate 8 Banksia Street South, and Gate 7 Victoria Street. Use of these gates should be restricted to daylight hours and outside of typical school arrival/departure times.

The EIS notes that delivery of material using oversized vehicles is to occur between 12 am and 6 am. The noise associated with these deliveries will need to be managed with the local community. Confirmation is required that residential gates will not be accepting these vehicles.

Response

Section 5.2 of *Technical Report 1 – Traffic and Transport Impact Assessment* provides an assessment of the traffic volumes during AM and PM peak periods for each gate to the project site. The details for the gates on residential roads are provided below.

Table 7.2 Vehicle movements for proposed access gate along the alignment

GATE ID	ACCESS GATE	GATE TYPE	MOVEMENTS PER PEAK HOUR			
			AM peak hour		PM peak hour	
			Light vehicles	Heavy vehicles	Light vehicles	Heavy vehicles
8	Banksia Street (South)	Compound	0	14	18	5
7	Morgan Street (Victoria Street)	Compound	18	14	35	5
9	Banksia Street East	Site	2	4	2	0
10	Bay Street (off Begonia Street)	Site	2	8	2	0
11	McBurney Avenue	Site	6	12	2	0
17	Baxter Road	Site	4	7	2	1

Not all sites/gates would be active throughout the full duration of the construction program as the individual construction activities would have varying durations and schedules.

Due to the nature of the project (duplicating track on an operational rail line, and bridge works) and its location (over busy roads and adjacent to Sydney Airport) some work activities will occur outside of the standard work hours. In particular, construction activities having an impact on the transport network may need to occur outside of the standard work hours and include but are not limited to:

- delivery of materials and plant by oversized vehicles between 12 am and 6 am
- work requiring lane or full road closures which will impact traffic and compromise vehicle, pedestrian and cyclist safety.

Additionally, as described in section 4.5 above, access to Gate 10 and Gate 11 would no longer be required due to the removal of the proposed access tracks that these gates were proposed to provide access to. The reduced impacts associated with this proposed change are described in greater detail in section 4.5.3.

Further details relating to noise impacts from out of hours works is described in section 7.2.2.

Issue

Bayside Council recommended that weekend closures of Southern Cross Drive on the Friday/Saturday night closure are restricted to 12 am–5 am, and the Saturday/Sunday night closure is restricted to 1 am–5 am. Council also requested that proponent monitor and mitigate any 'rat-run' impacts through local streets by motorists avoiding midnight closure congestion.

Response

As noted in section 8.3.3 of the EIS, it is anticipated that any required road closures would typically occur between Monday and Thursday, with the potential that there may be some periods where weekend closures are required (such as to align with a scheduled track possession period).

The final construction methodology for construction of the project, including the requirement for weekend closures of Southern Cross Drive, would be determined during detailed design. However, given the short duration of each available closure, it is critical that sufficient time is provided during each closure to allow for establishment of work sites, undertaking construction works and subsequent demobilisation prior to peak traffic periods commencing after 5 am. ARTC and the construction contractor would continue to consult with Roads and Maritime, Traffic Management Centre and the Sydney Coordination Office regarding the management and timing of any proposed temporary road closures.

Issue

Bayside Council noted the proposed re-routing of traffic for a 54 hour period for up to six times to Robey Street during weekend closures for bridge works is considered unacceptable. The traffic performance appears to increase travel times by up to 20 minutes. Council noted that the re-routing strategy should rely on utilising the broader State controlled road network (in particular Gardeners Road/Botany Road). Only local traffic that has passed through the broader diversion routes should be routed via Robey Street. Council requested that the proponent should consider temporary turn restrictions at other key State controlled intersections to promote the diversion route via State controlled roads. These were the strategies that were deployed for the Commonwealth Games along with a strong communications strategy, which may assist with deterring non-essential traffic from the area.

Response

It is acknowledged that the proposed temporary closure of Robey Street during the construction period would result in increases in travel times for vehicles during these periods. As discussed in section 8.3.2 of the EIS, the proposed closures to Robey Street and O'Riordan Street are required at certain times to conduct construction activities, ensure worker and general public safety, as a result of existing space constraints.

ARTC and the construction contractor would continue to consult with Roads and Maritime, Traffic Management Centre and the Sydney Coordination Office regarding the management of the proposed temporary road closures. This would include consideration of additional traffic restrictions as suggested by Bayside Council and finalisation of proposed public transport detour routes.

Additionally, as identified in mitigation measure CTT7 (see Table 8.2), ongoing public information campaigns would be conducted during construction to allow for early warning to motorists about proposed traffic changes and temporary road closures prior to implementation. Measures recommended by Bayside Council, such as consideration of temporary turn restrictions at key State controlled intersections to promote the diversion route via State controlled roads would also be considered during detailed design.

Issue

Bayside Council raised concerns about the proposed public transport re-routing during weekend closures of Robey Street/O'Riordan Street Bridge. On a weekend Council considered that this would be an unreasonable impact to local residents. Council stated that the preferred option should be 'Option B' with the creation of an interchange stop on that route; and the introduction of a smaller vehicle feeder shuttle service that picks up on the route section that is missed as a result of the diversion.

Response

Section 5.2.2 of *Technical Report 1 – Traffic and Transport Impact Assessment* provides an impact assessment of the proposed road closures of Robey Street or O'Riordan Street. Closure is required to conduct construction activities, ensure worker and general public safety, and ease space constraints (for activities such as moving and erecting new and demolishing redundant bridge structures). A 54-hour weekend closures (from 11 pm Friday to 5 am Monday) would be required to minimise impacts to weekday peak period traffic, and ARTC is currently in consultation with Transport for NSW regarding these proposed temporary closures.

To facilitate the proposed scope of works, approximately 10 weekend road closures over the proposed three-year construction period would be required. Only one of the roads would be closed at one time, resulting in a detour around the closed section of road.

Bus route 400 and 420, which travels along Robey Street, between O'Riordan Street and Qantas Drive, during its outbound (eastbound) route would be directly impacted by the Robey Street weekend closures, requiring a detour to be implemented. Inbound (westbound) bus routes will not be detoured.

ARTC and the construction contractor would continue to consult with Roads and Maritime, Traffic Management Centre and the Sydney Coordination Office regarding the management of the proposed temporary road closures. This would include finalisation of proposed public transport detour routes.

Issue

Bayside Council required clarification about the statement that 'work requiring lane or full road closures which will impact traffic and compromise vehicle, pedestrian and cyclist safety' (Section 5.1.5 of *Technical Report 1 – Traffic and Transport Impact Assessment*) and seeks assurance that vehicle, pedestrian and cyclist safety will not be compromised by construction activities.

Response

The statement 'work requiring lane or full road closures which will impact traffic and compromise vehicle, pedestrian and cyclist safety' provided in section 5.1.5 of *Technical Report 1 – Traffic and Transport Impact Assessment* identified a potential risk from the project prior to mitigation measures being implemented. Having identified these risks, mitigation measures CTT1 to CTT7 (see Table 8.2) have been developed to minimise the risk to vehicle, pedestrian and cyclist safety during construction.

Issue

Bayside Council noted that there was no mention of loaded truck impacts to existing residential street pavements impacted. The proponent is to determine the condition of residential streets and contact Council's asset strategy team to determine an appropriate contribution for road/ pavement damage.

Response

The condition of residential streets to be used as key haulage routes would be assessed prior to construction commencing. Following completion of construction, an additional survey would be undertaken to identify any damage caused by project construction vehicles. Any damaged identified to be caused as a result of the project would be rectified on completion of work or as soon possible to prevent safety issues.

A process for pre-construction and post-construction condition surveys, and rectification of local roads used for construction vehicle routes has been added to mitigation measure CTT1 (see Table 8.2).

Issue

Bayside Council required details of mitigation measures in relation to the statement under the heading 'Local amenity' at page 43 of *Technical Report 1 – Traffic and Transport Impact Assessment*, which states that 'there is potential for a decrease in the local neighbourhood amenity through increased construction traffic along local streets.'

Response

The statement 'there is potential for a decrease in the local neighbourhood amenity through increased construction traffic along local streets.' provided in section 5.2.1 of *Technical Report 1 – Traffic and Transport Impact Assessment* identified a potential risk from the project prior to mitigation measures being implemented. This section also notes that as the volume of construction traffic is low compared to existing traffic volumes, the effects of the temporary increase on the road network is not expected to substantially impact local neighbourhoods in the study area.

Having identified this potential risk, mitigation measures CTT1 to CTT7 (see Table 8.2) have been developed to minimise traffic related impacts during construction.

In addition, the EIS has also identified and assessed the following impacts related to construction traffic:

- Noise impacts from construction traffic – see *Technical Report 2 – Noise and Vibration Impact Assessment.*
- Air quality impacts from construction traffic – *Technical Report 3 – Air Quality Impact Assessment.*
- Social and amenity impacts from construction traffic and changes to access – *Technical Report 12 – Social Impact Assessment.*
- Risks to health and safety from noise, air quality and the safety use of roads – see *Technical Report 13 – Health Impact Assessment* and *Technical Report 14 – Hazard and Risk Assessment*.

Mitigation measures outlined in section 8.2 provide a range of management measures related to traffic and transport, noise, dust, amenity and safety risks which would minimise impacts to amenity.

Issue

Bayside Council noted that where construction vehicles are proposed in residential streets and/or areas where pedestrians are known to cross the road, road safety audits should be conducted prior to implementing the CTTAMP and post-opening (within 24 hrs) of the Traffic Control Plan (TCP) to ensure that issues such as parked cars, signage, children's crossings, driveways, vegetation, cyclists etc are all considered prior to implementation. This requirement should be included in the CTTAMP.

Response

Section 6.2.1 of *Technical Report 1 – Traffic and Transport Impact Assessment* outlines the approach to the management of impacts which includes suitably designed construction site accesses and traffic management to implement safe management of vehicles, pedestrians, public transport, and emergency vehicle accesses through, around or approaching the construction sites. This encompasses design consideration in line with road design guidelines, conspicuous temporary regulatory, warning and guide signs, and use of accredited traffic controllers where appropriate.

Mitigation measures CTT1 to CTT7 (see Table 8.2) have been developed to manage potential safety risks, including identification of requirements for road safety audits as part of the CTTAMP (CTT1).

7.7.6 Traffic – operation

Issue

Bayside Council highlighted opportunities to provide a sustainable transport route alongside the freight line or upgrade existing routes in the surrounding locality should be considered. Council requested for inclusion of shared cycle and pedestrian pathways and green grid connections into the Botany Rail Duplication project.

Response

It is assumed that Council's reference to "sustainable transport route" relates to an active transport route. The opportunity to include an active transport corridor as part of the project was considered during the design and development phase of the project. However, the existing rail corridor was identified to have limited space or space is designated as a maintenance access route, to accommodate an active transport path. Additionally it was not considered to be consistent with the objectives for the project (refer to section 1.2.1 of the EIS). However, the development of the project would not preclude the provision of an active transport path (or similar) by others in the future.

7.7.7 Proposal – response to adequacy review comments

Issue

Bayside Council requested for a response to Bayside Council's queries raised in a letter on 10 September 2019 following a review of the draft EIS during adequacy review, and where these issues were addressed in the EIS.

Response

The issues raised by Bayside Council in the letter to DPIE on 10 September 2019 were considered and addressed, where relevant, during finalisation of the EIS prior to exhibition (see Table 7.3). The purpose of an adequacy review is to gain advice from DPIE as to whether the SEARs have been met.

Table 7.3 Response to Bayside Council's adequacy review of EIS

SUMMARY OF ISSUE RAISED BY BAYSIDE COUNCIL	WHERE AND/OR HOW ADDRESSED IN FINAL EIS
The air quality impact assessment should consider potential impacts associated with PFAS.	The potential air quality impacts associated with PFAS were addressed in sections 5.1 and 7.2 of *Technical Report 3 – Air Quality Impact Assessment*.
The project should consider the inclusion of tree-canopy or non-bird attracting landscaping in the project to improve the micro-climate of the surrounding locality.	The project does not include provision of a tree-canopy or similar landscaping due to space constraints within the existing rail corridor and the safety implications that can arise from falling trees and branches (refer to section 7.7.3).
The EIS should assess opportunities for a sustainable transport route alongside the freight line or whether the project could integrate upgrades to existing sustainable transport routes within the surrounding locality.	The opportunity to include an active transport corridor was considered during the design and development phase of the project. However, the existing rail corridor was identified to have limited space to accommodate an active transport path and was not considered to be consistent with the objectives for the project (refer to section 6.1.2).
The EIS needs more explanation as to how the project meets the provisions of the EP&A Act and EP&A Regulation.	Section 3.2 of the EIS was updated with additional explanation regarding the EP&A Act and EP&A Regulation.
Larger scale plans are required to assess the proximity of the project to existing development.	The scale of the plans provided in the EIS were considered suitable for assessment of the project and to present the findings in a communicable manner.
Technical Report 3 does not specifically address the POEO Act or the *Protection of the Environment Operations (Clean Air) Regulation (2010).*	Section 2.1 of *Technical Report 3 – Air Quality Impact Assessment* was updated to include specific reference to the POEO Act and the *Protection of the Environment Operations (Clean Air) Regulation (2010).*
Incorrect cross-references in the draft EIS.	The cross references were checked and revised in the final EIS and technical reports.

7.7.8 Consultation – construction

Issue

Bayside Council raised the following concerns relating to consultation:

- There should be co-ordination of the multiple construction projects to ensure broader network route shifts can occur.
- Council is to be consulted on the preparation of the traffic management plans to manage impacts on Council assets and local stakeholders.
- Council requests co-ordination with other projects in the area and development of a working group to establish terms of reference.

Response

The potential for cumulative impacts to occur due to multiple projects being constructed at the same time was assessed and reported within section 21.5.2 of the EIS and section 5.4 of *Technical Report 1 – Traffic and Transport Impact Assessment*. Cumulative construction traffic, transport and access impacts may occur if construction on the project occurs at the same time as construction on other nearby projects.

Consultation and collaboration with key stakeholders will be ongoing through detailed design, construction and operation of the project. ARTC understands that the existing Mascot Area Projects Coordination group, established and overseen by Sydney Coordination Office, will regularly convene throughout early works and main construction to address project interface issues. This would include the cumulative traffic impact of concurrent projects within the area, such as Sydney Gateway road project, WestConnex St Peters Interchange and this project. ARTC intends to attend the Mascot Area Projects Coordination group to coordinate with other projects in the area, including weekend road closures and cumulative traffic impact.

Mitigation measure CTT1 (see Table 8.2) states that a CTTAMP will be prepared for the main construction works and relevant mitigation measures will form part of the site EMPs for the enabling works. This will include a notification and consultation strategy with public and relevant authorities/stakeholders. Mitigation measures CTT5, CTT6 and CTT7 (see Table 8.2) outline the measures to be taken to manage road closures and detours during the construction phase. Mitigation measures CCT2 and CTT6 (see Table 8.2) are provided to manage active transport safety and facilities including safety around construction site access and appropriate detours.

The community and stakeholder engagement plan (refer to section 8.1) will identify people, organisations and government authorities to be consulted during the works and set out the procedures and mechanisms for consulting with relevant councils and government authorities. The plan would be developed in consultation with Bayside Council.

Issue

Bayside Council requested that details of swept paths for large trucks using the diversion routes/intersections on Council owned roads are to be submitted to Council for review.

Response

Details of swept paths for large trucks using the diversion routes/ intersections on Council owned roads would be included as part of the CTTMP. The CTTMP would developed in consultation with Council.

7.7.9 Land use and property – construction and operation

Issue

Bayside Council requested further information on such matters as timing and impact on billboards. Council noted that there are a number of Voluntary Planning Agreements (VPAs) being negotiated in relation to public benefit under clause 13 (2) of *State Environmental Planning Policy No 64—Advertising and Signage 2018* (SEPP 64) and the accompanying SEPP 64 guidelines, that will be impacted by the proposed acquisitions. It was therefore important that Council understands the impact on ongoing agreements. Council requested information in relation to:

- when the billboards will be removed and the duration of their removal
- where the billboards will be relocated to
- the approval mechanism for the relocation of the billboards
- a detailed assessment of the proposal's consistency with SEPP 64 and accompanying SEPP 64 guidelines.

Response

A number of large advertising billboards are located within and adjacent to the project site, between Qantas and Joyce drives and the Botany Line. The current track alignment has been developed to mitigate the effects of associated civil and structural elements on the existing billboards, where possible. This design would be further refined during detailed design in order to further reduce impacts on existing billboards where practicable.

As part of the project adjustment to some of these billboards may be required as follows:

- Temporary removal of a number of existing billboards during construction to allow for construction of the new second track and associated structures.
- In consultation with the billboard owner, impacted billboards may be replaced following completion of construction works. Where billboards cannot be relocated within their original location due to space constraints, replacement billboards may be installed within other sections of the corridor. If opportunities for replacement or relocation are not available further consultation with the billboard owner will be undertaken in accordance with relevant legislation.

The strategy during detailed design is defined in mitigation measures DLP4 and DLV3 (see Table 8.1) and would be managed during construction through mitigation measures CLP1 and CLP2 (see Table 8.2).

The criteria in Schedule 1 (Assessment Criteria) of SEPP 64 will be considered further in the design. An additional point has been added to mitigation measure DLP4 (see Table 8.1) to outline this.

Issue

Bayside Council requested further information to be submitted to determine the public land and roads that will be acquired temporarily and permanently as part of this project. Council's preferred method of acquisition would be lease hold for the temporary works with an agreed make good, environmental management, term and compensation. Council also requested detailed information on the anticipated impacts to the following Council owned public open spaces: Botany Aquatic Centre, Booralee Park, Gaiarine Gardens and Garnet Jackson Reserve.

Response

The majority of the project would be constructed and operated within the existing rail corridor or on land for which ARTC has existing access agreements. No public land is required permanently for operation of the project as detailed in section 6.8 of the EIS. During construction some areas of land would be required to be temporarily accessed outside of the current rail corridor to allow for construction of certain aspects of the project. The final extent of temporary land requirements during construction would be determined during detailed design in consultation with the construction contractor. The relevant property owners will be consulted in relation to the acquisition of properties required to facilitate the project.

The following mitigation measures outline the measures to manage the need for temporary use and access to public and private land (see Table 8.2):

- CLP3 – Consultation will be carried throughout construction with the surrounding businesses, the local community and key stakeholders including Bayside Local Council, Sydney Airport and other potentially impacted stakeholders to advise them in advance of proposed works and any temporary access arrangements that may be required.
- CLP4 – Prior to any impact on access, alternative arrangements will be negotiated with the affected parties in order to enable continued access and to minimise disruption as much as reasonably possible.
- CLP5 – Affected property owners and businesses will be provided with advanced notification of relevant project schedules, construction works and changes to access arrangements.

The land and property acquisition process is separate to the EIS process and will be carried out in accordance with the *Land Acquisition (Just Terms Compensation) Act 1991* and the land acquisition reforms announced by the NSW Government in 2016.

Impact to the following reserves and facilities would be minimal and limited to minor reductions in amenity principally due to construction noise, when construction activities are taking place in close proximity. Botany Aquatic Centre, Booralee Park, Gaiarine Gardens; and Garnet Jackson Reserve. No changes to access or land use are predicted.

This is discussed further in section 19.3.4 of the EIS which concludes that prior to mitigation measures being implemented, construction activities would likely affect the amenity of these facilities including temporary increased noise, vibration and dust as well as changes to the visual environment such as views of construction activities and removal of vegetation within the existing rail corridor. This may cause nuisance and reduce some people's ability to utilise the outdoor spaces at optimum function or enjoyment. These sites are, however, already impacted by noise from the airport and adjacent roads. Overall, given the existing amenity of these open spaces, the above changes are expected to result in a minor social impact for users of the reserves.

Mitigation measures outlined in section 8.2 provide a range of management measures to minimise noise, dust and amenity impacts which would minimise these impacts to public facilities near the project site.

7.7.10 Other

Issue

Bayside Council requested details of quality controls in relation to fuel quality to reduce pollution impacts in relation to the Port Authority of New South Wales: Project Update 1 October 2019 Cruise Capacity Newsletter. Council noted that the Port Authority, has released very few details to the public of what the impacts of the cruise ship terminals will be, particularly in relation to traffic and transport impacts. Therefore, Council was unable to adequately assess traffic benefits of the Botany Rail Duplication project without understanding how much of the suggested increased in capacity of the roads being delivered by Botany Rail Duplication will be taken up by traffic requirements of the Cruise Ship terminal.

Response

The primary driver of the project is to increase freight capacity on the Botany Line, as discussed in section 1.3 and to meet expected increases in freight demands over the long term.

ARTC does not have further details relating to the impacts of the cruise ship terminals particularly in relation to traffic and transport impacts.

7.8 Inner West Council

7.8.1 Construction activity influence

Issue

Inner West Council raised concern that the analysis of construction impact should be carried out using a wider study area to determine the likely approach and departure routes of construction traffic, particularly to the west and north-west (e.g. within the Inner West and the City of Sydney Local Government Areas (LGAs)).

Response

The study area for the project was described in section 8.1.2 of the EIS and section 3.1 of the *Technical Report 1 – Traffic and Transport Impact Assessment*. For the purpose of the traffic and transport assessment, a study area (as shown in Figure 8.1 of the EIS) was adopted that incorporated the project site, including a wider area surrounding the project site. The study area identified typically included an area around one kilometre from the project site (with the exception of the Sydney Airport site).

The study area incorporated sections of the surrounding street network that would be used or potentially impacted during the construction of the project (including proposed approach and departure routes for construction haulage routes etc). While it is acknowledged that vehicles movements would typically originate from outside of the study area, the area assessed is considered to be appropriate for the assessment of the proposed impacts associated with the project.

7.8.2 Impact of increased rail movements

Inner West Council requested that more detailed analysis of the proposed increase in rail traffic associated with the project be provided, including:

- noise and vibration
- hours of operation
- air quality, most notably dust and particular pollution
- impact on public health
- potential increases beyond that envisaged within the EIS timeframe.

Inner West Council also suggested that a series of ongoing air quality and noise/vibration monitoring stations be established along the corridor.

Response

The operational noise assessment includes the predicted increase in rail traffic movements from the project. The impacts from the project have been assessed against the requirements of the NSW EPA *Rail Infrastructure Noise Guideline*, at project opening in 2024 and in the design year in 2034.

Section 6.9.1 of the EIS outlined the number of train movements which are proposed following completion of the project. The assessment presented in the EIS, including assessment of noise and vibration, air quality and public health all considered the potential operational impacts of the project (including increased rail traffic) as part of each impact assessment. A range of mitigation measures for each of these issues were presented in the EIS (summarised in section 24.3). It is considered that the assessments for these issues was sufficient to address the potential impacts associated with the increase in rail movements currently expected to occur along the Botany Line in the future.

With respect to the hours of operation, as stated in section 6.9.1 of the EIS, the Botany Line would continue to operate during the existing operational hours. This includes 24 hours per day along the existing Botany Line.

An ONVR will be prepared for operation to confirm the noise and vibration impacts from the project and to define the mitigation measures used to control operational impacts.

Due to design development, the commencement of project construction and subsequent completion will be six months later than the indicative program described in the EIS, however the duration of construction and staging will remain as indicated within the EIS.

7.8.3 Traffic – operational impacts

Issue

Inner West Council requested a more detailed analysis of the impacts of the likely increased heavy vehicle activity around the Enfield intermodal facility that will result from greater dependency on rail freight.

Response

Given the nature of freight transport, direct increase to the forecast delivery demand increases at the Enfield intermodal is not available. While the project has the ability to increase capacity on the existing freight network, the increased capacity is also anticipated to be dispersed among a number of the key intermodal and logistic centres across Sydney, limiting any potential direct impacts to any one intermodal with respect to increased heavy vehicle activity at these locations.

The operational impacts associated with other key intermodal and logistic centres will be managed according to the statutory requirements and planning approval conditions pertaining to each respective facility.

Issue

Inner West Council requested a commitment from the State government to support measures for:

- increased traffic calming
- improved pedestrian safety and amenity
- enhanced local environments
- improved active transport opportunities.

Response

The provision of additional traffic and pedestrian improvements such as traffic calming, active transport and other local environment improvements is considered to be outside the scope of the current project. These works are also not considered to be consistent with the objectives for the project which is to improve the capacity of the existing freight line. The development of the project would not however, preclude the provision of these types of traffic improvements (or similar) being provided by others in the future.

Issue

Inner West Council noted that the project should incorporate active and sustainable transport modes within the rail corridor in addition to legible, user-friendly connections for these users adjacent to the corridor.

Response

The opportunity to include an active transport corridor as part of the project was considered following early engagement during the design and development phase of the project. However, the existing rail corridor was identified to have limited space or space is designated as a maintenance access route, to accommodate an active transport path and was not considered to be consistent with the objectives for the project (refer to section 1.2.1 of the EIS). However, the development of the project would not preclude the provision of an active transport path (or similar) by others in the future.

7.9 Randwick City Council

7.9.1 Traffic – construction

Issue

Randwick City Council raised concern that the analysis of construction impact should be carried out using a wider study area (including the Randwick LGA) taking into consideration likely routes to and from construction sites.

Response

The study area for the project was described in section 8.1.2 of the EIS and section 3.1 of the *Technical Report 1 – Traffic and Transport Impact Assessment*. For the purpose of the traffic and transport assessment, a study area (as shown in Figure 8.1 of the EIS) was adopted that incorporated the project site, including a wider area surrounding the project site. The study area identified typically included an area around one kilometre from the project site (with the exception of the Sydney Airport site).

The study area incorporated sections of the surrounding street network that would be used or potentially impacted during the construction of the project (including proposed approach and departure routes for construction haulage routes etc). While it is acknowledged that vehicles movements would typically originate from outside of the study area including Randwick, the area assessed is considered to be appropriate for the assessment of the proposed impacts associated with the project.

7.9.2 Noise – construction

Issue

Randwick City Council noted that an acoustical assessment and report should be prepared for the proposed development to take into consideration cumulative noise impacts especially during any proposed night time construction works.

Response

As part of the preparation of the EIS, a detailed noise and vibration impact assessment was undertaken (*Technical Report 2 – Noise and Vibration Impact Assessment*). This assessment included a comprehensive assessment of the potential noise and vibration impacts, including cumulative impacts which were discussed in Chapter 7 of the Technical Report (and summarised in section 9.5 of the EIS). This assessment considered potential cumulative impacts during both construction and operation.

For the construction assessment, the project was considered against a number of known developments including:

- Sydney Gateway road project
- WestConnex – New M5
- Qantas Flight Training Centre Relocation
- Airport North
- Airport East
- F6 Extension – Stage 1.

Overall, the cumulative construction noise impacts identified are expected to be relatively minor, with a low likelihood of worst-case noise levels being generated by two different projects at the same time. The main cumulative impact identified was noted as being likely to be associated with a potential increase in the duration of the noise impacts, rather than a cumulative increase in the noise levels themselves. If more than one project occurs in the same area consecutively, there may be a combined effect from the increased duration of impacts on nearby receivers and the associated reduced respite period between consecutive construction works.

Mitigation measures to manage potential cumulative noise and vibration impacts have been developed. This includes measures CNV2 and CNV15 (see Table 8.2). A CNVMP will be prepared that considers cumulative construction impacts and the likelihood for 'construction fatigue' from consecutive projects in the area and define a suitable management approach. Also, the likelihood of cumulative or consecutive construction noise impacts will be reviewed during detailed design when detailed construction schedules are available. Coordination will occur between the various projects to minimise concurrent works (particularly concurrent out of hours work) in the same areas, where possible.

Specific additional management and mitigation measures designed to address potential consecutive impacts will be developed and used to minimise the impacts as far as practicable, in consultation with the affected community.

7.9.3 Traffic – operation

Issue

Randwick City Council noted that the project should incorporate active and sustainable transport.

Response

The opportunity to include an active transport corridor as part of the project was considered during the design and development phase of the project. However, the existing rail corridor was identified to have limited space or space is designated as a maintenance access route, to accommodate an active transport path and was not considered to be consistent with the objectives for the project (refer to section 1.2.1 of the EIS). However, the development of the project would not preclude the provision of an active transport path (or similar) by others in the future.

7.10 Sydney Airport Corporation Limited (SACL)

7.10.1 Consultation

Issue

SACL raised concern regarding the consultation undertaken during the preparation of the EIS, stating that there were no records available of the consultation that was undertaken between ARTC and Sydney Airport Corporation.

Key concerns that Sydney Airport Corporation requested further consultation are summarised below:

- Obstacle Limitation Surface intrusions during construction
- traffic management such as consideration of timing, coordination and management of road closures, construction staging plan, diversion routes
- noise impacts and sleep disturbances
- management of vibration impacts
- operational issues such as transient obstacle condition, lighting and navigation.

Response

Initially, as a landowner and rail operator, ARTC was involved in consultation with SACL as part of RMS's Airport East consultation from mid-2015 (refer to section 4.2 of the EIS). This included discussion regarding approval requirements for permanent Obstacle Limitation Surface intrusion associated with the new bridge at Wentworth Avenue and allowance for transient intrusions associated with future duplicated track between General Holmes Drive and Southern Cross Drive at Botany.

Section 4.2.2 of the EIS (see Table 4.3) identifies that SACL was included as part of the stakeholder briefings for this project conducted during preparation of the EIS. In addition to ongoing correspondence, meetings have included:

- initial project briefing outlining key elements including construction
- combined discussion with Sydney Gateway and SACL
- discussions regarding property use and access
- briefing on the impacts identified during the development of the EIS.

ARTC currently attend the Airport Precinct – Infrastructure Coordination and Operations Workstream meetings. Attendance will continue during construction of the project. In addition, ARTC understands that the existing Mascot Area Projects Coordination group, established and overseen by Sydney Coordination Office, will regularly convene throughout early works and main construction to address project interface issues. This would include the cumulative traffic impact of concurrent projects within the area, such as Sydney Gateway road project, WestConnex St Peters Interchange and this project. ARTC intends to attend the Mascot Area Projects Coordination group to coordinate with other projects in the area, including weekend road closures and cumulative traffic impact.

As identified in section 4.4.1, consultation with the community and key stakeholders, including SACL would be ongoing in the lead up to, and during construction.

7.10.2 Traffic and transport

Issue

SACL raised concerns regarding the proposed parking management for workers during construction. The response noted that the traffic assessment provided as part of the EIS stated that there would be some reliance on existing on-street parking spaces. SACL noted that this would be likely to create impacts for Sydney Airport with regards to congestion, limited parking availability for visitors, workers and support services and places pressure on parking infrastructure.

Response

Where space is available, parking would be provided for construction workers within the construction compounds and work areas within the existing rail corridor. Further development of the proposed areas for parking would be determined during detailed design by the construction contractor. Where possible, carpooling (or other forms of shuttle transportation) would be used to move construction workers from the main construction compounds to the smaller compounds and individual work areas.

It is expected that the construction contractor would restrict the use of on-street parking around compounds and work sites for both the forecast workforce and construction vehicles at all times. As such, the impact on the demand and availability of existing on-street parking in the vicinity of the construction sites and compounds is expected to be negligible. This is discussed further in section 7.6.5 and section 8.3.1 of the EIS.

As per mitigation measures CTT1 and CTT4 (see Table 8.2), potential impacts on parking would be managed through the CTTAMP. In particular, CTT4 notes that impacts on on-street parking would be managed through measures such as:

- maximising parking at each site and compound
- encouraging carpooling/cycling/public transport
- providing shuttle buses between off-site parking locations
- providing shuttle buses between the two main on-site compounds and smaller construction compounds
- development of a parking review protocol in the event complaints are received relating to workers using on-street parking.

Issue

SACL raised concern that road closures to accommodate bridge works would likely increase travel times to and from Sydney Airport, increase local road network congestion and require greater time allowances for public transport and motorists.

Response

Closure of some streets during construction, in particular Robey Street (between Qantas Drive and O'Riordan Street), O'Riordan Street (between Qantas Drive and Robey Street) and Southern Cross Drive would be required at some times during construction of the project to conduct construction activities, ensure worker and general public safety, and as a result of space constraints (for activities such as moving, demolishing and erecting new bridge structures over these streets) (refer to section 8.3 of the EIS). While the construction methodology will be further refined by the contractor, it is unlikely that all works could be undertaken safely without full closures of each road.

In order to minimise potential impacts, only one of the identified roads would be closed at any one time, resulting in detours around the closed portion of road (as described in section 8.3 the EIS for each road). Additionally, it is acknowledged that traffic generated by Sydney Airport may peak at different times to typical peak times, however given that the capacity of large arterial roads experience high traffic at typical peak times, undertaking such closures outside weekend periods would result in much further reaching impacts and would unlikely reduce the impact on traffic localised to Mascot and within proximity of Sydney Airport.

While it is acknowledged that each closure would result in some traffic impacts (in particular to travel times), ARTC, and the nominated construction contractor would continue to consult with Roads and Maritime, Traffic Management Centre and the Sydney Coordination Office regarding the proposed temporary closures and identification of appropriate management measures to minimise disruptions including (refer to management measures CTT1 and CTT7 in Table 8.2):

- implement suitable traffic management during closures to manage and guide motorists at the approaches and through or around the work sites
- selection of bus detour routes that minimise impacts on punctuality of bus services and public transport accessibility to the community
- public information campaigns prior to closure to allow for early identification of temporary road change impacts.

Issue

SACL stated that further justification was required regarding the approach undertaken for traffic modelling used as part of *Technical Report 1 – Traffic and Transport Impact Assessment* including the application of different models for various aspects of the project. SACL also requested additional clarity be provided regarding key assumptions used in the modelling. In particular, this included the difference between the software used in the modelling of the closure of Robey Street and O'Riordan Street, which used SIDRA, and the modelling for the impacts at Southern Cross Drive, which used a micro-simulation model (AIMSUN).

Response

For the purpose of traffic assessment for the project, the Sydney Gateway Operational Traffic Model was developed using the AIMSUN modelling platform. This AIMSUN model covered Sydenham along the Princess Highway and M5 south of Sydney Airport as well as Wolli Creek and Mascot areas for the weekday AM and PM peak periods.

Modelling for the project construction was separately developed using SIDRA intersection software to conduct the quantitative assessment of capacity and potential delay at key intersections that may be affected by redistributed traffic due to the closure of Robey Street and O'Riordan Street.

The SIDRA intersection modelling software package was used for the assessment of impacts during the weekend road closure periods because:

- the wider road network (AIMSUN) models only assessed the weekday peak hours. It was therefore determined to be more effective to develop the network model on a smaller scale with additional traffic count surveys on weekends
- the assessed eight intersections were closely located, so the SIDRA network model would be more suitable to understand the interaction of queues between intersections.

For the Southern Cross Drive closure scenario, AIMSUN was selected as a modelling tool since the study section of the Sothern Cross Drive was included as part of the Sydney Gateway model.

As part of the assessment, additional traffic modelling was undertaken which assessed the impact of the proposed closure of Southern Cross Drive during rail construction and the impact on the adjoining intersections during night time on typical weekdays and weekends. As the main focus of this assessment was the difference in travel time along the key detour routes rather than operational performance at key intersections, a microsimulation model was used to quantitatively assess the travel time and intersection performance affected by the proposed closure of Southern Cross Drive.

Issue

SACL stated that further justification was required regarding the approach to assessment of construction traffic impact, particularly the decision not to carry out a quantified assessment of potential impacts.

Response

As described in section 3.2 of the *Technical Report 1 – Traffic and Transport Impact Assessment*, both qualitative and quantitative assessment approaches were undertaken.

A qualitative assessment was utilised of 'typical' construction stages. Construction vehicle activity during these periods was identified as being typically low and therefore a qualitative assessment was considered to be appropriate to assess the potential impacts. These activities would occur over an extended duration of time (throughout the construction period of 2021 to 2023). The overall number of construction vehicles in typical weekday peak periods would be approximately between 20 and 150 at key intersections. As the anticipated construction traffic volume was low compared to existing traffic volumes, the effects of the temporary traffic increase are not expected to be significant in the project area. This methodology was also consistent with the assessment approach undertaken as part of the Sydney Gateway road project. In addition, the Secretary's Environmental Assessment Requirements (SEARs) issued by the DPIE did not specify the requirement for preparation of a quantitative assessment of potential traffic impacts. Therefore, it was considered that a qualitative assessment for 'typical' construction stages of the project was appropriate.

In addition to the assessment of 'typical' construction stages along the overall project alignment, a quantitative assessment was undertaken for 'temporary road or lane closure' construction stages. These activities were comprehensively quantified and assessed using detailed traffic modelling. Due to the potential impact of these works on key transport corridors within the study area (such as Southern Cross Drive), the potential impacts were deemed appropriate to warrant qualitative assessment. It is noted that the main construction works for Botany Rail Duplication project will commence in year 2021 and construction works will be carried out in different phases. However, for the purpose of this assessment a conservative approach has been adopted by assuming that all construction works will start at the same time. The year 2022 was selected as the assessment year. The tested scenario represents a future 2022 road network including any planned network upgrades (i.e. Airport North and Airport East Upgrade projects) completed up until that year.

Issue

SACL raised concern that the information presented in *Technical Report 1 – Traffic and Transport Impact Assessment* underestimated existing traffic volumes. These concerns are summarised below:

- low construction volumes were applied
- the conclusion that a qualitative assessment approach is appropriate does not recognise that the existing road network is highly congested.

Response

The traffic volumes presented in the EIS and *Technical Report 1 – Traffic and Transport Impact Assessment* was based on available data from survey data collected in June and September 2018. This information is considered to be representative of the existing traffic volumes in the area and was suitable for the assessment of potential traffic impacts.

Issue

SACL raised concern that traffic volumes and cumulative impacts associated with the consideration of the Sydney Gateway road project construction had not been taken into account as part of the assessment.

Response

Cumulative impacts associated with the construction of the Sydney Gateway road project and this project was discussed in section 5.4 of the *Technical Report 1 – Traffic and Transport Impact Assessment*. This concluded that construction of the Sydney Gateway road project is likely to increase the overall level of traffic using the existing road network. It is expected that construction of the Sydney Gateway road project would increase the potential impact and duration of the traffic delays and other impacts experienced by drivers and pedestrians/cyclists.

This assessment approach was generally consistent with the assessment undertaken as part of the Sydney Gateway road project.

In addition, ARTC currently attend the Airport Precinct – Infrastructure Coordination and Operations Workstream meetings. Attendance will continue during construction of the project. In addition, ARTC understands that the existing Mascot Area Projects Coordination group, established and overseen by Sydney Coordination Office, will regularly convene throughout early works and main construction to address project interface issues. This would include the cumulative traffic impact of concurrent projects within the area and on Airport traffic.

Issue

SACL requested further detail be provided regarding proposed lane closures during construction, including proposed timing and the nature and location of the proposed closures.

Response

Further detail regarding proposed lane closures during construction, including proposed timing and the nature and location of the proposed closures would be developed during detailed design once the nominated construction contractor has been determined.

While it is acknowledged that proposed lane closures would result in some traffic impacts (in particular to travel times), ARTC, and the nominated construction contractor would continue to consult with Roads and Maritime, Traffic Management Centre and the Sydney Coordination Office regarding the proposed temporary closures and identification of appropriate management measures to minimise disruptions including (refer to management measures CTT1 and CTT7 in Table 8.2):

- implement suitable traffic management during closures to manage and guide motorists at the approaches and through or around the work sites
- selection of bus detour routes that minimise impacts on punctuality of bus services and public transport accessibility to the community
- public information campaigns prior to closure to allow for early identification of temporary road change impacts.

As identified above, ARTC would continue to attend the Airport Precinct – Infrastructure Coordination and Operations Workstream meetings. In addition, ARTC understands that the existing Mascot Area Projects Coordination group, established and overseen by Sydney Coordination Office, will regularly convene throughout early works and main construction to address project interface issues. This would include the cumulative traffic impact of concurrent projects within the area and on Airport traffic. Considerations include Sydney Gateway road project, WestConnex St Peters Interchange and this project. Attendance at the Mascot Area Projects Coordination group to coordinate with other projects in the area will continue throughout construction, including in planning for weekend road closures and consideration of cumulative traffic impact.

7.10.3 Noise and vibration

Issue

SACL raised concern that noise modelling indicated construction noise levels for hotels at Sydney Airport and the Qantas Flight Training Centre have the potential to exceed 20 dB(A) during several construction stages. Concern was also raised that the EIS did not provide sufficient consideration regarding how potential construction noise impacts would be mitigated for these receivers.

Response

The anticipated noise levels and exceedances of the noise management level (NML) relate to noise levels anticipated immediately outside the premises of hotels and the existing Qantas Flight Training Centre, was discussed in section 9.3.2 of the EIS. This section discusses the existing noise environment of which these hotels are currently placed. The ambient noise environment is currently influenced by airport operations, proximity to main roads and the existing Botany Line. The hotels within the study area have been recently constructed, therefore it is expected that the facade of the new hotels would be high performing, which would likely reduce the potential airborne construction noise impacts to receivers inside those hotels. Regardless, mitigation measures were developed assuming no improvement to façade performance.

A comprehensive list of general mitigations measures that would be used to minimise noise from the project are contained in *Technical Report 2 – Noise and Vibration Impact Assessment,* Table 24.2 of the EIS and included in section 8.2 of this report. These measures include items such as using quieter construction equipment, non-tonal reversing alarms, shielding stationary noise sources and using silencers on mobile plant.

Additional project specific construction mitigation measures based on the predicted impacts are also detailed in Technical Report 2 and include:

- preparation of a Construction Noise and Vibration Management and Out of Hour Work Protocol
- restricting noise intensive works to the daytime where possible. If it is not possible to restrict the works to daytime then they will be scheduled so noise intensive equipment is not used after 11:00 pm, where possible, noting that there is a requirement for many of the works to be completed during possessions and restrictions on working hours during these periods are generally not feasible
- providing shielding, such as hoarding, where receivers are near to compounds or worksites with long-term works
- optimising the layout of compounds to minimise noise emissions
- consulting with all hotels within 50 metres of the project area to determine their sensitivity to noise impacts (e.g. through understanding existing façade performance in reducing noise) and to determine appropriate criteria and mitigation requirements
- completing monitoring at the start of noise intensive activities near to receivers to confirm the actual levels.

Issue

SACL raised concern that vibration from construction of the project had the potential to cause cosmetic damage to SACL structures along Qantas and Joyce Drive, as well as cause discomfort for employees and visitors to Sydney Airport. SACL noted that dilapidation surveys of relevant structures should be undertaken prior to and following construction.

Response

Building condition surveys have been recommended to be completed before and after the works where buildings or structures are within the minimum working distances and considered likely to exceed the cosmetic damage criteria during the use of vibration intensive equipment. Appropriate criteria would be confirmed for each item before the works begin, based on the surveys.

Mitigation measures CNV11 to CNV14 (see Table 8.2) manage potential vibration impacts. Where works are required within the minimum working distances and considered likely to exceed the cosmetic damage criteria:

- different construction methods with lower source vibration levels will be investigated and implemented, where feasible
- attended vibration measurements will be undertaken at the start of the works to determine actual vibration levels at the item. Works will be ceased if the monitoring indicates vibration levels are likely to, or do, exceed the relevant criteria.

The potential human comfort impacts and requirement for vibration intensive works will be reviewed as the project progresses. Where receivers are within the human comfort minimum working distances, the impacts would be managed with the procedures defined in the project's CNVMP.

The community and stakeholder engagement plan would detail the approach to communication between ARTC and its Construction Contractors, the community and government authorities. Site environmental management plans for the enabling works and the CNVMP for the main construction works would provide detail, where relevant on:

- how community consultation would be completed in accordance with the Stakeholder and Community Engagement Plan
- details on how respite would be applied where ongoing high impacts are seen at certain receivers
- community notifications
- procedures for handling complaints
- details on how respite would be applied where ongoing high impacts are seen at certain receivers.

Issue

SACL noted that operational noise level triggers are likely to be exceeded at sensitive receiver locations, at times to a significant degree. Concern was raised that the assessment relied on assumptions about timing of the relocation of Qantas Flight Training Centre and existing noise attenuation at airport hotels, noting that further consideration of noise mitigation measures should be undertaken, including the consideration of at-source options such as at-received measures or noise barriers.

Concern was also raised that the EIS did not provide sufficient consideration regarding how potential operational noise impacts would be mitigated.

Response

The operational impacts from the project have been assessed against the requirements of the RING. The RING contains criteria for rail infrastructure upgrade projects and requires mitigation to be investigated where a project results in exceedances of the criteria. Noise levels from the project have been predicted and feasible and reasonable noise mitigation has been recommended for all receivers which are identified as being above the noise criteria.

An Operational Noise and Vibration Review (ONVR) would be prepared to confirm the noise and vibration impacts from the project and to define the mitigation measures used to control the identified noise and vibration impacts due to operation of the project. The ONVR (see measure ONV1, Table 8.3) would be prepared in consultation with affected stakeholders and the community and would be made publicly available once complete. It is anticipated that the effectiveness of the façade of affected receivers may be further understood through this consultation process. It will consider the receivers at that point in time including the relocation of Qantas Flight Training Centre, particularly given that this new facility hadn't been approved at the time of the assessment which informed the EIS.

The recommended noise mitigation includes a track lubrication system to reduce curving noise. Noise barriers would also be investigated further during detailed design. Where residual impacts are apparent, at-property treatment would be discussed with impacted residents, which aims to achieve suitable internal noise levels by increasing facade performance of items such as glazing and door upgrades.

Issue

SACL stated that the noise source levels included in Table 22 of *Technical Report 2 – Noise and Vibration Impact Assessment* appeared to be incorrect and underestimated the of operational noise impacts that may occur as a result of the project. SACL requested confirmation of the sources provided in the report and that updated assessment be undertaken if required.

Response

The source levels used in the assessment presented in *Technical Report 2 – Noise and Vibration Impact Assessment* are taken from the NSW rail noise database and validated by literature. The operational noise model validates this data through onsite noise monitoring and the validation results reflect the accepted tolerances. This confirms that the inputs to the model are valid.

Issue

SACL stated that the operational noise impacts appeared to be lower than expected. Concern was also raised that there were errors in the noise model, inputs and presentation of results at Sydney Airport receivers which were understated. SACL requested that a review and confirmation of modelling, assumptions and presentations be provided.

Response

As outlined in Section 4.4.3 of *Technical Report 2 – Noise and Vibration Impact Assessment*, the model has been validated and is performing as expected and is valid for predicting rail noise levels for the project.

Increases in noise level differ significantly between receivers depending on location, proximity to curves and other track features, train speeds and notch setting on the adjacent track, along with other parameters such as topography which form part of the modelling.

Issue

SACL raised concern regarding the omission of locomotive wheel squeal as part of the noise model used as part of the *Technical Report 2 – Noise and Vibration Impact Assessment*. Concern was raised that this may lead to an underestimation of noise impacts from this source on adjacent receivers.

Response

The noise impact assessment presented in *Technical Report 2 – Noise and Vibration Impact Assessment* notes that the operational noise model validated well and within the accepted tolerances, except at one location (V02) for maximum noise levels. This location was next to a particularly tight curve and a small number of trains were observed to result in higher levels of wheel squeal in comparison to other curves in the study area.

Location V02 is in a commercial area adjacent to Qantas Drive where noise sensitivity is generally low and the nearest residential receivers are over 200 metres away. The model predicted maximum noise levels at the six other validation locations, which are much closer and more representative of the nearest residential receivers to the project.

Issue

SACL raised concern that *Technical Report 2 – Noise and Vibration Impact Assessment* did not specifically consider ground-borne noise impacts on airport hotels and the Qantas Flight Training Centre during operation. It was requested that further consideration of ground-borne noise impacts be undertaken to assess specific impacts at Sydney Airport receivers.

Response

The assessment has predicted operational ground-borne noise levels to receivers in the study area, with reference to the RING. The RING does not specify criteria for hotels so residential criteria have conservatively been applied on the assumption that they may have staff who reside permanently on site.

The RING internal residential ground-borne noise criteria are 40 dB for the daytime and 35 dBA at night, with both being required to be assessed against the L_{ASmax} acoustic parameter.

The ground-borne vibration/noise assessment methodology is detailed in Section 4.5 of *Technical Report 2 – Noise and Vibration Impact Assessment*.

As the project would move trains to be further away from the existing Qantas Flight Training Centre, and trains would not be able to travel faster on the track adjacent this location due to the presence of tight radius curves, no additional ground-borne noise or vibration impacts at this receiver are expected as a result of the project.

The new Qantas Flight Training centre was assessed in section 5.9 and section 7.1.2.3 of *Technical Report 2 – Noise and Vibration Impact Assessment*, which included consideration of maximum noise levels. Additional assessment of operational noise has been carried out (see Appendix C) to provide greater detail on ground-borne noise. This identified that ground-borne noise impacts are likely to exceed the RING residential criteria at the Stamford Plaza Hotel during the night-time. The extent of the ground-borne noise impacts inside the hotel would depend on the performance of the existing building facades and the amount by which high external airborne noise levels are attenuated. It is expected that the Stamford Plaza Hotel would have high performance facades due to high existing noise levels near the airport, meaning rail related ground-borne noise may be perceptible inside the hotel at times when ambient noise levels are low.

Issue

SACL raised concern that *Technical Report 2 – Noise and Vibration Impact Assessment* only utilised a qualitative approach for the assessment of cumulative construction noise between the project and Sydney Gateway road project.

Response

Information regarding the finalised construction methodology and impacts from Sydney Gateway road project were not available at the time of writing *Technical Report 2 – Noise and Vibration Impact Assessment* and therefore a qualitative assessment was the only approach available.

Concurrent impacts at Sydney Airport are expected to be relatively minor from the two projects and would likely be dominated by the much closer Sydney Gateway road project if works were being completed in the same area on both projects. The likelihood of cumulative or consecutive construction noise impacts will be reviewed during detailed design when detailed construction schedules are available. Coordination would occur between the various projects to minimise concurrent works (particularly concurrent out of hours work) in the same areas, where possible.

Issue

SACL raised concern that *Technical Report 2 – Noise and Vibration Impact Assessment* did not adequately assess the potential cumulative impacts associated with operation of both the project and the proposed Sydney Gateway road project. SACL noted that consideration needed to be given to the combined operational noise impacts, particularly focusing on identification of sources and management approaches to address noise contributions from numerous sources.

Response

Cumulative operational impacts are difficult to assess because operational noise from different types of transportation (i.e. road and rail) have different characteristics and result in different annoyance responses from affected communities. In addition, a quantitative cumulative assessment cannot be completed without the full noise modals, assumptions and construction details for both projects. This data was not available at the time of writing *Technical Report 2 – Noise and Vibration Impact Assessment*. *Technical Report 2 – Noise and Vibration Impact Assessment* provided a qualitative cumulative assessment in regard to cumulative impacts that noted that in the area around NCA01 and NCA03, the Sydney Gateway road project may also result in operational road traffic noise impacts on similar receivers to Botany Rail Duplication. Where elements of both projects occur in the same location, there is potential for operational mitigation measures to be required for both projects at the same receivers. The final operational mitigation strategy for each project should consider its impacts with the aim of maximising the benefit provided by the mitigation from both projects in a pragmatic way.

7.10.4 Air quality

Issue

SACL noted that the information presented in the EIS did not provide sufficient information to determine whether the ambient air quality criteria would be met at Sydney Airport as a result of concurrent operation of the project and the Sydney Gateway road project. Further specialist consideration including potential modelling is required to address the potential for significant air quality impacts on Sydney Airport receivers during concurrent operation of the Sydney Gateway road project and the Botany Rail Duplication project. Given the complex atmospheric chemistry responsible for the generation of nitrogen dioxide (NO_2) it is not possible to simply add contributions from two different sources (without more detailed analysis).

Response

Section 10.5 of the EIS provided a discussion on the potential cumulative air quality impacts associated with the project and other identified projects during both construction and operation.

The project and Sydney Gateway road project air quality assessments assessed cumulative impacts by including measured background pollutant concentrations but did not explicitly assess potential cumulative impacts from both the road and rail projects together. The results reported in the air quality assessments prepared for each project are 100th percentile worst case predictions for NO_2, as required by NSW EPA guidance (Approved Methods (EPA, 2016)). By definition, this is the highest predicted hourly NO_2 concentration in the modelled year. It is unlikely that worst case 100th percentile results from both projects would occur at the same time due to different source locations and source characteristics and that the worst-case air quality impacts from both projects would occur at different locations at any one time.

Worst case air quality impacts from the Sydney Gateway road project were predicted to be localised near major roadways. Air quality impacts from the project were predicted to be localised within proximity to the rail corridor. The location where the potential air quality impacts from two projects are in close proximity and could therefore result in the potential highest cumulative impacts is on Joyce Drive. As discussed below in 'One hour NO2', maximum cumulative impacts are not anticipated to exceed the criteria at Sydney Airport or anywhere else in the assessment area.

A worst-case screening assessment for the key identified pollutant NO_2, is provided below. Predicted operational air quality impacts associated with both projects for all other pollutants are well below applicable ambient air quality criteria and as such the worst-case scenario during operation of both projects is highly unlikely to exceed the applicable ambient air quality criteria. Consequently, no further investigation was considered necessary.

One hour NO_2

The assessment process requires adding predicted NO_2 concentrations to the background measured NO_2 concentrations for every hour in the year, to determine the highest concentration. This screening assessment considered the predicted results from the 2026 Sydney Gateway road project and the predicted results for 2024 for the project combined.

The maximum predicted incremental one hour NO_2 concentration from the Sydney Gateway road project for the 2026 year was 95.6 µg/m^3 (2026-WPC). The maximum predicted cumulative one hour NO_2 concentration from the project for the 2024 year was 138 µg/m^3 (includes background concentration). This results in a cumulative one hour NO^2 concentration of 233.6 µg/m^3 which is below the assessment criteria of 246 µg/m^3. It is unlikely the maximum road impact would occur in the same hour of the year as the rail impact but these have been added together in order to be conservative.

The maximum predicted incremental one hour NO_2 concentration from the Sydney Gateway road project for the 2036 year was 54.0 µg/m^3 (2036-WP). The maximum predicted cumulative one hour NO_2 concentration from the project for the 2034 year was 166 µg/m^3 (includes background concentration). This results in a cumulative one hour NO_2 concentration of 220 µg/m^3 which is below the assessment criteria.

It should be noted that the above screening assessment considered the maximum predicted concentrations regardless of where they occurred. It is unlikely that maximum worst case impacts from both projects would occur at the same location in the same hour.

Annual NO_2

A screening assessment for cumulative annual NO_2 is provided below.

The maximum predicted incremental annual NO_2 concentration from the Sydney Gateway road project was 13.4 µg/m^3 (2026-WPC) (sourced from page 6-79 of the *Sydney Gateway Technical Working Paper 4 – Air Quality*).

The maximum predicted incremental annual NO_2 concentrations from the project was 25 µg/m^3 (sourced from Table 6.7, page 34 of the projects *Technical Report 3 – Air Quality Impact Assessment*).

Assuming a background annual NO_2 concentration of 15.8 µg/m^3 (sourced from *Technical Report 3 – Air Quality Impact Assessment*), this results in a cumulative predicted annual NO^2 concentration of 54.2 µg/m^3. This cumulative predicted is below the assessment criteria of 62 µg/m^3.

Therefore, based on the screening assessment above, cumulative air quality impacts from the Sydney Gateway road project in combination with the project is considered unlikely.

7.10.5 Contamination

Issue

SACL noted that *Technical Report 5 – Contamination Assessment* identified and presented the entire Sydney Airport site as an area of environmental concern (AEC 4) based on a limited number of PFAS-contamination data points. SACL raised its concern related to the potential reputational issue that this may result in for stakeholders associated with the Sydney Airport.

Response

Based on the former and current activities undertaken within the Sydney Airport site, the Sydney Airport site was identified as a potential area of environmental concern (AEC), which may have existing soil and/or groundwater contamination in close proximity to the project site. The use of the term ‘AEC’ does not necessarily mean that the site is contaminated or a potential health concern, and therefore should not be interpreted as such, but rather indicates areas that should be considered in the contamination assessment as potential sources of contamination. Moreover, while it is unlikely that the whole of the Sydney Airport is contaminated, without undertaking extensive testing within Sydney Airport land, the exact areas of contamination cannot be determined. Therefore, a conservative approach was adopted for the EIS, where the land boundary was used for the boundary of the AEC, as presented in Chapter 6 of *Technical Report 5 – Contamination Assessment*.

Issue

SACL noted that the contamination assessment (Technical Report 5) committed to the preparation of a Remediation Action Plan (RAP) regarding known and potential areas contaminated with asbestos. SACL requested clarification regarding what remediation responsibility would fall to, or if a commercial arrangement exists, between ARTC and SACL to address this issue.

Response

Technical Report 5 – Contamination Assessment, outlines the assessment that determined that the soil contamination identified in the eastern portion of the project site was sufficient to warrant remediation to mitigate the risk of contamination exposure to future users of the rail corridor.

As described in section 10.2 of the Technical Report, a RAP would be prepared for Area 1 (consisting of the rail corridor south of Southern Cross Drive) in accordance with *National Environment Protection (Assessment of Site Contamination) Measure 1999*.

This location is within the rail corridor and refers to RailCorp land, not SACL Land. ARTC would be responsible for the preparation and management of the RAP.

The extent of project activities on SACL land is limited to construction access, laydown areas for plant and equipment and compounds. There are no permanent works on SACL land. Relevant commercial arrangements and approvals will be obtained as appropriate.

7.10.6 Groundwater

Issue

SACL noted that the proposed groundwater monitoring locations identified within the *Groundwater Impact Assessment* (Technical Report 7) within Sydney Airport land would require necessary arrangements to be made between ARTC and SACL for establishment and operation of monitoring as well as data sharing.

Response

It is noted that some of the proposed groundwater monitoring wells (as identified in Appendix A of *Technical Report 7 – Groundwater Impact Assessment*) are located within Sydney Airport land. Where monitoring locations are proposed within Sydney Airport Land, ARTC would liaise with Sydney Airport regarding any approvals required and to ensure that all requirements are met.

7.10.7 Landscape and visual

Issue

SACL stated that the *Landscape and Visual Impact Assessment* (Technical Report 11) did not consider the visual impacts during construction of the project on airport hotels within Sydney Airport land, noting that this may have negative commercial implications.

Response

Technical Report 11 – Landscape and Visual Impact Assessment presented a comprehensive assessment of potential visual impacts that would potentially occur during construction. This included consideration of five landscape view point locations between Robey Street and General Holmes Drive (refer to section 4.2.4 of the Technical Report). These were selected as representative to a range of receivers in proximity to the project.

Of these viewpoints, Viewpoint 4 is considered to be consistent with the potential impacts that would be expected to the airport hotels within Sydney Airport land. This viewpoint provided an assessment similar to that of the views currently experienced by airport hotels within Sydney Airport land (looking south in comparison to north).

The assessment of this viewpoint noted that there are several hotels in Mascot in the vicinity of the site. In general, these views offer elevated views across the existing rail corridor Qantas and Joyce Drive and surrounding areas. In these views, the rail corridor can be seen adjacent to an existing surface carpark, and is lined with a mix of trees and shrubs. Assessment of Viewpoint 4 noted that construction activities would be visible from the viewpoint, and that construction of the project would result in a moderate adverse visual impact during the temporary construction period.

This assessment is considered to be consistent to what would be expected from airport hotels within Sydney Airport land. Given the nature of the visual impacts as viewed from an elevated location, limited mitigation measures were available to mitigate potential impacts.

Issue

SACL noted that *Technical Report 11 – Landscape and Visual Impact Assessment* did not consider the visual impacts of the project on advertising structures both in and outside Sydney Airport during construction phase, in particular the assessment of obstruction of sightlines towards these structures.

Response

Technical Report 11 – Landscape and Visual Impact Assessment presented a comprehensive assessment of potential visual impacts that would potentially occur during construction. This included consideration of the removal of existing advertising signage within Mascot. The removal of existing advertising billboards as part of the project (both temporary and permanent) was considered where relevant as part of each of the viewpoint assessments presented in sections 5.2, 5.3, 6.2 and 6.3 of the Technical Report. Technical Report 11 states that the views towards some billboards being retained during the construction works, may be partly obstructed by construction equipment, such as plant and cranes, at times. It also states that the works would introduce a construction character that would extend across much of the view for which the billboards are an integral part.

Section 6.6 of the EIS, identified the billboards proposed to be retained during construction, in addition to number of the existing billboards that would be temporarily removed during construction. For the billboards that are not proposed to be temporarily removed, it is expected that there would be limited obstruction of these structures during construction as a majority of the proposed works would be undertaken behind these structures. Economic or commercial impacts to these structures is therefore considered to be minimal.

Additionally, where billboards are proposed to be temporarily removed, mitigation measure CLP1 (see Table 8.2) also notes that the removal, and reinstatement of billboards would be undertaken in consultation with land owners and billboard owners.

Changes required to billboards will be developed during detailed design as described in section 6.6 of the EIS, when the following will be defined:

- when the billboards will be removed and the duration of their removal
- where the billboards could be relocated to if they cannot be reinstated like for like.

7.10.8 Social

Issue

SACL noted that *Technical Report 12 – Social Impact Assessment* identifies that the project would have adverse social and business impacts in relation to noise and additional travel time/congestion of road network. SACL raised concern that the assessment did not specifically consider social and business impacts on Sydney Airport, noting that consultation should be undertaken with impacted businesses within Sydney Airport land regarding issues such as construction and operational noise and disruptions to the road network.

Response

While some temporary amenity impacts were identified as part of the project, *Technical Report 12 – Social Impact Assessment* concluded that the construction of the project would also result in additional benefits including:

- direct employment opportunities for skilled workers across Greater Sydney including roles such as engineers, designers and construction workers in the short term
- as an indirect result of the increase in construction workers in the local study area, there may be increased expenditure at local businesses, such as food, beverage and retail services close to the project site. An increase in patronage has the potential to provide increased income generation opportunities to these types of local businesses, benefitting business owners in the short term.

Overall, the project is not expected to result in substantial impacts to existing businesses, including those within Sydney Airport land.

Where required, ARTC would continue to consult with impacted businesses during the subsequent phases of the project.

7.10.9 Hazards and risk (non-airport operation/aviation hazard)

Issue

SACL noted that the identified potential disruptions to utilities and services during construction would be likely to impact services that supply Sydney Airport. SACL noted that consultation and management would be required to ensure essential services supporting the airport are not adversely affected.

Response

The relocation and/or protection of all existing utilities within the project site would form a critical and complex part of the construction process, was described in section 7.2.1 of the EIS.

Where an existing utility has been identified, an interface agreement to identify the required management of the utility during construction and operation will be developed in close co-operation with the utility asset owner. Once finalised, these agreements would be incorporated into the design and delivery of the project. Management of this interface would help ensure relocation and/or protection of utilities can be designed, agreed and constructed in an efficient manner, and ongoing maintenance and access arrangements can be agreed for the construction and operation phases.

SACL will be consulted with regards to the protection of potentially any affected SACL utility during construction of the project. In addition, proposed mitigation measures DHS1 to DHS3 (see Table 8.1) identify additional mitigation measures to minimise the disruption of utility services during construction.

7.10.10 Airport operations

Issue

SACL noted that the project would require some construction activities that would intrude into the Obstacle Limitation Surface. SACL also noted that the EIS did not provide sufficient information about the likely location and times where these intrusions would occur and requested additional information be provided. SACL raised concern regarding whether intrusions into this zone could be practically managed alongside ongoing airport operations.

Response

The methodology and information presented in the EIS was indicative and would continue to be modified and refined as the design and construction planning process continues.

The indicative construction methodology (section 7.1.1 of the EIS) and risk chapter (section 21.3.5 of the EIS) did however identify the types of activities that would likely to cause short term intrusion into the airspace. This included activities such as piling, embankment/retaining wall works and cranes required for bridge construction, as well as any other construction activity where plant and equipment is required to be placed within the Obstacle Limitation Surface zone. The track work and backfilling of the retaining walls would require plant (hi-rail dump trucks, excavators, cranes) that would encroach the Obstacle Limitation Surface. Dump trucks would also be required to operate at full lift while excavators can be operated with height restrictors.

At this stage, it is assumed that activities that intrude the Obstacle Limitation Surface would be required to be undertaken during the scheduled curfew hours for Sydney Airport (between 11 pm and 6 am), noting that permit/approval exemptions would still be required during these periods. Therefore it is assumed that impact to airport operations would be negligible. Where work is required to be undertaken outside of this time, it is expected that ARTC and the construction contractor would consult with Sydney Airport to seek relevant approval exemptions and crane permits (as required) to intrude within the Obstacle Limitation Surface (refer to mitigation measure CHS5, Table 8.2).

The detailed location and times where these intrusions would occur as part of the development of the final construction methodology and program once the nominated construction contractor has been appointed. This would include consultation with SACL (and other relevant stakeholders such as the Civil Aviation Safety Authority) to discuss the proposed timing and relevant approval processes to be followed.

Issue

SACL noted that the airport operations assessment commits to the use of lighting to comply with maximum light intensities but raised concern that the EIS failed to demonstrate how these requirements would be met in practice. It was also noted that further assessment of locomotive lighting distraction risks should be provided.

Response

Flood lighting in the site compounds, which are to operate up to 24 hours a day, dependent on the activities occurring at the time, would be designed to be compliant with the lighting zones requirements for the area surrounding the airport including the provision of light shielding as necessary (see mitigation measure CHS4 in Table 8.2). Further detail is provided in section 21.3.5 of the EIS.

As also detailed in mitigation measure DHS5 (see Table 8.1), lighting associated with operation and maintenance of the rail line, including train headlights, will comply with CASA Manual of Standards 139 section 9.21 and National Airports Safeguarding Framework Guideline E.

Issue

SACL raised concern about the level of assessment undertaken regarding the increased number of freight train movements (by 2030) passing through the Obstacle Limitation Surface as transient obstacles. SACL requested that further assessment and information be provided demonstrating that increasing of freight can be managed acceptably with ongoing airport operations.

Response

It is expected that by 2030, up to 25 additional trains per day, per direction are expected to utilise the Botany Line, as identified in section 6.9 of the EIS. As discussed in *Technical Report 15 – Airport Operations Assessment* it is acknowledged that the increased number of trains would therefore result in an increase in the frequency of transient obstacles.

ARTC would undertake further consultation with SACL, DITCRD, CASA and Airservices Australia (ASA) and other relevant stakeholders to address any potential changes to the transient obstacle conditions currently declared. An approval process may then be required involving consultation with CASA and ASA during detailed design.

Issue

SACL raised concern that the assessment did not adequately consider the impacts of the project on airport communication, navigation and surveillance, requesting that further consideration be undertaken including further engagement with SACL and Airservices Australia.

Response

Each of these issues raised by SACL are considered in section 5.2.9 of *Technical Report 15 – Airport Operations Assessment,* as part of the consideration of the National Airports Safeguarding Framework. Overall, the assessment noted the project would not impact on ongoing airport operations. It was stated that a review of impacts to airport communication, navigation and surveillance would be undertaken during detailed design to ensure that the project would not impact on these elements of airport operations.

8. REVISED MITIGATION MEASURES AND PERFORMANCE OUTCOMES

This chapter provides the approach to environmental management and mitigation for the project. It includes the revised set of mitigation measures for the project.

8.1 Approach to environmental management

The approach to environmental mitigation and management for the project involves:

- avoiding and minimising impacts through ongoing detailed design
- environmental performance outcomes, which have not changed from the EIS
- mitigation measures, which have been revised from the EIS and are consolidated in section 8.2.

A number of systems and documents will inform the detailed construction and operational planning and methodologies to minimise and mitigate potential impacts, including (refer to Chapter 24 of the EIS):

- **Independent Environmental Representative (ER) –** who would review the Site EMPs for enabling works and the CEMP (and associated sub-plans) for the main construction works and act as a key contact point between ARTC and DPIE.
- **Community and stakeholder engagement plan –** that would detail the approach to communication between ARTC and its Construction Contractors, the community and government authorities.
- **ARTC's Site EMPs for enabling works** – that would be based on ARTC's existing Site EMP template and be the primary management plan for works prior to the finalisation and approval of the CEMP.
- **Project specific CEMP** – that would guide the approach to environmental management during the main construction works, including the environmental management practices and procedures to be followed, how the mitigation measures would be implemented and compliance processes. The CEMP will also outline the process for obtaining the relevant statutory and other obligations at the appropriate time, including consents, licenses, approvals, and voluntary agreements.
- **ARTC's environmental management system** – which is an existing structured framework for the management of the operational rail corridor. The management system manages the evaluation, regulatory compliance and reporting of environmental issues.
- **ARTC's Safety Management System (SMS)** – which is an integrated system that manages the safety and environmental risks associated with operating and maintaining ARTC infrastructure. The Asset Management System forms part of the SMS and guides the planning of maintenance works. shows the interaction of the management plans and the key stages of the project.

Figure 8.1 shows the interaction of the management plans and the key stages of the project.

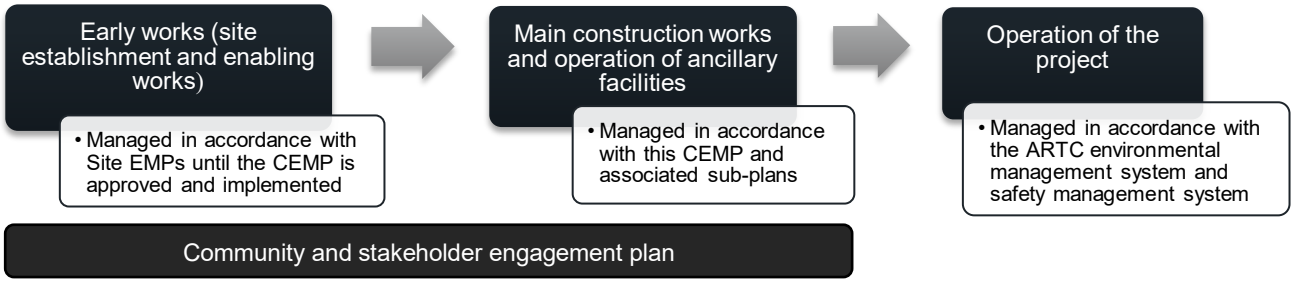


Figure 8.1 Approach to environmental management

8.2 Revised mitigation measures

The list of mitigation measures presented in Chapter 24 of the EIS has been updated with consideration given to the additional assessment work undertaken and the basis of submissions received. Some new measures have been added, and the wording of existing measures has been adjusted. These tables supersede the mitigation measures presented in the EIS. New mitigation measures or additions to existing mitigation measures are shown in **bold, blue** text, with deletions shown with a ~~strikethrough~~.

The measures are broadly grouped according to the main stage of implementation. However, it is noted that the implementation of some measures may occur across a number of stages.

If the project is approved, the project would be undertaken in accordance with the final list of mitigation measures.

Table 8.1 Compilation of revised mitigation measures for detailed design

REF	TOPIC	IMPACT	REVISED MITIGATION MEASURES
DNV1	Noise and vibration	Sleep disturbance from consecutive night-time works	The need for consecutive night-time works and likelihood for sleep disturbance impacts will be reviewed during detailed design. Where impacts are considered likely, appropriate noise mitigation will be developed which takes into consideration factors such as the existing facade performance of affected residential receivers. Appropriate respite will be provided to affected receivers to limit impacts from night-time works in the same location~~, as required by the conditions of approval.~~
DNV2	Noise and vibration	Potential noise impacts on hotels	Further investigation will be completed during detailed design to determine appropriate criteria which take into account the existing facade performance of the affected hotels, noting that most of the hotels are of recent construction and are likely to have high performance facades. Prior to construction, all hotels within 50 metres of the project site will be consulted and assessed to determine their sensitivity to airborne and ground-borne noise impacts, existing facade performance, areas of permanent residence (if any) and to allow appropriate criteria and mitigation to be determined.
DNV3	Noise and vibration	Potential vibration impacts on pipeline assets	The project has the potential to impact a number of pipeline assets during construction. An assessment will be completed in detailed design which will: • calculate the actual distance of the works from the structure • assess ground conditions and the effect this will have on vibration. Where impacts are considered likely, the susceptibility of the various assets to vibration levels and appropriate monitoring and management protocols will be developed in consultation with the relevant owners. Condition surveys will be completed before and after the works where appropriate.
DNV4	Noise and vibration	Noise impacts on the community	In locations where ‘moderate’ or ‘high’ noise impacts are predicted, engagement with the affected communities will be outlined in the community and stakeholder engagement plan and undertaken during detailed design to determine their preference for mitigation and management measures.

REF	TOPIC	IMPACT	REVISED MITIGATION MEASURES
DNV5	Noise and vibration	Operational noise impacts	Investigate operational noise and vibration mitigation options during detailed design, including source control measures, path control measures and receiver controls as per the RING. This will include a review of the: • use of track lubrication as the primary source of noise control for operation noise impacts • feasibility and reasonableness of using noise barriers to provide path control mitigation to nearby receivers, noting the specific constraints that are applicable to this project • need for at-property treatment to be used to mitigate residual impacts at receivers which require consideration of mitigation after the use of source of path control measures. The potential operational noise and vibration mitigation options to be investigated are discussed further in section 8.3 in *Technical Report 2 – Noise and Vibration Impact Assessment*.
DNV6	Noise and vibration	Operational ground-borne noise impacts	Potential ground-borne noise impacts will be investigated further during detailed design when the extent of airborne rail noise mitigation, train speeds, and the position of track turnouts is confirmed.
DFL1	Hydrology and flooding	Rail duplication	As a minimum, the modification and duplication of the existing rail line is to be configured to ensure the existing level of flood immunity is not reduced by the project. Measures to improve the existing level of flood immunity are to be further investigated during detailed design with the goal of providing a 1% annual exceedance probability (AEP) level of flood immunity.
DFL2	Hydrology and flooding	New bridge over Mill Stream	The new bridge crossing over Mill Stream is to provide a minimum freeboard of 0.5 metres between the underside of the bridge structure and the peak 1% AEP flood level.
DFL3	Hydrology and flooding	System and control network	Rail location cabinets (LOCs) for housing communications, power and signalling equipment for the system and control network will be located a minimum 0.5 metres above the peak 1% AEP flood level in accordance with ARTC standards.
DFL4	Hydrology and flooding	New corridor access roads	A 10% AEP level of flood immunity is to be provided to the new access roads.

REF	TOPIC	IMPACT	REVISED MITIGATION MEASURES
DFL5	Hydrology and flooding	Management of adverse flood impacts on the existing environment (design)	A detailed hydrologic and hydraulic (flood) assessment of the impacts of the project on flood behaviour and the associated measures which are required to mitigate those impacts will be undertaken during detailed design. Works within the floodplain will be designed to minimise adverse impacts on surrounding development (including roads) for flooding up to the 1% AEP event in magnitude. Assessment will also be made of impacts during floods up to the probable maximum flood (PMF) in the context of impacts on critical infrastructure and flood hazards. Subject to the flood assessment during detailed design, it may be necessary to collect detailed ground survey (including floor levels and entry levels to buildings and basement carparks) in affected areas to determine whether the project will increase flood damages in adjacent development (i.e. in properties where there is a potential for increases in peak flood levels for events up to 1% AEP in magnitude) or increase the flood hazard to basement carparks (i.e. in basement carparks where there is a potential for increases in the frequency, rate and volume of flow into basement carparks for events up to the PMF). The design of the project will need to incorporate measures that are aimed at mitigating the impact of the project on flood behaviour in properties where existing buildings will experience above-floor inundation during floods up to the 1% AEP event, or where there is the ingress of floodwater to basement carparks during storms up to the PMF. Drainage structures will be sized and positioned more precisely during detailed design to mitigate these impacts. Localised increases in flow velocities at the outlets to upgraded or relocated, or new stormwater drainage systems will be mitigated through the provision of scour protection and energy dissipation measures
DWQ1	Water quality and soils	Formation failure	The formations and integrated drainage will be designed to prevent formation failure. This will include designing the longitudinal drainage to direct surface water runoff away from formations.
DWQ2	Water quality and soils	Soil erosion	Batter slope gradients, surface treatments and the construction program will be designed to minimise erosion risk so the annual sediment export rate is below 150 m^3 at each outlet to avoid the need for sediment basins in accordance with the Blue Book.
DWQ3	Water quality and soils	Use of water during construction	Requirements for construction water (volumes, quality, demand curves, approvals requirements and lead times) will be defined during detailed design.
DWQ4	Water quality and soils	Potential scour and erosion impacts	Suitably designed scour and erosion control measures will be included in the detailed design where required, including at the Mill Stream drainage outlets.
DWQ5	Water quality and soils	Potential scour and erosion impacts	The detailed design of Mill Stream bridge will be optimised to minimise upstream or downstream scour effects on the existing watercourse.

REF	TOPIC	IMPACT	REVISED MITIGATION MEASURES
DWQ6	Water quality and soils	Groundwater impacts	A baseline groundwater monitoring program will be implemented to characterise baseline groundwater conditions as per Chapter 8 of *Technical Report 7 – Groundwater Impact Assessment*.
DNH1	Non-Aboriginal heritage	Avoidance of heritage impacts	Impacts to significant fabric, locally and State significant archaeological remains and landscapes (including trees, plantings and public recreation areas) within and adjacent to the project site will be avoided, where possible. Designs will also endeavour to reduce visual impacts by considering sympathetic and unobtrusive fabric, colour, form and size for new built elements. Appropriate impact avoidance measures will be considered during the detailed design phase and included in the Construction Environment Management Plan (CEMP) for the project where required.
DNH2	Non-Aboriginal heritage	Heritage Interpretation	A Heritage Interpretation Plan (HIP) including a heritage interpretation strategy will be prepared in accordance with the *NSW Heritage Manual, the NSW Heritage Office's Interpreting Heritage Places and Items: Guidelines* (NSW Heritage Office, 2005), and the *NSW Heritage Council's Heritage Interpretation Policy* (Heritage Council of NSW, 2005). The HIP will focus on the study areas historic development and target items considered to contain heritage significance within the project site including: • Mascot (Botany Road) Underbridge • Mascot (O'Riordan Street) Underbridge • Mascot (Robey Street) Underbridge • Botany Rail Line and its associations with the development of industry and land use in the Botany and Mascot areas. The HIP will be prepared in consultation with: • Bayside Council • NSW Heritage Council • Randwick and District Historical Society.
DLP1	Land use and property	Property acquisition	The overall disturbance footprint will continue to be refined during detailed design to identify areas where it could be minimised to reduce impacts on existing land uses. Detailed staging of the project will also be determined during detailed design and will aim to minimise the time that affected land uses are impacted during construction.
DLP2	Land use and property	Property acquisition	The relevant property owners will be consulted in relation to the acquisition of properties required to facilitate the project. All acquisitions required for the project will be carried out in accordance with the *Land Acquisition (Just Terms Compensation) Act 1991* and the land acquisition reforms announced by the NSW Government in 2016.

REF	TOPIC	IMPACT	REVISED MITIGATION MEASURES
DLP3	Land use and property	Establishment of compound sites within private property	Temporary occupation of required site compounds will be negotiated under legal agreement with property owners. On completion of the project, the land will be returned to the owners for continued future use.
DLP4	Land use and property	Billboard modification/ relocation	The overall disturbance footprint will be refined during detailed design to identify areas where the footprint could be minimised to reduce impacts on billboards and to minimise modification or relocation where possible. **Where modification or relocation of billboards is proposed, the criteria in Schedule 1 (Assessment Criteria) of *SEPP 64 – Advertising and Signage* will be considered in the design of the modified or relocated billboards.**
DLV1	Landscape character and visual amenity	Landscape character and visual impact of proposed retaining walls	Proposed retaining wall finishes will be selected to align with the projects urban design and landscaping principles and aim to minimise adverse visual impact. These treatments will be aligned with the urban design concepts of the Sydney Gateway road project between O'Riordan and Robey Streets.
DLV2	Landscape character and visual amenity	Landscape character and visual impact of proposed bridges	The proposed twin bridges at Robey and O'Riordan Streets and Southern Cross Drive will be designed to minimise visual clutter. All bridges will incorporate measures to discourage graffiti.
DLV3	Landscape character and visual amenity	Landscape impact from relocation of Billboards	As a priority, billboards will be replaced like for like. Where they cannot be replaced like for like they will be shifted in space to allow like for like placement on a new location in immediate vicinity of their current location. Where they cannot be placed in their immediate vicinity, they will be relocated along the existing rail corridor and combined with existing structures (such as bridges) where practicable in order to minimise potential to introduce structures in areas where there are minimal structures and infrastructure (i.e. clustering instead of introducing impacts on higher sensitivity areas).
DRW1	Resources and waste	Spoil generation	Measures to minimise excess spoil generation will be investigated at detailed design. This will include a focus on optimising the design to minimise spoil volumes and the reuse of material on-site.
DHS1	Risks, health and safety	High pressure flammable material released from pipeline	Independently facilitated AS 2885.6 SMS workshops will be completed with each high pressure pipeline owner and the construction contractor. The SMS workshops will be conducted once design has reached a level that enables completion of a compliant AS 2885.6 process. This level is considered to be detailed design and will be completed before construction relating to the relevant utilities commence.

REF	TOPIC	IMPACT	REVISED MITIGATION MEASURES
DHS2	Risks, health and safety	Disruption of utility services	The location of key utility infrastructure which relate to the project site and proposed construction works will be identified and documented in the relevant design drawings and reports, prior to construction works commencing.
DHS3	Risks, health and safety	Disruption of utility services	Details of proposed works for key utilities, such as relocate or protect will be confirmed prior to construction works commencing.
DHS4	Risks, health and safety	Wind shear and turbulence due to new constructions in the vicinity of the airport	Based on the current design, detailed windshear assessment is not warranted. Consultation with Sydney Airport Corporation Limited is required to confirm any need for detailed assessment in accordance with *National Airports Safeguarding Framework Guideline B* during detailed design.
DHS5	Risks, health and safety	Light glare distracting and confusing Sydney Airport aircraft pilots	Lighting associated with operation and maintenance of the rail line, including train headlights, will comply with CASA Manual of Standards 139 section 9.21 and National Airports Safeguarding Framework Guideline E.
DHS6	Risks, health and safety	Rail and train heights infringing the Sydney Airport obstacle limitation surface	The rail alignment has been designed in conjunction with the protected airspace associated with Sydney Airport to minimise the intrusions into the airspace. Consultation with Sydney Airport Corporation Limited will be undertaken during detailed design on the final rail alignments and heights. Consultation with Airservices Australia will be undertaken during detailed design for assessment of any required updates to the ERSA.
DHS7	Risks, health and safety	Wildlife strikes to Sydney Airport aircraft due to increased wildlife activity in the vicinity of the airport	Drainage and revegetation has been designed so as not to create high risk environments for attracting additional wildlife. Any changes to the drainage or revegetation design made during detailed design will ensure that no high risk environments for attracting additional wildlife are created.
DHS8	Risks, health and safety	Cumulative impacts on utility services (Sydney Gateway road project)	Co-ordination of utility relocations will be considered before enabling works commence.

REF	TOPIC	IMPACT	REVISED MITIGATION MEASURES
DCC1	Climate change	Climate change resulting in a range of potential impacts on the asset that can be mitigated through design	Measures to mitigate any extreme, high and medium climate change risks will be further refined and included in the detailed design to ensure there are no residual extreme or high climate risks, and minimise medium risks where practicable. The following potential measures will be considered: • designing drainage systems to consider the increase in rainfall intensity due to climate change • locating new rail systems infrastructure above predicted climate change flood levels, where practicable • placing cable routes outside climate change flood inundation zones where feasible • adjusting the neutral point when specifications are prepared for the stressing of steel rail to account for likely temperature variations and increases in average maximum temperatures • selecting equipment that is resilient to the projected temperature changes over its design life • designing ventilation systems for signalling equipment rooms/location cases to account for increased temperatures due to climate change • connecting to existing system at the site where UPS changeovers are provided to bridge power supply when changing from electricity network to critical infrastructure back-up supply to reduce risk of power failure • limiting outside exposure of cables where possible, ensure the installation of surge protection and provide a redundant power source to reduce likelihood and impacts of lightning strikes to exposed cables • reducing the number of signalling cabinets to reduce the amount of exposed cabling.

Table 8.2 Compilation of mitigation measures during construction

REF	TOPIC	IMPACT	MEASURES	ENABLING WORKS	MAIN CONSTRUCTION
CTT1	Traffic and transport	General management of traffic during the project	Implementation of Construction Transport, Traffic and Access Management Plan (CTTAMP) for the main construction works. As a minimum, the CTTAMP will include: • identification of haulage routes • notification and consultation strategy with public and relevant authorities/stakeholders • special event and emergency services management • parking restrictions • protocol for monitoring cumulative traffic impact • **Pre and post-construction surveys of local road pavement conditions to identify any potential damage caused by heavy vehicles, and processes for rectification (as appropriate)** • **Requirements for post-construction road safety audits**. The CTTAMP will also consider cumulative construction impacts and define a suitable management approach. The CTTAMP will not be created for enabling works, however the relevant mitigation measures will form part of the site EMPs.		✓
CTT2	Traffic and transport	Localised vehicular, pedestrian, cyclists and public transport management around site accesses	Provide suitably designed construction site access which will consider: • road design guidelines • visible temporary regulatory, warning and guide signs • use of accredited traffic controllers where appropriate • provision of deceleration lanes at accesses abutting highly trafficked roads.	✓	✓
CTT3	Traffic and transport	Increased heavy vehicles in the road network	• Administrative controls to limit truck activities during peak periods. • Implement radio communication and designated truck idling areas to minimise impact of truck queuing on public roads. • Temporary traffic controls.	✓	✓

REF	TOPIC	IMPACT	MEASURES	ENABLING WORKS	MAIN CONSTRUCTION
CTT4	Traffic and transport	On-street parking management	• Maximise parking at each site and compound. • Encourage carpooling/cycling/public transport. • Providing shuttle buses between off-site parking locations. • Providing shuttle buses between the two main on-site compounds and smaller construction compounds. • **Develop a protocol to review the approach to management of worker parking in the event complaints are received relating to workers using on-street parking.**	✓	✓
CTT5	Traffic and transport	Public transport services travel time	• Consultation with service providers to develop alternative service arrangements. • Notification to the general public prior to implementation of service changes. • Changes to services during possessions.		✓
CTT6	Traffic and transport	Active transport facility closures and diversions	• Ensure appropriate detours such as maintaining access on at-least one side of the road. • Provide safe access across site gates.		✓
CTT7	Traffic and transport	Reduced accessibility on the road network. Detour can result in increased travel time.	• Manage closures during off-peak periods. • **In accordance with the relevant protocols (for example for Road Opening Licences), consult with Transport for NSW, Traffic Management Centre and the Sydney Coordination Office, regarding the management and timing of any proposed temporary road closures.** • Select a bus detour route that will minimise impact on punctuality of bus services and minimise public transport accessibility impact on the community. • **Temporary turn restrictions at key State controlled intersections to promote the diversion route via State controlled roads would also be considered during detailed design.** • Implement suitable traffic management during closures to manage and guide motorists at the approaches and through or around the work sites. • Public information campaigns. • Truck travel time management.		✓

REF	TOPIC	IMPACT	MEASURES	ENABLING WORKS	MAIN CONSTRUCTION
CNV1	Noise and vibration	Noise generated from enabling activities including billboard removal, utilities relocation, **track slewing** and vegetation clearing and property adjustments	Site EMPs will be prepared before any enabling works begin. Specific to the activities proposed, these plans will include: • identification of nearby sensitive receivers • description of works, construction equipment and hours of work • mitigation measures that apply to the works proposed • criteria for the project and relevant licence and approval conditions • requirements for noise and vibration monitoring • details of how community consultation will be completed in accordance with the community and stakeholder engagement plan • details of how respite will be applied where ongoing high impacts are seen at certain receivers. The requirement for enabling works out of hours will be described in the site EMPs to be approved by the independent Environmental Representative (ER). The Site EMPs will detail: • the proposed activities and predict the potential noise impact against the relevant noise and vibration criteria • the relevant mitigation measures, including consideration of sleep disturbance and respite periods • the required community notification specific to the activities proposed.	✓	

REF	TOPIC	IMPACT	MEASURES	ENABLING WORKS	MAIN CONSTRUCTION
CNV2	Noise and vibration	Noise generated from main construction activities	A CNVMP will be prepared as a sub plan to the CEMP before any main construction works begin. This will include: • identification of nearby sensitive receivers • description of works, construction equipment and hours of work • criteria for the project and relevant licence and approval conditions • requirements for noise and vibration monitoring • details of how community consultation and notification will be completed • procedures for handling complaints • details on how respite will be applied where ongoing high impacts are seen at certain receivers. The CNVMP will also consider cumulative construction impacts and the likelihood for 'construction fatigue' from consecutive projects in the area and ongoing operation and maintenance activities in the rail corridor, and define a suitable management approach. Quantitative road traffic noise impacts from temporary detours during construction would also be evaluated, especially for local roads with low existing volumes. **Ongoing operation and maintenance activities of the existing rail corridor during the period of construction will be managed through ARTC's existing environmental management system**.		✓
CNV3	Noise and vibration	Noise generated from main construction activities	Community consultation measures will be included in the CNVMP and community and stakeholder engagement plan, including periodic notification (monthly letterbox drop or equivalent) detailing all upcoming construction activities delivered to impacted sensitive receivers at least 14 days prior to commencement of relevant works.	✓	✓

REF	TOPIC	IMPACT	MEASURES	ENABLING WORKS	MAIN CONSTRUCTION
CNV4	Noise and vibration	Noise generated from out-of-hours work	Unless subject to an Environment Protection License, an Out-of-Hours Work Protocol will be prepared and included as part of the CNVMP for main construction works. It will identify a process for the consideration, management and approval of works which are outside standard hours. The protocol will be prepared in consultation with the EPA and approved by the independent ER before the commencement of main construction works. The protocol will include processes for: • the consideration of out of hours work against the relevant noise and vibration criteria • the identification of mitigation measures for residual impacts, including respite periods in consultation with the community at affected locations • consideration of the risk of activities, proposed mitigation, management and coordination for works outside of standard hours to be approved by the independent ER.		✓
CNV5	Noise and vibration	Noise generated from out-of-hours work	Where feasible and reasonable, construction will be carried out during Standard Construction Hours. If it is not possible to restrict the works to daytime, then they will be scheduled so noise intensive equipment is not used after 11:00 pm, where possible, noting that there is a requirement for many of the works to be completed during possessions, and restrictions on working hours during these periods are generally not feasible.	✓	✓
CNV6	Noise and vibration	Noise generated from use of noise intensive equipment	Where noise intensive equipment is to be used near sensitive receivers, the works will be scheduled for Standard Construction Hours, where possible. If it is not possible to restrict the works to daytime then they will be scheduled so noise intensive equipment is not used after 11:00 pm, where feasible.	✓	✓
CNV7	Noise and vibration	Noise generated from use of noise intensive equipment	Monitoring will be carried out at the start of noise and vibration intensive activities which are near to receivers to confirm that actual levels are consistent with the predictions. Where mitigation measures have been specified, the monitoring results should confirm their effectiveness.	✓	✓

REF	TOPIC	IMPACT	MEASURES	ENABLING WORKS	MAIN CONSTRUCTION
CNV8	Noise and vibration	Use of construction compounds	Hoardings, or other shielding structures, will be used where receivers are near compounds or worksites with long-term works. To provide effective noise mitigation, the hoarding will break the line of sight from the nearest receivers to the works, where possible, and be of solid construction with minimal gaps. Hoarding for construction sites is typically around three metres in height.		✓
CNV9	Noise and vibration	Use of construction compounds	Noise generating activities in compounds will be positioned away from receivers where possible. Items such as sheds can also be used to shield receivers from noise generated in other parts of the compound.		✓
CNV10	Noise and vibration	Use of construction compounds	Noise impacts are predicted for the compound between Banksia Street and Stephen Road due to the proximity of the nearest receivers. The use of this compound site during out of hours works associated with the road closures at Robey Street and O'Riordan Street will be avoided as far as practicable.	✓	✓
CNV11	Noise and vibration	Vibration impacts from use of vibration intensive equipment	Where works are required within the minimum working distances and considered likely to exceed the cosmetic damage criteria: • different construction methods with lower source vibration levels will be investigated and implemented, where feasible • attended vibration measurements will be undertaken at the start of the works to determine actual vibration levels at the item. Works will be ceased if the monitoring indicates vibration levels are likely to, or do, exceed the relevant criteria.	✓	✓
CNV12	Noise and vibration	Vibration impacts from use of vibration intensive equipment	Building condition surveys will be completed before and after the works where buildings or structures, including heritage items, are within the minimum working distances and considered likely to exceed the cosmetic damage criteria during the use of vibration intensive equipment. Appropriate criteria will be confirmed for each item before the works begin, based on the surveys.	✓	✓

REF	TOPIC	IMPACT	MEASURES	ENABLING WORKS	MAIN CONSTRUCTION
CNV13	Noise and vibration	Vibration impacts from use of vibration intensive equipment	The potential human comfort impacts and requirement for vibration intensive works will be reviewed as the project progresses. Where receivers are within the human comfort minimum working distances, the impacts will be managed with the procedures defined in the CNVMP.	✓	✓
CNV14	Noise and vibration	Vibration impacts from use of vibration intensive equipment	The requirement for vibration intensive works near heritage items will be reviewed during detailed construction planning. Where heritage items are considered potentially sensitive to vibration impacts, the more stringent DIN 4150 Group 3 guideline values will be applied and monitoring will be completed when vibration intensive works are in close proximity. Condition surveys will be completed before and after the works where heritage items are within the minimum working distances and considered likely to exceed the cosmetic damage criteria.	✓	✓
CNV15	Noise and vibration	Cumulative construction noise impacts	The likelihood of cumulative or consecutive construction noise impacts will be reviewed during detailed design when detailed construction schedules are available. Coordination will occur between the various projects to minimise concurrent works (particularly concurrent out of hours work) in the same areas, where possible. Specific additional management and mitigation measures designed to address potential consecutive impacts will be developed and used to minimise the impacts as far as practicable, in consultation with the affected community.	✓	✓
CNV16	Noise and vibration	Noise generated from construction workers	All employees, contractors and subcontractors will receive an environmental induction. The induction must at least include: • all relevant project specific and standard noise and vibration mitigation measures • relevant licence and approval conditions • permissible hours of work • any limitations on noise generating activities with special audible characteristics • location of nearest sensitive receivers • construction employee parking areas • designated loading/unloading areas and procedures • site opening/closing times (including deliveries) • environmental incident procedures.	✓	✓

REF	TOPIC	IMPACT	MEASURES	ENABLING WORKS	MAIN CONSTRUCTION
CNV17	Noise and vibration	Noise generated from construction workers	No swearing or unnecessary shouting or loud stereos/radios/phone calls on speaker on site. No dropping of materials from height, throwing of metal items and slamming of doors. No unnecessary idling of vehicles near to receivers.	✓	✓
CNV18	Noise and vibration	General construction noise generation	Use quieter and less vibration emitting construction methods where feasible and reasonable. For example, when piling is required, bored pile rather than impact-driven piles will minimise noise and vibration impacts.	✓	✓
CNV19	Noise and vibration	General construction noise generation	Simultaneous operation of noisy plant within discernible range of a sensitive receiver will be avoided. The offset distance between noisy plant and adjacent sensitive receivers will be maximised. Plant used intermittently will be throttled down or shut down. Noise-emitting plant will be directed away from sensitive receivers, where possible.	✓	✓
CNV20	Noise and vibration	General construction noise generation	Plan traffic flow, parking and loading/unloading areas to minimise reversing movements within the site.	✓	✓
CNV21	Noise and vibration	General construction noise generation	Non-tonal reversing beepers (or an equivalent mechanism) will be fitted and used on all construction vehicles and mobile plant regularly used on site as well as any out of hours work.	✓	✓
CNV22	Noise and vibration	General construction noise generation	Loading and unloading of materials/deliveries will occur as far as possible from sensitive receivers. Site access points and roads will be selected as far as possible away from sensitive receivers. Dedicated loading/unloading areas will be shielded if close to sensitive receivers.	✓	✓

REF	TOPIC	IMPACT	MEASURES	ENABLING WORKS	MAIN CONSTRUCTION
CNV23	Noise and vibration	General construction noise generation	Where possible, noise from mobile plant will be reduced through additional: • residential grade mufflers • damped hammers such as 'City' Model Rammer Hammers • Air Parking brake engagement is silenced.	✓	✓
CNV24	Noise and vibration	General construction noise generation	Stationary noise sources will be enclosed or shielded while ensuring that the occupational health and safety of workers is maintained. Appendix F of AS 2436: 1981 lists materials suitable for shielding.	✓	✓
CNV25	Noise and vibration	General construction noise generation	A CTTAMP will be prepared for the project to manage the haul routes and vehicle movements. Where construction routes are along local roads there is potential for impacts at the adjacent residential receivers, depending on the volume of construction traffic. The potential impacts will be managed using the following approaches: • vehicle movements will be away from sensitive receivers and during less sensitive times, where possible • the speed of vehicles will be limited and will avoid the use of engine compression brakes • on-site storage capacity will be maximised to reduce the need for truck movements during sensitive times • heavy vehicles will be restricted from idling near residential receivers.		✓
CNV26	Noise and vibration	General construction noise generation	Structures, such as site sheds, will be used to shield residential receivers from noise (where practicable), noting that upper floors of multi-storey buildings will be unlikely to benefit.	✓	✓

REF	TOPIC	IMPACT	MEASURES	ENABLING WORKS	MAIN CONSTRUCTION
CNV27	Noise and vibration	Detours during construction	The assessment indicates there is potential for noticeable increases in road traffic noise for some receivers along the detours routes, such as Robey Street. Detours using this road are planned for up to 10 weekends (for closures to either Robey Street or O'Riordan Street) during construction of the project. The potential impacts would be reviewed as the project progresses using detailed traffic volume data Where residential receivers are expected to be subject to a >2.0 dB night-time increase during detours, the project would: • consider the use of different detour routes that do not put traffic during the night-time on roads with low existing volumes. Where this is not possible, the project would: • apply appropriate mitigation measures to the affected residential receivers, as agreed with the independent Environmental Representative (ER), based on the expected magnitude of the exceedance and the total duration of night-time impacts from all detours during construction of the project.		
CAQ1	Air quality	Minor and temporary elevated particulate matter (PM_{10}) at receptors within six metres of the construction boundary	Dust suppression will be undertaken as required using water sprays, water carts or other media on: • unpaved work areas subject to traffic or wind • sand, spoil and aggregate stockpiles • during the loading and unloading of dust generating materials. As a minimum, level 1 watering should be undertaken on general construction areas and level 2 watering should be undertaken on heavy construction areas. Further discussion including a description of construction work classification is provided in section 5.2 of *Technical Report 3 – Air Quality Impact Assessment*.	✓	✓

REF	TOPIC	IMPACT	MEASURES	ENABLING WORKS	MAIN CONSTRUCTION
CAQ2	Air quality	Minor and temporary elevated particulate matter (PM_{10}) at receptors within six metres of the construction boundary	Visual dust monitoring will be performed on a routine basis, and all staff will be trained to look out for visible dust leaving the worksite in the direction of sensitive receptors. If the works are creating visible dust plumes, the works will be modified or stopped until the dust hazard is reduced to an acceptable level. If complaints are received relating to dust from construction works, works will be reviewed to identify opportunities to reduce potential impacts from dust. In the instance of ongoing dust issues, or complaints, a short term dust monitoring device will be installed in the relevant area which may be adjacent to a sensitive receptor near any longer term construction area.	✓	✓
CAQ3	Air quality	Dust from construction vehicles	Construction vehicles with potential for loss of loads (such as dust or litter) will be covered when using public roads.	✓	✓
CAQ4	Air quality	Emissions from construction equipment and plant	Plant and equipment will be maintained in good condition to minimise spills and air emissions that may cause air quality impacts.	✓	✓
CAQ5	Air quality	Dust from stockpiles	The size of stockpiles will be minimised where possible and located as far as practicable from sensitive receptors.	✓	✓
CAQ6	Air quality	Contaminated dust with PFAS may become airborne and disperse to receptors	Identified areas which may have elevated PFAS/PFOS concentrations are limited to small areas shown in the *Technical Report 5 – Contamination Assessment* (WSP 2019)). This report includes specific management measures. Dust management measures are considered sufficient to manage dust from areas potentially containing PFAS however high risk areas will be identified in the site induction so all personnel are aware of the importance of dust management in these areas. Dust management measures will prevent visible dust from potentially contaminated areas from leaving the construction site boundary.	✓	✓
CBD1	Biodiversity	Additional clearing	If additional vegetation is identified to be impacted, an ecologist will undertake further assessment for impact and the need for offsetting in accordance with the legislation, prior to clearing.	✓	✓

REF	TOPIC	IMPACT	MEASURES	ENABLING WORKS	MAIN CONSTRUCTION
CBD2	Biodiversity	Spread of chytrid fungus	Protocols to prevent introduction or spread of chytrid fungus will be detailed in the relevant management plan and implemented following the DPIE Hygiene protocol for the control of disease in frogs (DECC, 2008c).	✓	✓
CBD3	Biodiversity	General	The project environmental induction will include information on the ecological values of the study area, protection measures to be implemented to protect biodiversity and penalties for breaches.	✓	✓
CBD4	Biodiversity	Vegetation clearing	Disturbance of vegetation will be limited to the minimum necessary to construct works. The contractor will design the layout of the work areas to locate infrastructure, where practicable, to previously cleared areas or areas of exotic vegetation to minimise or avoid impacts on native vegetation (and particularly EECs). Equipment storage and stockpiling of resources will be restricted to designated areas in cleared land.	✓	✓
CBD5	Biodiversity	Impact to flora and fauna during vegetation clearance or works to bridges	A trained ecologist will undertake pre-clearing surveys and be present during the clearing of native vegetation or removal of potential fauna habitat during construction where necessary to avoid impacts on resident fauna as far as is practicable. Pre-clearing surveys will include: • inspections of native vegetation for resident fauna and/or nests or other signs of fauna occupancy • inspections of bridges for roosting bats • pre-clearing surveys for the Green and Golden Bell Frog at Mill Stream as a precaution • capture and relocation or captive rearing of less mobile fauna (such as nestling birds) by a trained fauna handler and with assistance from Wildlife Information Rescue and Education Service (WIRES) as required.	✓	✓
CBD6	Biodiversity	Impact on vegetation to be retained	Where the project site adjoins native vegetation, the limits of clearing will be marked and temporary fencing installed and maintained around the vegetated areas prior to the commencement of construction activities to avoid unnecessary vegetation and habitat removal.	✓	

REF	TOPIC	IMPACT	MEASURES	ENABLING WORKS	MAIN CONSTRUCTION
CBD7	Biodiversity	Increase in weeds	Management and disposal of the weeds, including the priority weeds, will be conducted in accordance with the *Biosecurity Act 2015* and the *NSW Weed Control Handbook* (DPI 2018c). Vehicles and other equipment to be used within the rail corridor will be cleaned to minimise seeds and plant material entering the study area to prevent the introduction of further exotic plant species or disease.	✓	✓
CBD8	Biodiversity	Reinstatement of vegetation	Revegetation of riparian areas along Mill Stream, Mill Pond and New Pond following construction will be undertaken by a bush regeneration contractor. Disturbed areas will be stabilised as soon as possible following construction and locally endemic species typical of Swamp Oak swamp forest and Coastal freshwater wetlands will be used to revegetate these disturbed riparian areas. **The methodology for revegetation, including a suitable plant species list, will be included in the CEMP. A minimum 12 month maintenance period would follow the revegetation of Mill Stream riparian areas and any other disturbed areas.**		✓
CCT1	Contamination	Asbestos contaminated fill material	A remediation action plan (RAP) will be prepared for Area 1 in accordance with the National Environmental Protection (Assessment of Site Contamination) Measure (NEPM 2013) prior to placement of the asbestos capping layer. Remediation in Area 1 will be undertaken in accordance with the endorsed RAP. Following this, a validation report will be prepared by a suitably qualified environmental consultant to validate the suitability of the project site for its proposed use. Installation of the capping layer will be done under the supervision of a suitably qualified and experienced consultant, as defined in Schedule B9 of the NEPM. The final elevation of residual contaminated soils will be surveyed prior to the installation of the marking layer and capping layers. Final levels should also be surveyed and included in the SWMP and ARTC asbestos register.	✓	✓

REF	TOPIC	IMPACT	MEASURES	ENABLING WORKS	MAIN CONSTRUCTION
CCT2	Contamination	Potential for unidentified ACM	West of Robey Street within Area 2, existing investigations will be supplemented with additional sampling using a test pit or trenching method in accordance with NEPM 2013 and WA Department of Health (WA-DoH) 2009, *Guidelines for the Assessment, Remediation and Management of Asbestos-Contaminated Sites in Western Australia*. If enabling works in this area are undertaken prior to additional sampling, ACM will be assumed to be present and works will be supervised by an appropriately licensed contractor. This will be specified in site EMPs for the enabling works.	✓	
CCT3	Contamination	Potential for encountering ASS	An acid sulfate soils management plan (ASSMP) will be developed prior to start of enabling works in accordance with the ASSMAC (1998) *Acid Sulfate Soils Manual* and included in the SWMP. ASS encountered during construction will be managed in accordance the ASSMP.	✓	✓
CCT4	Contamination	ACM impacted soils	An asbestos management plan (AMP) will be prepared prior to start of enabling works in accordance with NSW EPA guidelines (including waste guidelines), SafeWork NSW 2014, *Managing Asbestos in or on Soil* and relevant industry codes of practice. This AMP will be included in the SWMP.	✓	✓
CCT5	Contamination	Surface ACM	An emu pick involving the systematic manual collection of identified asbestos surface fragments will be undertaken prior to soil disturbance in Area 1 and the section west of Robey Street in Area 2, to remove ACM fragments from the site surface. A clearance certificate will be obtained from a licensed asbestos assessor.	✓	

REF	TOPIC	IMPACT	MEASURES	ENABLING WORKS	MAIN CONSTRUCTION
CCT6	Contamination	Contaminated groundwater	Adopt construction techniques to avoid groundwater disturbance where practicable. If groundwater is encountered, temporarily store all extracted groundwater to be disposed of offsite in appropriate containers then ensure it is tested for potential contaminants (including PFAS). Options for final disposal of extracted groundwater include: • removal offsite to a water recycling facility if the level of contaminants does not exceed the water acceptance thresholds • discharge to a sewer via a trade waste agreement with Sydney Water • treatment through a groundwater remediation system before being released to surface water (with approval from NSW EPA). For the above options, the analytical testing results will need to demonstrate compliance with the applicable licence or discharge criteria.		✓
CCT7	Contamination	Spills and leaks contaminating soil or groundwater	Procedures to store, handle and use materials and equipment appropriately to prevent spills will be prepared and implemented during construction, and included in the SWMP. Immediately contain and clean up leakage of fuels, oils, chemicals and other hazardous liquids in accordance with the Safety Data Sheet and ARTC's NSW Pollution Incident Response Management Plan to prevent migration of contaminants to other parts of the site.	✓	✓
CCT8	Contamination	Stockpile management and soil handling.	Employ stockpile management procedures as per ARTC's Standard Environmental Management Measures for segregating soil and preventing cross-contamination of clean soil with contaminated soil. These will be documented in the SWMP.	✓	✓
CCT9	Contamination	ACM contaminated areas	ACM impacted soil will be handled and managed in accordance with the AMP at all times during construction. Areas that are designated as ACM contaminated areas will be clearly fenced off and suitable warning signs posted prior to soil disturbance in that area. Hygiene facilities will be provided incorporating a high standard of washing facilities and storage area for contaminated clothing/footwear. These areas will only be accessible to authorised personnel and work permitted only under controlled/supervised conditions by appropriately qualified/licensed personnel.	✓	✓

REF	TOPIC	IMPACT	MEASURES	ENABLING WORKS	MAIN CONSTRUCTION
CCT10	Contamination	Unexpected contamination	An unexpected finds procedure will be prepared prior to commencement of enabling works and included as part of the SWMP. It will identify the process to follow in the event that indicators of contamination are encountered during construction (such as odours, ACM or visually contaminated materials).	✓	✓
CFL1	Hydrology and flooding	Earthworks	Plan, implement and maintain measures, which are aimed at: • intercepting flow from areas upstream of the project and diverting it in a controlled manner whether through or around the construction sites • implementing construction practices that minimise the potential for scour through stabilisation of disturbed surfaces.	✓	✓
CFL2	Hydrology and flooding	Spoil management	Spoil stockpiles will need to be located in areas which are not subject to frequent inundation by floodwater and ideally outside the 1% AEP flood extent. The CEMP will define the flood immunity criteria for stockpiles proposed to be located in areas that are inundated during a 1% AEP event. These criteria will be based on the duration of stockpiling operations, the type of material stored, the nature of the receiving drainage lines and also the extent to which the stockpile will impact flooding conditions in adjacent areas.	✓	✓
CFL3	Hydrology and flooding	Site facilities and flood emergency management	As a minimum, site facilities are to be located outside high flood hazard areas based on a 1% AEP flood and ideally outside the 1% AEP flood extent. For site facilities located within the floodplain, the CEMP is to identify how risks to personal safety and damage to construction facilities and equipment will be managed. The CEMP will need to include details of: • the procedure to monitor accurate and timely weather data, and disseminate warnings to construction personnel of impending flood producing rain • an evacuation plan for construction personnel should a severe weather warning be issued.	✓	✓

REF	TOPIC	IMPACT	MEASURES	ENABLING WORKS	MAIN CONSTRUCTION
CFL4	Hydrology and flooding	Management of adverse flood impacts on existing development (construction)	The CEMP will need to include details and procedures to manage the potential for proposed construction activities to adversely impact on flood behaviour in adjacent development. A more detailed assessment of the impact that construction activities will have on flood behaviour, as well as the scope of measures which will be required to mitigate those impacts, will need to be undertaken during the detailed design phase, with the benefit of more refined construction plans and details by the preferred construction contractor. Subject to the outcomes of further design development and flood assessment during the detailed design phase, a floor level survey may need to be undertaken of affected properties (i.e. in properties where there is a potential increase in flood levels) to determine whether construction activities will increase flood damages in adjacent development and if mitigation measures are required. The layout of the construction compounds, material storage areas, as well as temporary crane pads and temporary piling platforms will need to be designed to: • limit the extent of works located in floodway areas • divert overland flow either through or around work areas in a controlled manner • minimise adverse impacts on flood behaviour in adjacent development. Measures to manage residual flood impacts may include: • staging construction to limit the extent and duration of temporary works on the floodplain • ensuring construction equipment and materials are removed from floodplain areas at the completion of each work activity or should a weather warning be issued of impending flood producing rain • providing temporary flood protection to properties identified as being at risk of adverse flood impacts during any stage of construction of the project • developing flood emergency response procedures to remove temporary works during periods of heavy rainfall.	✓	✓

REF	TOPIC	IMPACT	MEASURES	ENABLING WORKS	MAIN CONSTRUCTION
CWQ1	Water quality and soils	Spills and leaks causing soil or water contamination	**A Soil and Water Management Plan will be developed to manage soil and water risks during the projects main construction works, including risks associated with encountering existing and potential soil contamination.** Procedures to store, handle and use materials and equipment appropriately to prevent spills and leaks will be included in the SWMP.		✓
CWQ2	Water quality and soils	Spills and leaks causing soil or water contamination	Leakage of fuels, oils, chemicals and other hazardous liquids will be immediately cleaned up in accordance with the Safety Data Sheet and relevant emergency response procedures.	✓	✓
CWQ3	Water quality and soils	Spills and leaks causing soil or water contamination	Adequately stocked spill kits will be readily accessible to site personnel during all refuelling activities.	✓	✓
CWQ4	Water quality and soils	Spills and leaks causing soil or water contamination	Construction plant and equipment will be regularly inspected and maintained to prevent leaks.	✓	✓
CWQ5	Water quality and soils	Spills and leaks causing soil or water contamination	All potentially contaminating substances will be stored in secure, bunded and impervious locations away from surface water features and outside of the extent of the 20 year ARI design flood wherever practicable.	✓	✓
CWQ6	Water quality and soils	Spills and leaks causing soil or water contamination	Impervious and bunded areas will be established for the on-site maintenance of construction plant and equipment.	✓	✓
CWQ7	Water quality and soils	Erosion and sediment impacts	The area of exposed soils within the project site will be minimised through staging vegetation clearing and ground disturbing works across the project site. Disturbed areas and all long-term stockpiles will be protected or stabilised during periods of inactivity. Areas disturbed by construction activities will be rehabilitated and restored as soon as possible after completion of works in the area.	✓	✓

REF	TOPIC	IMPACT	MEASURES	ENABLING WORKS	MAIN CONSTRUCTION
CWQ8	Water quality and soils	Erosion and sediment impacts	Where feasible, construction activities will be scheduled to avoid ground disturbance works or in-stream works during periods of heavy or prolonged rainfall.	✓	✓
CWQ9	Water quality and soils	Erosion and sediment impacts	Protect stockpiles of loose material from erosion due to rain and wind.	✓	✓
CWQ10	Water quality and soils	Erosion and sediment impacts	Erosion and sediment control measures will be implemented prior to soil disturbance in accordance with *Managing Urban Stormwater: Soils and Construction Volume 1* (Landcom, 2004) and included in the SWMP. Erosion and sediment controls throughout the project site will be regularly inspected and maintained.	✓	✓
CWQ11	Water quality and soils	Erosion and sediment impacts	Remove all material from the site as soon as practical at the completion of work.	✓	✓
CWQ12	Water quality and soils	Erosion and sediment impacts	Specific measures and procedures for works within waterways, such as the use of silt barriers will be implemented where necessary.		✓
CWQ13	Water quality and soils	Erosion and sediment impacts	Instruct site workers on the need to prevent materials from washing or blowing into the stormwater system.	✓	✓
CWQ14	Water quality and soils	Erosion and sediment impacts	Infiltration trenches will be installed to allow for potentially contaminated water to be collected and infiltrated back into groundwater rather than flowing to surface water.	✓	✓
CWQ15	Water quality and soils	Groundwater and surface water impacts during construction	A groundwater construction monitoring program will be prepared and implemented as per chapter 8 of *Technical Report 7 – Groundwater Impact Assessment*. This monitoring program will verify the effectiveness of construction activities at preventing changes in the beneficial use potential of the aquifer system. A surface water quality monitoring program will be prepared and implemented for specific construction works (refer to section 6.2.3 of *Technical Report 8 Surface Water Impact Assessment*).		✓
CWQ16	Water quality and soils	Litter polluting waterways	Bins will be provided on-site for litter. All general litter and waste collected on-site will be transported off-site to an appropriate waste facility.	✓	✓

REF	TOPIC	IMPACT	MEASURES	ENABLING WORKS	MAIN CONSTRUCTION
CNH1	Non-Aboriginal heritage	Significant items within, and outside of, the study area	For the Botany Water Reserves (also known as Botany Wetlands or Botany Swamps), the following site specific management measures will be implemented: • establishment of fenced exclusion zones around the item's SHR curtilage to prevent inadvertent impacts to the item prior to, and during construction of the project • engagement of an arborist to ensure significant plant species are not impacted during the construction phase if impacts outside of the project footprint are proposed • archaeological monitoring in areas assessed as containing low potential for Phase 1 archaeological remains where subsurface impacts are proposed. This would be carried out in accordance with recommendations set out in Section 11.5 of *Technical Report 9 – Statement of Heritage Impact.*	✓	✓
CNH2	Non-Aboriginal heritage	Significant items within, and outside of, the study area	The CEMP will identify measures to specifically minimise the potential impact to the bridge during the construction phase of the project. This may include establishment of protective barriers or pads around elements of the bridge to ensure impacts to fabric are avoided.	✓	✓
CNH3	Non-Aboriginal heritage	Significant items within, and outside of, the study area	The CEMP will include measures to prevent inadvertent impacts to fabric within the curtilage of the Sydney Airport Group south of Qantas Drive. This may include establishment of an exclusion zone around the LEP curtilage for the item. The inclusion of the exclusion zone in the ECMs would be appropriate.	✓	✓
CNH4	Non-Aboriginal heritage	Significant items within, and outside of, the study area	For the potential archaeological remains shown in Figure 15.4, archaeological monitoring or testing will be undertaken (where required) in accordance with recommendations set out in Section 11.5 of *Technical Report 9 – Statement of Heritage Impact.*	✓	✓

REF	TOPIC	IMPACT	MEASURES	ENABLING WORKS	MAIN CONSTRUCTION
CNH5	Non-Aboriginal heritage	Photographic archival recording	Photographic archival recording and reporting will be carried out 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 (NSW Heritage Office 2006) for the following items: • Mascot (Botany Road) Underbridge • Mascot (O'Riordan Street) Underbridge • Mascot (Robey Street) Underbridge • existing nature and elements of the Botany Rail Line located within the study area. The relevant record will be prepared by a suitably qualified heritage consultant using archival-quality material prior to the demolition or modification of each bridge, and main construction works to Botany Line. Additional recording may also take place during bridge removal. Records for LEP-listed items will be held by the local Council and local library. A copy of the record will be held by the owner of the asset.		✓
CNH6	Non-Aboriginal heritage	S170 notification	As the items listed on the ARTC s170 register will be demolished, a s170 notification will be provided to Sydney Trains and the NSW Heritage Division prior their demolition: • Mascot (O'Riordan Street) Underbridge • Mascot (Robey Street) Underbridge.		✓

REF	TOPIC	IMPACT	MEASURES	ENABLING WORKS	MAIN CONSTRUCTION
CNH7	Non-Aboriginal heritage	Archaeological management	The location of subsurface excavations will be designed, where possible to avoid areas containing low or moderate potential for State and locally significant Phase 1 and 2 resources. ~~If these impacts cannot be avoided, a Historical Archaeological Assessment and Research Design (HAARD) and Excavation Methodology would be prepared once designs for the project have been finalised and the extent and depth of subsurface excavations are known in that area. Likely recommended archaeological management includes:~~ • ~~East: Land surrounding Mill Pond and immediately north and south of Southern Cross Drive – archaeological monitoring and recording with potential salvage.~~ • ~~Central: Land to the north and south of General Holmes Drive, west of the Botany Rail Line – archaeological test excavations or monitoring and recording to the south and archaeological monitoring and recording to the north, both with the potential for salvage.~~ • ~~West: No archaeological resources considered to contain local or State significance are located in this portion of the study area – unexpected finds protocol. The HAARD will recommend appropriate archaeological management and research questions based on final detailed design. It will also include a requirement that all archaeological monitoring and test excavations be led by a suitably qualified heritage consultant who meets the NSW Heritage Council's Excavation Director criteria.~~	✓	✓
CNH8	Non-Aboriginal heritage	Heritage induction	The project environmental induction will include making contractors aware of areas of high/moderate archaeological potential, areas containing highly significant fabric, relevant strategies to minimise potential impacts on archaeological remains and heritage fabric, information regarding the identification and management of unexpected archaeological and heritage finds and their obligations under NSW heritage legislation ~~and the conditions of approval for the project~~. The induction will be provided to relevant contractors and subcontractors and its preparation overseen and approved by a suitably qualified heritage professional.	✓	✓

REF	TOPIC	IMPACT	MEASURES	ENABLING WORKS	MAIN CONSTRUCTION
CNH9	Non-Aboriginal heritage	Unexpected finds	An Unexpected Finds Procedure will be established and implemented in the case of unexpected structural and archaeological finds ~~in areas assessed as containing nil and low archaeological potential~~.	✓	✓
CNH10	Non-Aboriginal heritage	Unexpected finds	The Heritage Council must be notified if a relic is uncovered during construction	✓	✓
CAH1	Aboriginal heritage	Unexpected discovery of Aboriginal objects	An unexpected finds procedure will be prepared and include requirements for: • protecting any unexpected finds (including Aboriginal heritage items and human skeletal remains) encountered during construction activities • procedures to manage reporting and investigation when unexpected finds are encountered.	✓	✓
CAH2	Aboriginal heritage	Unexpected discovery of human remains	If suspected human skeletal remains are uncovered at any time throughout undertaking the proposed works, the unexpected finds procedure will be implemented.	✓	✓
CLP1	Land use and property	Billboard modification/ relocation	The removal, and reinstatement of billboards will be undertaken in consultation with land owners and billboard owners.	✓	✓
CLP2	Land use and property	Billboard modification/ relocation	As a priority, billboards will be replaced like for like. If replacement and relocation are not available, the affected parties will be appropriately compensated under the *Land Acquisition (Just Terms Compensation) Act 1991.*	✓	✓
CLP3	Land use and property	Access to private property/ businesses/ Sydney Airport	Consultation will be carried throughout construction with the surrounding businesses, the local community and key stakeholders including Bayside Local Council, Sydney Airport and other potentially impacted stakeholders to advise them in advance of proposed works and any temporary access arrangements that may be required.	✓	✓
CLP4	Land use and property	Access to private property/ businesses/ Sydney Airport	Prior to any impact on access, alternative arrangements will be negotiated with the affected parties in order to enable continued access and to minimise disruption as much as reasonably possible.	✓	✓
CLP5	Land use and property	General construction activities	Affected property owners and businesses will be provided with advanced notification of relevant project schedules, construction works and changes to access arrangements.	✓	✓

REF	TOPIC	IMPACT	MEASURES	ENABLING WORKS	MAIN CONSTRUCTION
CLV1	Landscape character and visual amenity	Landscape character and visual impact from residential properties	Shade cloth screening on site boundary fencing will be provided where works or compound sites are being undertaken in close proximity to residential areas to screen street level views into the construction site, such as: • Myrtle Street • Bay Street • Ellis Street • Banksia to Morgan Street.	✓	✓
CLV2	Landscape character and visual amenity	Visual impact from construction lighting at night	Temporary lighting required during the construction period will be sited and designed to avoid light spill into residential properties. Particular consideration will be given to works near Baxter Road, McBurney Avenue and between Myrtle Street and Stephen Road which are located close to residential properties and hotels.	✓	✓
CLV3	**Landscape character and visual amenity**	**Reinstatement of landscaping**	**Where landscaping is impacted outside the rail corridor during construction, opportunities for reinstatement will be identified (where possible) in consultation with affected property owners to minimise visual impacts.**		✓

REF	TOPIC	IMPACT	MEASURES	ENABLING WORKS	MAIN CONSTRUCTION
CSO1	Social	Changes to amenity and access due to construction	The community will be informed about changes to amenity and access through the community and stakeholder engagement plan. The plan will include: • communication with residents to provide an overview of the project, and the likely nature, extent and duration of amenity and access changes as a result of construction. Particular attention will be given to ensuring any vulnerable groups are appropriately targeted, these may include families with children, people with need for assistance, older people, people with disability, people with mobility difficulties or medical conditions, and culturally and linguistically diverse people in Mascot • communication of measures to minimise construction fatigue experienced by residents, businesses and general community members (such as construction respite periods associated with out of standard construction hours works, if required) • communication of the complaints and enquiry procedure through which community members can contact the project to raise any concerns regarding amenity and access changes, such as the ARTC Enviroline.	✓	✓
CSO2	Social	Amenity and access changes affecting community infrastructure facilities and users due to construction	Targeted communication on measures to minimise impacts on amenity and access will be carried out with the following stakeholders: • Bayside Council about timing of the most noise intensive works and changed traffic conditions that may affect public open space areas and active transport routes within the LGA • community infrastructure and accommodation facilities (hotels) if direct impacts are identified such as temporary changes to access or utility services.	✓	✓
CSO3	**Social**	**Opportunity to use local and Indigenous labour**	**ARTC will work with the nominated construction contractor to seek opportunities, where possible, to use local and Indigenous labour as part of the workforce requirements for the construction of the project.**	✓	✓

REF	TOPIC	IMPACT	MEASURES	ENABLING WORKS	MAIN CONSTRUCTION
CRW1	Resources and waste management	Resource use	Where feasible and practicable, construction material will be sourced from within the Sydney region.	✓	✓
CRW2	Resources and waste management	Enabling works waste generation and resource use	Site EMPs will be prepared before any enabling works begin. The Site EMPs will detail how waste will be managed during enabling works activities that could generate significant waste e.g. billboard removal and vegetation clearance. The Site EMPs will include: • all key early and enabling works waste streams • classification of waste streams in accordance with the *Waste Classification Guidelines* (EPA, 2014a) • applicable resource recovery orders and exemptions including the existing 'The Australian Rail Track Corporation excavated material order 2019' and 'The Australian Rail Track Corporation excavated material exemption 2019' • waste identification, handling and segregation procedures • proposed waste reuse, recovery and recycling and disposal measures • waste tracking, record keeping and reporting requirements • key sources of construction related resource use • energy conservation and energy efficiency practices to be implemented.	✓	

REF	TOPIC	IMPACT	MEASURES	ENABLING WORKS	MAIN CONSTRUCTION
CRW3	Resources and waste management	Main construction works waste generation and resource use	The CEMP will consider management of all construction waste including spoil in accordance with the waste management hierarchy. The CEMP will include: • all key construction waste streams • classification of waste streams in accordance with the *Waste Classification Guidelines* (EPA, 2014a) • applicable resource recovery orders and exemptions including the existing 'The Australian Rail Track Corporation excavated material order 2019' and 'The Australian Rail Track Corporation excavated material exemption 2019' • waste identification, handling and segregation procedures • spoil disposal locations, onsite spoil management and offsite transport protocols • proposed waste reuse, recovery and recycling and disposal measures • waste tracking, record keeping and reporting requirements • key sources of construction related resource use • energy conservation and energy efficiency practices to be implemented.		✓
CRW4	Resources and waste management	Main construction works waste generation and resource use	Construction waste will be minimised by accurately calculating materials brought to the site and limiting materials packaging.	✓	✓
CRW5	Resources and waste management	Main construction works waste generation and resource use	All waste will be assessed, classified, managed and disposed of in accordance with the *Waste Classification Guidelines* (EPA, 2014a).	✓	✓

REF	TOPIC	IMPACT	MEASURES	ENABLING WORKS	MAIN CONSTRUCTION
CRW6	Resources and waste management	Stockpile management	The size of stockpiles will be determined by material quantity requirements, space availability, stockpile stability and safety, indicative volumes and restrictions. Stockpile siting and management will include the following parameters: • will be no higher than three metres • will be sited as far as practical from sensitive receivers and where possible equipment i.e. site compound buildings, sited between the stockpile and receiver • will be located in areas which are not subject to frequent inundation by floodwater and ideally outside the 1% AEP flood extent • will not be sited next to schools or day care facilities • will be temporary and material not needed for ongoing maintenance will be removed at completion of construction.	✓	✓
CHS1	Risks, health and safety	Risks to infrastructure from utility works during enabling works	The site EMPs will include a section specific to utility management and utility protection.	✓	
CHS2	Risks, health and safety	Risks to public safety from general construction activities	Construction-related risks related to public safety from general construction activities (listed in section 21.3.1) will be incorporated into the relevant management plans with measures to minimise and manage risks.	✓	✓
CHS3	Risks, health and safety	Chemical and explosive management	The management of all chemicals and detonators used during construction will comply with the relevant Australian Standard.	✓	✓
CHS4	Risks, health and safety	Dangerous goods use and storage quantities exceeded	The relevant management plan will include a review of the required dangerous goods quantities to be used and stored during construction to validate Applying SEPP 33 (DoP 2011a) screening assessment. If the Applying SEPP 33 (DoP 2011a) thresholds levels are not exceeded, no further work is needed. If the Applying SEPP 33 (DoP 2011a) thresholds are exceeded, a preliminary hazard analysis will be completed and provided to the DPIE for reference.	✓	✓

REF	TOPIC	IMPACT	MEASURES	ENABLING WORKS	MAIN CONSTRUCTION
CHS5	Risks, health and safety	Construction plant infringing Sydney Airport obstacle limitation surface	Management plans will be developed and implemented for the project to ensure that the necessary approvals are sought, particularly for the use of cranes. Use of cranes will comply with *National Airports Safeguarding Framework Guideline F* (DIRDC, n.d.) Where necessary, use of cranes that will infringe the obstacle limitation surface will be limited to curfew hours and/or permits obtained from Sydney Airport.	✓	✓
CHS6	Risks, health and safety	Construction lighting producing light spill in the direction of incoming Sydney Airport aircraft	Management plans will be developed and implemented for the project to ensure the lights proposed for use comply with CASA Manual of Standards 139 section 9.21 and *National Airports Safeguarding Framework Guideline E* (DIRDC, n.d.).	✓	✓
CHS7	Risks, health and safety	Risk of wildlife strikes to Sydney Airport aircraft due to attraction of wildlife to areas near airport operations	Management plans will include measures to minimise waste attracting wildlife, particularly birdlife. These will include, but not be limited to: • food waste being stored in covered bin • waste being regularly removed from site.	✓	✓

Table 8.3 Compilation of mitigation measures during operation

REF	TOPIC	IMPACT	MEASURES
ONV1	Noise and vibration	Operational noise impacts	An Operational Noise and Vibration Review (ONVR) will be prepared to confirm the noise and vibration impacts from the project and to define the mitigation measures used to control the impacts. The ONVR will be prepared in consultation with affected stakeholders and the community. It will: • be based on the operational noise and vibration objectives identified in *Technical Report 2 – Noise and Vibration Impact Assessment* • confirm the predicted operational noise and vibration impacts at the surrounding receivers based on the final design • review the suitability of the operational noise mitigation measures identified below and any other measures which may be considered appropriate to manage additional impacts identified as a result of design changes and include the timing of implementation • include a consultation strategy to seek feedback from directly affected landowners on the noise and vibration mitigation measures • outline how complaints will be managed in accordance with ARTC's existing complaints handling service (Enviroline). The ONVR will be prepared with reference to the *ARTC Noise Prediction and Mitigation Guideline* (ARTC, 2018) and will be made publicly available once complete.
ONV2	Noise and vibration	Operational noise impacts	Implement noise and mitigation source controls, path controls and/or receiver controls where feasible and reasonable as determined during detailed design. These mitigation measures will be included in the ONVR, with the identified measures being managed through ARTC's environmental management system for operation of the project.
OAQ1	Air quality	Operational emissions	Plant and equipment used for maintenance works will be operated in accordance with manufacturer specifications and ARTC's Safety Management System and Environment Management System.
OAQ2	Air quality	Release of odour and pollutants from contaminated land	Ongoing management measures will be implemented for areas where contamination remains following construction. These management measures will be documented in an environmental management plan that is specific to contamination. In particular, the plan will clearly identify areas of remaining ACM impacts and detail the controls to be implemented during maintenance works likely to disturb soils. The plan will also detail the requirements for periodic inspections of ACM capping layer to ensure its integrity.
OBD1	Biodiversity	Increase in weeds	ARTC's Assessment Management System (under the Safety Management System) includes provision for regular weed management and ARTC's Environmental Management System provides procedures for weed management and pesticide use. Ongoing weed management throughout the rail corridor will be undertaken in accordance with ARTC's procedures, as well as relevant legislation such as the *Biosecurity Act 2015*.

REF	TOPIC	IMPACT	MEASURES
OCT1	Contamination	Spills and leaks contaminating soil or groundwater	Potential spills and/or leaks will be managed in accordance with ARTC's pollution incident response procedure (under the Environment Management System) or in accordance with an Operator's Operational Management Environmental Management Plan (OEMP) prepared in accordance with ARTC's access agreement requirements (depending on the extent and natural of the spill).
OCT2	Contamination	Potential spillage from lubricant system	Biodegradable low risk non-petrogenic products will be used where appropriate.
OCT3	Contamination	Containment of contaminated soils	The location and nature of any known contamination will be registered on ARTC's Contaminated Land Register and ARTCMap (internal GIS system). Prior to maintenance works in the corridor, a Task Based Environmental Assessment (TBEA) will be prepared which identifies known environmental sensitivities, including contamination. ARTC's Standard Environment Management Measures (under the Environment Management System) include procedures for no go zones for known areas of in-situ contamination, which will be implemented prior to maintenance works likely to disturb soils. ARTC's Work, Health and Safety work instructions will also be used for works near known contamination. Any required inspections of the capping layer undertaken by ARTC will be undertaken in accordance with ARTC's Asset Management System procedures. These procedures will be summarised in a site management plan in accordance with the CLM framework, which will be prepared by an environmental consultant and guide the management of residual contamination within the project site. This may be a standalone plan, or combined with site management plans that relate to adjacent areas.
OWQ1	Water quality and soils	Formation failure	Regular inspections of formation and any necessary repairs will be undertaken in accordance with ARTC's Safety Management System procedures.
OWQ2	Water quality and soils	Water or soil impacts from maintenance works	The existing ARTC Standard Environmental Management Measures (under the Environment Management System) will be implemented to manage impacts from maintenance works, including potential litter.
ONH1	Non-Aboriginal heritage	Unexpected finds	The existing ARTC Standard Environmental Management Measures (under the Environmental Management System) will be implemented to manage the potential for unexpected non-Aboriginal heritage finds.
OAH1	Aboriginal heritage	Unexpected discovery of Aboriginal objects or human remains	The existing ARTC Standard Environmental Management Measures (under the Environmental Management System) will be implemented to manage the potential for unexpected discovery of Aboriginal objects or human remains.
OSO1	Social	Amenity change (noise) due to operation	The ONVR will include a consultation strategy to seek feedback from directly affected landowners on the noise and vibration mitigation measures. This will the use of the Enviroline mechanism for communication with local residents and businesses impacted by at-property noise mitigation measures.

REF	TOPIC	IMPACT	MEASURES
ORW1	Resources and waste management	Operational waste generation	The existing ARTC Standard Environmental Management Measures (under the Environment Management System), which include measures for identification, classification, management and disposal of waste will be implemented to manage operational waste generation.
OHS1	Risks, health and safety	Disruption of utility services or rail services	Communication with utility service providers during maintenance (both rail and utility) will be undertaken in accordance with the ARTC Safety Management System.
OHS2	Risks, health and safety	Personal injury (within the community) relating to maintenance activities around utilities	Utility maintenance works will be undertaken in accordance with safety protocols prescribed in ARTC's Safety Management System, ARTC's Safety Management System includes requirements for safe work method statements, which will be prepared as required for utility maintenance works.
OCC1	Climate change	Risk of extreme weather event affecting infrastructure and operations	ARTC's Asset Management System includes provision for regular inspections and maintenance. In accordance with ARTC's Asset Management System. Inspections of drainage infrastructure will be undertaken, to ensure operating at design capacity.
OCC2	Climate change	Risk of extreme weather event affecting infrastructure and operations	Equipment rooms will be designed in accordance with the relevant standards and to consider future extreme heat events due to climate change. Response to such events will be in accordance with ARTC's safety management system and standard operating procedures.
OCC3	Climate change	Risk of extreme weather event affecting infrastructure and operations	Where infrastructure is to be replaced during maintenance, it will be undertaken in accordance with the relevant standards and will consider the most up to date climate change projections. Response to such events will be in accordance with ARTC's standard operating procedures.
OCC4	Climate change	Risk of extreme weather event affecting infrastructure and operations	Weather forecasting will be taken into consideration when planning maintenance works in accordance with ARTC's Standard Management Measures (under the Environmental Management System).

9. CONCLUSION

This section provides a synthesis of the findings of the Submissions Report and concludes the environmental impact assessment process.

9.1 Overview

The EIS included a comprehensive assessment of the potential environmental impacts associated with the project and, where appropriate, proposed mitigation and management measures to address these potential impacts. Consultation was undertaken with the community and key stakeholders throughout the environmental impact assessment process, to allow early identification of key issues and addressing of those issues, where possible. The EIS concluded that with the implementation of the proposed mitigation and management measures the potential environmental impacts of the project would be adequately managed.

The EIS was placed on public exhibition between 16 October 2019 and 13 November 2019. A total of 32 submissions were received, comprising 13 submissions from community members, seven submissions from organisations or businesses and 12 submissions from government agencies or key stakeholders.

9.2 Summary of issues raised

The top three issues raised by community members and organisations/businesses were related to:

- noise and vibration, with both construction and operational noise being a key concern
- project justification and need, due to the lack of active transport infrastructure in the design
- air quality, associated with the potential for airborne pollutants and diesel emissions.

Key issues raised by government agencies and key stakeholders included, but were not limited to:

- construction and operational noise
- traffic impacts during construction
- impacts due to the removal of vegetation.

Chapters 6 and 7 of this report provides responses to each issue raised in the submissions. Based on issues raised, some of the mitigation measures presented in the EIS have been updated and some new mitigation measures have been added.

9.3 Project changes and additional environmental assessment

A number of proposed design changes to the project have been assessed in section 4. This includes the following:

- Track and drainage changes at Myrtle Street – minor changes to the proposed design of the track and drainage structures within the vicinity of Myrtle Street during detailed design to reduce potential flooding impacts to adjacent properties (refer to section 4.3).
- Mill Stream bridge abutment – change to the design of the proposed new bridge structure over Mill Stream bridge (refer to section 4.4).
- Removal of proposed access tracks – removal of the need for the proposed construction access tracks generally to the south of Myrtle Street, Botany (refer to section 4.5).
- Removal of additional asbestos containing material (ACM) – removal of additional ACM following design refinement and ongoing development of the preferred construction methodology (refer to section 4.6).

9.4 Performance outcomes

The project as described in this Submissions Report is generally consistent with the:

- project description provided in Chapter 6 (Project features and operation) and Chapter 7 (Construction) of the EIS
- project need and benefits as well as strategic planning and policy documents discussed in Chapter 5 (Justification and need) of the EIS
- objectives of the project as specified in section 1.2 of the EIS.

The Secretary's Environmental Assessment Requirements (SEARs) identified a number of desired performance outcomes for the project. These outcomes were reviewed in section 24.4 of the EIS, based on the assessment of potential environmental impacts and mitigation measures identified as part of the impact assessment process. Given the project's general consistency with the description in the EIS, the project specific environmental performance outcomes have not changed from those presented in the EIS.

9.5 Concluding statement

The project involves the construction and operation of a new second rail track largely within the existing Botany Line rail corridor between Mascot and Botany, in the Bayside local government area (as described in Chapters 6 and 7 of the EIS). The project is needed to reduce the potential for a bottleneck by duplicating the remaining section of single rail track to allow for increases to the capacity on the Botany Line, which is vital to meet the long-term freight demands to Port Botany.

The project was described in the EIS, which was put on public exhibition to provide the community, organisations, businesses, government agencies and key stakeholders with an opportunity to respond to the project. All submissions received by DPIE regarding the project have been reviewed, considered and responded to in this report.

To avoid, minimise or manage the potential impacts identified by the EIS and submissions, section 8.2 of this report lists the revised mitigation measures that would be implemented during construction and operation of the project. This includes implementing Site EMP(s) during enabling works, the CEMP and community and stakeholder engagement plan during main construction works and ARTC's environmental management system during operation. With the implementation of the proposed revised mitigation and management measures, the potential environmental impacts of the project would be adequately managed. This would also ensure compliance with relevant legislation and any conditions of approval.

9.6 Next steps

The EIS and this Submissions Report will be reviewed by DPIE, on behalf of the Minister for Planning and Public Spaces. Once DPIE has completed their assessment, a draft assessment report will be prepared for the Secretary of DPIE, which may include recommended conditions of approval. A final assessment report will then be provided to the Minister for Planning and Public Spaces, who will determine the project.

A copy of this Submissions Report will be published on DPIE's website following submission of the report to DPIE for assessment. Following assessment, the Minister for Planning and Public Spaces' determination will also be published on DPIE's website, as well as any conditions of approval (should the project be approved).

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Appendices

Appendix A – Overview of community submissions

SUBMISSION #	RESPONDENT	KEY ISSUES RAISED	SECTIONS WHERE ISSUES ARE ADDRESSED
1	Individual	• Noise and vibration • Air quality • Contamination • Water quality and soil • Other	6.4.1, 6.4.3, 6.4.5, 6.4.6, 6.5.1, 6.6.1, 6.7.1, 6.11.2
2	Individual	• Noise and vibration • Air quality • Contamination • Water quality and soil • Other	6.4.1, 6.4.3, 6.4.5, 6.4.6, 6.5.1, 6.6.1, 6.7.1, 6.11.2
3	Individual	• Noise and vibration • Air quality • Contamination • Water quality and soil • Other	6.4.1, 6.4.3, 6.4.5, 6.4.6, 6.5.1, 6.6.1, 6.7.1, 6.11.2
4	Individual	• Noise and vibration • Air quality • Contamination • Water quality and soil • Other	6.4.1, 6.4.3, 6.4.5, 6.4.6, 6.5.1, 6.6.1, 6.7.1, 6.11.2
5	Individual	• Construction methodology • Noise and vibration	6.2.1, 6.4.2, 6.4.5, 6.4.6
6	Individual	• Noise and vibration	6.4.6
7	Individual	• Traffic and transport	6.3.2
8	Individual	• Project justification and need	6.1.2
9	Individual	• Project justification and need	6.1.2
10	Individual	• Project justification and need • Air quality • Noise and vibration • Water quality and soil • Other	6.1.2, 6.4.3, 6.5.1, 6.7.1, 6.11.3
11	Individual	• Noise and vibration	6.4.2, 6.4.5, 6.4.6
12	Individual	• Noise and vibration	6.4.5, 6.4.6
13	Individual	• Noise and vibration	6.4.5

SUBMISSION #	RESPONDENT	KEY ISSUES RAISED	SECTIONS WHERE ISSUES ARE ADDRESSED
14	BIKEast	• Project justification and need • Traffic and transport	6.1.1, 6.1.2, 6.3.2
15	Bikes Botany Bay	• Project justification and need	6.1.1, 6.1.2
16	Owners Corporation – 2 Victoria St, Botany	• Noise and vibration • Landscape and visual • Traffic and transport	6.3.1, 6.4.1, 6.4.2, 6.4.6, 6.8.1
17	Owners Corporation – SP 56587	• Noise and vibration	6.4.6
18	APG Mascot Commercial	• Noise and vibration • Traffic and transport	6.3.1, 6.4.3
19	APA Group	• Hazards and risks	6.9.1
20	Qantas	• Noise and vibration • Traffic and transport • Cumulative • Other	6.3.1, 6.4.1, 6.4.2, 6.4.3, 6.4.4, 6.10.1, 6.11.1

Appendix B – Additional flooding impact assessment

TECHNICAL NOTE 1
BOTANY RAIL DUPLICATION ENVIRONMENTAL IMPACT STATEMENT
ASSESSMENT OF RESIDUAL IMPACTS OF THE PROJECT ON FLOOD BEHAVIOUR

1. Background

Australian Rail Track Corporation (ARTC) proposes to construct and operate a new second track within the existing rail corridor of the Botany Line between Mascot and Botany in the Bayside local government area (LGA). The Botany Rail Duplication project ('the project') would increase freight rail capacity to and from Sydney Airport and Port Botany. The location of the project is shown in **Figure 1**.

An Environmental Impact Statement (EIS) was prepared to support the application for approval of the project. The assessment of flood related impacts of the project was presented in a report entitled *Botany Rail Duplication Environmental Impact Statement Technical Working Paper: Flooding* ('Flooding TWP') (Lyall and Associates, 2019). The flood assessment was based on the design for the project that formed part of the EIS that was placed on public exhibition in late 2019 ('EIS design').

The Flooding TWP found that once constructed, the project would generally have only a minor impact on flood behaviour with the exception of the following residual flood impacts that were identified on existing infrastructure:

1. *Peak 1% AEP flood levels upstream of Mill Stream bridge would be increased by a maximum of 0.1 metres, which would also lead to an increase in the rate and therefore depth of flow that surcharges the western bank of Mill Stream and is conveyed along the travel lanes of Southern Cross Drive and Botany Road. The increase in peak flood levels upstream of the rail corridor would also lead to an increase in the frequency with which flow surcharges the western bank of Mill Stream onto the travel lanes of Southern Cross Drive, from about a 1% AEP event under pre-project conditions, to about a 2% AEP event under post-project conditions (i.e. twice as frequent).*
2. *During a 1% AEP event there would be an increase in peak flood levels upstream of the inlet to the 1,050 millimetre diameter pipe that crosses the rail corridor at Myrtle Street which would also lead to the following impacts in adjoining development:*
    a. *Peak flood levels in a multi-unit development at 104 Bay Street would be increased by a maximum of 0.02 metres. Impacts would occur in the northern portion of the development over an area that includes several units that front Myrtle Street.*
    b. *Peak flood levels in a multi-unit development at 15 Begonia Street would be increased by a maximum of 0.02 metres. Impacts would occur in the north-eastern portion of the development, adjacent to the entry to a basement carpark from Myrtle Street.*

Subsequent to the preparation of the Flooding TWP the EIS design for the project has been further developed to incorporate a number of measures that are aimed at mitigating its impact on flood behaviour ('revised design'). This technical note presents the findings of an assessment that was undertaken into the effectiveness of the revised design to mitigate the abovementioned residual impacts of the project.

For the purpose of this Technical Note, the assessment of flood impacts has been based on floods with Annual Exceedance Probabilities (AEPs)[1] of 50%, 10%, 2%, 1% and 0.5%, as well as the Probable Maximum Flood (PMF).

In accordance with the *Floodplain Development Manual* (DIPNR, 2005), floods up to the 1% AEP event were used to assess the impact of the project on flood behaviour in existing residential, and by default industrial and commercial development, while the PMF event was used to assess the impact of the project on critical infrastructure and significant increases in the hazardous nature of flooding. An assessment of flood behaviour during a 0.5% AEP event[2] was also undertaken in order to assess the impact of the project on flood behaviour under future climate change conditions.

The structure of this Technical Note is as follows:

- **Section 2** provides a summary of key findings of the investigation in terms of the effectiveness of the revised design to mitigate the residual impacts in Mill Stream and in the vicinity of Myrtle Street that were identified in the Flooding TWP.
- **Section 3** provides a brief background to the development of the hydraulic and hydrologic models (collectively referred to as 'flood models') that were relied upon for the present investigation.
- **Section 4** provides a brief description of flooding and drainage patterns under present day (i.e. pre-project) conditions.
- **Section 5** describes the updates that were made to the structure of the flood models in order to define flood behaviour under post-project conditions based on the revised design. This section also provides a summary of key differences between the revised design and the EIS design that was assessed as part of the Flooding TWP.
- **Section 6** summarises the key findings of the investigation with regards to the impacts that the revised design would have on flood behaviour in the vicinity of Mill Stream and Myrtle Street.

2. Summary of key findings

The key findings of the investigation in regards to the impact of the project on flood behaviour in the vicinity of Mill Stream bridge and Myrtle Street are summarised below. Further discussion on the results of the flood assessment that formed the basis of these findings is provided in **Section 6** of this Technical Note.

- There would be minor changes in peak flood levels upstream of Mill Stream bridge for all events up to the PMF. The increase in the length of the proposed bridge for the duplicated track under the revised design would reduce its obstruction on flow in Mill Stream. As a result, the increase in peak flood levels upstream of Mill Stream bridge that were predicted to occur under the EIS design, and the associated impact that this would have on an increase in the frequency, rate and depth of flow that is conveyed along the

[1] A storm with an AEP of 50 per cent has a 1 in 2 chance of occurring in a given year, while a storm with an AEP of 10 per cent has a 1 in 10 chance, a storm with an AEP of 1 per cent has a 1 in 100 chance and a storm with an AEP of 0.5 per cent has a 1 in 200 chance.

[2] Design rainfall intensities for the 0.5% AEP event were adopted as being analogous to the 1% AEP design rainfall intensities increased by 10 per cent.

travel lanes of Southern Cross Drive and Botany Road would be mitigated under the revised design.

- The increase in the length of the proposed bridge over Mill Stream under the revised design would also reduce the impact that the project would have on an increase in scour potential along the section of Mill Stream downstream of the rail corridor. While the EIS design would have increased peak 1% AEP flow velocities along the section of Mill Stream downstream of the rail corridor by a maximum of 0.9 metres per second, under the revised design there would be minor increases in peak flow velocities by a maximum of 0.2 metres per second on existing velocities that typically range between 1.8 and 2.4 metres per second. The relative increase in 1% AEP flow velocities in Mill Stream under the revised design is considered to have a minor impact on scour potential along Mill Stream.
- There would be minor changes in peak flood levels upstream of the 1,050 millimetre diameter pipe that crosses the rail corridor at Myrtle Street for all events up to the PMF. Within the adjacent residential properties that are located between Banksia Street and Myrtle Street there would be either no change or a slight reduction in peak flood levels for all events up to the PMF.

  The removal of proposed works along the existing section of track between Banksia Street and Myrtle Street under the revised design would reduce the impact that the project would have in altering flooding patterns in this area. As a result, increases in peak flood levels that would be experienced in 104 Bay Street and 15 Begonia Street under the EIS design would be mitigated under the revised design.
- Proposed changes to the project based on the revised design would have only a minor impact on flood behaviour in the areas adjacent to the Mill Stream bridge and Myrtle Street. That is, the measures that have been incorporated into the revised design in order to mitigate the residual impacts that were identified in the Flooding TWP would have only a minor impact on flood behaviour in adjoining areas.

3. Background to the development of the flood models

The flood models that were relied upon for the purpose of undertaking the flood assessment for the EIS and the present investigation were originally developed as part of the following previous studies:

- A series of flooding investigations that were undertaken for the WestConnex New M5 Motorway and associated projects which were previously documented in the *WestConnex New M5 EIS Technical Working Paper: Flooding* (Lyall and Associates, 2015).

  The hydrologic models that were developed as part of these earlier investigations included a RAFTS model of the Cooks River catchment and a DRAINS model of the Alexandra Canal catchment. A hydraulic model was developed of the lower Cooks River and Alexandra Canal floodplain using the TUFLOW software.
- The *Mascot, Rosebery and Eastlakes Flood Study*[3] (WMAwater, 2015) that was carried out on behalf of the City of Botany Bay Council (now Bayside Council).

  As part of WMAwater, 2015 two separate but overlapping models were developed covering:

[3] While the flood study by WMAwater was entitled “Mascot, Rosebery and Eastlakes” it also covered the Mill Stream catchment.

- the suburbs of Mascot, Rosebery and Eastlakes within the Alexandra Canal and Mill Stream catchments
- the main arm of Mill Stream and the suburb of Pagewood within the Mill Stream catchment.

Hydrologic models were developed using the DRAINS software, while hydraulic models were developed using the TUFLOW software.

Annexure A of the Flooding TWP contains further details of how the flood models from the previous studies were combined and updated for the purpose of undertaking the flood assessment for the EIS. For the purpose of the present investigation the flood models were updated to incorporate bathymetric survey that was collected to define the inbank area of Mill Stream where it crosses the rail corridor.

4. Recap of flood behaviour under pre-project conditions

This section provides a brief overview of flood behaviour along the section of the rail corridor in the vicinity of Mill Stream and Myrtle Street under present day (i.e. pre-project) conditions. Further details on flood behaviour under pre-project conditions are provided in Section 4.3 of the Flooding TWP.

Figure 2 shows the indicative extent and depth of inundation for a 50% AEP event under pre-project conditions, while **Figures 3**, **4**, **5**, **6** and **7** respectively show corresponding results for a 10%, 2%, 1% and 0.5% AEP event, as well as the PMF. **Figures 8** and **9** respectively show peak flow velocities and the duration of inundation during a 1% AEP event.

Flood behaviour due to mainstream flooding along the main arm of Mill Stream can be summarised as follows:

i. The peak 1% AEP flood level at the bridge that spans Mill Stream (denoted Mill Stream bridge on **Figure 5**, sheet 3) is RL 6.0 metres AHD, which is about 1.5 metres below the underside of the bridge.

ii. Southern Cross Drive where it runs under the rail line to the west of Botany Road acts as an overland flowpath to convey flows that surcharge the section of Mill Stream within the Lakes Golf Club during events greater than about 2% AEP. During a 1% AEP event overland flow that is conveyed along Southern Cross Drive collects at the low point in Botany Road between Wentworth Avenue and Southern Cross Drive.

iii. A section of rail line about 220 metres to the east of the Mill Stream bridge would be inundated by overland flow that surcharges Mill Stream and discharges through the southern portion of the Lakes Golf Club during events greater than about 10% AEP in intensity. During a 2% AEP event the track ballast layer would be inundated to a maximum depth of 0.3 metres, increasing to 0.5 metres and 1.0 metre during a 1% AEP event and the PMF, respectively.

Flood behaviour due to major overland flow along the section of the rail corridor to the east of Mill Stream, including the area in the vicinity of Myrtle Street, can be summarised as follows:

i. Flow that surcharges the stormwater drainage system in Banksia Street will collect at its low point before discharging into the rail corridor from the north. The depth of ponding in Banksia Street will occur to a maximum of 0.4 metres during a 10% AEP event, increasing to about 0.5 metres during a 1% AEP event. While the majority of flow that

discharges into the rail corridor is conveyed along the vegetated channel that runs along its eastern side, during a 1% AEP event a portion of this flow will overtop the adjacent section of rail line, albeit to relatively shallow depths of 0.1 metres or less.

ii. Flow that surcharges the stormwater drainage system in Bay Street will collect at its low point to the north of the rail corridor before discharging into the vegetated channel that runs along the eastern side of the rail line during events more frequent than 50% AEP. The depth of ponding in Bay Street will occur to a maximum of 0.5 metres during a 10% AEP event, increasing to about 0.8 metres during a 1% AEP event. Flow that discharges into the rail corridor during a 1% AEP event combines with flow that originates in Banksia Street and is conveyed along the vegetated channel.

iii. Flow in the vegetated channel that runs along the eastern side of the rail line from Banksia Street would surcharge the inlet to the 1,050 millimetre diameter piped drainage line where it crosses the rail corridor at Myrtle Street during events greater than about 10% AEP. Flow that surcharges the inlet of the 1,050 millimetre piped drainage line would discharge in a northerly direction toward the Eastlake golf course and combine with flow that surcharges Mill Stream.

iv. A section of the existing rail line that is located 150 metres to the north of Myrtle Street is impacted by local catchment runoff that collects at the low point in the rail corridor along its northern boundary. Runoff that collects at the low point during a 10% AEP event will overtop the rail line where it will discharge in a westerly direction toward Mill Stream.

5. Assessment of flood behaviour under post-project conditions

The following adjustments were made to the structure of the flood models in order to assess the impact that the revised design would have on flood behaviour:

- The DRAINS hydrologic model representing pre-project conditions was modified by adjusting sub-catchment boundaries based on the layout of the proposed rail drainage as set out in the revised design, as were catchment characteristics such as percentage impervious
- Ground elevations in the TUFLOW hydraulic model were adjusted using a 3D model of the revised design
- The piers and superstructure of the proposed Mill Stream bridge were modelled as a layered flow constriction shape in the TUFLOW hydraulic model in order to reflect the obstruction that it would have on flow in Mill Stream
- The drainage system in the TUFLOW model was modified to reflect the details of the revised design, which included:
    - a drainage line to control runoff from the section of rail corridor and adjoining portion of Eastlake golf course to the east of Mill Stream
    - a series of drainage channels which would control runoff from the section of rail corridor between Mill Stream and Banksia Street.

Figure 10 shows the key features of the revised design which were incorporated into the TUFLOW hydraulic model representing post-project conditions. In comparison to the EIS design that was assessed as part of the Flooding TWP, the revised design includes the following changes:

- The proposed bridge over Mill Stream has been increased in total span length from 23 metres (EIS design) to 30 metres (revised design). This has been achieved by increasing the length of the western span from 8 metres to 15 metres. The central pier would be located on the western bank of Mill Stream as per the EIS design. The increase in total span length of the bridge would reduce the encroachment of its western abutment on the floodway of Mill Stream.
- The new drainage line that is proposed to cross the rail line about 240 metres to the east of Mill Stream has been changed from a 1.0 metre wide by 0.45 metre high box culvert (EIS design) to two 0.6 metre diameter pipes (revised design), which would provide a slight increase in waterway area. The drainage line would control runoff from the section of rail corridor and adjoining portion of Eastlake golf course to the east of Mill Stream bridge.
- The new cess drain that is proposed to run along the southern side of the rail corridor between Lord Street and Mill Stream bridge has been increased in size in order to increase its hydraulic capacity.
- The new corridor access roads that were proposed to run along the northern side of the rail line between Mill Street and Myrtle Street and between Bay Street and Banksia Street as part of the EIS design have subsequently been removed from the revised design.
- The realignment of the existing track where it runs between Banksia Street and Myrtle Street and the widening of the adjacent section of channel that was proposed under the EIS design has been removed from the revised design. This has included the removal of a proposed crossover adjacent to Bay Street. Under the revised design the existing track and adjacent section of channel would be largely maintained over the section between Banksia Street and Myrtle Street.
- There would be additional cut along the western side of the rail corridor between Bay Street and Myrtle to provide a track of suitable width for vehicular access. It is proposed that a 0.8 metre high barrier wall be provided along the western side of the access track to control overland flow that would otherwise surcharge from the rail corridor into the adjoining properties due to the lowering of ground levels in this area.

6. Impact of project on flood behaviour

Figure 10 shows the impact that the revised design would have on flood behaviour for a 50% AEP event, while **Figures 11**, **12**, **13**, **14** and **15** show the same set of results for a 10%, 2%, 1% and 0.5% AEP event, as well as the PMF. **Figures 16** and **17** show the impact that the project would have in terms of changes in peak flow velocities and the duration of inundation during a 1% AEP event, respectively.

The key findings of the investigation with regards the impact that the revised design would have on flood behaviour under pre-project conditions are outlined below.

<u>In the vicinity of Mill Stream bridge</u>

Changes in peak flood levels:

- There would be an increase in peak 10% AEP flood levels upstream of the rail corridor by a maximum of 0.012 metres, which is due to the slight obstruction to flow caused by the western abutment of the proposed bridge over Mill Stream. This compares to an increase in peak flood level of 0.14 metres based on the EIS design.

The residual impact of the revised design is considered to be minor given that increases would be confined to an area between Mill Stream and Southern Cross Drive that is owned by Sydney Water where existing depths of inundation range between 0.6 and 1.2 metres.

- There would be a slight reduction in peak 1% AEP flood levels upstream of Mill Stream bridge by a maximum of 0.02 metres. The obstruction to flow caused by the western abutment of the proposed bridge over Mill Stream is offset by the new drainage culvert that is proposed to cross the rail line about 250 metres to its east. The new drainage culvert would control overland flow that surcharges Mill Stream and discharges through the southern portion of the Eastlake golf course during events greater than about 10% AEP.

  Under the EIS design there would be an increase in the peak 1% AEP flood level upstream of Mill Stream of 0.10 metres, which would also lead to an increase in the rate and therefore depth of flow that surcharges the western bank of Mill Stream and is conveyed along the travel lanes of Southern Cross Drive and Botany Road. These impacts have now been mitigated under the revised design.

- There would be either no change or a slight reduction in peak flood levels upstream of Mill Stream bridge for storms with AEP's of 50%, 2% and 0.5%, in addition to the PMF.

- The upgrade of the drainage system along the section of rail corridor between Mill Stream bridge and Lord Street would result in a reduction in the depth and extent of inundation within the section of the Eastlake golf course to its north, which is consistent with the EIS design.

- While the upgrade of the drainage system along the rail corridor would result in a reduction in the depth and extent of inundation in a number of properties to the south (downstream) of the rail corridor in Lord Street for events up to 0.5% AEP in intensity, during a PMF there would be an increase in peak flood levels in three commercial type properties in Lord Street, as well as an area of Booralee Park and the carpark of the Botany Aquatic Centre. PMF levels would be increased by a maximum of 0.13 metres but typically less than 0.08 metres on existing depths of about 0.6 metres. The relative increase in the depth of inundation during a PMF event is considered to have a minor impact on the flood hazard in the area.

  Under the EIS design there would be a similar increase in PMF levels in the vicinity of Lord Street, but over a smaller area that includes two commercial type properties in Lord Street. The extent of the impact under the revised design has increased due to an increase in flow that surcharges across the rail corridor to the east of Mill Stream bridge. The increase in flow is the result of a slight lowering of ground levels which is required to accommodate the duplicated track and its cess drain.

Changes in flow velocities:

- During a 1% AEP event maximum flow velocities along the section of Mill Stream to the south of the rail line would be increased by a maximum of 0.2 metres per second on existing velocities that typically range between 1.8 and 2.4 metres per second. This compares to a maximum increase in flow velocity of 0.9 metres per second based on the EIS design.

  The relative increase in 1% AEP flow velocities in Mill Stream under the revised design is considered to have a minor impact on scour potential along Mill Stream.

Changes in the extent and duration of flooding:

- While under the EIS design there would be an increase in both the extent and duration of inundation along Southern Cross Drive and Botany Road due to an increase in the rate of flow that surcharges Mill Stream, this impact would be mitigated under the revised design due to its reduced obstruction on the conveyance of flow in the watercourse.
- Changes in the extent and duration of inundation along the main arm of Mill Stream would be minor, which is consistent with the EIS design.

In the vicinity of Myrtle Street

Changes in peak flood levels:

- There would be either no change or a slight reduction in peak flood levels in residential properties that are located to the north (upstream) of the rail corridor between Banksia Street and Myrtle Street. The removal of proposed works along the existing section of track between Banksia Street and Myrtle Street under the revised design has reduced the impact that the project would have in altering flooding patterns in this area. As a result, increases in peak flood levels that would be experienced in 104 Bay Street and 15 Begonia Street under the EIS design would be mitigated under the revised design.
- There would be minor changes in peak flood levels within the section of the Eastlake golf course to the north of Myrtle Street for all events up to the PMF. For example, during a 10% and 2% AEP event there would be an increase in peak flood levels in an area of the golf course immediately east of the rail corridor by a maximum of 0.05 m, whereas during a 1% and 0.2% AEP event and the PMF there would be either no change or a slight reduction in peak flood levels in the same area. The changes in peak flood levels are considered minor given the existing depths of inundation and the nature of the areas that would be impacted.
- The upgrade of the drainage system and the provision of a barrier wall along the southern side of the rail corridor between Banksia Street and Myrtle Street would result in either no change or a slight reduction in the depth and extent of inundation in areas to its south (downstream) for events up to the PMF.

Changes in flow velocities:

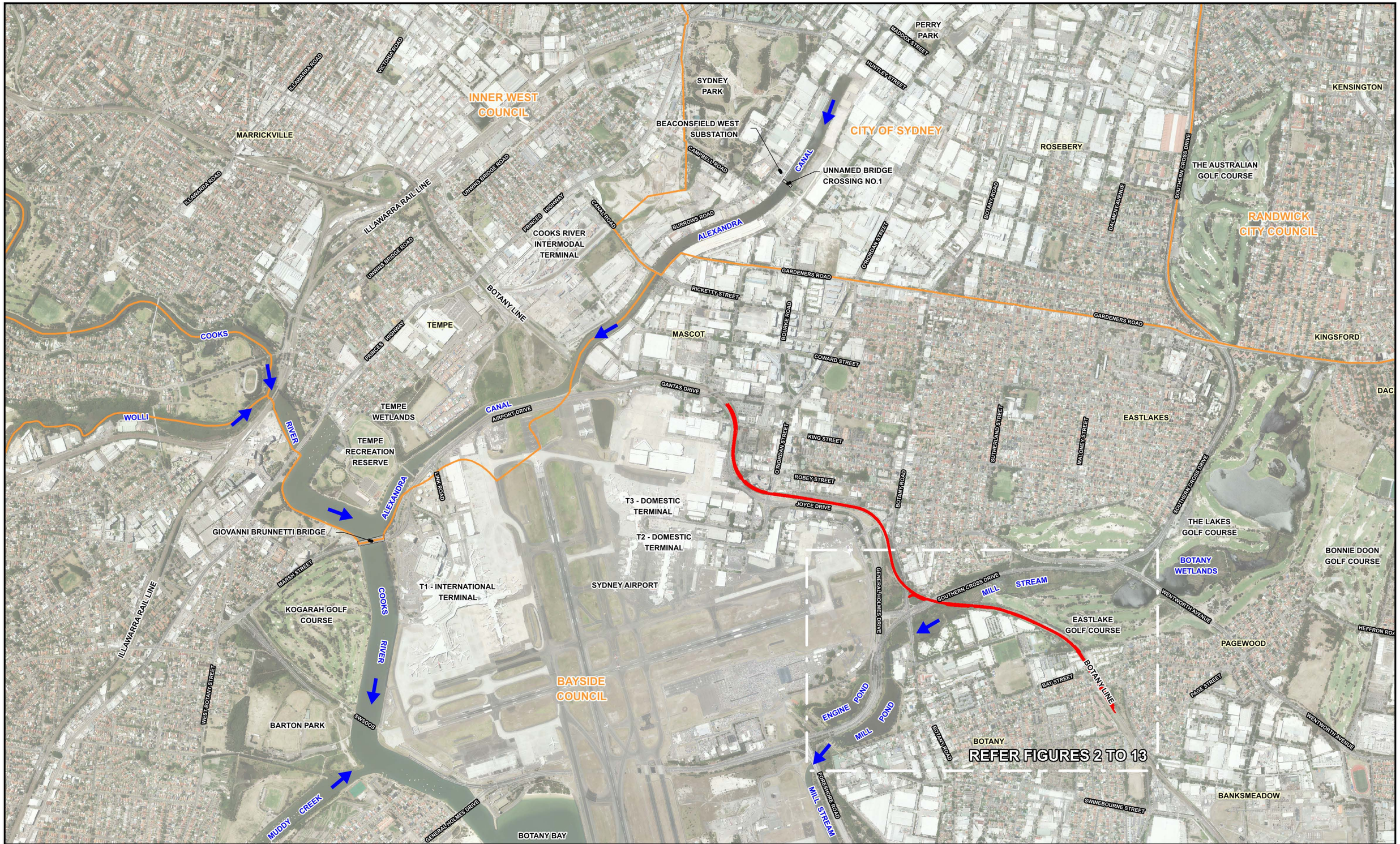
- Changes in flow velocities during a 1% AEP event would generally be consistent with those described in L&A, 2019 based on the EIS design.

Changes in the extent and duration of flooding:

- Changes in the extent and duration of inundation during a 1% AEP event would generally be consistent with those described in L&A, 2019 based on the EIS design.

FIGURES

LIST OF FIGURES



N

200 0 200 400 600 m

Scale: 1:20,000

LEGEND

- LGA Boundary
- Botany Rail Duplication Project

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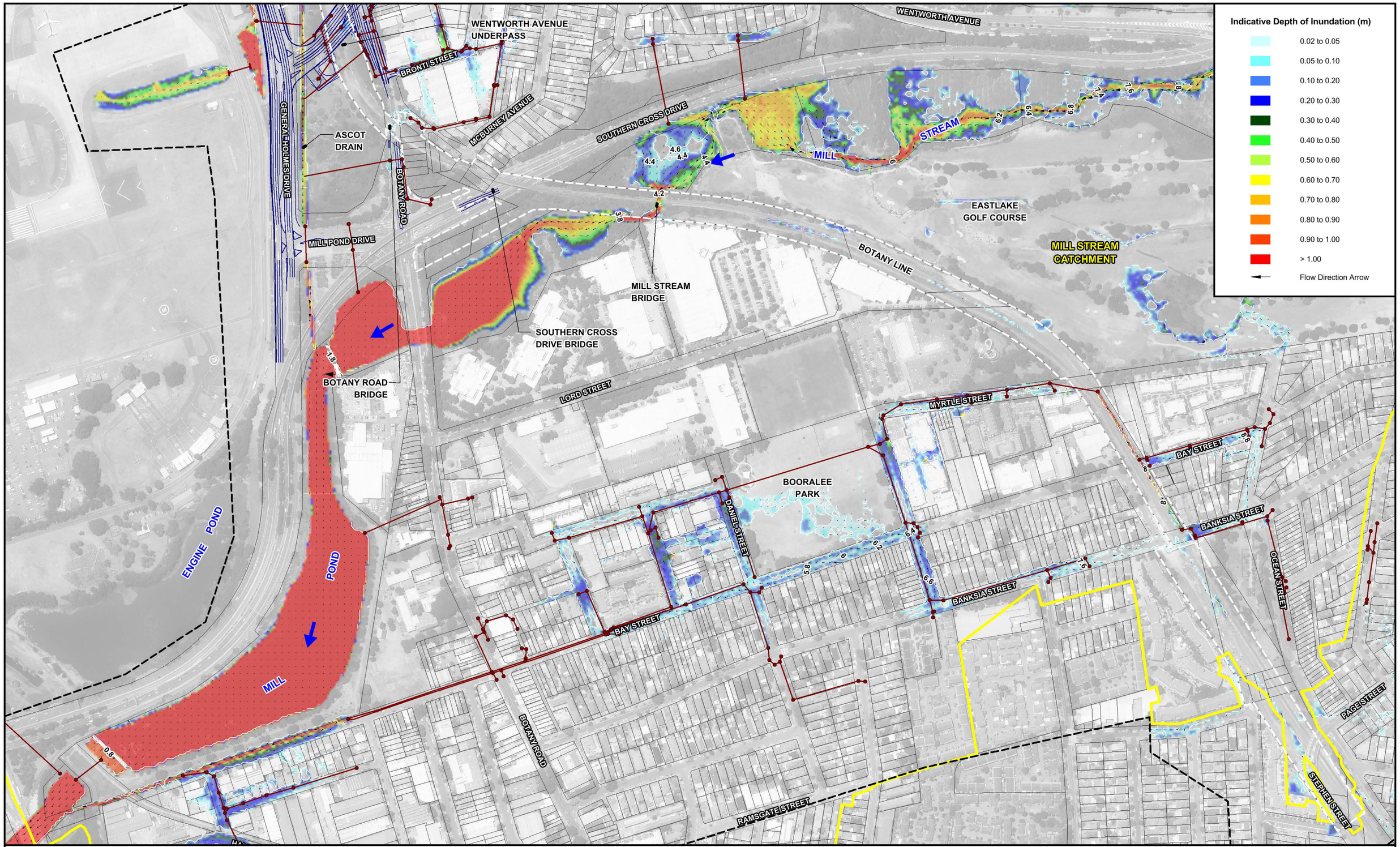
BOTANY RAIL DUPLICATION ENVIRONMENT IMPACT STATEMENT
ASSESSMENT OF RESIDUAL IMPACTS OF THE PROJECT ON FLOOD BEHAVIOUR

Figure 1

LOCATION PLAN



N

50 0 50 100 150 m

Scale: 1:5,000

Lyall & Associates

Note:

The ground surface model incorporated in TUFLOW is based on LiDAR survey which has been sampled on a 2m (min.) grid and does not necessarily incorporate localised features which can influence flooding behaviour in individual allotments.

Flood depths are therefore approximate only and require interpretation by a suitably qualified engineer to determine flooding behaviour in individual allotments. Any assessment of flooding in individual allotments may also require a site survey.

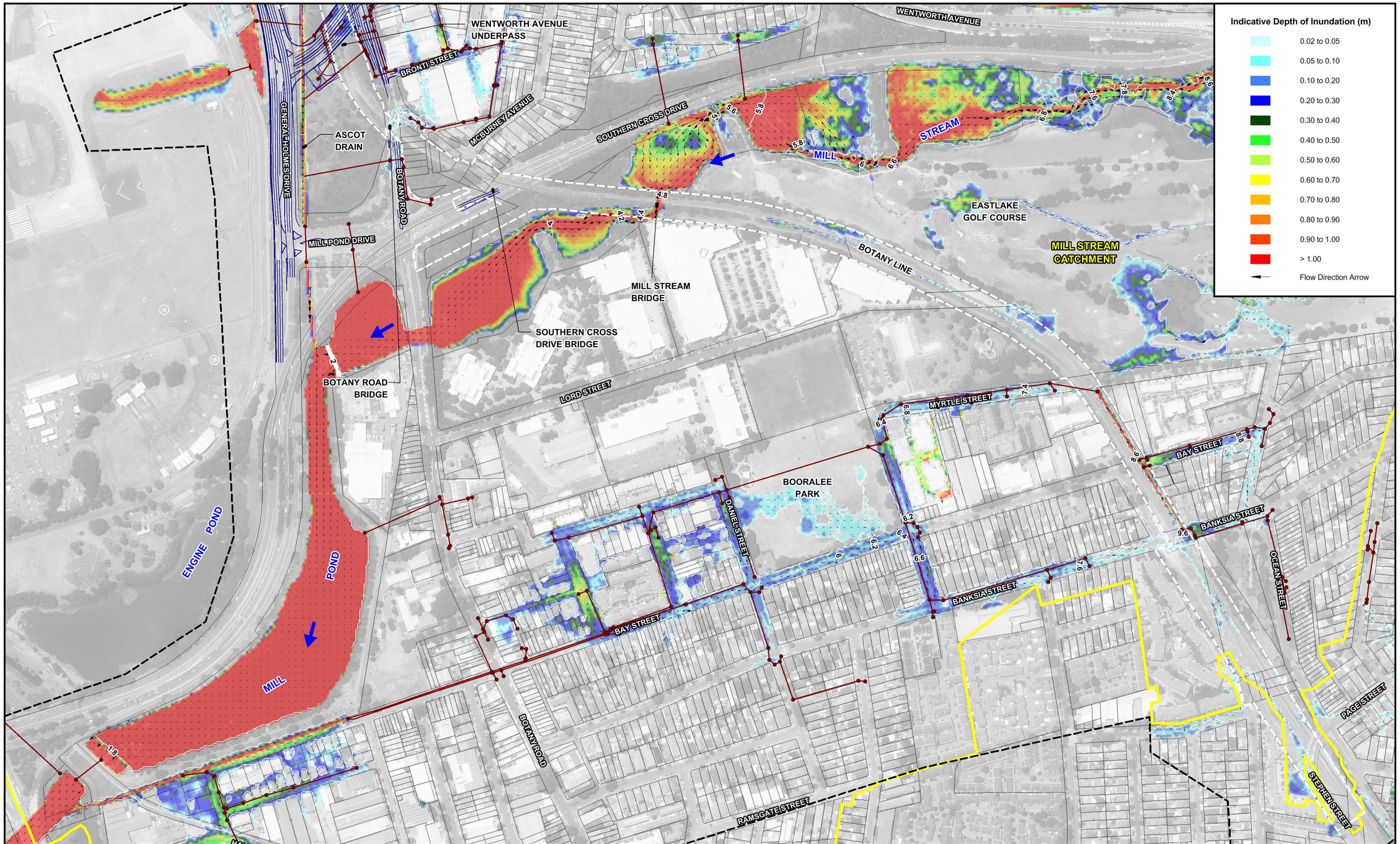
LEGEND

- Two-Dimensional Model Boundary
- Catchment Boundary
- Existing Drainage System
- Project Footprint
- Airport North and Airport East Road Works
- 4.4 Water Surface Elevation Contours

BOTANY RAIL DUPLICATION ENVIRONMENT IMPACT STATEMENT
ASSESSMENT OF RESIDUAL IMPACTS OF THE PROJECT ON FLOOD BEHAVIOUR

Figure 2

PATTERNS OF MAIN STREAM FLOODING AND MAJOR OVERLAND FLOW
PRE-PROJECT CONDITIONS - 50% AEP EVENT



N

50 0 50 100 150 m

Scale: 1:5,000

Lyall & Associates

Note:

The ground surface model incorporated in TUFLOW is based on LiDAR survey which has been sampled on a 2m (min.) grid and does not necessarily incorporate localised features which can influence flooding behaviour in individual allotments.

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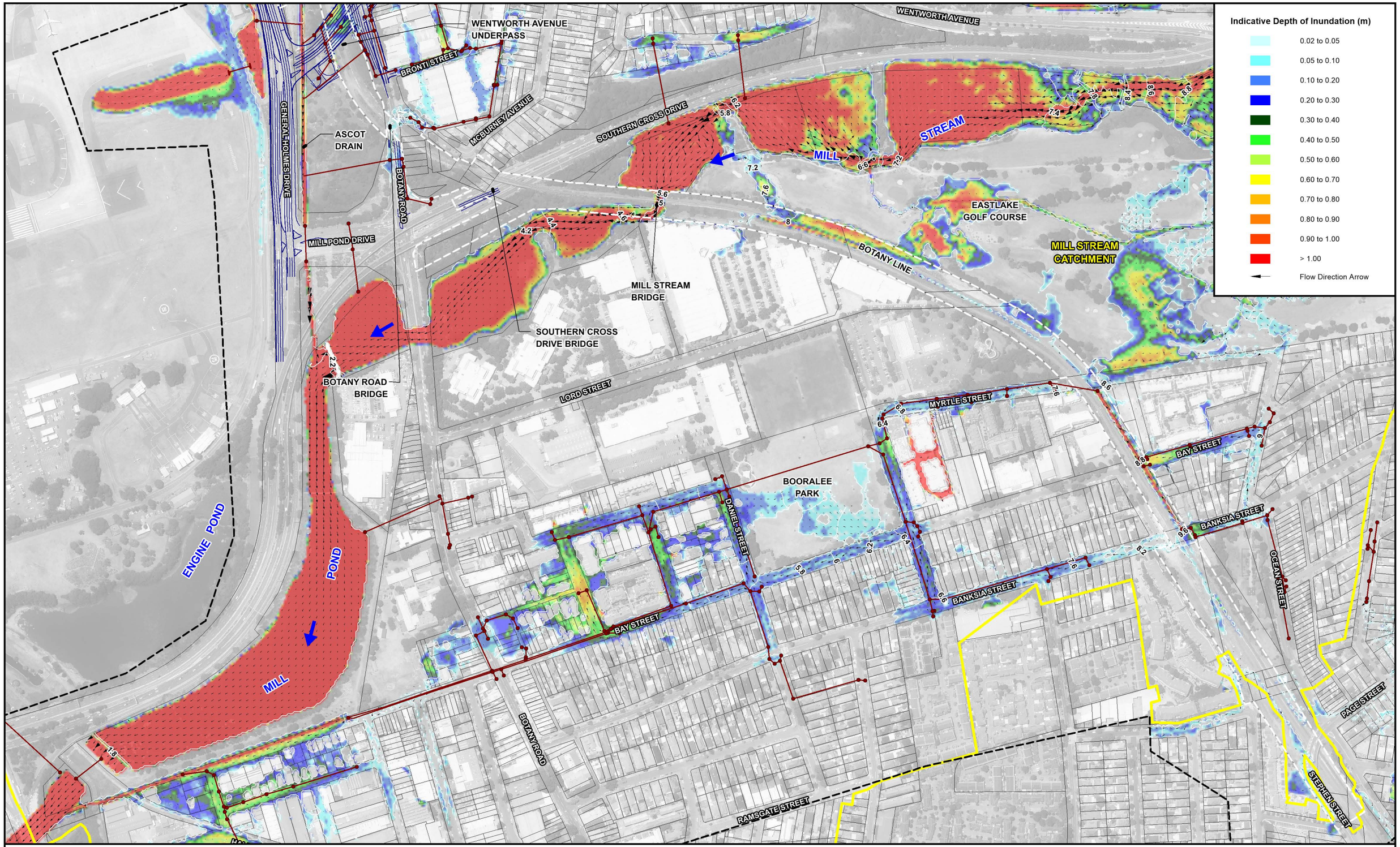
LEGEND

- Two-Dimensional Model Boundary
- Catchment Boundary
- Existing Drainage System
- Project Footprint
- Airport North and Airport East Road Works
- Water Surface Elevation Contours

BOTANY RAIL DUPLICATION ENVIRONMENT IMPACT STATEMENT
ASSESSMENT OF RESIDUAL IMPACTS OF THE PROJECT ON FLOOD BEHAVIOUR

Figure 3

PATTERNS OF MAIN STREAM FLOODING AND MAJOR OVERLAND FLOW
PRE-PROJECT CONDITIONS - 10% AEP EVENT



N

50 0 50 100 150 m

Scale: 1:5,000

Lyall & Associates

Note:

The ground surface model incorporated in TUFLOW is based on LiDAR survey which has been sampled on a 2m (min.) grid and does not necessarily incorporate localised features which can influence flooding behaviour in individual allotments.

Flood depths are therefore approximate only and require interpretation by a suitably qualified engineer to determine flooding behaviour in individual allotments. Any assessment of flooding in individual allotments may also require a site survey.

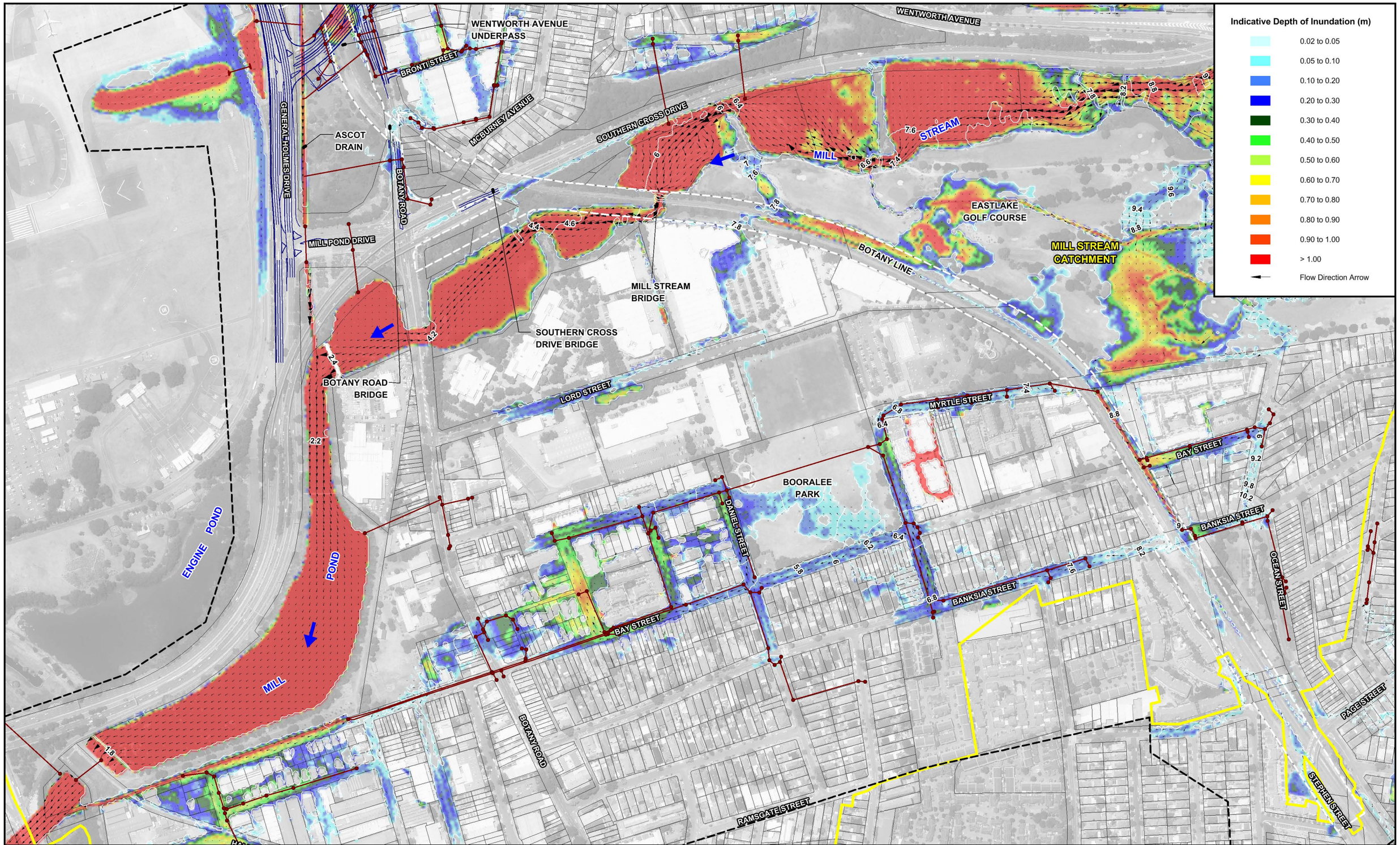
LEGEND

- Two-Dimensional Model Boundary
- Catchment Boundary
- Existing Drainage System
- Project Footprint
- Airport North and Airport East Road Works
- Water Surface Elevation Contours

BOTANY RAIL DUPLICATION ENVIRONMENT IMPACT STATEMENT
ASSESSMENT OF RESIDUAL IMPACTS OF THE PROJECT ON FLOOD BEHAVIOUR

Figure 4

PATTERNS OF MAIN STREAM FLOODING AND MAJOR OVERLAND FLOW
PRE-PROJECT CONDITIONS - 2% AEP EVENT



N

50 0 50 100 150 m

Scale: 1:5,000

Lyall & Associates

Note:

The ground surface model incorporated in TUFLOW is based on LiDAR survey which has been sampled on a 2m (min.) grid and does not necessarily incorporate localised features which can influence flooding behaviour in individual allotments.

Flood depths are therefore approximate only and require interpretation by a suitably qualified engineer to determine flooding behaviour in individual allotments. Any assessment of flooding in individual allotments may also require a site survey.

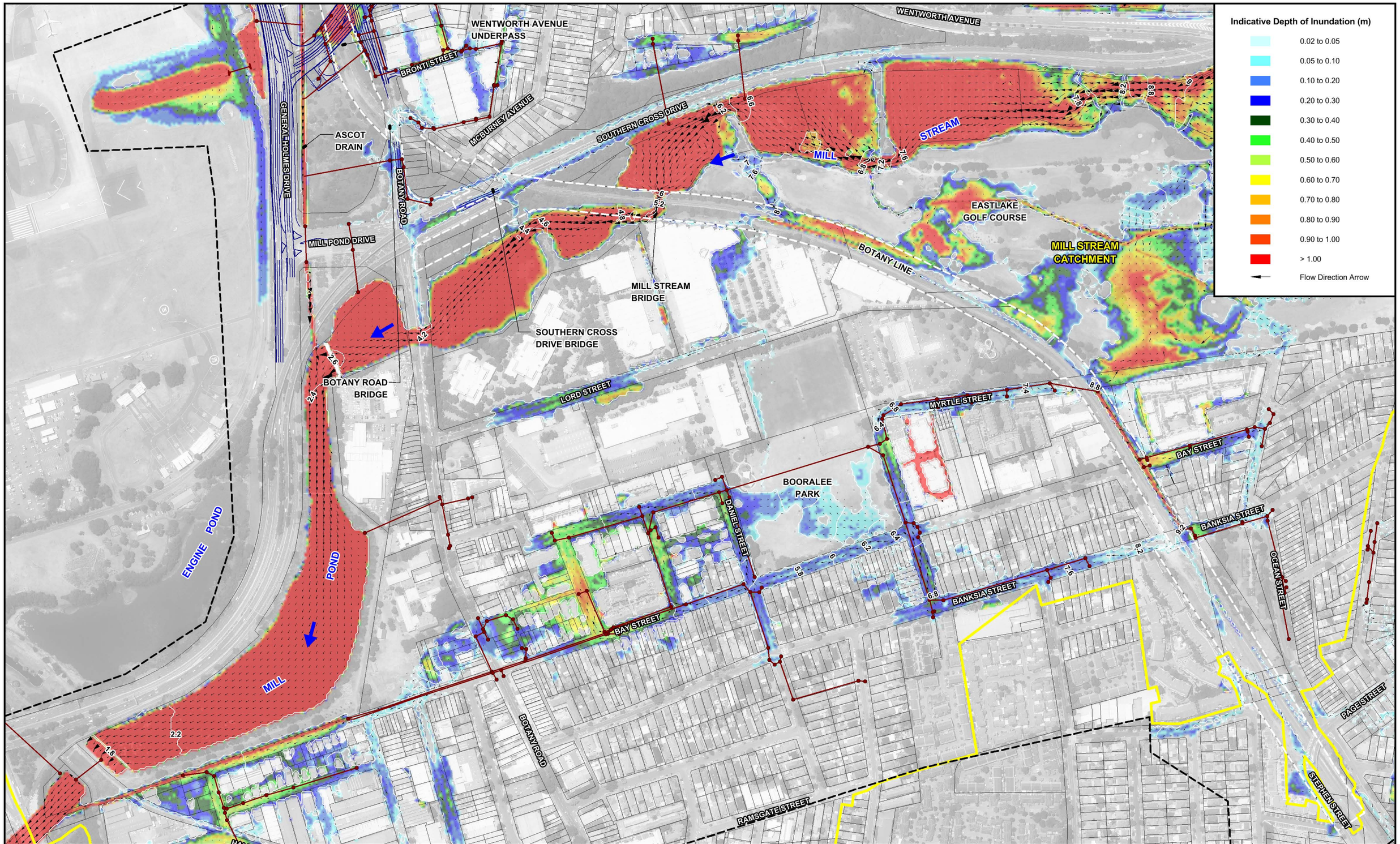
LEGEND

- Two-Dimensional Model Boundary
- Catchment Boundary
- Existing Drainage System
- Project Footprint
- Airport North and Airport East Road Works
- Water Surface Elevation Contours (4.4)

BOTANY RAIL DUPLICATION ENVIRONMENT IMPACT STATEMENT
ASSESSMENT OF RESIDUAL IMPACTS OF THE PROJECT ON FLOOD BEHAVIOUR

Figure 5

PATTERNS OF MAIN STREAM FLOODING AND MAJOR OVERLAND FLOW
PRE-PROJECT CONDITIONS - 1% AEP EVENT



N

50 0 50 100 150 m

Scale: 1:5,000

Lyall & Associates

Note:

The ground surface model incorporated in TUFLOW is based on LiDAR survey which has been sampled on a 2m (min.) grid and does not necessarily incorporate localised features which can influence flooding behaviour in individual allotments.

Flood depths are therefore approximate only and require interpretation by a suitably qualified engineer to determine flooding behaviour in individual allotments. Any assessment of flooding in individual allotments may also require a site survey.

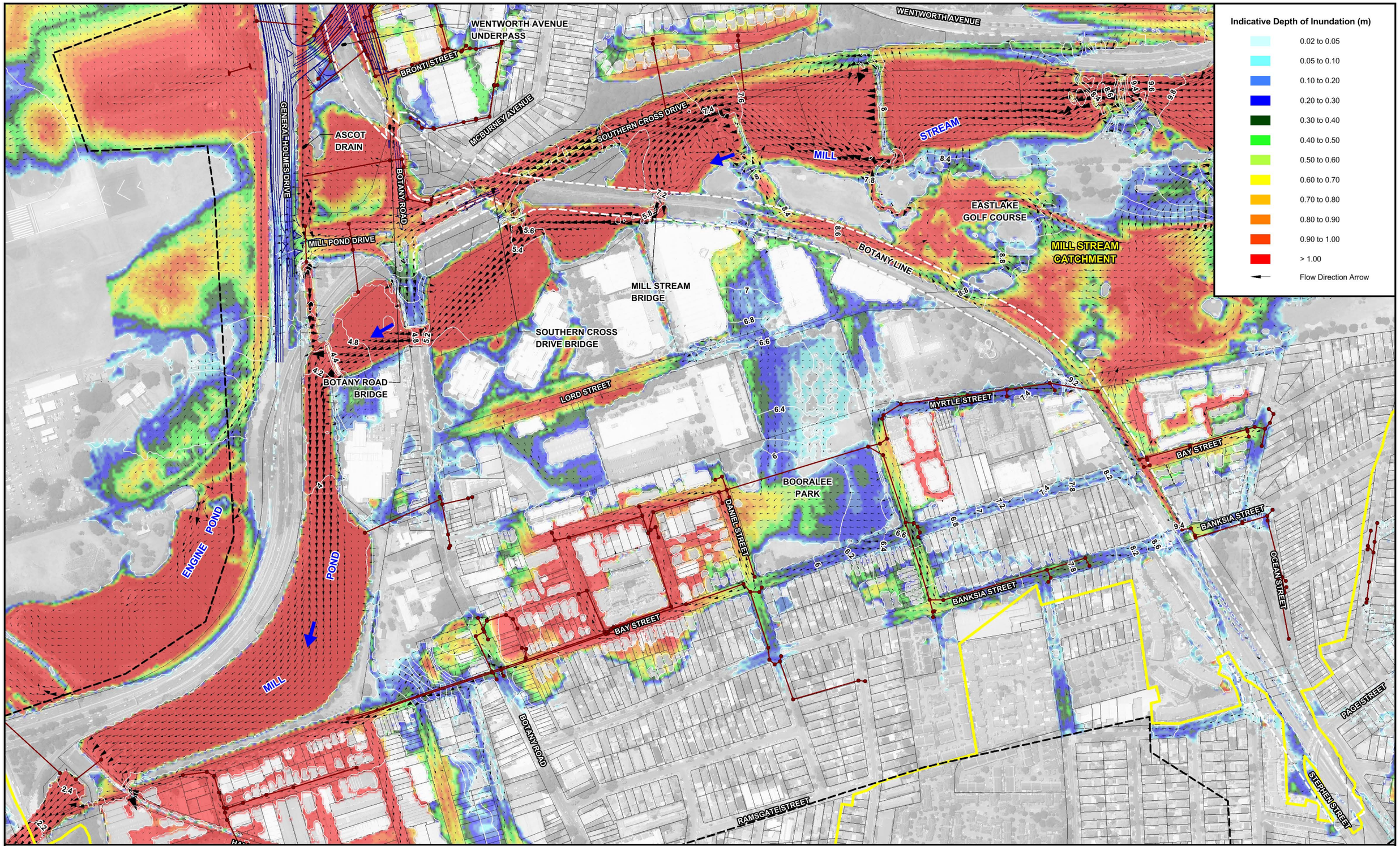
LEGEND

- Two-Dimensional Model Boundary
- Catchment Boundary
- Existing Drainage System
- Project Footprint
- Airport North and Airport East Road Works
- 4.4 Water Surface Elevation Contours

BOTANY RAIL DUPLICATION ENVIRONMENT IMPACT STATEMENT
ASSESSMENT OF RESIDUAL IMPACTS OF THE PROJECT ON FLOOD BEHAVIOUR

Figure 6

PATTERNS OF MAIN STREAM FLOODING AND MAJOR OVERLAND FLOW
PRE-PROJECT CONDITIONS - 0.5% AEP EVENT



N

50 0 50 100 150 m

Scale: 1:5,000

Note:

The ground surface model incorporated in TUFLOW is based on LiDAR survey which has been sampled on a 2m (min.) grid and does not necessarily incorporate localised features which can influence flooding behaviour in individual allotments.

Flood depths are therefore approximate only and require interpretation by a suitably qualified engineer to determine flooding behaviour in individual allotments. Any assessment of flooding in individual allotments may also require a site survey.

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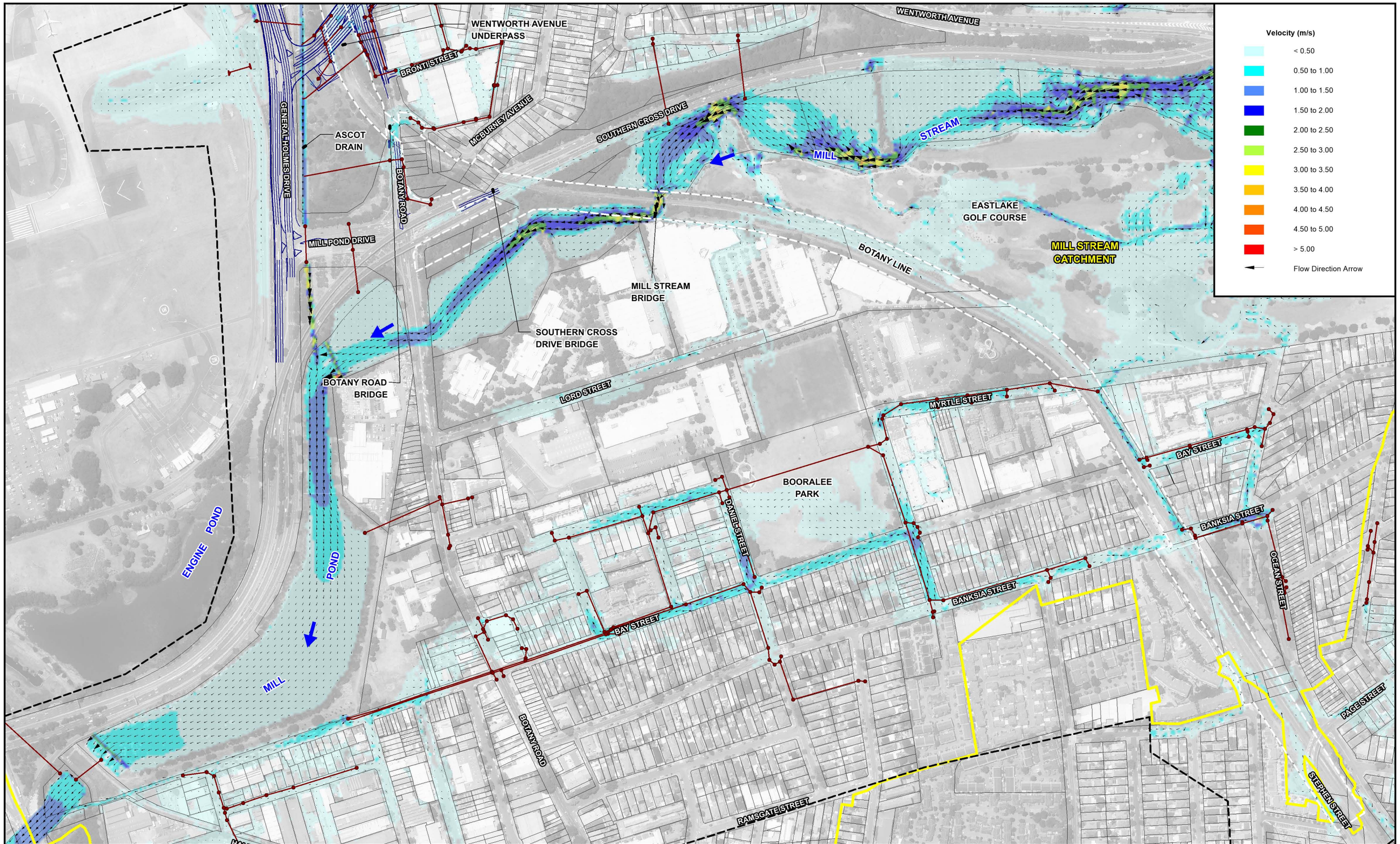
LEGEND

- Two-Dimensional Model Boundary
- Catchment Boundary
- Existing Drainage System
- Project Footprint
- Airport North and Airport East Road Works
- 5.6 Water Surface Elevation Contours

BOTANY RAIL DUPLICATION ENVIRONMENT IMPACT STATEMENT
ASSESSMENT OF RESIDUAL IMPACTS OF THE PROJECT ON FLOOD BEHAVIOUR

Figure 7

PATTERNS OF MAIN STREAM FLOODING AND MAJOR OVERLAND FLOW
PRE-PROJECT CONDITIONS - PMF EVENT



N

50 0 50 100 150 m

Scale: 1:5,000

Lyall & Associates

Note:

The ground surface model incorporated in TUFLOW is based on LiDAR survey which has been sampled on a 2m (min.) grid and does not necessarily incorporate localised features which can influence flooding behaviour in individual allotments.

Flood depths are therefore approximate only and require interpretation by a suitably qualified engineer to determine flooding behaviour in individual allotments. Any assessment of flooding in individual allotments may also require a site survey.

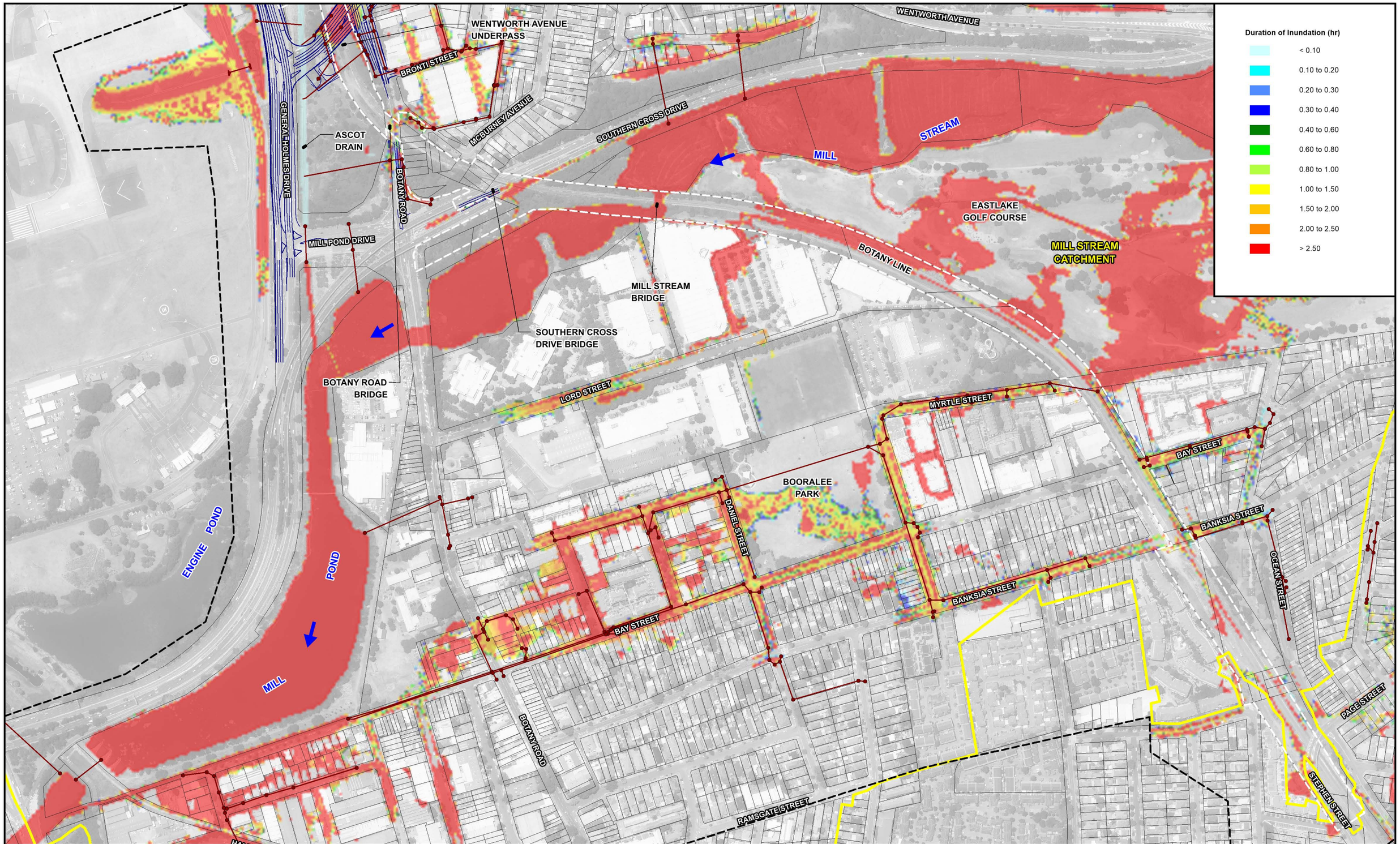
LEGEND

- Two-Dimensional Model Boundary
- Catchment Boundary
- Existing Drainage System
- Project Footprint
- Airport North and Airport East Road Works

BOTANY RAIL DUPLICATION ENVIRONMENT IMPACT STATEMENT
ASSESSMENT OF RESIDUAL IMPACTS OF THE PROJECT ON FLOOD BEHAVIOUR

Figure 8

PEAK FLOW VELOCITIES
PRE-PROJECT CONDITIONS - 1% AEP EVENT



N

50 0 50 100 150 m

Scale: 1:5,000

Note:

The ground surface model incorporated in TUFLOW is based on LiDAR survey which has been sampled on a 2m (min.) grid and does not necessarily incorporate localised features which can influence flooding behaviour in individual allotments.

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LEGEND

- Two-Dimensional Model Boundary
- Catchment Boundary
- Existing Drainage System
- Project Footprint
- Airport North and Airport East Road Works

BOTANY RAIL DUPLICATION ENVIRONMENT IMPACT STATEMENT
ASSESSMENT OF RESIDUAL IMPACTS OF THE PROJECT ON FLOOD BEHAVIOUR

Figure 9

DURATION OF INUNDATION
PRE-PROJECT CONDITIONS - 1% AEP EVENT

Afflux (m)

- < -0.2
- -0.20 to -0.10
- -0.10 to -0.01
- -0.01 to 0.01
- 0.01 to 0.02
- 0.02 to 0.05
- 0.05 to 0.10
- 0.10 to 0.20
- 0.20 to 0.30
- 0.30 to 0.50
- > 0.50
- Land Rendered Flood Free as a Result of Change
- Additional Area of Land Flooded as a Result of Change

WENTWORTH AVENUE UNDERPASS
WENTWORTH AVENUE
BRONTI STREET
DO10
GENERAL HOLMES DRIVE
ASCOT DRAIN
MCBURNEY AVENUE
SOUTHERN CROSS DRIVE
DO11
BOTANY ROAD
EXISTING BRIDGE
MILL
STREAM
DO12
DO13
EASTLAKE GOLF COURSE
MILL POND DRIVE
PROPOSED BRIDGE FOR DUPLICATED TRACK
MILL STREAM BRIDGE
BOTANY LINE
MILL STREAM CATCHMENT
SOUTHERN CROSS DRIVE BRIDGE
BOTANY ROAD BRIDGE
LORD STREET
MYRTLE STREET
DO14
BAY STREET
BOORALEE PARK
DANIEL STREET
BARRIER WALL
BANKSIA STREET
OCEAN STREET
PAGE STREET
STEPHEN STREET
ENGINE POND
POND
MILL
BOTANY ROAD
RAMSGATE STREET

N

50 0 50 100 150 m

Scale: 1:5,000

Note:

The ground surface model incorporated in TUFLOW is based on LiDAR survey which has been sampled on a 2m (min.) grid and does not necessarily incorporate localised features which can influence flooding behaviour in individual allotments.

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LEGEND

- Two-Dimensional Model Boundary
- Catchment Boundary
- Existing Drainage System to Remain
- Proposed Drainage System
- Botany Rail Duplication Project
- Airport North and Airport East Road Works
- DO5 Drainage Outlet Location and Identifier
- Proposed Corridor Access Road
- Project Footprint

BOTANY RAIL DUPLICATION ENVIRONMENT IMPACT STATEMENT
ASSESSMENT OF RESIDUAL IMPACTS OF THE PROJECT ON FLOOD BEHAVIOUR

Figure 10

IMPACT OF PROJECT OPERATION ON FLOOD BEHAVIOUR
50% AEP EVENT

Afflux (m)

- < -0.2
- -0.20 to -0.10
- -0.10 to -0.01
- -0.01 to 0.01
- 0.01 to 0.02
- 0.02 to 0.05
- 0.05 to 0.10
- 0.10 to 0.20
- 0.20 to 0.30
- 0.30 to 0.50
- > 0.50
- Land Rendered Flood Free as a Result of Change
- Additional Area of Land Flooded as a Result of Change

WENTWORTH AVENUE UNDERPASS
WENTWORTH AVENUE
BRONTI STREET
DO10
GENERAL HOLMES DRIVE
ASCOT DRAIN
MCBURNEY AVENUE
SOUTHERN CROSS DRIVE
DO11
BOTANY ROAD
EXISTING BRIDGE
STREAM
MILL
DO12
DO13
EASTLAKE GOLF COURSE
MILL POND DRIVE
PROPOSED BRIDGE FOR DUPLICATED TRACK
MILL STREAM BRIDGE
BOTANY LINE
MILL STREAM CATCHMENT
SOUTHERN CROSS DRIVE BRIDGE
BOTANY ROAD BRIDGE
LORD STREET
DO14
MYRTLE STREET
BAY STREET
BOORALEE PARK
DANIEL STREET
BARRIER WALL
BANKSIA STREET
OCEAN STREET
ENGINE POND
POND
MILL
BOTANY ROAD
PAGE STREET
STEPHEN STREET
RAMSGATE STREET

N

50 0 50 100 150 m

Scale: 1:5,000

Note:

The ground surface model incorporated in TUFLOW is based on LiDAR survey which has been sampled on a 2m (min.) grid and does not necessarily incorporate localised features which can influence flooding behaviour in individual allotments.

Flood depths are therefore approximate only and require interpretation by a suitably qualified engineer to determine flooding behaviour in individual allotments. Any assessment of flooding in individual allotments may also require a site survey.

Lyall & Associates

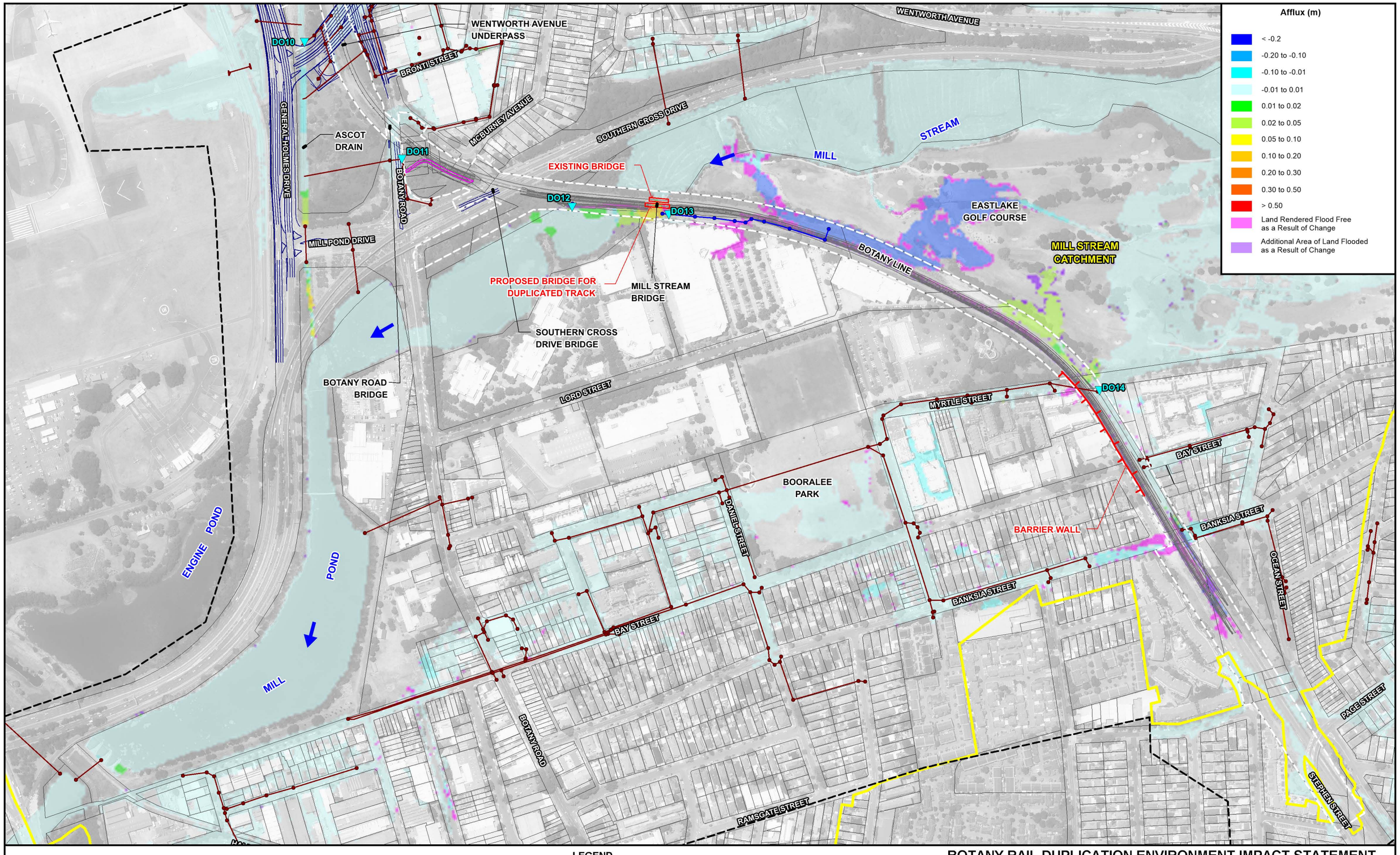
LEGEND

- Two-Dimensional Model Boundary
- Catchment Boundary
- Existing Drainage System to Remain
- Proposed Drainage System
- Botany Rail Duplication Project
- Airport North and Airport East Road Works
- DO5 Drainage Outlet Location and Identifier
- Proposed Corridor Access Road
- Project Footprint

BOTANY RAIL DUPLICATION ENVIRONMENT IMPACT STATEMENT
ASSESSMENT OF RESIDUAL IMPACTS OF THE PROJECT ON FLOOD BEHAVIOUR

Figure 11

IMPACT OF PROJECT OPERATION ON FLOOD BEHAVIOUR
10% AEP EVENT



N

50 0 50 100 150 m

Scale: 1:5,000

Note:

The ground surface model incorporated in TUFLOW is based on LiDAR survey which has been sampled on a 2m (min.) grid and does not necessarily incorporate localised features which can influence flooding behaviour in individual allotments.

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Lyall & Associates

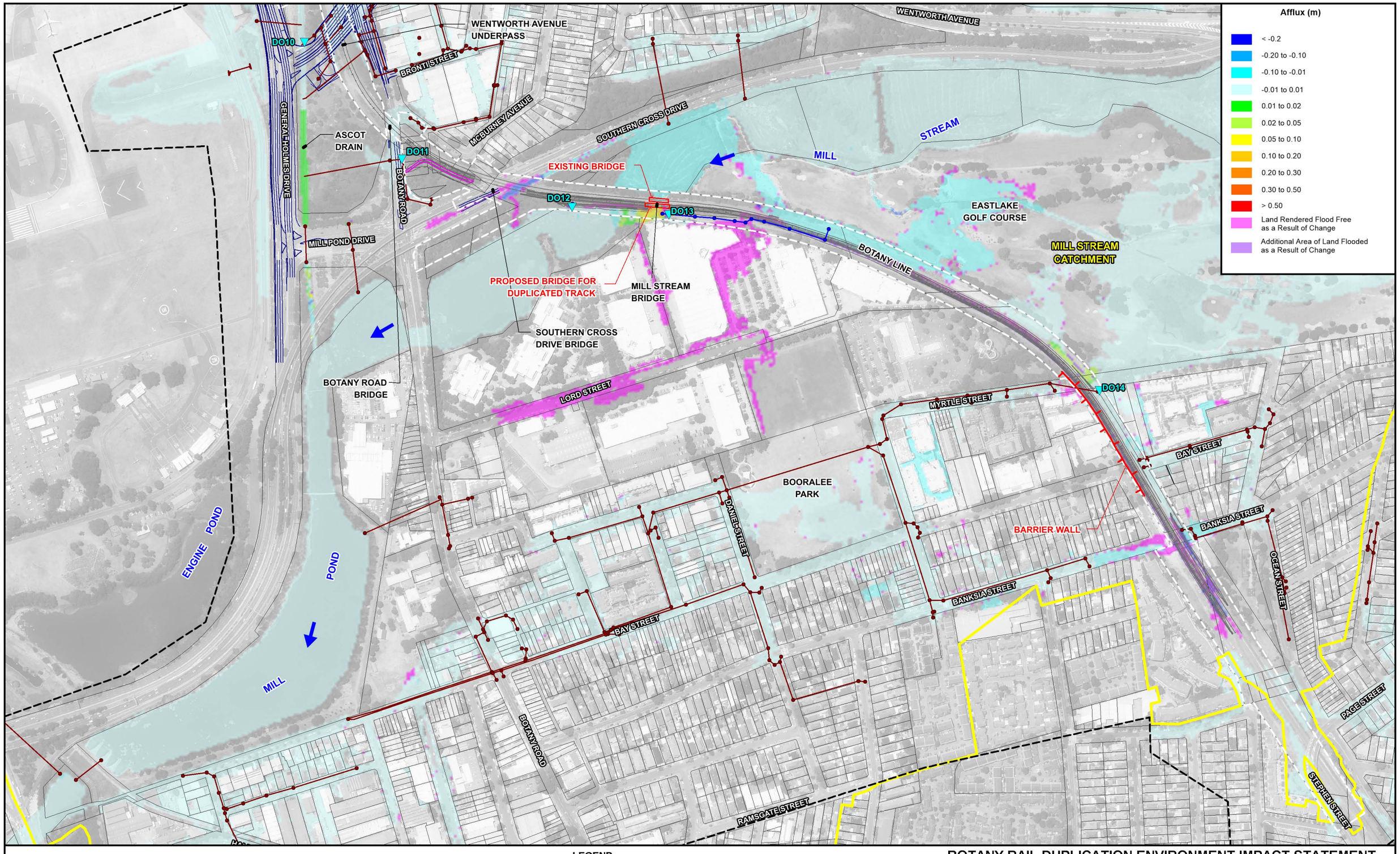
LEGEND

- Two-Dimensional Model Boundary
- Catchment Boundary
- Existing Drainage System to Remain
- Proposed Drainage System
- Botany Rail Duplication Project
- Airport North and Airport East Road Works
- DO5 Drainage Outlet Location and Identifier
- Proposed Corridor Access Road
- Project Footprint

BOTANY RAIL DUPLICATION ENVIRONMENT IMPACT STATEMENT
ASSESSMENT OF RESIDUAL IMPACTS OF THE PROJECT ON FLOOD BEHAVIOUR

Figure 12

IMPACT OF PROJECT OPERATION ON FLOOD BEHAVIOUR
2% AEP EVENT



N

50 0 50 100 150 m

Scale: 1:5,000

Lyall & Associates

Note:

The ground surface model incorporated in TUFLOW is based on LiDAR survey which has been sampled on a 2m (min.) grid and does not necessarily incorporate localised features which can influence flooding behaviour in individual allotments.

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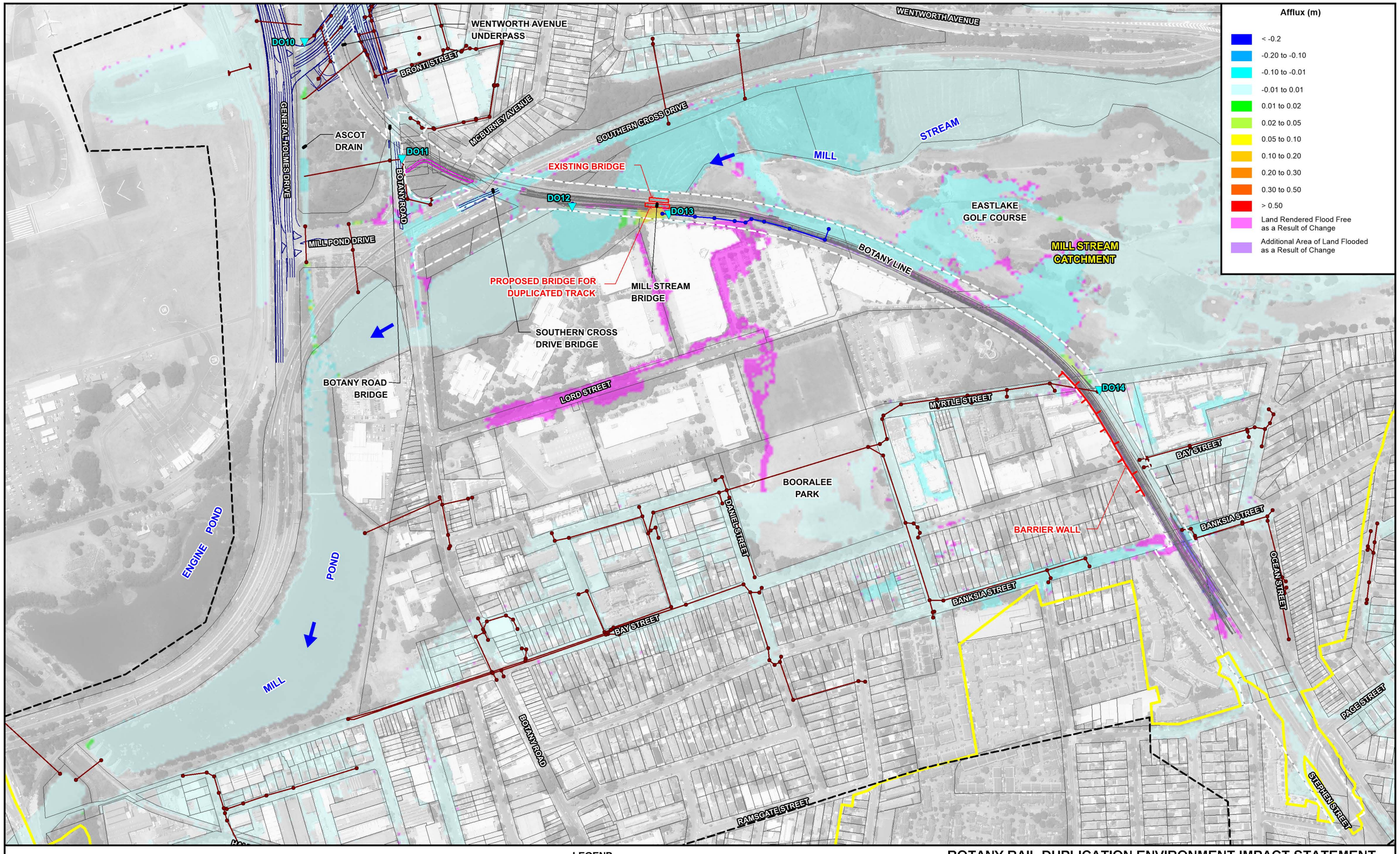
LEGEND

- Two-Dimensional Model Boundary
- Catchment Boundary
- Existing Drainage System to Remain
- Proposed Drainage System
- Botany Rail Duplication Project
- Airport North and Airport East Road Works
- DO5 Drainage Outlet Location and Identifier
- Proposed Corridor Access Road
- Project Footprint

BOTANY RAIL DUPLICATION ENVIRONMENT IMPACT STATEMENT
ASSESSMENT OF RESIDUAL IMPACTS OF THE PROJECT ON FLOOD BEHAVIOUR

Figure 13

IMPACT OF PROJECT OPERATION ON FLOOD BEHAVIOUR
1% AEP EVENT



N

50 0 50 100 150 m

Scale: 1:5,000

Note:

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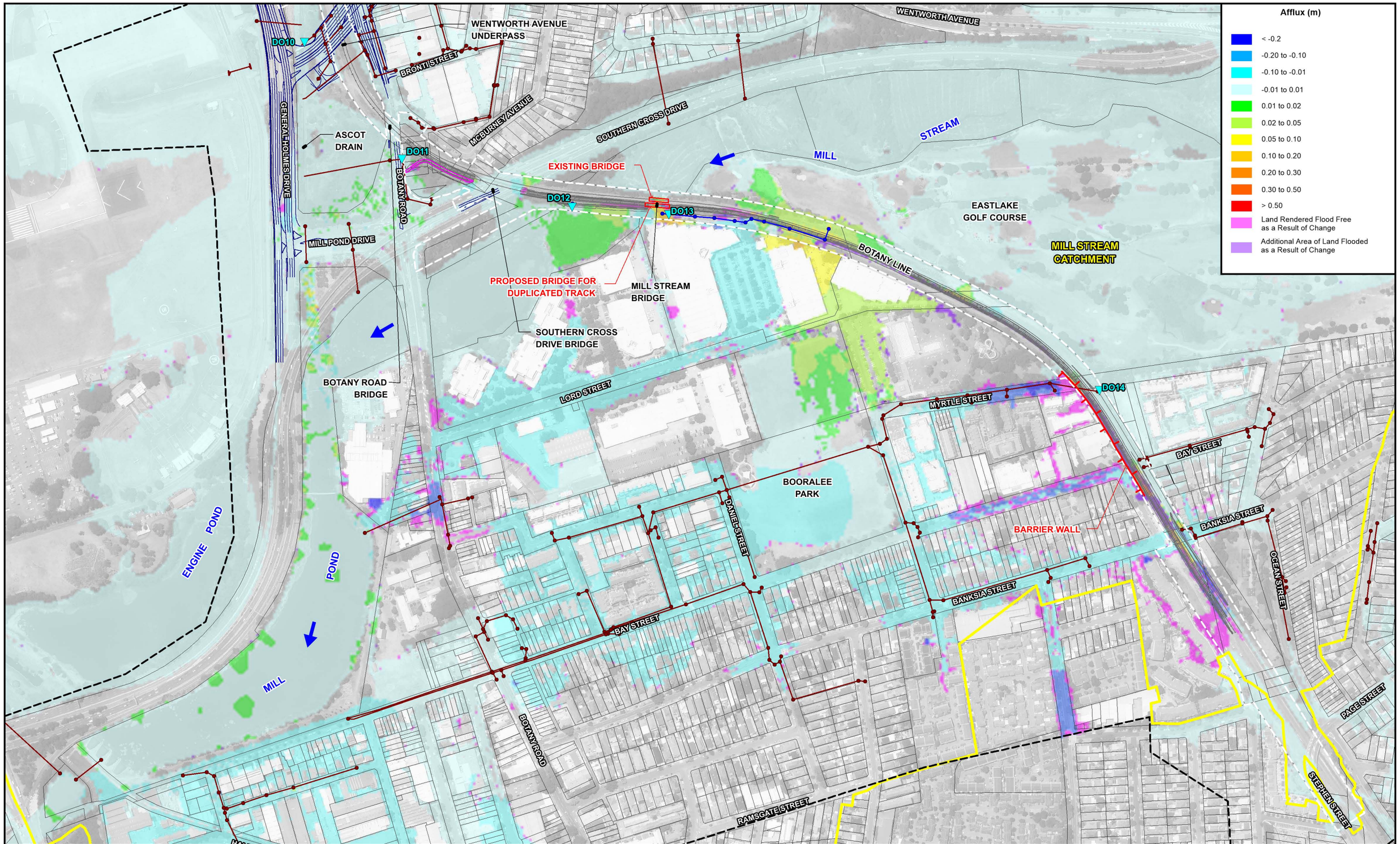
LEGEND

- Two-Dimensional Model Boundary
- Catchment Boundary
- Existing Drainage System to Remain
- Proposed Drainage System
- Botany Rail Duplication Project
- Airport North and Airport East Road Works
- DO5 Drainage Outlet Location and Identifier
- Proposed Corridor Access Road
- Project Footprint

BOTANY RAIL DUPLICATION ENVIRONMENT IMPACT STATEMENT
ASSESSMENT OF RESIDUAL IMPACTS OF THE PROJECT ON FLOOD BEHAVIOUR

Figure 14

IMPACT OF PROJECT OPERATION ON FLOOD BEHAVIOUR
0.5% AEP EVENT



N

50 0 50 100 150 m

Scale: 1:5,000

Lyall & Associates

Note:

The ground surface model incorporated in TUFLOW is based on LiDAR survey which has been sampled on a 2m (min.) grid and does not necessarily incorporate localised features which can influence flooding behaviour in individual allotments.

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LEGEND

- Two-Dimensional Model Boundary
- Catchment Boundary
- Existing Drainage System to Remain
- Proposed Drainage System
- Botany Rail Duplication Project
- Airport North and Airport East Road Works
- DO5 Drainage Outlet Location and Identifier
- Proposed Corridor Access Road
- Project Footprint

BOTANY RAIL DUPLICATION ENVIRONMENT IMPACT STATEMENT
ASSESSMENT OF RESIDUAL IMPACTS OF THE PROJECT ON FLOOD BEHAVIOUR

Figure 15

IMPACT OF PROJECT OPERATION ON FLOOD BEHAVIOUR
PMF EVENT

Velocity Afflux (m/s)

-0.05 to 0.05
0.05 to 0.10
0.10 to 0.15
0.15 to 0.20
0.20 to 0.30
0.30 to 0.40
0.40 to 0.50
> 0.50
Land Rendered Flood Free as a Result of Change
Additional Area of Land Flooded as a Result of Change

WENTWORTH AVENUE UNDERPASS
WENTWORTH AVENUE
BRONTI STREET
MCBURNEY AVENUE
SOUTHERN CROSS DRIVE
GENERAL HOLMES DRIVE
ASCOT DRAIN
DO10
DO11
DO12
DO13
DO14
BOTANY ROAD
MILL POND DRIVE
EXISTING BRIDGE
PROPOSED BRIDGE FOR DUPLICATED TRACK
MILL STREAM BRIDGE
SOUTHERN CROSS DRIVE BRIDGE
BOTANY ROAD BRIDGE
LORD STREET
MILL
STREAM
EASTLAKE GOLF COURSE
MILL STREAM CATCHMENT
BOTANY LINE
MYRTLE STREET
BAY STREET
BOORALEE PARK
DANIEL STREET
BARRIER WALL
BANKSIA STREET
OCEAN STREET
PAGE STREET
STEPHEN STREET
RAMSGATE STREET
ENGINE POND
POND
MILL

N

50 0 50 100 150 m

Scale: 1:5,000

Note:

The ground surface model incorporated in TUFLOW is based on LiDAR survey which has been sampled on a 2m (min.) grid and does not necessarily incorporate localised features which can influence flooding behaviour in individual allotments.

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LEGEND

- Two-Dimensional Model Boundary
- Catchment Boundary
- Existing Drainage System to Remain
- Proposed Drainage System
- Botany Rail Duplication Project
- Airport North and Airport East Road Works
- DO5 Drainage Outlet Location and Identifier
- Proposed Corridor Access Road
- Project Footprint

BOTANY RAIL DUPLICATION ENVIRONMENT IMPACT STATEMENT
ASSESSMENT OF RESIDUAL IMPACTS OF THE PROJECT ON FLOOD BEHAVIOUR

Figure 16

IMPACT OF PROJECT OPERATION ON PEAK FLOW VELOCITIES
1% AEP EVENT

Change in
Duration of Inundation (hr)

- < -0.05
- -0.05 to 0.05
- 0.05 to 0.10
- 0.10 to 0.15
- 0.15 to 0.20
- 0.20 to 0.30
- 0.30 to 0.40
- 0.40 to 0.50
- > 0.50
- Land Rendered Flood Free as a Result of Change
- Additional Area of Land Flooded as a Result of Change

WENTWORTH AVENUE UNDERPASS
WENTWORTH AVENUE
DO10
BRONTI STREET
GENERAL HOLMES DRIVE
ASCOT DRAIN
DO11
BOTANY ROAD
MCBURNEY AVENUE
SOUTHERN CROSS DRIVE
STREAM
MILL
EXISTING BRIDGE
DO12
DO13
EASTLAKE GOLF COURSE
MILL POND DRIVE
BOTANY LINE
MILL STREAM CATCHMENT
PROPOSED BRIDGE FOR DUPLICATED TRACK
MILL STREAM BRIDGE
SOUTHERN CROSS DRIVE BRIDGE
BOTANY ROAD BRIDGE
LORD STREET
MYRTLE STREET
DO14
BAY STREET
BOORALEE PARK
DANIEL STREET
BARRIER WALL
BANKSIA STREET
OCEAN STREET
PAGE STREET
STEPHEN STREET
ENGINE POND
POND
MILL
BOTANY ROAD
RAMSGATE STREET

N

50 0 50 100 150 m

Scale: 1:5,000

Lyall & Associates

Note:

The ground surface model incorporated in TUFLOW is based on LiDAR survey which has been sampled on a 2m (min.) grid and does not necessarily incorporate localised features which can influence flooding behaviour in individual allotments.

Flood depths are therefore approximate only and require interpretation by a suitably qualified engineer to determine flooding behaviour in individual allotments. Any assessment of flooding in individual allotments may also require a site survey.

LEGEND

- Two-Dimensional Model Boundary
- Catchment Boundary
- Existing Drainage System to Remain
- Proposed Drainage System
- Botany Rail Duplication Project
- Airport North and Airport East Road Works
- DO5 Drainage Outlet Location and Identifier
- Proposed Corridor Access Road
- Project Footprint

BOTANY RAIL DUPLICATION ENVIRONMENT IMPACT STATEMENT
ASSESSMENT OF RESIDUAL IMPACTS OF THE PROJECT ON FLOOD BEHAVIOUR

Figure 17

IMPACT OF PROJECT OPERATION ON DURATION OF INUNDATION
1% AEP EVENT

Appendix C – Additional construction noise assessment

Memorandum

To:		**At:**	Gateway to Sydney Joint Venture
From:	Antony Williams	**At:**	SLR Consulting Australia Pty Ltd
Date:	24 February 2020	**Ref:**	610.17858-Subs Report_Construction-v0.3.docx
Subject:	Botany Rail Duplication Submissions Report Construction Impacts		

1 Additional Construction Noise Assessment

Technical Report 2 – Noise and Vibration Impact Assessment assessed the construction impacts from the project against the NSW EPA *Interim Construction Noise Guideline* which requires "realistic worst-case" construction impacts to be determined.

In response to submissions, additional modelling of key construction scenarios has been completed to provide additional granularity regarding the extent of predicted impacts, including impacts from non worst-case scenarios. The potential impacts to the New Qantas Flight Training Centre, which has recently been approved, have also been included in this assessment.

The additional construction scenarios have been categorised into 'Peak' and 'Typical' works. The 'Peak' scenarios represent the noisiest activities which may require noise intensive equipment such as rockbreakers or concrete saws at times. The 'Typical' scenarios represent typical noise emissions when noise intensive equipment is generally not being used.

It is noted that at this early stage of the project, information regarding how the project would be constructed is indicative in nature. Detailed construction staging information would become available as the project progresses and a construction contractor is engaged.

The additional assessment scenarios are shown in **Table 1**. This assessment uses the same methodology, prediction methods and criteria as defined in the *Technical Report 2 – Noise and Vibration Impact Assessment*, which should be referenced where further details are required.

Table 1 Construction Scenario Descriptions

ID	Scenario[1,2]	Activity	Description
1a	Enabling Works	Utilities – Peak	Enabling works would be required early to allow the main construction activities to occur. These works are expected to include: • Utility relocation/protection • Vegetation clearing and property adjustment Works using noise intensive equipment would be required at certain times and would include the use of concrete saws during utility works, and chain saws and chippers during vegetation removal.
1b		Utilities – Typical	
2a		Veg. Clearance & Prop. Adjusts. – Peak	
2b		Veg. Clearance & Prop. Adjusts. – Typical	
3a	Bridge Works	Demolition (inc. breaker) – Peak	There are four bridge locations in the project site – Mill Stream bridge, Southern Cross bridge, O'Riordan Street bridge and Robey Street bridge. New bridge structures would be required at each location and demolition and replacement of the existing bridge would be required at O'Riordan Street and Robey Street. Works using noise intensive equipment would be required at certain times during bridge demolition and would include the use of concrete saws or rockbreakers.
3b		Demolition – Typical	
4a		Construction – Peak	
4b		Construction – Typical	
5a	Track Works	Peak	The track works would involve the construction of new track, the upgrading of existing track and installation of new crossovers, turnouts and catchpoints. 'Peak' work includes the use of noise intensive equipment such as concrete saws or track machines including a ballast tamper or ballast regulator. 'Typical' works are representative of noise levels outside of the worst-case when noise intensive equipment isn't being used.
5b		Typical	
6a	Testing, Commissioning & Finishing	Peak	Testing and commissioning works are required for the new track and signalling equipment prior to operation. Finishing works would include: • Removal of temporary fencing • Landscape activities • Removal of ancillary compounds. Testing, commissioning and finishing works generally have no requirement for noise intensive equipment.
6b		Typical	

2 Predicted Impacts

The following assessment shows the predicted noise impacts based on the exceedance of the Noise Management Level (NML), as per the three categories in **Table 2**. The corresponding subjective response of people affected by the impacts is also shown in the table, noting that the subjective response would vary and depends on the period in which the impacts occur (ie people are generally less sensitive to impacts during the daytime and more sensitive in the evening and night-time).

Table 2 NML Exceedance Bands and Corresponding Qualitative Response to Impacts

Exceedance of NML	Symbol	Likely Subjective Response
Compliance	·	Barely noticeable
1 to 10 dB	●	Marginal to minor
11 dB to 20 dB	◆	Moderate
>20 dB	■	High

The predicted construction noise impacts are presented for the most affected receivers. Receivers which are further away from the works and/or shielded from view would have substantially lower noise impacts. The assessment is generally considered conservative as the calculations assume several items of construction equipment are in use at the same time within individual scenarios.

A summary of the predicted construction noise impacts in each Noise Catchment Area (NCA) for residential receivers is shown in **Table 3**. Detailed noise level predictions and summaries of the number of receivers predicted to have 'minor', 'moderate' and 'high' impacts in each NCA are provided in **Appendix A**.

To identify the likely range of impacts during 'Peak' and 'Typical' works, the NML exceedances from selected scenarios are also shown at all receivers in the following figures:

- **Figure 1 -** '*Scenario 1a, Enabling Works – Utilities – Peak*' (Night-time)
- **Figure 2 -** '*Scenario 1b, Enabling Works – Utilities – Typical*' (Night-time)
- **Figure 3 -** '*Scenario 2a, Enabling Works – Veg Clearance & Property Adjustments – Peak'* (Night-time)
- **Figure 4 -** '*Scenario 2b, Enabling Works – Veg Clearance & Property Adjustments – Typical'* (Night-time)
- **Figure 5 -** '*Scenario 5a, Track Works – Peak'* (Night-time)
- **Figure 6 -** '*Scenario 5b, Track Works – Typical'* (Night-time).

Table 3 Predicted Construction Noise Exceedances – Residential Receivers

Period	ID	Scenario	Activity	NCA01	NCA02	NCA03	NCA04	NCA05	NCA06	NCA07	NCA08
Daytime	1a	Enabling Works	Utilities – Peak	·	·	◆	◆	·	·	■	■
	1b		Utilities – Typical	·	·	●	●	·	·	◆	■
	2a		Veg. Clearance & Prop. Adjusts. – Peak	·	·	◆	◆	·	·	■	■
	2b		Veg. Clearance & Prop. Adjusts. – Typical	·	·	●	·	·	·	◆	■
	3a	Bridge Works	Demolition (inc. breaker) – Peak	·	·	●	◆	·	·	·	●
	3b		Demolition – Typical	·	·	·	●	·	·	·	·
	4a		Construction – Peak	·	·	·	●	·	·	·	·
	4b		Construction – Typical	·	·	·	●	·	·	·	·
	5a	Track Works – Peak		·	·	◆	◆	·	·	■	■
	5b	Track Works – Typical		·	·	·	·	·	·	●	◆
	6a	Testing, Commissioning & Finishing – Peak		·	·	●	●	·	·	◆	■
	6b	Testing, Commissioning & Finishing – Typical		·	·	·	·	·	·	●	◆
Evening	1a	Enabling Works	Utilities – Peak	●	·	■	◆	·	·	■	■
	1b		Utilities – Typical	·	·	◆	●	·	·	■	■
	2a		Veg. Clearance & Prop. Adjusts. – Peak	●	·	■	■	·	·	■	■
	2b		Veg. Clearance & Prop. Adjusts. – Typical	·	·	●	●	·	·	■	■
	3a	Bridge Works	Demolition (inc. breaker) – Peak	·	·	◆	■	·	·	·	●
	3b		Demolition – Typical	·	·	●	◆	·	·	·	·
	4a		Construction – Peak	·	·	●	◆	·	·	·	·
	4b		Construction – Typical	·	·	●	●	·	·	·	·
	5a	Track Works – Peak		●	·	■	■	·	·	■	■
	5b	Track Works – Typical		·	·	●	●	·	·	◆	◆
	6a	Testing, Commissioning & Finishing – Peak		·	·	◆	◆	·	·	■	■
	6b	Testing, Commissioning & Finishing – Typical		·	·	●	●	·	·	◆	◆
Night-time	1a	Enabling Works	Utilities – Peak	●	·	■	■	·	·	■	■
	1b		Utilities – Typical	·	·	◆	◆	·	·	■	■
	2a		Veg. Clearance & Prop. Adjusts. – Peak	◆	·	■	■	·	·	■	■
	2b		Veg. Clearance & Prop. Adjusts. – Typical	·	·	◆	◆	·	·	■	■
	3a	Bridge Works	Demolition (inc. breaker) – Peak	●	·	◆	■	·	·	●	●
	3b		Demolition – Typical	·	·	●	◆	·	·	·	·
	4a		Construction – Peak	·	·	◆	■	·	·	·	●
	4b		Construction – Typical	·	·	●	◆	·	·	·	·
	5a	Track Works – Peak		●	·	■	■	·	·	■	■
	5b	Track Works – Typical		·	·	●	●	·	·	◆	■
	6a	Testing, Commissioning & Finishing – Peak		·	·	◆	◆	·	·	■	■
	6b	Testing, Commissioning & Finishing – Typical		·	·	●	●	·	·	◆	■
Key to Impacts			●	◆ Moderate (11 dB to 20 dB)				■ High (>20 dB)			

Note: Cells with no coloured shape represent noise levels that are either compliant or there are no residential receivers in the catchment.

Figure 1 Predicted Impacts '*Scenario 1a, Enabling Works – Utilities – Peak*' (Night-time)

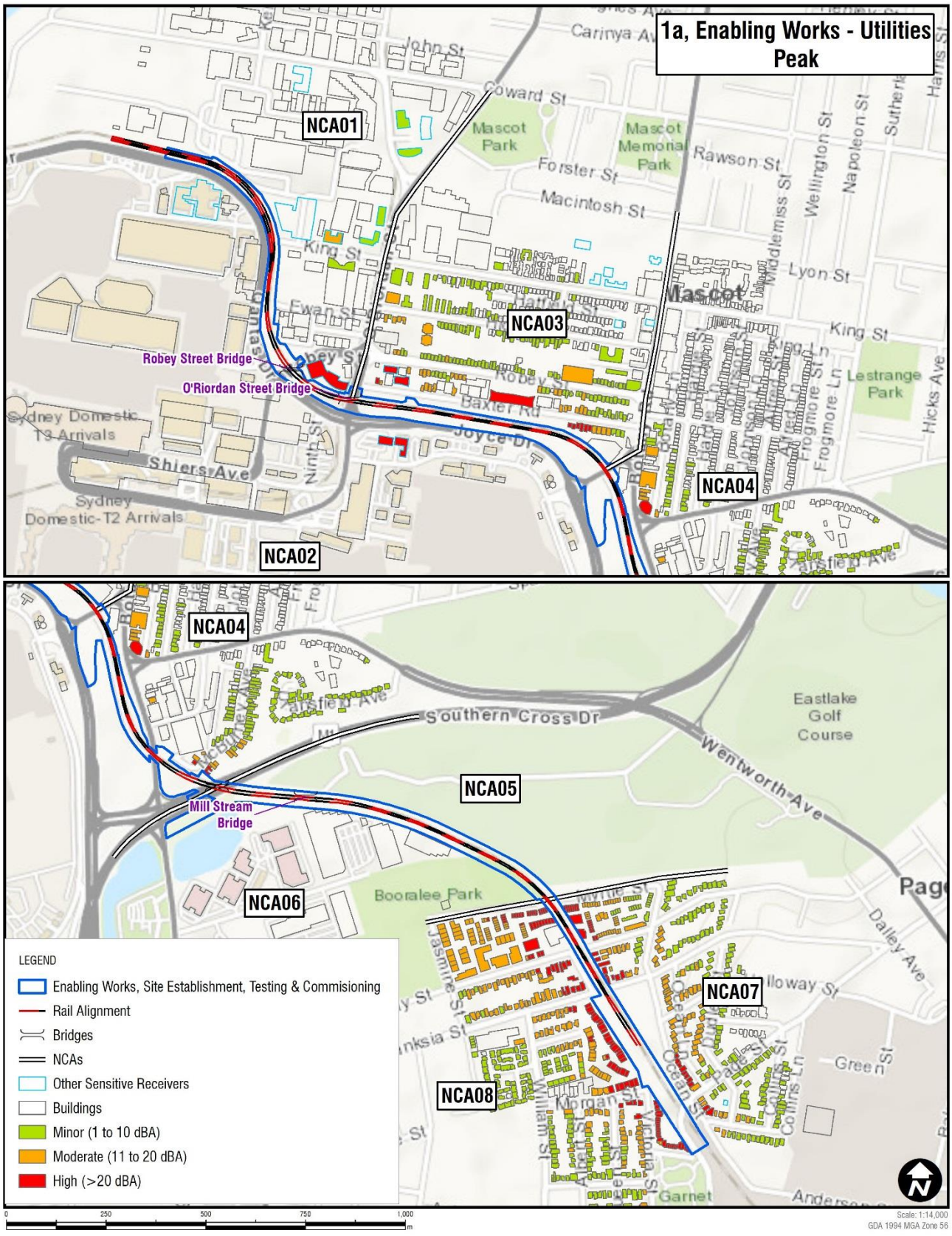


Figure 2 Predicted Impacts '*Scenario 1b, Enabling Works – Utilities – Typical*' (Night-time)

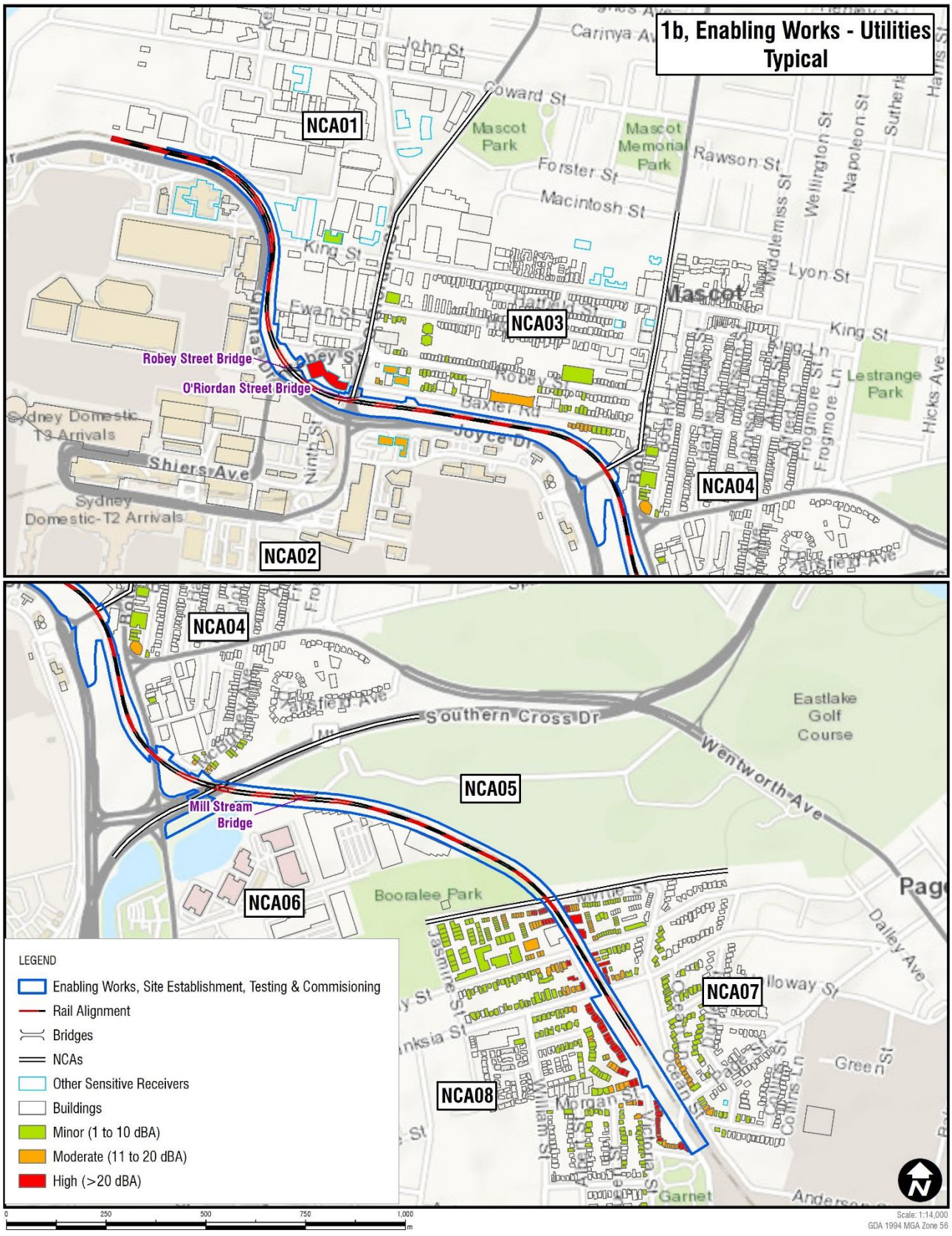


Figure 3 Predicted Impacts '*Scenario 2a, Enabling Works – Veg Clearance & Property Adjustments – Peak*' (Night-time)

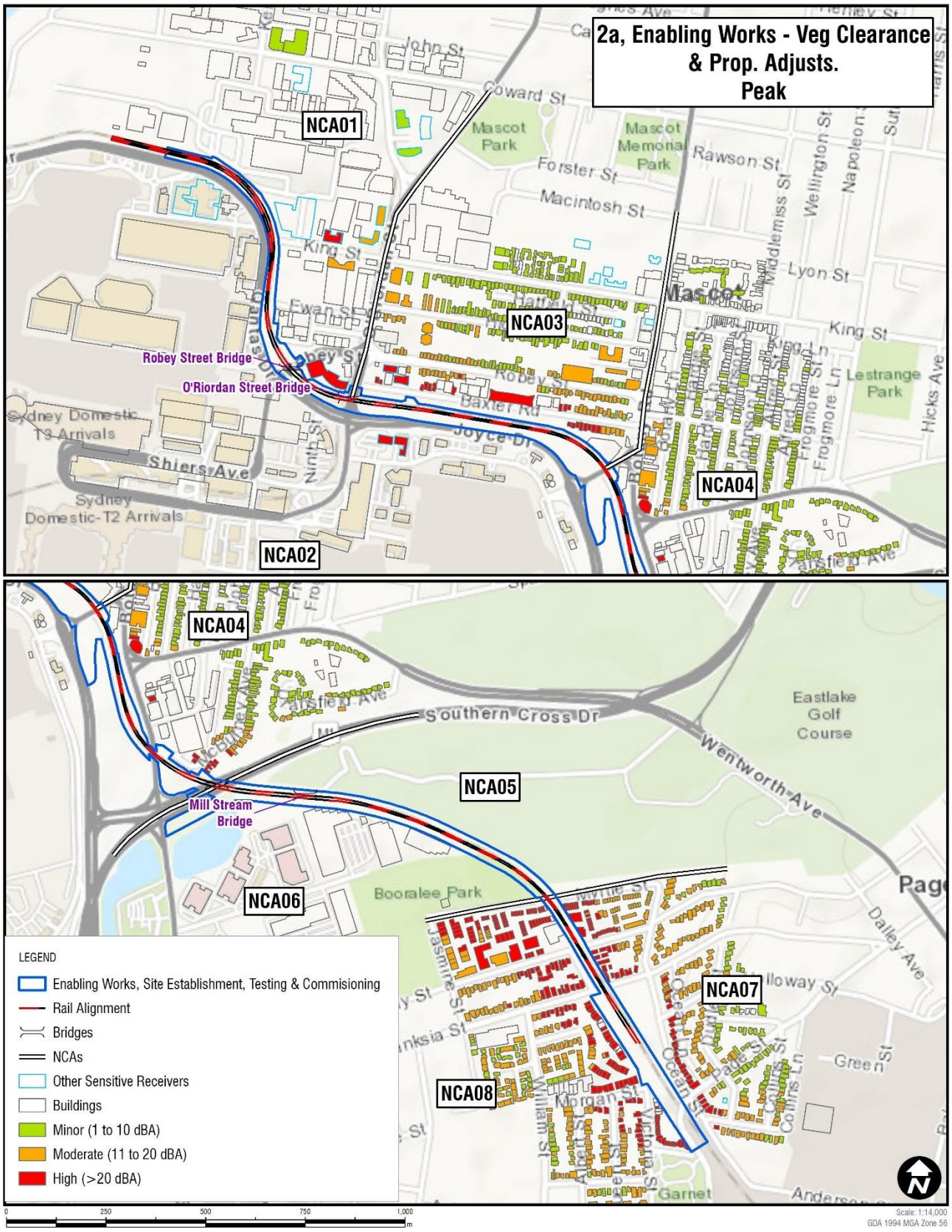


Figure 4 Predicted Impacts '*Scenario 2b, Enabling Works – Veg Clearance & Property Adjustments – Typical*' (Night-time)

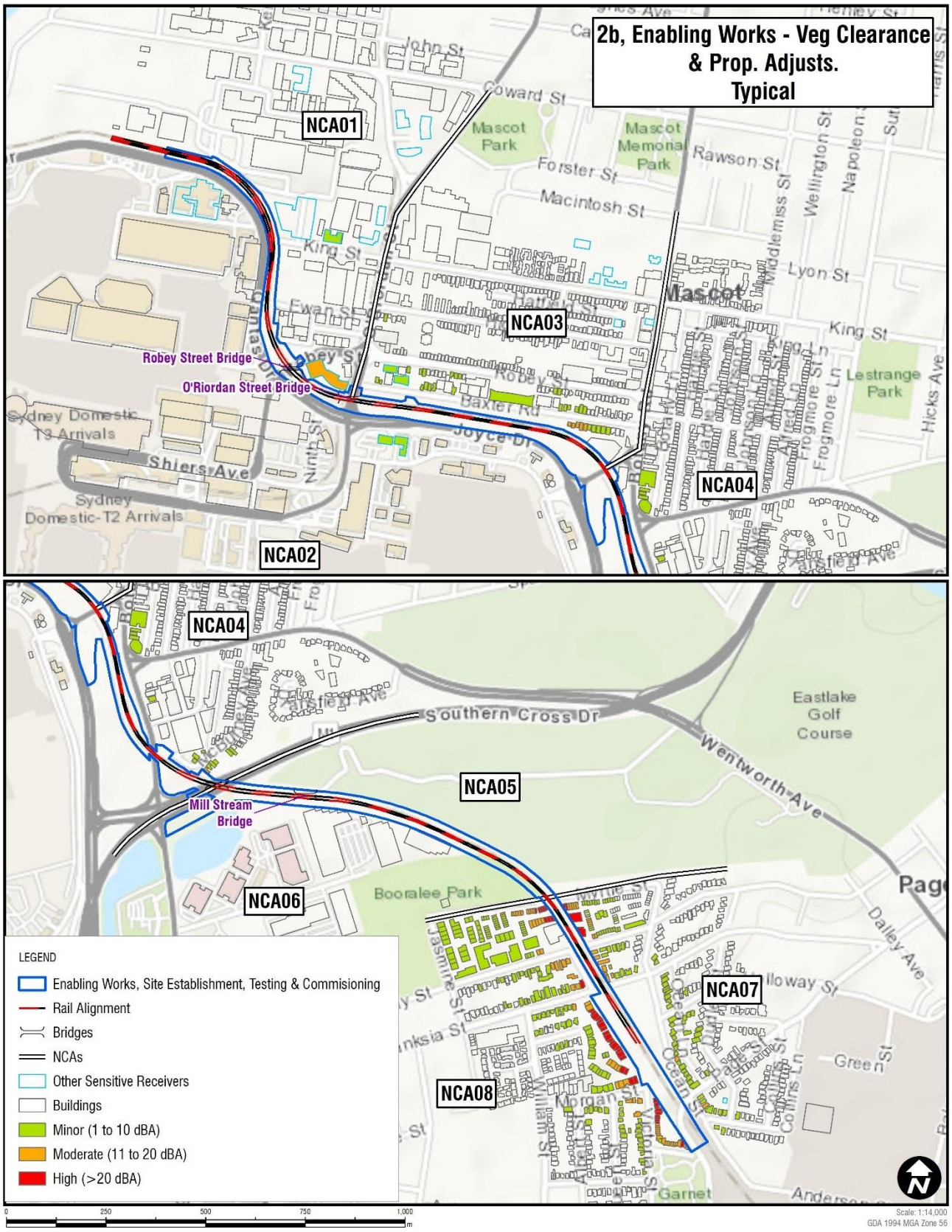


Figure 5 Predicted Impacts '*Scenario 5a, Track Works – Peak*' (Night-time)

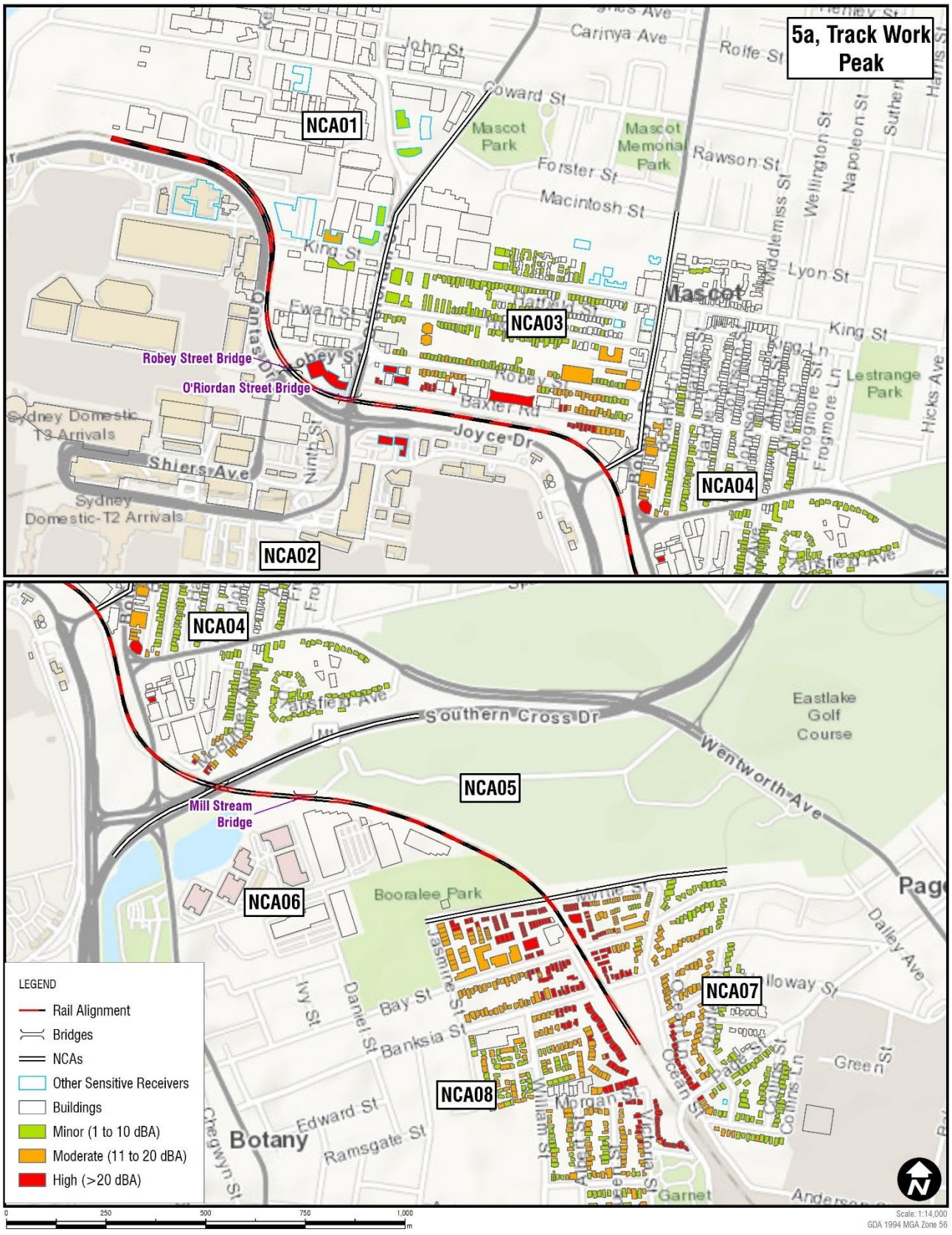
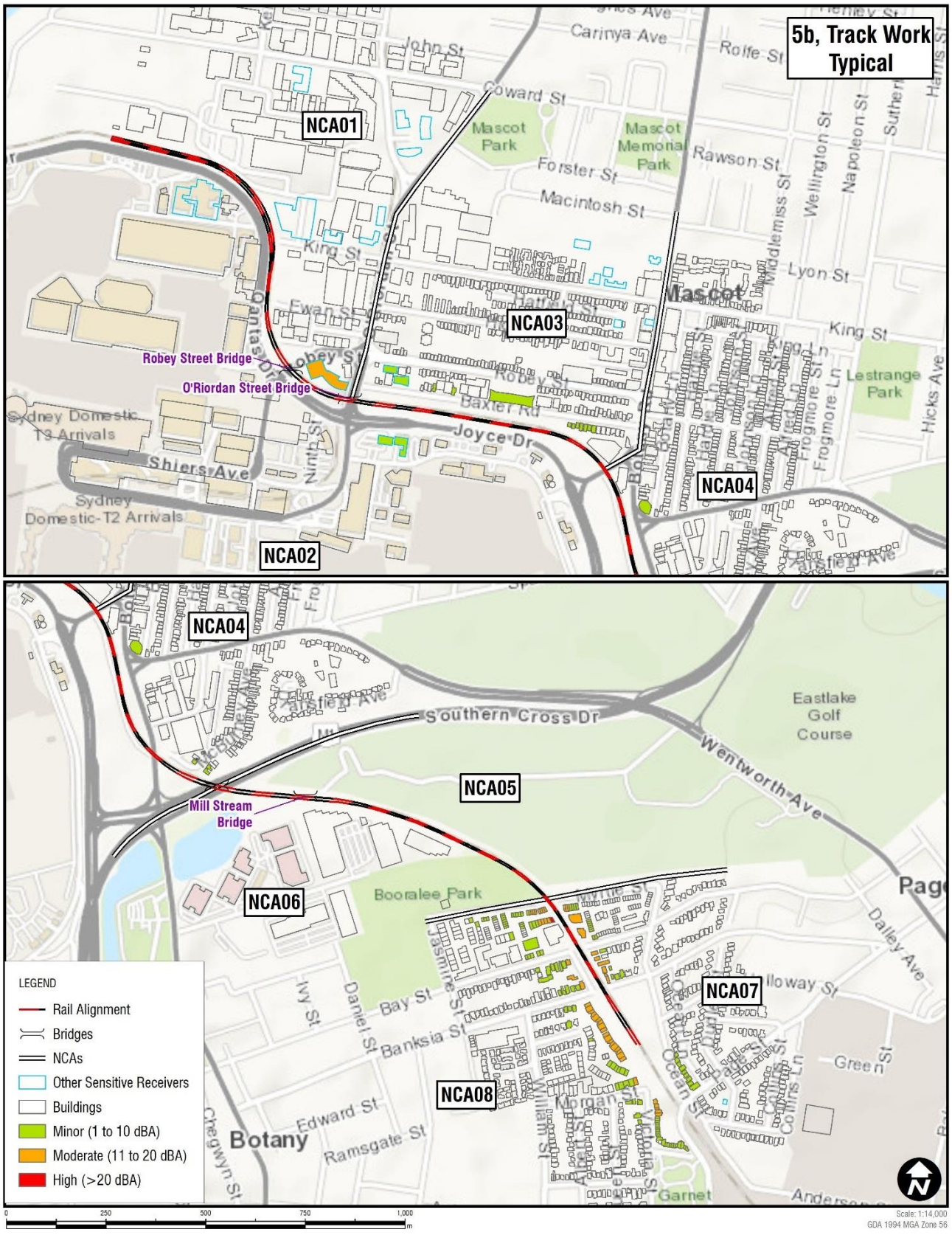


Figure 6 Predicted Impacts '*Scenario 5b, Track Works – Typical*' (Night-time)



The above assessment shows that:

- The highest impact is seen in the 'Peak' scenarios when noise intensive equipment such as rockbreakers, concrete saws, ballast tampers or chainsaws is in use near to receivers. For most scenarios, these 'Peak' noise intensive works would only be required for a relatively short period.
- Noise levels and impacts during 'Typical' works are significantly lower and much fewer receivers are impacted. 'Typical' works represent the stages of works that do not require noise intensive equipment.
- The highest impacts are at receivers adjacent to the rail corridor. Impacts at residential receivers are generally limited to NCA03 near Baxter Road, NCA04 near McBurney Avenue, and in NCA07 and NCA08 on either side of the rail corridor, due to the relatively close proximity of receivers to the works in these areas.

2.1 Duration of Works

The expected duration of each stage of the works is detailed in **Table 4**. At this early stage of the project, information regarding the specific duration of works are indicative and would be further developed when detailed construction staging information becomes available.

Table 4 Indicative Duration of Works

ID	Scenario	Activity	Indicative Duration of Works			
			Near Baxter Road	Near McBurney Avenue	Near Myrtle Street	Near Banksia Street
1a	Enabling Works	Utilities – Peak	1 x 48hr possession	n/a	2 x 48hr possessions	2 x 48hr possessions
1b		Utilities – Typical	40 days	n/a	40 days	40 days
2a		Veg. Clearing & Property Adjust. – Peak	1 x 48hr possession	n/a	n/a	n/a
2b		Veg. Clearing & Property Adjust. – Typical	10 days	n/a	10 days	10 days
3a	Bridge Works	Demolition (inc. breaker) – Peak	2 x 54hr possessions	n/a	n/a	n/a
3b		Demolition – Typical	10 days	n/a	n/a	n/a
4a		Construction – Peak	248 days	180 days	n/a	n/a
4b		Construction – Typical	249 days	180 days	n/a	n/a
5a	Track Works – Peak		2 x 48hr possessions	n/a	2 x 48hr possessions	2 x 48hr possessions
5b	Track Works – Typical		58 days	17 days	46 days	46 days
6a	Testing, Commissioning & Finishing – Peak		2 x 48hr possessions	2 x 48hr possessions	2 x 48hr possessions	2 x 48hr possessions
6b	Testing, Commissioning & Finishing – Typical		40 days	40 days	40 days	40 days

The above shows that the 'Peak' scenarios, which generally result in the highest impacts, would mostly be completed during one or two possession periods.

Possessions are periods where the rail line would be shut down so that works can be completed safely. ARTC currently schedules routine maintenance possessions on four weekends each calendar year and the shutdowns start at around 2 am on Saturday and end at 2 am on Monday. These scheduled maintenance possessions would likely be used to carry out construction works that cannot be done when the line is in operation. Work during possessions would be undertaken on a 24-hour basis continuously for the duration of each possession.

'Typical' works are expected to last for longer periods and outside of possessions in some cases. Noise levels during these works are substantially lower and much few receivers are impacted.

Bridge Works – Construction is identified as the longest duration activity. With reference to the above assessment and supplementary information provided in **Appendix A**, noise levels from these works during Standard Construction Hours are expected to generally be compliant or result in only 'minor' exceedances at the nearest receivers. Due to reduced criteria, the extent of impact increases during out of hours periods. During the most sensitive night-time period, the impact from 'Peak' *Bridge Works – Construction* in the worst-affected noise catchment (NCA04) is predicted to be high at only one adjacent receiver.

2.2 Impacts at Varying Distance from Receivers

The above assessment presents the predicted impacts when works are at their closest position to each receiver. In response to submissions that requested further information regarding how impacts change as works move away from a particular location, **Table 5** presents indicative NML exceedances for works at various offset distances. The impacts are presented for three different sets of works which are represented by:

- **High impact**, which includes noise intensive equipment such as rockbreakers, concrete saws or wood chippers
- **Medium impact**, which includes equipment such as piling rigs, semi-trailers or concrete pumps
- **Low impact**, which includes equipment such as small excavators, cranes or hand tools.

Table 5 Predicted Impacts with Changing Offset Distance

Works	Distance from Works			
	20 m	50 m	100 m	200 m
Daytime (indicative NML = 60 dBA)				
High Impact	■	◆	●	●
Medium Impact	◆	●	●	-
Low Impact	●	-	-	-
Night-time (indicative NML = 50 dBA)				
High Impact	■	■	◆	◆
Medium Impact	■	◆	◆	●
Low Impact	◆	●	●	-

Key to Impacts ● Marginal to minor (1 to 10 dB) ◆ Moderate (11 dB to 20 dB) ■ High (>20 dB)

The above table shows that while impacts can be 'high' for the nearest receivers to the works (ie within around 20 m of high impacts works during the daytime and 50 m during the night-time), the impacts for receivers which are further away are substantially lower.

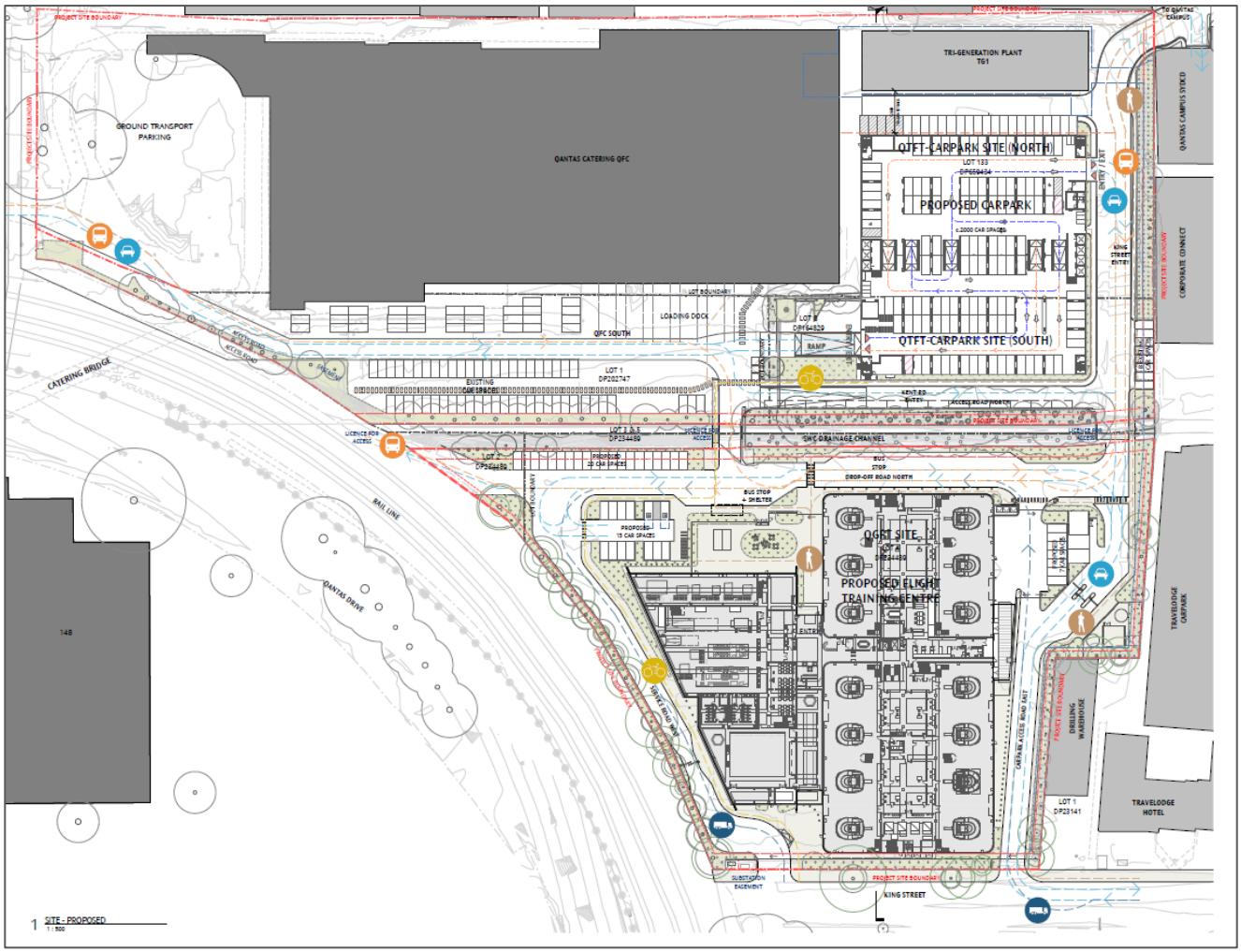
Where 'high' or 'moderate' worst-case impacts are predicted from noisy works, they are generally limited to the receivers around the work site, with more distant receivers being subject to much lower noise levels and impacts. This also indicates the reduction in noise level as linear sections of works progress and move away from a given receiver.

2.3 New Qantas Flight Training Centre

The proposed relocation of the Qantas Flight Training Centre to the eastern side of the Botany Line rail corridor was recently approved. As approval was granted after completion of the Botany Rail Duplication EIS, this revised assessment has included the new Qantas Flight Training Centre as an additional receiver in the assessment.

The new location and layout of the facility is shown in **Figure 7**.

Figure 7 New Qantas Flight Training Centre



Note: Taken from *Assessment of Noise and Vibration Emissions (SEARs) – Qantas Flight Training & Simulator Centre*.

Construction Noise

The predicted construction noise impacts to the new location are shown in **Table 6**.

Table 6 Predicted Impacts to the New Qantas Flight Training Centre[1,2]

ID	Scenario	Activity	Distance from Works	
			Outside Building	200 m Away
1a	Enabling Works	Utilities – Peak	■	●
1b		Utilities – Typical	◆	-
2a		Veg. Clearance & Prop. Adjusts. – Peak	■	●
2b		Veg. Clearance & Prop. Adjusts. – Typical	◆	-
3a	Bridge Works	Demolition (inc. breaker) – Peak	-	-
3b		Demolition – Typical	-	-
4a		Construction – Peak	-	-
4b		Construction – Typical	-	-
5a	Track Works – Peak		■	●
5b	Track Works – Typical		●	-
6a	Testing, Commissioning & Finishing – Peak		◆	-
6b	Testing, Commissioning & Finishing – Typical		●	-
Key to Impacts	● Marginal to minor (1 to 10 dB)	◆ Moderate (11 dB to 20 dB)	■ High (>20 dB)	

Note 1: Assessed as an educational receiver with an internal noise criterion of 45 dBA and assuming a conservative 10 dB difference between internal and external noise levels, consistent with the assessment of the existing centre in *Technical Report 2 – Noise and Vibration Impact Assessment*. The recommended facade performance of the New Qantas Flight Training Centre, as specified in *Assessment of Noise and Vibration Emissions (SEARs) – Qantas Flight Training & Simulator Centre*, is much higher than this meaning above predicted construction impacts are conservative.

Note 2: Exceedances are based on L_{Aeq} noise levels. L_{max} noise predictions are provided in **Appendix A**.

The above shows that 'high' worst-case impacts are likely at the New Qantas Flight Training Centre when 'Peak' works which use noise intensive equipment such as rockbreakers, concrete saws, or ballast tampers, are being completed near to the Training Centre building. When 'Typical' works are being completed outside the building the impacts are predicted to range from 'moderate' to below the NMLs.

When works move away from the Training Centre and are around 200 m away, the worst-case impacts are predicted to be reduced to 'minor' or below the NMLs.

It is noted that the noise and vibration assessment in the EIS for the New Qantas Flight Training Centre (*Assessment of Noise and Vibration Emissions (SEARs) – Qantas Flight Training & Simulator Centre*) concluded that high-performance facade and glazing elements would be required at the new facility due to the presence of high external noise levels from existing sources including road traffic noise and frequent aircraft movements.

These high-performance facades have not been considered in this assessment and would likely be sufficient to mitigate construction noise levels from most Botany Rail Duplication construction works to suitable levels inside the new facility.

It is also noted that the works required in this area of the project would likely be similar to existing rail maintenance works which currently occur within the adjacent rail corridor.

Construction Vibration

Similar to other buildings and structures near to the project, the New Qantas Flight Training Centre is within the minimum working distances for cosmetic damage and human comfort when vibration intensive equipment is being used nearby.

As noted in *Technical Report 2*, where works are within the minimum working distances and considered likely to exceed the cosmetic damage objectives:

- Different construction methods with lower source vibration levels would be investigated and implemented, where feasible
- Attended vibration measurements would be undertaken at the start of the works to determine the actual vibration levels at the nearest receivers or structures. Work would cease if the monitoring indicates vibration levels are likely to exceed the relevant criteria.

Condition surveys would also be completed before and after the works for all structures within the cosmetic damage minimum working distances. Appropriate criteria would be confirmed before the works begin on the basis of the surveys.

3 Mitigation

The mitigation requirements of this assessment are consistent with those outlined in the *Technical Report 2 – Noise and Vibration Impact Assessment*. The construction impacts from the project would be mitigated as far as practicable using the measures identified in Section 8 of the *Technical Report 2 – Noise and Vibration Impact Assessment*.

4 Conclusion

Additional modelling has been completed to provide additional granularity regarding the extent of predicted construction impacts from the project and to determine the potential impacts to the recently approved New Qantas Flight Training Centre.

The assessment concluded that works outside of the worst-case scenarios are expected to result in noise levels and impacts that are significantly lower than worse-case, with much fewer receivers being impacted. Similarly, when works move away from a particular receiver the impacts would reduce substantially and the highest impacts would be limited to the area surrounding the works.

The impacts at the New Qantas Flight Training Centre are predicted to be ‘high’ when the noisiest works are outside the centre. Less noisy works, or works which are more distant, are predicted to be result in only ‘minor’ impacts or be below the NML.

It is noted that the EIS for the New Qantas Flight Training Centre concluded that high-performance facade and glazing elements would be required at the new facility due to the presence of high existing noise levels from existing sources including road traffic noise and frequent aircraft movements. These high-performance facades would likely be sufficient to mitigate construction noise levels from most Botany Rail Duplication works to suitable levels inside the new facility.

Similar to other buildings and structures near to the project, the New Qantas Flight Training Centre is within the minimum working distances for cosmetic damage and human comfort.

On the basis of the predictions, no additional mitigation measures or changes to the proposed measures are required.

Checked/
Authorised by: RH

APPENDIX A

Construction Information

Table 1 Equipment Lists and Sound Power Levels

Equipment		Ballast Tamper	Bobcat	Chainsaw[1]	Chipper	Concrete Mixer Truck	Concrete Pump	Concrete Saw[1]	Dozer	Excavator - Breaker[1]	Excavator (14 tonne)	Excavator (22 tonne)	Front End Loader	Generator (small)	Grader	Hand Tools	Lighting - Diesel Generator	Mobile Crane - Franna	Mobile Crane (400 tonne)	Piling - Bored	Roller - Smooth Drum	Roller - Vibratory (12 tonne)[1]	Semi Trailer	Test Train	Truck
SWL LAeq(15min)[2]		118	104	114	120	103	106	119	110	121	97	99	104	93	108	94	98	98	106	111	107	109	106	105	107
Ref	**Scenario**																								
1a	Enabling Works – Utilities – Peak		X			X	X	X				X				X					X				X
1b	Enabling Works – Utilities – Typical		X			X						X				X									
2a	Enabling Works – Veg. Clearance & Prop. Adjusts. – Peak		X	X	X				X		X				X										
2b	Enabling Works – Veg. Clearance & Prop. Adjusts. – Typical		X								X														
3a	Bridge Works - Demolition (inc. breaker) – Peak							X		X			X			X	X		X				X		X
3b	Bridge Works - Demolition – Typical												X			X	X		X						
4a	Bridge Works – Construction – Peak					X	X						X			X	X		X	X			X		
4b	Bridge Works – Construction – Typical					X	X									X	X								
5a	Track Works – Peak	X						X	X		X		X		X	X						X	X	X	
5b	Track Works – Typical											X				X									
6a	Testing, Commissioning & Finishing – Peak										X			X		X		X						X	X
6b	Testing, Commissioning & Finishing – Typical										X			X		X									

Note 1: Equipment classed as 'annoying' in the ICNG and requires an additional 5 dB correction.

Note 2: Sound power level data is taken from the DEFRA Noise Database, TfNSW *Construction Noise and Vibration Strategy*, RMS *Construction and Vibration Guideline*.

Table 2 Predicted Worst-case Construction Noise Levels (dBA) – Residential Receivers

Period	ID	Scenario	Activity	Predicted Worst-case Noise Level (dBA)							
				NCA01	NCA02	NCA03	NCA04	NCA05	NCA06	NCA07	NCA08
Daytime	1a	Enabling Works	Utilities – Peak	65	-	78	79	-	-	84	82
	1b		Utilities – Typical	55	-	68	69	-	-	74	72
	2a		Veg. Clearance & Prop. Adjusts. – Peak	70	-	83	84	-	-	89	87
	2b		Veg. Clearance & Prop. Adjusts. – Typical	53	-	66	67	-	-	72	70
	3a	Bridge Works	Demolition (inc. breaker) – Peak	59	-	70	82	-	-	50	51
	3b		Demolition – Typical	48	-	59	71	-	-	39	40
	4a		Construction – Peak	52	-	63	75	-	-	43	44
	4b		Construction – Typical	46	-	57	69	-	-	37	38
	5a	Track Works – Peak		68	-	81	82	-	-	87	85
	5b	Track Works – Typical		46	-	59	60	-	-	65	63
	6a	Testing, Commissioning & Finishing – Peak		56	-	69	70	-	-	75	73
	6b	Testing, Commissioning & Finishing – Typical		46	-	59	60	-	-	65	63
Evening	1a	Enabling Works	Utilities – Peak	65	-	78	79	-	-	84	82
	1b		Utilities – Typical	55	-	68	69	-	-	74	72
	2a		Veg. Clearance & Prop. Adjusts. – Peak	70	-	83	84	-	-	89	87
	2b		Veg. Clearance & Prop. Adjusts. – Typical	53	-	66	67	-	-	72	70
	3a	Bridge Works	Demolition (inc. breaker) – Peak	59	-	70	82	-	-	50	51
	3b		Demolition – Typical	48	-	59	71	-	-	39	40
	4a		Construction – Peak	52	-	63	75	-	-	43	44
	4b		Construction – Typical	46	-	57	69	-	-	37	38
	5a	Track Works – Peak		68	-	81	82	-	-	87	85
	5b	Track Works – Typical		46	-	59	60	-	-	65	63
	6a	Testing, Commissioning & Finishing – Peak		56	-	69	70	-	-	75	73
	6b	Testing, Commissioning & Finishing – Typical		46	-	59	60	-	-	65	63
Night-time	1a	Enabling Works	Utilities – Peak	65	-	78	79	-	-	84	82
	1b		Utilities – Typical	55	-	68	69	-	-	74	72
	2a		Veg. Clearance & Prop. Adjusts. – Peak	70	-	83	84	-	-	89	87
	2b		Veg. Clearance & Prop. Adjusts. – Typical	53	-	66	67	-	-	72	70
	3a	Bridge Works	Demolition (inc. breaker) – Peak	59	-	70	82	-	-	50	51
	3b		Demolition – Typical	48	-	59	71	-	-	39	40
	4a		Construction – Peak	52	-	63	75	-	-	43	44
	4b		Construction – Typical	46	-	57	69	-	-	37	38
	5a	Track Works – Peak		68	-	81	82	-	-	87	85
	5b	Track Works – Typical		46	-	59	60	-	-	65	63
	6a	Testing, Commissioning & Finishing – Peak		56	-	69	70	-	-	75	73
	6b	Testing, Commissioning & Finishing – Typical		46	-	59	60	-	-	65	63

Table 3 Predicted Worst-case NML Exceedances (dB) – Residential Receivers

Period	ID	Scenario	Activity	Predicted Worst-case Noise Level (dBA)							
				NCA01	NCA02	NCA03	NCA04	NCA05	NCA06	NCA07	NCA08
Daytime	1a	Enabling Works	Utilities – Peak	-	-	14	12	-	-	28	33
	1b		Utilities – Typical	-	-	4	2	-	-	18	23
	2a		Veg. Clearance & Prop. Adjusts. – Peak	-	-	19	17	-	-	33	38
	2b		Veg. Clearance & Prop. Adjusts. – Typical	-	-	2	-	-	-	16	21
	3a	Bridge Works	Demolition (inc. breaker) – Peak	-	-	6	15	-	-	-	2
	3b		Demolition – Typical	-	-	-	4	-	-	-	-
	4a		Construction – Peak	-	-	-	8	-	-	-	-
	4b		Construction – Typical	-	-	-	2	-	-	-	-
	5a	Track Works – Peak		-	-	17	15	-	-	31	36
	5b	Track Works – Typical		-	-	-	-	-	-	9	14
	6a	Testing, Commissioning & Finishing – Peak		-	-	5	3	-	-	19	24
	6b	Testing, Commissioning & Finishing – Typical		-	-	-	-	-	-	9	14
Evening	1a	Enabling Works	Utilities – Peak	2	-	22	20	-	-	33	38
	1b		Utilities – Typical	-	-	12	10	-	-	23	28
	2a		Veg. Clearance & Prop. Adjusts. – Peak	7	-	27	25	-	-	38	43
	2b		Veg. Clearance & Prop. Adjusts. – Typical	-	-	10	8	-	-	21	26
	3a	Bridge Works	Demolition (inc. breaker) – Peak	-	-	14	23	-	-	-	7
	3b		Demolition – Typical	-	-	3	12	-	-	-	-
	4a		Construction – Peak	-	-	7	16	-	-	-	-
	4b		Construction – Typical	-	-	1	10	-	-	-	-
	5a	Track Works – Peak		5	-	25	23	-	-	36	41
	5b	Track Works – Typical		-	-	3	1	-	-	14	19
	6a	Testing, Commissioning & Finishing – Peak		-	-	13	11	-	-	24	29
	6b	Testing, Commissioning & Finishing – Typical		-	-	3	1	-	-	14	19
Night-time	1a	Enabling Works	Utilities – Peak	7	-	28	26	-	-	36	40
	1b		Utilities – Typical	-	-	18	16	-	-	26	30
	2a		Veg. Clearance & Prop. Adjusts. – Peak	12	-	33	31	-	-	41	45
	2b		Veg. Clearance & Prop. Adjusts. – Typical	-	-	16	14	-	-	24	28
	3a	Bridge Works	Demolition (inc. breaker) – Peak	1	-	20	29	-	-	2	9
	3b		Demolition – Typical	-	-	9	18	-	-	-	-
	4a		Construction – Peak	-	-	13	22	-	-	-	2
	4b		Construction – Typical	-	-	7	16	-	-	-	-
	5a	Track Works – Peak		10	-	31	29	-	-	39	43
	5b	Track Works – Typical		-	-	9	7	-	-	17	21
	6a	Testing, Commissioning & Finishing – Peak		-	-	19	17	-	-	27	31
	6b	Testing, Commissioning & Finishing – Typical		-	-	9	7	-	-	17	21

Table 4 Predicted Worst-case Construction Noise Levels – New Qantas Training Facility

ID	Scenario	Activity	Predicted Worst-case Noise Level (dBA)			
			LAeq		Lmax	
			Near	200 m	Near	200 m
1a	Enabling Works	Utilities – Peak	79	59	90	70
1b		Utilities – Typical	69	49	75	55
2a		Veg. Clearance & Prop. Adjusts. – Peak	84	64	91	71
2b		Veg. Clearance & Prop. Adjusts. – Typical	67	47	73	53
3a	Bridge Works	Demolition (inc. breaker) – Peak	52	52	60	60
3b		Demolition – Typical	41	41	44	44
4a		Construction – Peak	45	45	51	51
4b		Construction – Typical	39	39	45	45
5a	Track Works – Peak		82	62	90	70
5b	Track Works – Typical		60	40	68	48
6a	Testing, Commissioning & Finishing – Peak		70	50	76	56
6b	Testing, Commissioning & Finishing – Typical		60	40	64	44

Table 5 Predicted NML Exceedances, All Receiver Types – NCA01

ID	Scenario	Activity	Number of Receivers															
			Total	HNA[1]	With NML Exceedance[2]													
					Standard Daytime			Out of Hours Works[3]										
								Daytime OOH			Evening			Night-time			Sleep Disturbance		
					1-10 dB	11-20 dB	>20 dB	1-10 dB	11-20 dB	>20 dB	1-10 dB	11-20 dB	>20 dB	1-10 dB	11-20 dB	>20 dB	1-10 dB	11-20 dB	>20 dB
1a	Enabling Works	Utilities – Peak	110	-	12	1	2	12	1	2	2	1	1	5	1	1	1	-	-
1b		Utilities – Typical	110	-	1	2	-	1	2	-	1	1	-	1	-	1	-	-	-
2a		Veg. Clearance & Prop. Adjusts. – Peak	110	-	17	10	3	18	10	3	3	1	2	4	3	2	1	-	-
2b		Veg. Clearance & Prop. Adjusts. – Typical	110	-	2	1	-	2	1	-	2	-	-	1	1	-	-	-	-
3a	Bridge Works	Demolition (inc. breaker) – Peak	110	-	4	2	-	4	2	-	-	2	-	5	-	1	-	-	-
3b		Demolition – Typical	110	-	2	-	-	2	-	-	2	-	-	-	1	-	-	-	-
4a		Construction – Peak	110	-	2	-	-	2	-	-	2	-	-	-	1	-	-	-	-
4b		Construction – Typical	110	-	2	-	-	2	-	-	2	-	-	-	1	-	-	-	-
5a	Track Work – Peak		110	-	11	3	2	12	3	2	2	1	1	5	1	1	1	-	-
5b	Track Work – Typical		110	-	2	-	-	2	-	-	1	-	-	-	1	-	-	-	-
6a	Testing, Commissioning & Finishing – Peak		110	-	4	2	-	4	2	-	1	1	-	1	-	1	-	-	-
6b	Testing, Commissioning & Finishing – Typical		110	-	2	-	-	2	-	-	1	-	-	-	1	-	-	-	-

Note 1: Highly Noise Affected, based on ICNG definition (ie predicted noise at residential receiver is 75 dBA or greater).
Note 2: Based on worst-case predicted noise levels.
Note 3: OOH = Out of hours.

Table 6 Predicted NML Exceedances, All Receiver Types – NCA02

ID	Scenario	Activity	Number of Receivers															
			Total	HNA[1]	With NML Exceedance[2]													
					Standard Daytime			Out of Hours Works[3]										
								Daytime OOH			Evening			Night-time			Sleep Disturbance		
					1-10 dB	11-20 dB	>20 dB	1-10 dB	11-20 dB	>20 dB	1-10 dB	11-20 dB	>20 dB	1-10 dB	11-20 dB	>20 dB	1-10 dB	11-20 dB	>20 dB
1a	Enabling Works	Utilities – Peak	55	-	10	3	-	10	3	-	-	2	-	-	-	2	-	-	-
1b		Utilities – Typical	55	-	3	-	-	3	-	-	2	-	-	-	2	-	-	-	-
2a		Veg. Clearance & Prop. Adjusts. – Peak	55	-	17	7	1	17	7	1	-	2	-	-	-	2	-	-	-
2b		Veg. Clearance & Prop. Adjusts. – Typical	55	-	1	-	-	1	-	-	-	-	-	2	-	-	-	-	-
3a	Bridge Works	Demolition (inc. breaker) – Peak	55	-	2	-	-	2	-	-	2	-	-	-	2	-	-	-	-
3b		Demolition – Typical	55	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-
4a		Construction – Peak	55	-	1	-	-	1	-	-	1	-	-	1	1	-	-	-	-
4b		Construction – Typical	55	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-
5a	Track Work – Peak		55	-	13	3	1	13	3	1	-	2	-	-	-	2	-	-	-
5b	Track Work – Typical		55	-	1	-	-	1	-	-	-	-	-	2	-	-	-	-	-
6a	Testing, Commissioning & Finishing – Peak		55	-	2	1	-	2	1	-	2	-	-	-	2	-	-	-	-
6b	Testing, Commissioning & Finishing – Typical		55	-	1	-	-	1	-	-	-	-	-	2	-	-	-	-	-

Note 1: Highly Noise Affected, based on ICNG definition (ie predicted noise at residential receiver is 75 dBA or greater).
Note 2: Based on worst-case predicted noise levels.
Note 3: OOH = Out of hours.

Table 7 Predicted NML Exceedances, All Receiver Types – NCA03

ID	Scenario	Activity	Number of Receivers															
			Total	HNA[1]	With NML Exceedance[2]													
					Standard Daytime			Out of Hours Works[3]										
								Daytime OOH			Evening			Night-time			Sleep Disturbance		
					1-10 dB	11-20 dB	>20 dB	1-10 dB	11-20 dB	>20 dB	1-10 dB	11-20 dB	>20 dB	1-10 dB	11-20 dB	>20 dB	1-10 dB	11-20 dB	>20 dB
1a	Enabling Works	Utilities – Peak	370	3	22	6	-	54	14	-	67	17	3	148	39	10	164	50	11
1b		Utilities – Typical	370	-	6	-	-	14	-	-	17	3	-	39	10	-	18	3	-
2a		Veg. Clearance & Prop. Adjusts. – Peak	370	11	61	14	-	118	21	3	127	38	7	200	89	22	178	55	14
2b		Veg. Clearance & Prop. Adjusts. – Typical	370	-	4	-	-	8	-	-	14	-	-	30	5	-	15	3	-
3a	Bridge Works	Demolition (inc. breaker) – Peak	370	-	2	2	-	12	3	-	18	4	-	76	9	2	45	3	-
3b		Demolition – Typical	370	-	1	-	-	1	-	-	3	-	-	6	1	-	2	-	-
4a		Construction – Peak	370	-	2	-	-	4	-	-	4	-	-	14	4	-	5	-	-
4b		Construction – Typical	370	-	-	-	-	-	-	-	1	-	-	4	-	-	2	-	-
5a	Track Work – Peak		370	7	39	10	-	63	18	3	111	24	4	190	51	19	167	40	10
5b	Track Work – Typical		370	-	-	-	-	-	-	-	3	-	-	12	-	-	7	-	-
6a	Testing, Commissioning & Finishing – Peak		370	-	7	-	-	17	-	-	19	3	-	49	13	-	22	4	-
6b	Testing, Commissioning & Finishing – Typical		370	-	-	-	-	-	-	-	3	-	-	13	-	-	3	-	-

Note 1: Highly Noise Affected, based on ICNG definition (ie predicted noise at residential receiver is 75 dBA or greater).
Note 2: Based on worst-case predicted noise levels.
Note 3: OOH = Out of hours.

Table 8 Predicted NML Exceedances, All Receiver Types – NCA04

ID	Scenario	Activity	Number of Receivers																
			Total	HNA[1]	With NML Exceedance[2]														
					Standard Daytime			Out of Hours Works[3]											
								Daytime OOH			Evening			Night-time			Sleep Disturbance		
					1-10 dB	11-20 dB	>20 dB	1-10 dB	11-20 dB	>20 dB	1-10 dB	11-20 dB	>20 dB	1-10 dB	11-20 dB	>20 dB	1-10 dB	11-20 dB	>20 dB
1a	Enabling Works	Utilities – Peak	506	3	15	2	-	20	5	-	24	8	-	101	15	4	123	17	4
1b		Utilities – Typical	506	-	2	-	-	5	-	-	8	-	-	15	4	-	12	1	-
2a		Veg. Clearance & Prop. Adjusts. – Peak	506	8	23	5	-	54	13	1	86	14	3	252	29	10	147	21	4
2b		Veg. Clearance & Prop. Adjusts. – Typical	506	-	1	-	-	4	-	-	4	-	-	14	1	-	8	-	-
3a	Bridge Works	Demolition (inc. breaker) – Peak	506	2	11	2	-	16	3	-	37	6	1	124	12	2	80	9	2
3b		Demolition – Typical	506	-	1	-	-	2	-	-	5	1	-	10	2	-	5	1	-
4a		Construction – Peak	506	1	2	-	-	6	1	-	8	2	-	26	5	1	10	2	-
4b		Construction – Typical	506	-	1	-	-	2	-	-	3	-	-	8	2	-	5	1	-
5a	Track Work – Peak		506	4	20	4	-	30	9	-	60	14	1	175	23	5	123	17	4
5b	Track Work – Typical		506	-	-	-	-	-	-	-	1	-	-	4	-	-	3	-	-
6a	Testing, Commissioning & Finishing – Peak		506	-	2	-	-	5	-	-	9	1	-	17	4	-	14	1	-
6b	Testing, Commissioning & Finishing – Typical		506	-	-	-	-	-	-	-	1	-	-	4	-	-	1	-	-

Note 1: Highly Noise Affected, based on ICNG definition (ie predicted noise at residential receiver is 75 dBA or greater).
Note 2: Based on worst-case predicted noise levels.
Note 3: OOH = Out of hours.

Table 9 Predicted NML Exceedances, All Receiver Types – NCA05

ID	Scenario	Activity	Number of Receivers																
			Total	HNA[1]	With NML Exceedance[2]														
					Standard Daytime			Out of Hours Works[3]											
								Daytime OOH			Evening			Night-time			Sleep Disturbance		
					1-10 dB	11-20 dB	>20 dB	1-10 dB	11-20 dB	>20 dB	1-10 dB	11-20 dB	>20 dB	1-10 dB	11-20 dB	>20 dB	1-10 dB	11-20 dB	>20 dB
1a	Enabling Works	Utilities – Peak	1	-	1	-	-	1	-	-	1	-	-	-	-	-	-	-	-
1b		Utilities – Typical	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2a		Veg. Clearance & Prop. Adjusts. – Peak	1	-	1	-	-	1	-	-	1	-	-	-	-	-	-	-	-
2b		Veg. Clearance & Prop. Adjusts. – Typical	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3a	Bridge Works	Demolition (inc. breaker) – Peak	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3b		Demolition – Typical	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4a		Construction – Peak	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4b		Construction – Typical	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5a	Track Work – Peak		1	-	1	-	-	1	-	-	1	-	-	-	-	-	-	-	-
5b	Track Work – Typical		1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6a	Testing, Commissioning & Finishing – Peak		1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6b	Testing, Commissioning & Finishing – Typical		1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Note 1: Highly Noise Affected, based on ICNG definition (ie predicted noise at residential receiver is 75 dBA or greater).
Note 2: Based on worst-case predicted noise levels.
Note 3: OOH = Out of hours.

Table 10 Predicted NML Exceedances, All Receiver Types – NCA06

ID	Scenario	Activity	Number of Receivers																
			Total	HNA[1]	With NML Exceedance[2]														
					Standard Daytime			Out of Hours Works[3]											
								Daytime OOH			Evening			Night-time			Sleep Disturbance		
					1-10 dB	11-20 dB	>20 dB	1-10 dB	11-20 dB	>20 dB	1-10 dB	11-20 dB	>20 dB	1-10 dB	11-20 dB	>20 dB	1-10 dB	11-20 dB	>20 dB
1a	Enabling Works	Utilities – Peak	14	-	5	-	-	5	-	-	1	-	-	-	-	-	-	-	-
1b		Utilities – Typical	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2a		Veg. Clearance & Prop. Adjusts. – Peak	14	-	3	3	-	3	3	-	1	-	-	-	-	-	-	-	-
2b		Veg. Clearance & Prop. Adjusts. – Typical	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3a	Bridge Works	Demolition (inc. breaker) – Peak	14	-	-	1	-	-	1	-	-	-	-	-	-	-	-	-	-
3b		Demolition – Typical	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4a		Construction – Peak	14	-	1	-	-	1	-	-	-	-	-	-	-	-	-	-	-
4b		Construction – Typical	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5a	Track Work – Peak		14	-	2	3	-	2	3	-	1	-	-	-	-	-	-	-	-
5b	Track Work – Typical		14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6a	Testing, Commissioning & Finishing – Peak		14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
6b	Testing, Commissioning & Finishing – Typical		14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Note 1: Highly Noise Affected, based on ICNG definition (ie predicted noise at residential receiver is 75 dBA or greater).
Note 2: Based on worst-case predicted noise levels.
Note 3: OOH = Out of hours.

Table 11 Predicted NML Exceedances, All Receiver Types – NCA07

ID	Scenario	Activity	Number of Receivers															
			Total	HNA[1]	With NML Exceedance[2]													
					Standard Daytime			Out of Hours Works[3]										
								Daytime OOH			Evening			Night-time			Sleep Disturbance		
					1-10 dB	11-20 dB	>20 dB	1-10 dB	11-20 dB	>20 dB	1-10 dB	11-20 dB	>20 dB	1-10 dB	11-20 dB	>20 dB	1-10 dB	11-20 dB	>20 dB
1a	Enabling Works	Utilities – Peak	325	13	121	40	12	181	76	21	180	76	21	159	101	36	144	115	42
1b		Utilities – Typical	325	-	40	12	-	76	18	3	76	18	3	101	26	10	67	17	2
2a		Veg. Clearance & Prop. Adjusts. – Peak	325	32	180	77	21	134	120	52	133	120	52	77	163	76	133	119	52
2b		Veg. Clearance & Prop. Adjusts. – Typical	325	-	26	10	-	61	14	1	61	14	1	86	20	4	55	13	-
3a	Bridge Works	Demolition (inc. breaker) – Peak	325	-	-	-	-	-	-	-	-	-	-	4	-	-	-	-	-
3b		Demolition – Typical	325	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4a		Construction – Peak	325	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4b		Construction – Typical	325	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5a	Track Work – Peak		325	21	143	57	15	152	95	34	151	95	34	123	119	56	145	104	37
5b	Track Work – Typical		325	-	13	-	-	19	4	-	19	4	-	26	11	-	24	7	-
6a	Testing, Commissioning & Finishing – Peak		325	1	44	13	-	80	19	4	80	19	4	104	26	11	68	18	3
6b	Testing, Commissioning & Finishing – Typical		325	-	13	-	-	19	4	-	19	4	-	26	11	-	14	1	-

Note 1: Highly Noise Affected, based on ICNG definition (ie predicted noise at residential receiver is 75 dBA or greater).
Note 2: Based on worst-case predicted noise levels.
Note 3: OOH = Out of hours.

Table 12 Predicted NML Exceedances, All Receiver Types – NCA08

ID	Scenario	Activity	Number of Receivers																
			Total	HNA[1]	With NML Exceedance[2]														
					Standard Daytime			Out of Hours Works[3]											
								Daytime OOH			Evening			Night-time			Sleep Disturbance		
					1-10 dB	11-20 dB	>20 dB	1-10 dB	11-20 dB	>20 dB	1-10 dB	11-20 dB	>20 dB	1-10 dB	11-20 dB	>20 dB	1-10 dB	11-20 dB	>20 dB
1a	Enabling Works	Utilities – Peak	484	39	201	94	72	207	161	95	207	160	95	183	175	114	158	181	133
1b		Utilities – Typical	484	-	94	62	10	161	56	39	160	56	39	175	57	57	134	63	24
2a		Veg. Clearance & Prop. Adjusts. – Peak	484	72	207	161	95	108	202	165	108	201	165	61	213	200	145	181	148
2b		Veg. Clearance & Prop. Adjusts. – Typical	484	-	72	59	3	135	63	24	134	63	24	160	56	39	104	59	16
3a	Bridge Works	Demolition (inc. breaker) – Peak	484	-	9	-	-	103	-	-	103	-	-	121	-	-	103	-	-
3b		Demolition – Typical	484	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
4a		Construction – Peak	484	-	-	-	-	-	-	-	-	-	-	9	-	-	-	-	-
4b		Construction – Typical	484	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5a	Track Work – Peak		484	40	222	142	69	163	183	127	163	182	127	116	198	160	163	182	127
5b	Track Work – Typical		484	-	48	3	-	70	27	-	70	27	-	87	39	1	70	27	-
6a	Testing, Commissioning & Finishing – Peak		484	-	122	48	3	171	70	27	170	70	27	182	87	40	155	67	10
6b	Testing, Commissioning & Finishing – Typical		484	-	48	3	-	70	27	-	70	27	-	87	39	1	55	5	-

Note 1: Highly Noise Affected, based on ICNG definition (ie predicted noise at residential receiver is 75 dBA or greater).
Note 2: Based on worst-case predicted noise levels.
Note 3: OOH = Out of hours.

Appendix D – Additional operational noise assessment

Memorandum

To:		**At:**	Gateway 2 Sydney Joint Venture
From:	Dominic Sburlati	**At:**	SLR Consulting Australia Pty Ltd
Date:	24 February 2020	**Ref:**	610.17858-Subs Report-Operational-v0.3.docx
Subject:	Botany Rail Duplication Submissions Report Operational Modelling		

1 Revised Operational Airborne Noise Assessment

Technical Report 2 – Noise and Vibration Impact Assessment assessed the potential operational noise impacts from the project and recommended mitigation to control the impacts. Since completion of the EIS, the train speed profiles have been revised as a result of design progression to include trains travelling at a maximum speed of 50 km/h. The previous maximum train speed as assessed in *Technical Report 2* was 45 km/h.

This report provides updated noise modelling results for the project (for both the unmitigated 'Base Case' and mitigated 'With Lubrication' scenarios) and compares these results with the predictions in *Technical Report 2*.

The potential impacts to the New Qantas Flight Training Centre, which has recently been approved, have also been included in this assessment.

The operational airborne noise modelling methodology and assessment approach is consistent with the assessment in *Technical Report 2*, except for the inclusion of the revised speed profiles. The impacts have been assessed against the NSW EPA *Rail Infrastructure Noise Guideline* (RING) which is discussed in detailed in Section 3.1.2 of *Technical Report 2*. The various model inputs are described in *Technical Report 2* in Section 4.4.2.

2 Model Inputs

The revised 'with project' speed profiles, shown in **Figure 1** and **Figure 2**, were provided by ARTC and are representative of the fastest train speeds within the project area. It is likely that most trains would travel slower than the provided profiles, with the rates of acceleration and breaking also expected to be lower, however, the fastest speeds have been modelled to ensure a worst-case assessment.

Figure 1 Comparison of 'With Project' Up Speed Profiles

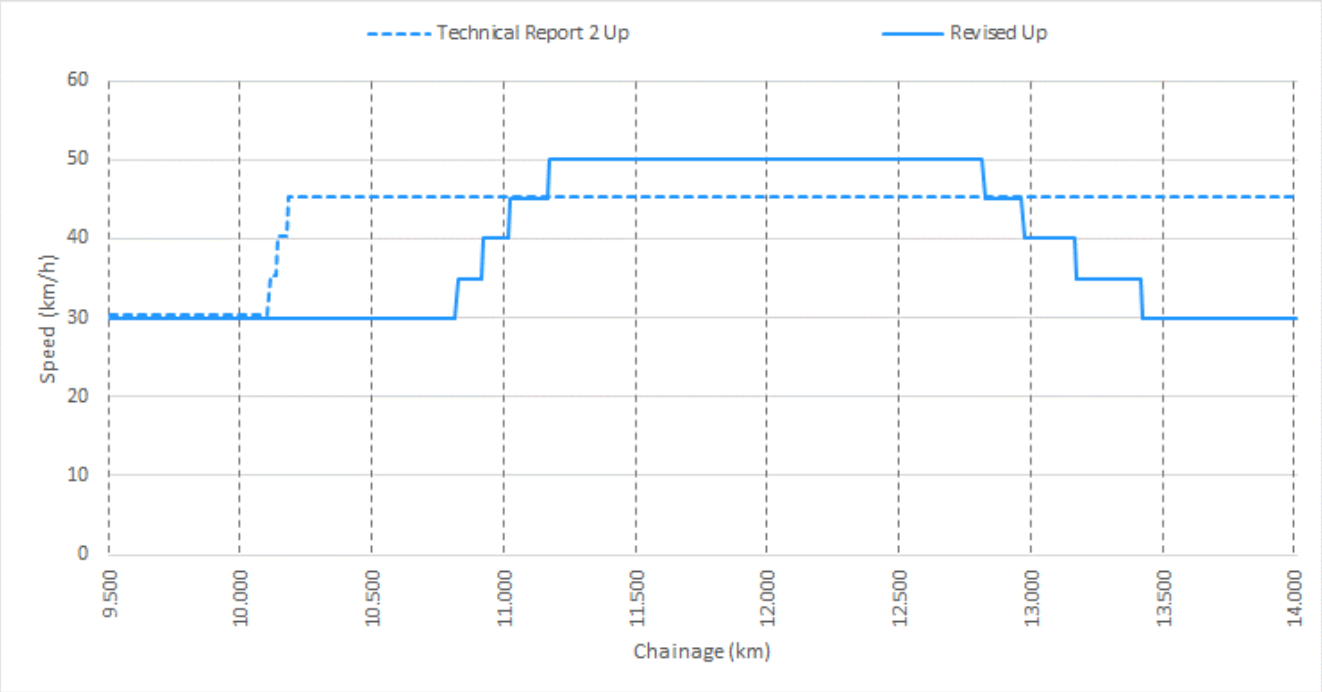
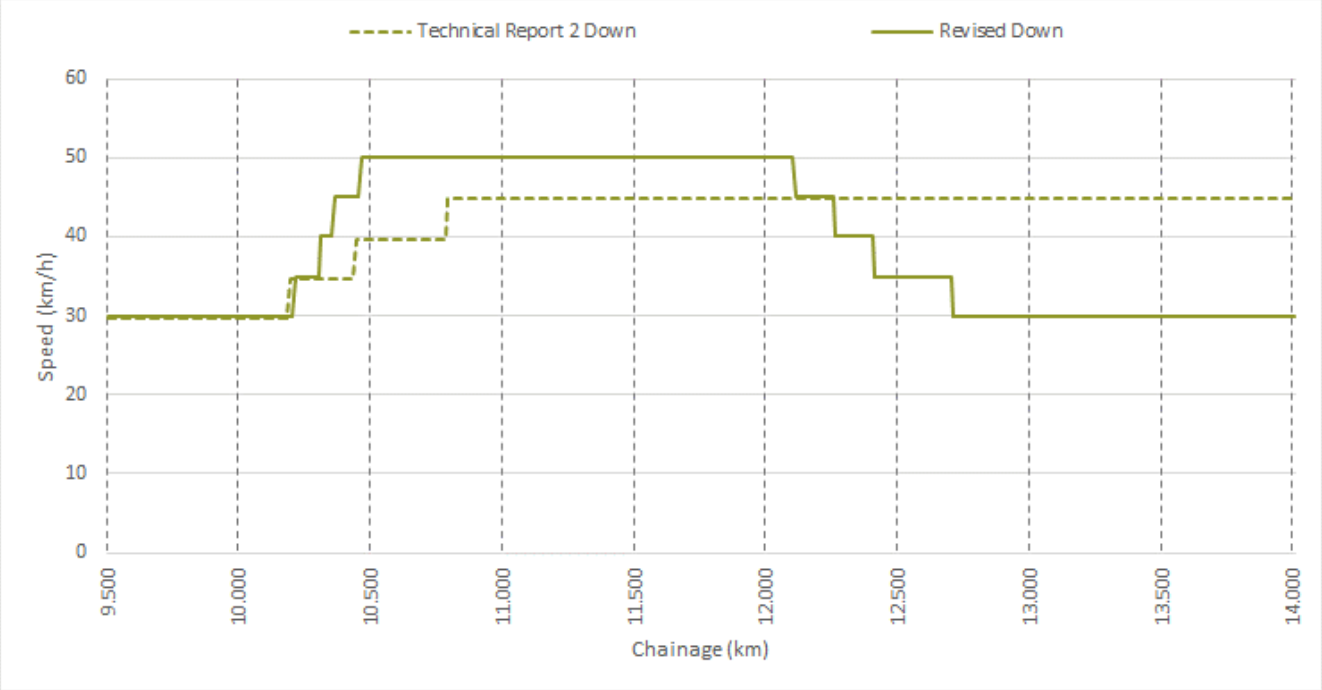


Figure 2 Comparison of 'With Project' Down Speed Profiles



The above shows the following:

- The revised maximum train speed is up to 5 km/h faster than the maximum speed used in *Technical Paper 2*. The maximum train speed is, however, over a shorter distance when accounting for acceleration and braking.
- The revised train speeds are slower at the south-eastern end of the project area near Port Botany for both the Up and Down tracks, with train speeds being reduced to 30 km/h from around chainage 13.400 km and 12.700 km, respectively.
- The revised Up track speed profile reduces speed earlier, with slowing beginning at approximate chainage 11.200 km as opposed to 10.450 km in *Technical Report 2*. The rate of breaking in this region is also slower than previously assessed.
- Based on the above, and when considering that trains are not required to stop in passing loops as part of typical operations in the project area, noise from braking and wagon bunching and/or stretching is not expected to be a regular feature and is not expected to significantly contribute to rail noise levels in the 'with project' scenario. Braking and wagon bunching/stretching noise has therefore not been considered further in this assessment.

3 Base case Predicted Operational Noise Impacts

3.1 Residential Receivers

The revised base case predicted rail noise levels at residential receivers are summarised in **Table 1** for the 2024 at-opening and 2034 future design scenarios. The tables show the highest noise levels in each NCA, which is typically at receivers nearest to the alignment. Details on the number of triggered receivers in each NCA is also provided and compared to the results in *Technical Report 2*.

Consistent with the predictions in *Technical Report 2*, the impacts from the project are predicted to be greatest in the 2034 future design scenario due to this timeframe having more trains. Receivers are generally most affected by the project in the night-time in 2034 and this scenario is considered to control the assessment in terms of determining the worst-case impacts and requirements for mitigation.

The predicted noise levels for each receiver are also shown in scatter graphs in **Appendix A** which show the predicted daytime, night-time and maximum noise levels.

The residential and 'other sensitive' receivers which are above the RING trigger levels are shown in **Figure 3.**

Table 1 Summary of the Predicted Operational Rail Noise Levels at Residential Receivers in each NCA

NCA	Side	Predicted Noise Level (dBA)[1]												Number of Receivers (2034)							
		Daytime $L_{Aeq(15hour)}$				Night-time $L_{Aeq(9hour)}$				Maximum L_{Amax}[2]				Above RING Absolute Trigger Level			Above RING Increase Trigger Level			Total Triggers[3]	*Technical Report 2 Triggers*
		At Opening (2024)		Design Year (2034)		At Opening (2024)		Design Year (2034)		At Opening (2024)		Design Year (2034)									
		Without project	With project	Without project	With project	Without project	With project	Without project	With project	Without project	With project	Without project	With project	Day	Night	Max.	Day	Night	Max.		
Criteria[4]		*65*	*65*	*65*	*65*	*60*	*60*	*60*	*60*	*85*	*85*	*85*	*85*	*65*	*60*	*85*	*2.0*	*2.0*	*3.0*	-	-
NCA01	Up	62	63	62	65	61	63	62	65	90	95	90	95	-	1	1	8	12	22	1	*1*
NCA02[5]	Down	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NCA03	Up	70	72	71	74	70	72	71	74	99	106	99	106	21	39	73	279	286	292	60	*43*
NCA04	Up	70	72	71	73	70	72	71	73	100	107	100	107	12	36	64	441	445	461	64	*52*
NCA05[5]	Up	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NCA06[5]	Down	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NCA07	Up	72	72	73	73	72	72	73	73	84	87	84	87	28	96	91	-	-	47	1	*39*
NCA08	Down	71	72	72	73	69	70	70	72	99	103	99	103	45	102	116	21	28	92	11	*47*
																			TOTAL	137	*182*

Note 1: The results are for the triggered receiver with the highest predicted noise level in the controlling 2034 'with project' scenario in each NCA for the daytime, night-time and maximum noise levels. As such the daytime, night-time and maximum results may be for a different receiver in the same NCA. The receiver with the highest predicted 2034 'with project' noise level may not be subject to the largest increase in noise from the project in that NCA.

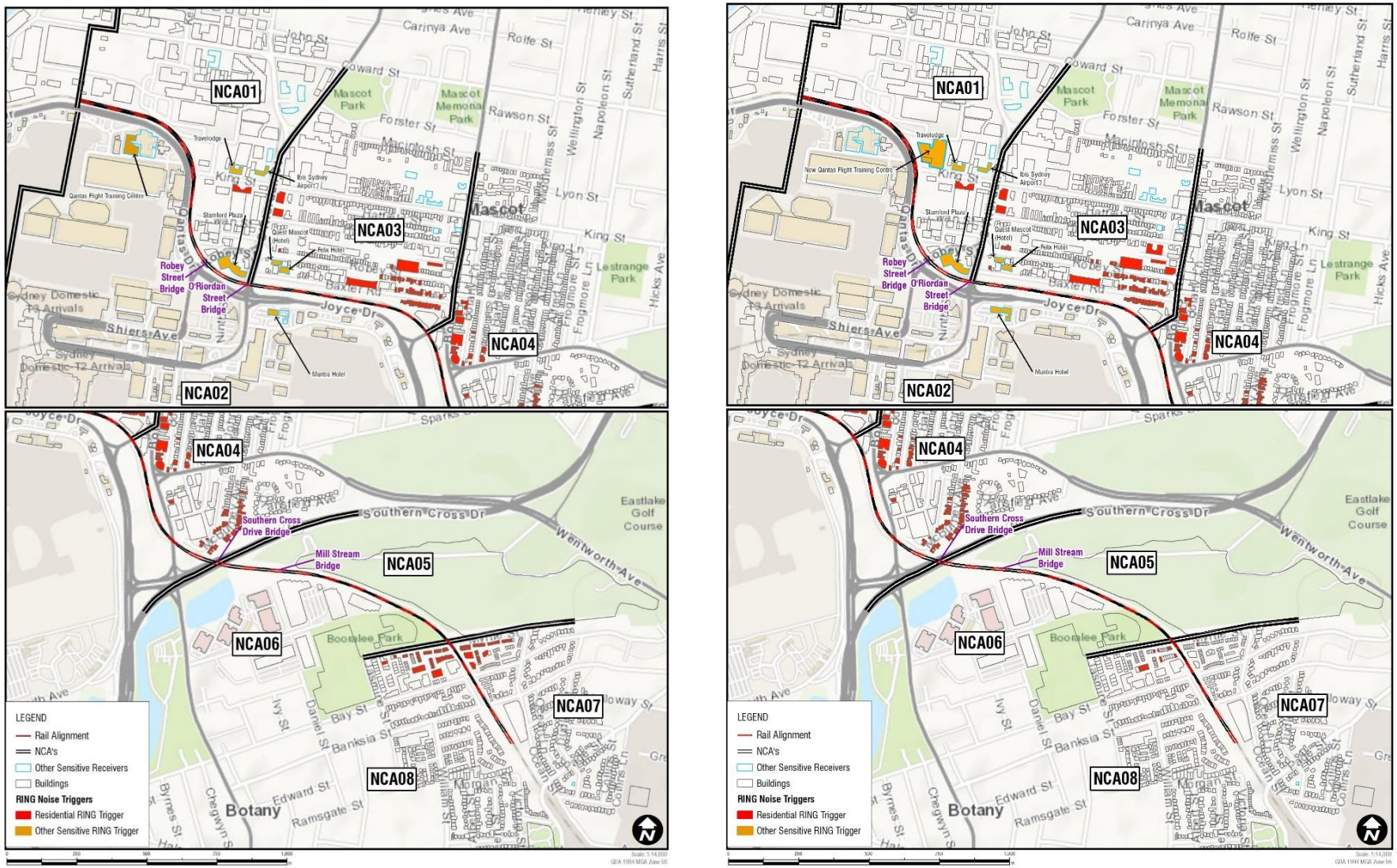
Note 2: Maximum refers to the L_{Amax} noise level and applies to both the daytime and night-time.

Note 3: Mitigation measures should be investigated for receivers that are predicted to experience noise levels above both the RING absolute and increase trigger levels.

Note 4: RING residential noise trigger level criteria for redeveloped rail projects.

Note 5: NCA does not contain residential receivers.

Figure 3 Locations of Predicted RING Noise Triggered Level Exceedances – Technical Report 2 (left) vs Revised Predictions (right)



The results above show the following:

- Noise levels in the project area are predicted to change as a result of the revised speed profiles. The changes are generally relatively small, however, they are sufficient to result in changes to the number of triggered receivers in some locations.
  - 'With project' noise levels at the north-western end of the project near NCA01 are predicted to marginally decrease by around 1 dB, due to train speeds being reduced on the Up track from 45 km/h in *Technical Report 2 to* 30 km/h in the revised modelling.
  - 'With project' noise levels near NCA03 and NCA04 are predicted to marginally increase by around 1 to 2 dB, due to train speeds increasing in this area from 45 km/h to 50 km/h on both tracks.
  - 'With project' noise levels at the south-eastern end of the project near NCA07 and NCA08 are predicted to decrease by around 2 dB, due to train speeds being reduced from 45 km/h to 30 km/h on both tracks.
- Additional residential receivers are predicted to be triggered in NCA03 and NCA04 when compared to *Technical Report 2*. Fewer receivers are predicted to be triggered in NCA07 and NCA08.

3.2 Other Sensitive Receivers

'Other sensitive' receivers that are predicted to have exceedances of the noise trigger levels with the revised modelling are shown in **Table 2** for the controlling 2034 scenario. The location of the triggered 'other sensitive' receivers are shown in **Figure 3**.

Table 2 Other Sensitive Receiver Triggers – 2034

NCA	Receiver	Noise Level (dBA)[1]					
		Predicted Level			Change in Noise from Project (With Project minus Without Project)		
		Day	Night	Max	Day	Night	Max
Hotels							
Criteria – Redeveloped[2]		***65***	***60***	***85***	***2.0***	***2.0***	***3.0***
NCA01	Ibis Sydney Airport	55	55	83	2.2	2.3	4.1
	Travelodge Sydney Airport	65	65	94	2.3	2.4	5.6
	Stamford Plaza Hotel	74	74	108	2.5	2.6	7.1
NCA02	Mantra Hotel	65	62	90	1.6	2.2	2.1
NCA03	Quest Mascot	64	64	92	1.5	1.5	3.9
	Citadines Hotel (formerly Felix)	67	67	87	1.2	1.3	6.8
Educational							
Criteria – Redeveloped[2]		***55***	***55***	n/a	***2.0***	***2.0***	n/a
NCA01	New Qantas Flight Training Centre[3]	73	73	n/a	2.2	2.4	n/a

Note 1: The results represent the facade of the receiver with the highest noise level increase.

Note 2: Criteria is the corresponding external level.

Note 3: It is noted that the existing Qantas Flight Training Centre is no longer predicted to be triggered due to a reduction in train speeds adjacent to this receiver.

The results above show the following:

- The revised predicted impacts at hotels near the project are generally consistent (ie within 1 to 2 dB) of the predictions in *Technical Report 2.*
- The only additionally identified 'other sensitive' trigger is the New Qantas Flight Training Centre in NCA01. It is noted that the design of the facades of the new centre are high-performance and assume an external L_{Aeq} noise level of 74 dBA in *Assessment of Noise and Vibration Emissions – Qantas Flight Training & Simulator Centre*, May 2019.

4 Management of Impacts

4.1 Airborne Noise Mitigation Options

The revised noise modelling results show that the trigger levels are likely to be exceeded in certain locations and noise mitigation measures are required to be investigated by the project.

Operational noise impacts can be controlled in a variety of ways and a summary of the potential options is provided in Table 48 of *Technical Report 2*.

4.1.1 Source Control – Track Lubrication Systems

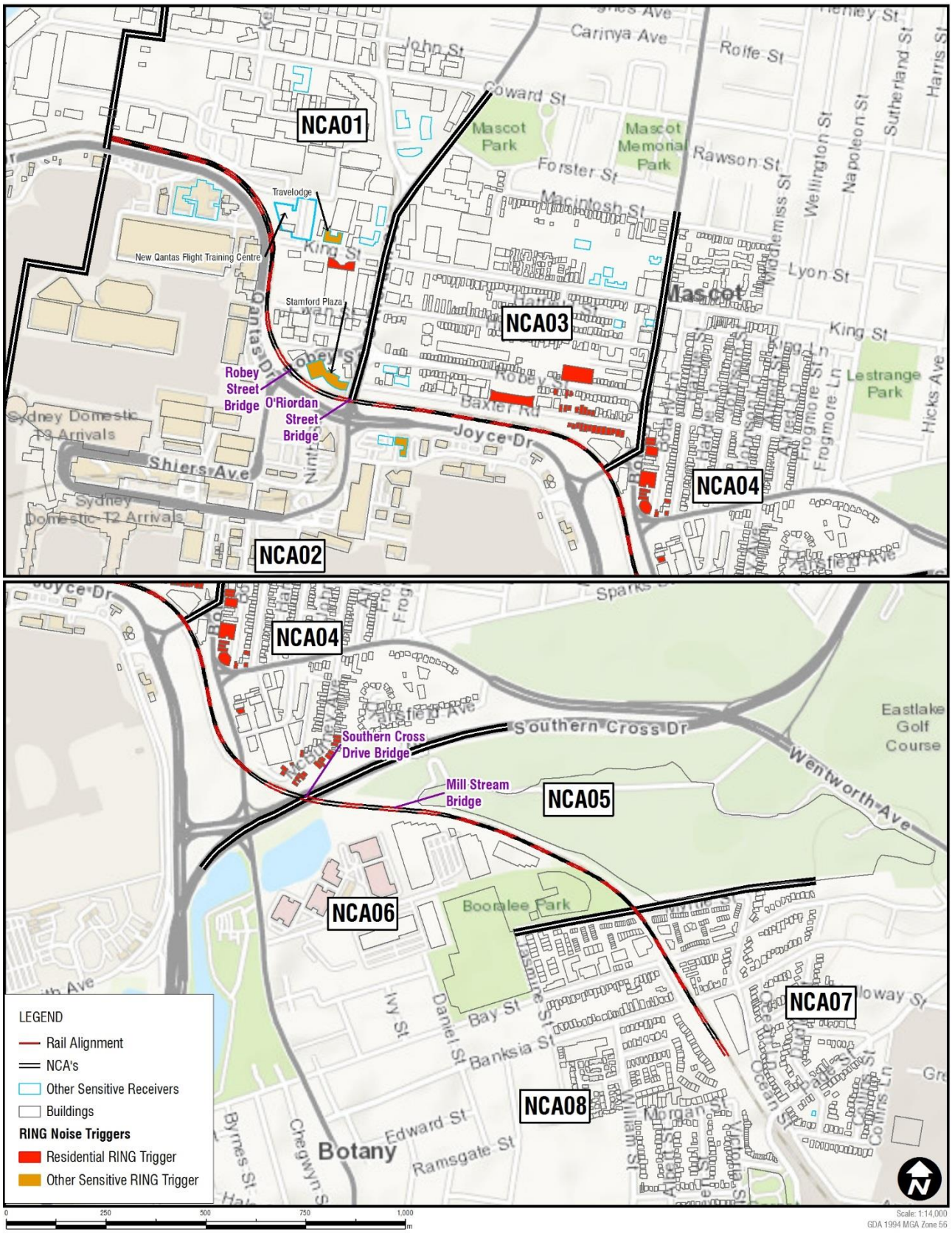
Track lubrication was recommended as the most appropriate form of mitigation in *Technical Report 2* as it addresses curve noise which was the primary contributor to the noise impacts in most locations.

The effect of track lubrication has been investigated for the revised modelling and a summary is provided in **Table 3** and **Figure 4**. The table shows the number of triggers with and without track lubrication, and the figure shows the location of the residual triggers after use of lubrication.

Table 3 Summary of Residual Impacts – With Track Lubrication

NCA	Side	Number of Exceedances of RING Noise Trigger Levels					
		2034 No Mitigation		2034 With Lubrication		Reduction With Lubrication	
		Residential	Other Sensitive	Residential	Other Sensitive	Residential	Other Sensitive
NCA01	Up	1	4	1	2	-	2
NCA02	Down	-	2	-	1	-	1
NCA03	Up	60	2	26	-	34	2
NCA04	Up	64	-	28	-	36	-
NCA05	Up	-	-	-	-	-	-
NCA06	Down	-	-	-	-	-	-
NCA07	Up	1	-	-	-	1	-
NCA08	Down	11	-	-	-	11	-
Sub Total		**137**	**8**	**55**	**3**	**82**	**5**
TOTAL		**145**		**58**		**87**	

Figure 4 Residual Triggered Receivers after Lubrication Used



The use of a modern track lubrication system on all curves is likely to remove all maximum noise levels triggers within the project area. Track lubrication is also expected to reduce L_{Aeq} noise levels by up to 1 dB. The above shows that this mitigation option is likely to reduce the number of RING triggers from 145 receivers to 58.

It is therefore recommended that, consistent with *Technical Report 2*, a properly maintained modern track lubrication system is installed by the project as the primary means of noise control. The specification of the noise control system for each curve would be determined as part of the Operational Noise and Vibration Report (ONVR), following an investigation of each curve.

Consistent with *Technical Report 2*, a number of approaches to mitigating operational noise impacts would be further reviewed as the project progresses. This review would be completed as part of the ONVR and would include:

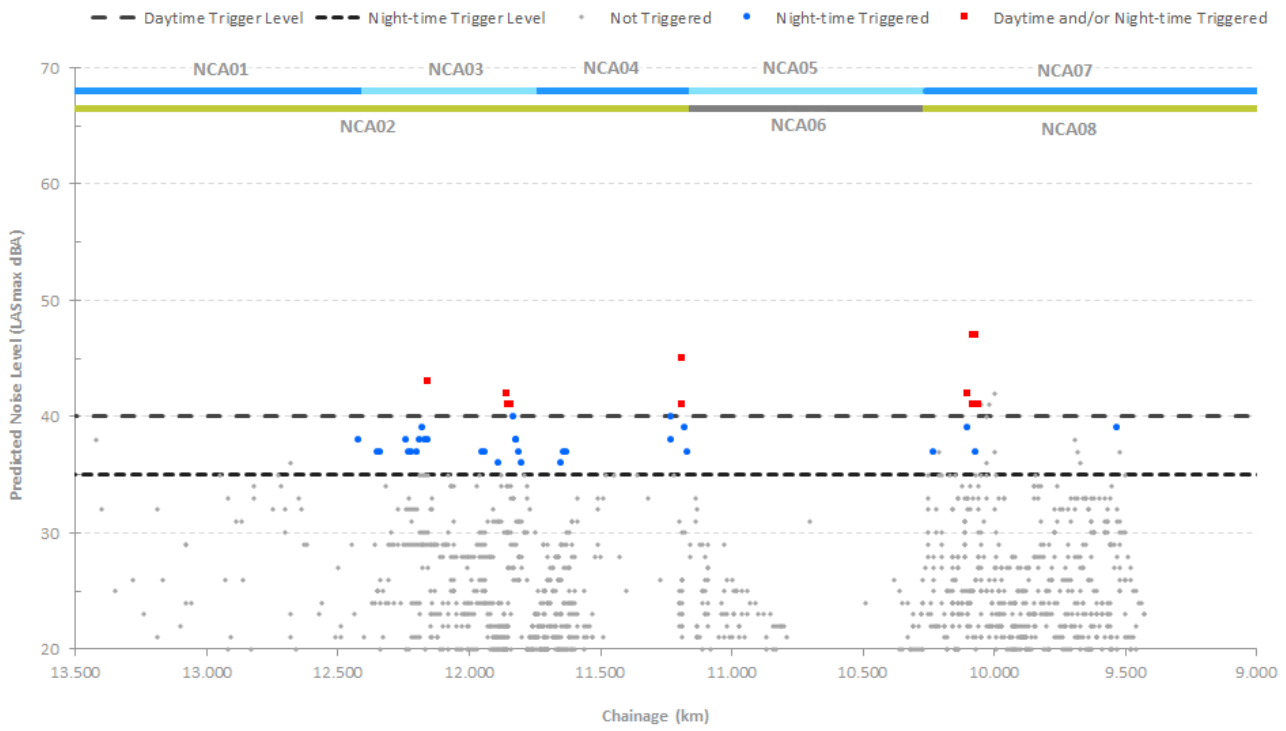
- Review of the use of track lubrication as the primary source of noise control for operational noise impacts
- Review of the feasibility and reasonableness of using noise barriers to provide path control mitigation to nearby receivers, noting the specific constraints that are applicable to the project
- Review of the locations where at-property treatment should be considered (after the use of source and path control measures) to mitigate residual impacts at individual receivers.

5 Ground-borne Noise Impacts

Operational ground-borne noise impacts were assessed in Section 6.5 of *Technical Report 2*. The revised predicted ground-borne noise levels at sensitive receivers adjacent to the project are shown in **Figure 5** and include the revised train speeds outlined in **Section 2**.

The RING notes that the ground-borne noise criteria only apply where ground-borne noise is higher than the corresponding airborne noise component.

Figure 5 Predicted Ground-borne Noise Levels



The revised predicted ground-borne noise impacts are generally comparable with the predictions in *Technical Report 2*. A small number of additional residential receivers are predicted to exceed the ground-borne criteria due to increased train speeds, however, as discussed in *Technical Report 2*, airborne noise levels would be expected to be louder than the corresponding ground-borne noise level in most situations.

Several hotels are located close to the project and the potential ground-borne noise impacts at these receivers were assessed against residential criteria in *Technical Report 2*. The predicted ground-borne noise levels at the nearby hotels, and at the recently approved New Qantas Flight Training Centre, are provided in **Table 2**.

Table 4 Ground-borne Noise Level Predictions

NCA	Receiver	Noise Level (L_{ASmax} dBA)			
		Predicted Level		Change in Noise	
		Day	Night	Day	Night
Hotels					
Criteria		***40***	***35***	***3.0***	***3.0***
NCA01	Ibis Sydney Airport	<30	<30	3.3	3.3
	Travelodge Sydney Airport	<30	<30	3.2	3.2
	Stamford Plaza Hotel	38	38	4.9	4.9
NCA02	Mantra Hotel (two buildings)	<30	<30	5.1	5.1
NCA03	Quest Mascot	<30	<30	4.6	4.6
	Felix Hotel	<30	<30	4.6	4.6
Educational					
Criteria		***40***	***40***	***3.0***	***3.0***
NCA01	New Qantas Flight Training Centre	35	35	3.2	3.2

The above shows ground-borne noise impacts are likely to exceed the RING residential criteria at the Stamford Plaza Hotel during the night-time. The extent of the ground-borne noise impacts inside the hotel would depend on the performance of the existing building facades and the amount by which high external airborne noise levels are attenuated. It is expected that the Stamford Plaza Hotel would have high performance facades due to high existing noise levels near the airport, meaning rail related ground-borne noise may be perceptible inside the hotel at times when ambient noise levels are low.

Ground-borne noise levels at the New Qantas Flight Training Centre are predicted to comply with the 40 dBA internal noise level criteria.

At this stage it is unclear if the potentially affected receivers contain sensitive rooms in locations which have the potential for ground-borne noise levels to be higher than the airborne noise level. As such, further consideration of potential ground-borne noise impacts would be investigated during the detailed design stage of the project.

6 Conclusion

Additional modelling has been completed to include revised train speed profiles as a result of design progression since completion of the EIS. The potential impacts to the recently approved New Qantas Flight Training Centre have also been assessed.

The assessment concluded that operational noise levels in the project area are predicted to change as a result of the revised speed profiles.

- 'With project' noise levels at the north-western end of the project near NCA01 are predicted to marginally decrease by around 1 dB, due to train speeds being reduced.
- 'With project' noise levels near NCA03 and NCA04 are predicted to marginally increase by around 1 to 2 dB, due to train speeds increasing.

- 'With project' noise levels at the south-eastern end of the project near NCA07 and NCA08 are predicted to decrease by around 2 dB, due to train speeds being reduced.
- Additional residential receivers are predicted to be triggered in NCA03 and NCA04 when compared to *Technical Report 2*. Fewer receivers are predicted to be triggered in NCA07 and NCA08.
- The only additionally identified 'other sensitive' trigger is the New Qantas Flight Training Centre in NCA01.

The assessment does not alter the recommendation that a modern track lubrication system is used on all curves as the primary method to mitigate noise impacts. The specification of the noise control system for each curve would be determined as part of the Operational Noise and Vibration Report, following an investigation of each curve.

Consistent with *Technical Report 2*, a number of approaches to mitigating operational noise impacts would be further reviewed as the project progresses. This review would be completed as part of the ONVR and would include:

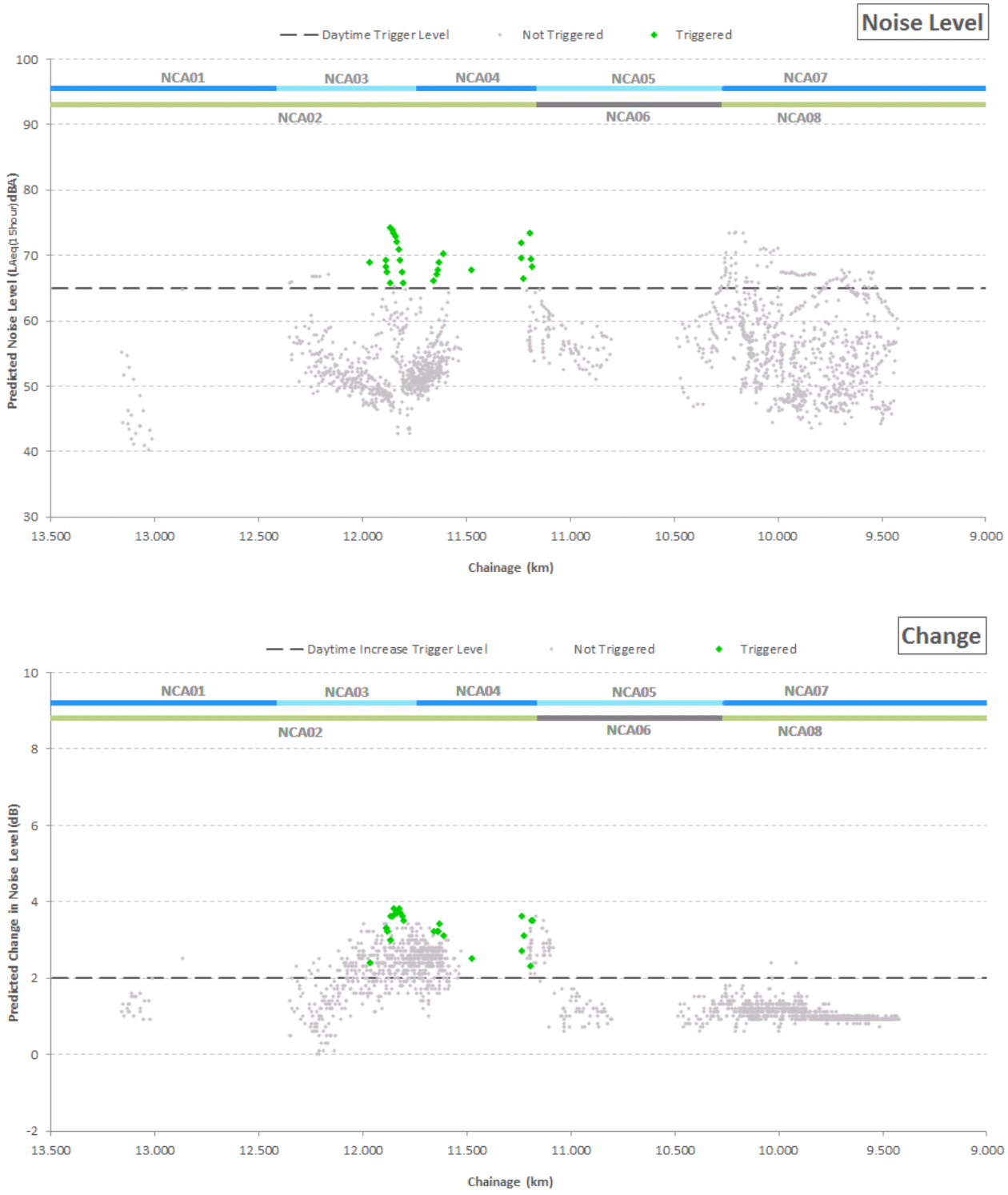
- Review of the use of track lubrication as the primary source of noise control for operational noise impacts
- Review of the feasibility and reasonableness of using noise barriers to provide path control mitigation to nearby receivers, noting the specific constraints that are applicable to the project
- Review of the locations where at-property treatment should be considered (after the use of source and path control measures) to mitigate residual impacts at individual receivers

Checked/
Authorised by: AW

APPENDIX A

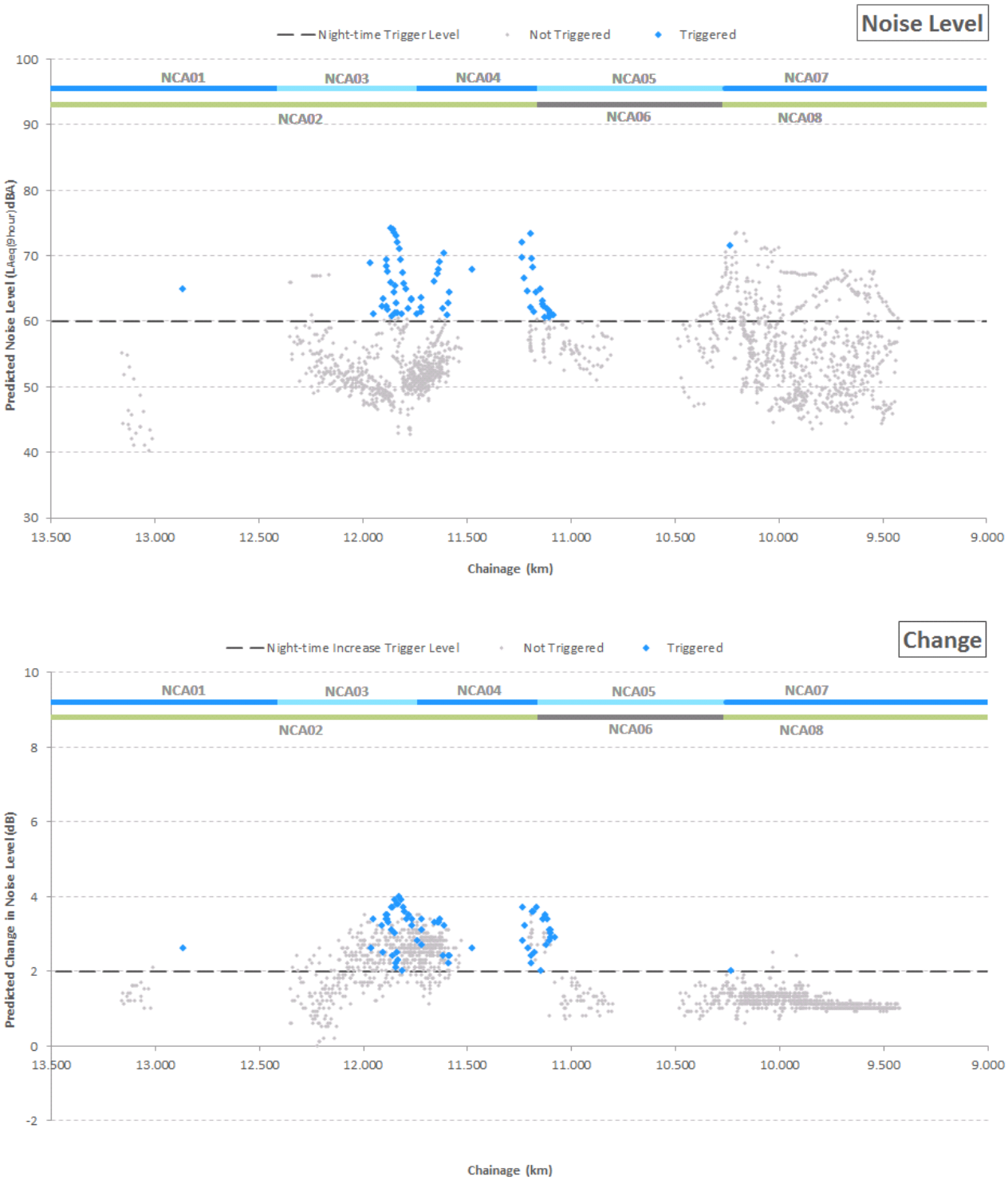
Operational Information

Figure 1 Predicted Operational Noise Impacts – Residential Receivers 2034 Daytime



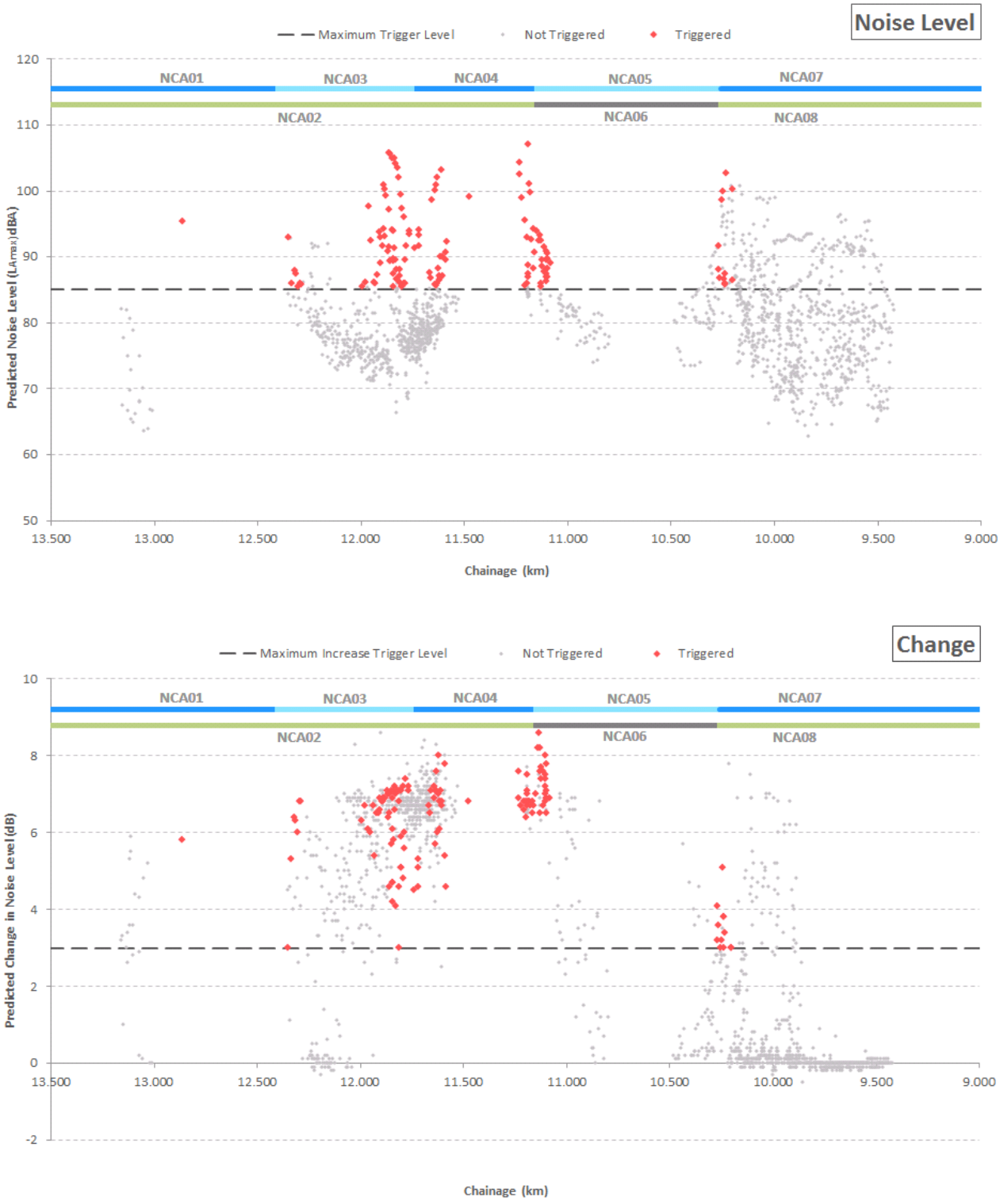
Note 1: For a receiver to be triggered it must be above both the RING daytime *and* the increase trigger levels.

Figure 2 Predicted Operational Noise Impacts – Residential Receivers 2034 Night-time



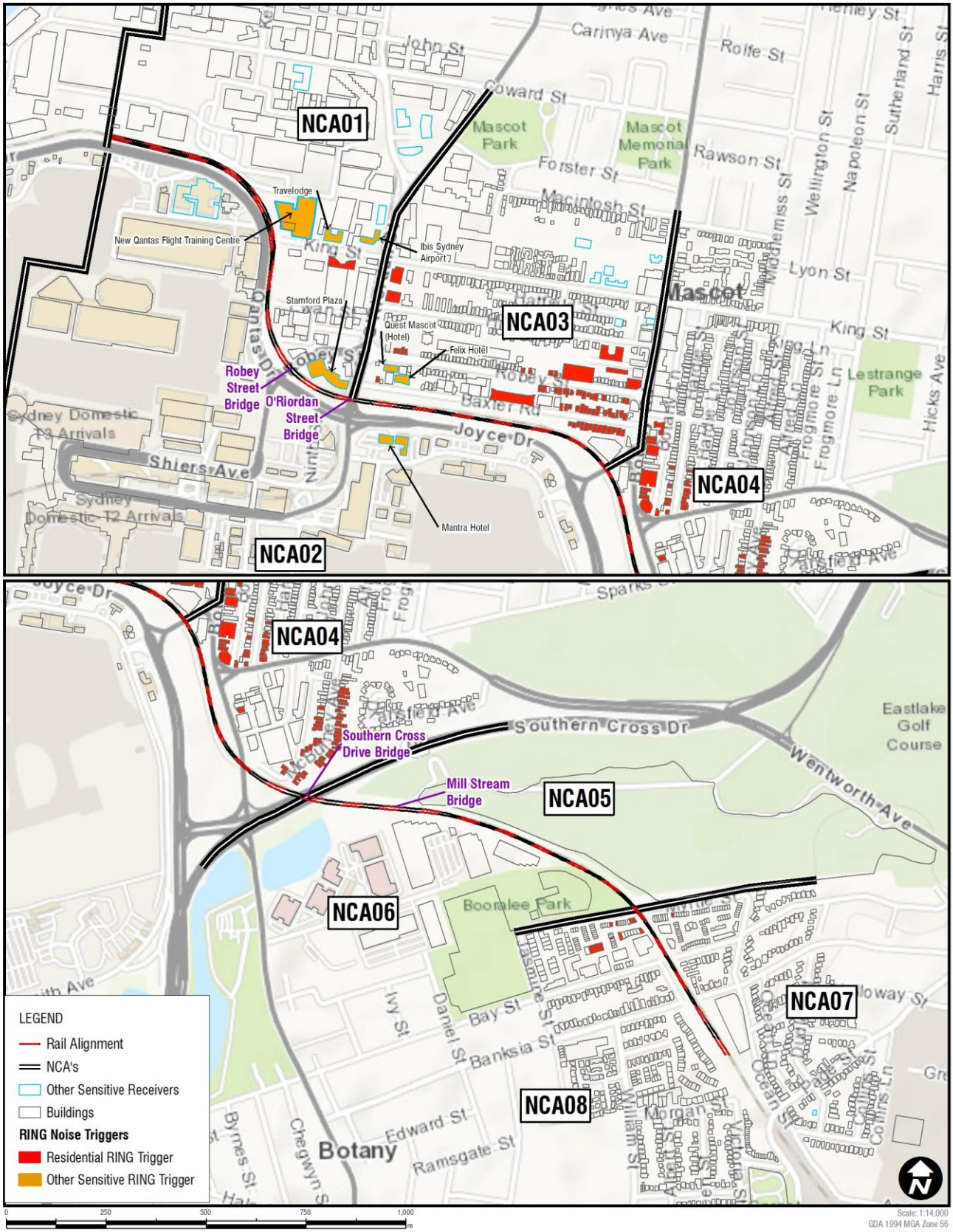
Note 1: For a receiver to be triggered it must be above both the RING night-time *and* the increase trigger levels.

Figure 3 Predicted Operational Noise Impacts – Residential Receivers 2034 Maximum Noise Levels



Note 1: For a receiver to be triggered it must be above both the RING maximum *and* the increase trigger levels.

Figure 4 Revised Locations of Predicted Base Case RING Noise Triggered Level Exceedances



BOTANY RAIL DUPLICATION

SUBMISSIONS REPORT