



Australian Government

BUILDING OUR FUTURE



M12 Motorway

Amendment Report

October 2020

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Appendices

Appendix	Appendix Name
Appendix A	Biodiversity supplementary technical report
Appendix B	Transport and traffic updated technical report
Appendix C	Urban design, landscape character and visual impact assessment supplementary technical memorandum
Appendix D	Socio-economic, land use and property supplementary technical memorandum
Appendix E	Aboriginal heritage supplementary technical memorandum
Appendix F	Non-Aboriginal heritage supplementary technical memorandum
Appendix G	Noise and vibration updated technical report
Appendix H	Flooding supplementary technical memorandum
Appendix I	Surface water quality and hydrology supplementary technical memorandum
Appendix J	Groundwater quality and hydrology supplementary technical memorandum
Appendix K	Soils and contamination supplementary technical memorandum
Appendix L	Air quality updated technical memorandum

Executive summary

Transport for New South Wales (TfNSW; formerly Roads and Maritime Services) is planning to construct and operate the M12 Motorway (the project) to provide direct access between the Western Sydney International Airport at Badgerys Creek and Sydney's motorway network. The M12 Motorway would run between the M7 Motorway at Cecil Hills and The Northern Road at Luddenham for about 16 kilometres and is expected to be opened to traffic prior to opening of the Western Sydney International Airport.

The project is subject to an approval under Division 5.2 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) as Critical State Significant Infrastructure (CSSI). The project is also a controlled action under Section 75 of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), requiring a separate approval from the Australian Minister for the Environment.

An environmental impact statement (EIS) was prepared to describe and assess the project and recommend management measures to address impacts. The EIS was exhibited by the NSW Department of Planning, Industry and Environment (DPIE) for 34 days from 16 October 2019 to 18 November 2019 to give the community and stakeholders the opportunity to provide comment.

During the exhibition of the EIS, 50 submissions were received from government agencies, stakeholders and the community. The Secretary of DPIE provided copies of these submissions to TfNSW. In accordance with Section 5.17 of the EP&A Act, the Secretary requested TfNSW to provide a response to submissions on 29 November 2019 to address the identified issues. These responses are detailed in the M12 Motorway Submissions Report which is available on the DPIE website: <https://www.planningportal.nsw.gov.au/major-projects/project/10226>.

Purpose of this report

TfNSW proposes to amend the project following further design development since exhibition of the EIS. The proposed amendments include design changes and construction updates. These provide functional improvements to the design and improved integration with surrounding major transport infrastructure projects and potential future development. They also respond to issues raised in community and stakeholder submissions, and in some instances, further reduce the potential impacts of the project as described in the EIS. In accordance with clause 192(2) of the Environmental Planning and Assessment Regulation 2000 (NSW) (EP&A Regulation), the Secretary of DPIE gave approval to amend the project in May 2020.

This amendment report has been prepared for the project in accordance with clause 192(3) of the EP&A Regulation. The report outlines the proposed design and construction changes to the project and assesses the associated environmental impact. Where required, the report has included additional or revised environmental management measures to manage or minimise environmental impacts.

Summary of proposed changes

The proposed changes to the project as described in the EIS are outlined below:

- Amendments to the motorway-to-motorway interchange at the M7 Motorway, including:
 - Changes to Elizabeth Drive and Cecil Road intersections, proposed exit ramps, the Wallgrove Road connection to Elizabeth Drive and proposed shared user path realignments
 - The widening of Elizabeth Drive under the M7 Motorway and approaches
- An option to provide a new connection between the M12 Motorway and Elizabeth Drive near the M7 Motorway interchange. The delivery of this option would be subject to available funding.
- Two new signalised intersections into the Western Sydney International Airport, with provisions for future connection to potential developments north of the Western Sydney International Airport
- Additional ancillary facilities to support the delivery of the project.

Refinements to the project have also been made as part of the ongoing development of the project since the EIS was exhibited. These refinements are considered to be consistent with the project as described in the EIS, however have been included in the amendment report for completeness. Refinements include both minor design changes and construction updates.

The project may be delivered in stages under multiple contracts, with the priority being to deliver the connection between the M7 Motorway and the Western Sydney International Airport prior to the Airport opening in 2026.

The project with all proposed changes and refinements is referred to as the amended project.

Key features of the amended project

The key features of the amended project are listed below and shown in **Figure A-1**.

- A new dual-carriageway motorway between the M7 Motorway and The Northern Road with two lanes in each direction with a central median allowing future expansion to six lanes
 - Motorway access via three interchanges/intersections:
 - A motorway-to-motorway interchange at the M7 Motorway and associated works (extending about four kilometres within the existing M7 Motorway corridor) with the following options:
 - Option 1 – without connection between the M12 Motorway and Elizabeth Drive
 - Option 2 – with connection between the M12 Motorway and Elizabeth Drive (Note: The decision on which option would be built is dependent on funding being available to include the Elizabeth Drive connection).
 - A grade-separated interchange referred to as the Western Sydney International Airport interchange, including a dual-carriageway four-lane airport access road (two lanes in each direction for about 1.5 kilometres) connecting with the Western Sydney International Airport Main Access Road
 - A signalised intersection at The Northern Road with provision for grade separation in the future
- Bridge structures across Ropes Creek, Kemps Creek, South Creek, Badgerys Creek and Cosgroves Creek
- A bridge structure across the M12 Motorway into the Western Sydney Parklands to maintain access to utilities, including the existing water tower and mobile telephone/other service towers on the ridgeline in the vicinity of Cecil Hills, to the west of the M7 Motorway

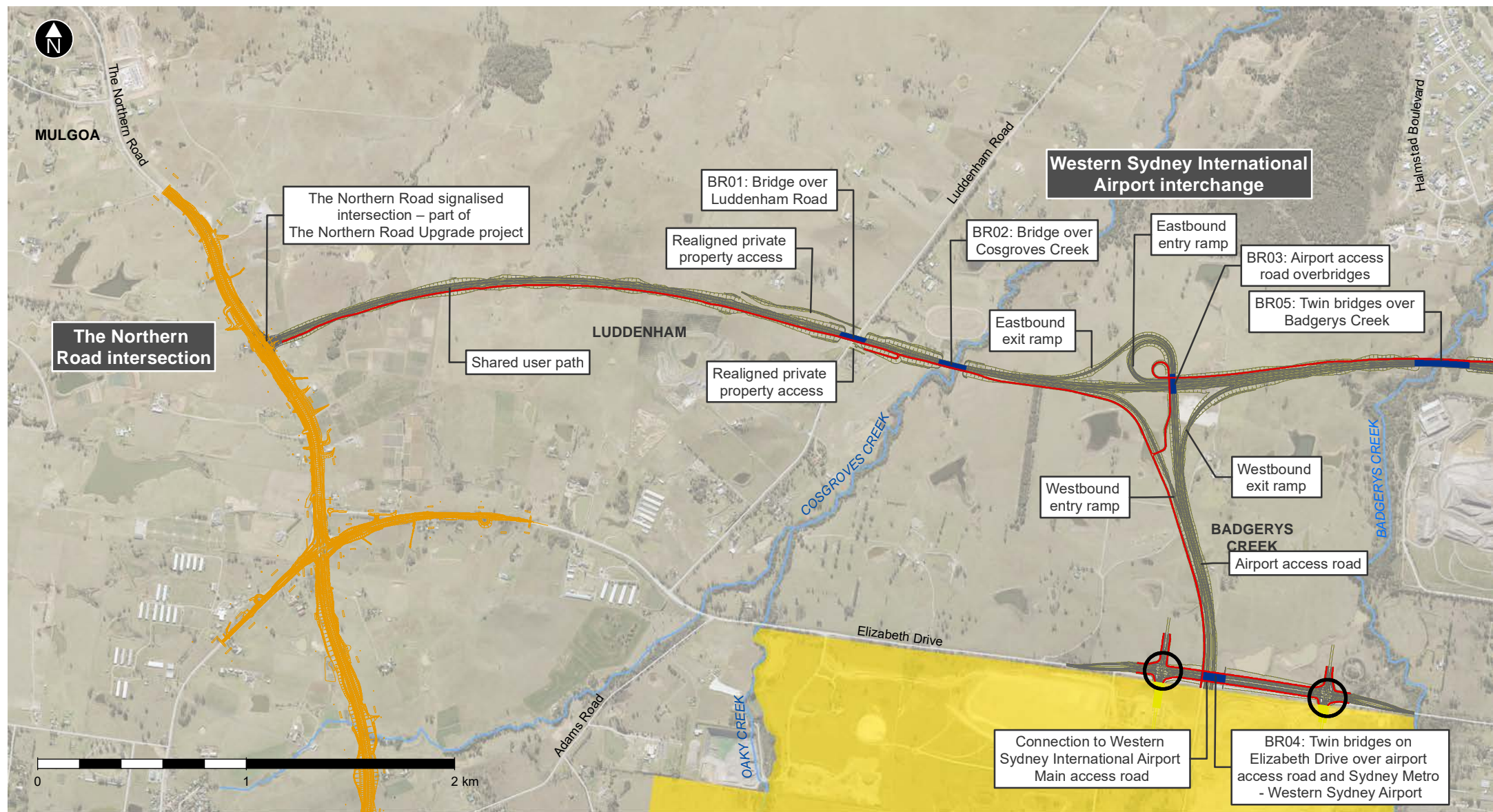
- Bridge structures at interchanges and at Clifton Avenue, Elizabeth Drive, Luddenham Road and other local roads to maintain local access and connectivity
- Inclusion of active transport (pedestrian and cyclist) facilities through provision of pedestrian bridges and an off-road shared user path, including connections to existing and future shared user path networks
- Modifications to the local road network, as required, to facilitate connections across and around the M12 Motorway including:
 - Realignment of Elizabeth Drive at the Western Sydney International Airport, with Elizabeth Drive overpassing the airport access road and rail infrastructure
 - Two new signalised intersections from Elizabeth Drive into the Western Sydney International Airport, with provisions for future connection to potential developments to the north
 - Widening of Elizabeth Drive under the M7 Motorway and approaches
 - Realignment of Clifton Avenue over the M12 Motorway, with associated adjustments to nearby property access
 - Relocation of Salisbury Avenue cul-de-sac, on the southern side of the M12 Motorway
 - Realignment of Wallgrove Road to connect to Cecil Road, including a connection between Elizabeth Drive and Wallgrove Road via Cecil Road with a signalised intersection with Elizabeth Drive
- Adjustment, protection or relocation of existing utilities
- Ancillary facilities to support motorway operations, smart motorways operation in the future and the existing M7 Motorway operation, including gantries, electronic signage and ramp metering
- Other roadside furniture including safety barriers, signage and street lighting
- Adjustments of waterways, where required, including Kemps Creek, South Creek and Badgerys Creek
- Permanent water quality management measures including swales and basins
- Establishment and use of temporary ancillary facilities, temporary construction sedimentation basins, access tracks and haul roads during construction
- Permanent and temporary property adjustments and property access refinements as required.

Assessment updates

The amended project was assessed against each of the key issues and other issues as set out in the Secretary's Environmental Assessment Requirements (SEARs) issued for the project on 30 October 2018 by the Secretary of DPIE. A request to amend the project was submitted to DPIE on 20 May 2020. In response, DPIE confirmed on 28 May 2020 that an amendment report is appropriate to address the environmental impacts associated with the amended project. No additional or updated SEARs were issued by DPIE. As a result, this amendment report and its appendices have been prepared in accordance with the SEARs issued for the project on 30 October 2018.

Updated technical reports have been prepared where there is likely to be a large number of changes, or a substantial change in the extent or type of impact for that technical discipline and the reports present a similar level of assessment and content as provided for the EIS. Supplementary technical memorandums were prepared where the expected changes to impacts is considered to be relatively minimal.

A number of assessments found there to be minimal variation in impacts from what was described in the EIS. These assessments included Aboriginal heritage, soil and contamination, air quality, waste, climate change risk and greenhouse gas, health and safety, sustainability and urban design, landscape character and visual amenity.



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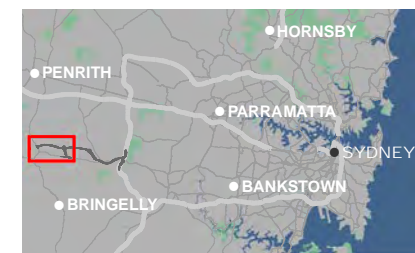
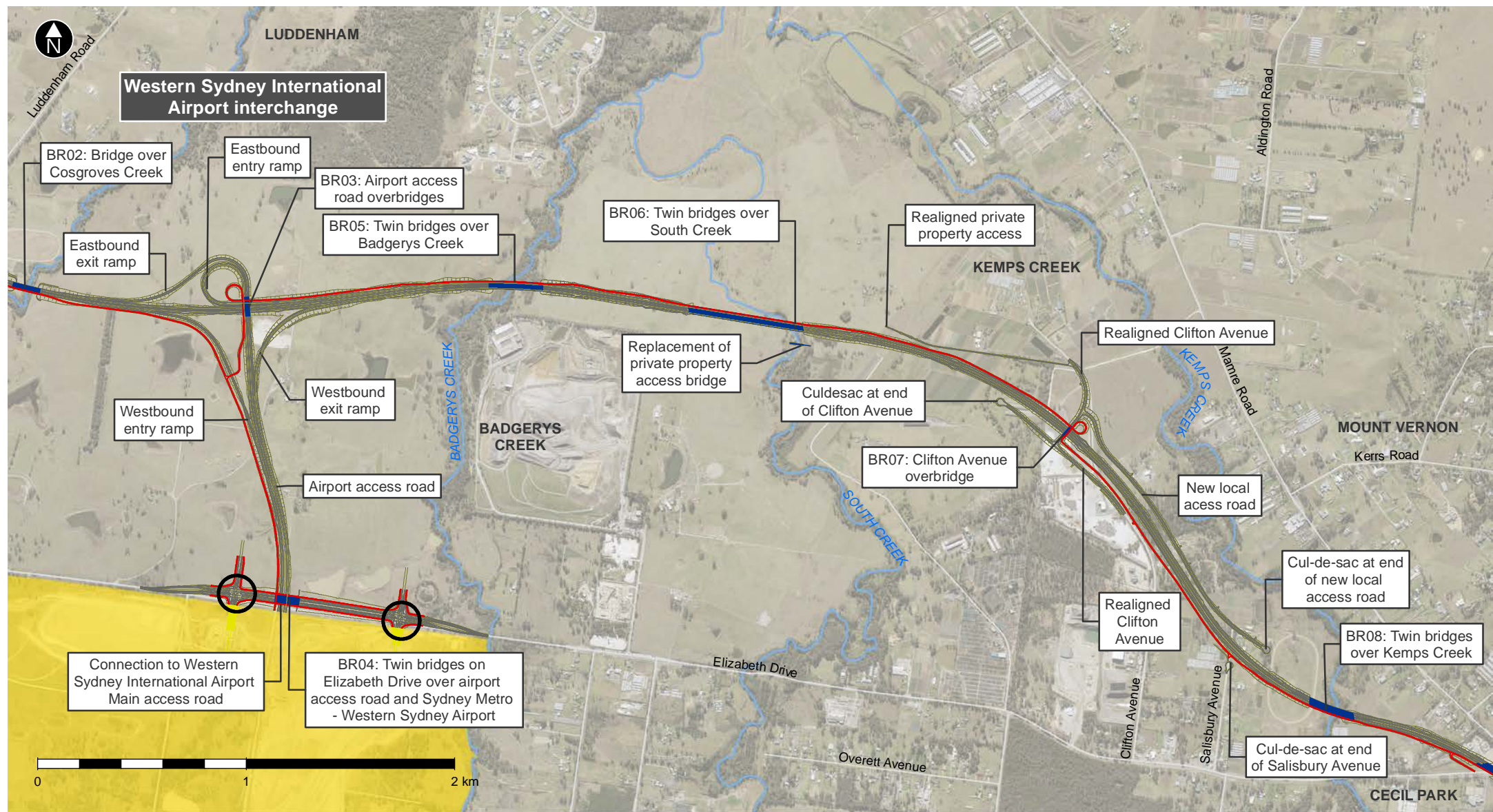
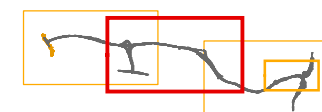


Figure A-1 Key features of the amended project



- The amended project
- Existing roads
- Western Sydney International Airport
- Shared user path
- Waterways
- Signalised intersections into the Western Sydney International Airport
- Note: Indicative, subject to detailed design
- Bridges



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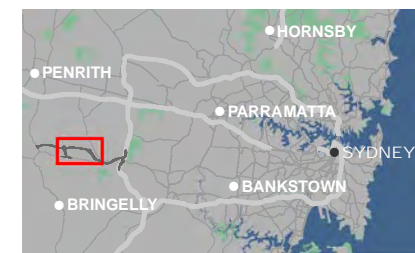


Figure A-1 Key features of the amended project

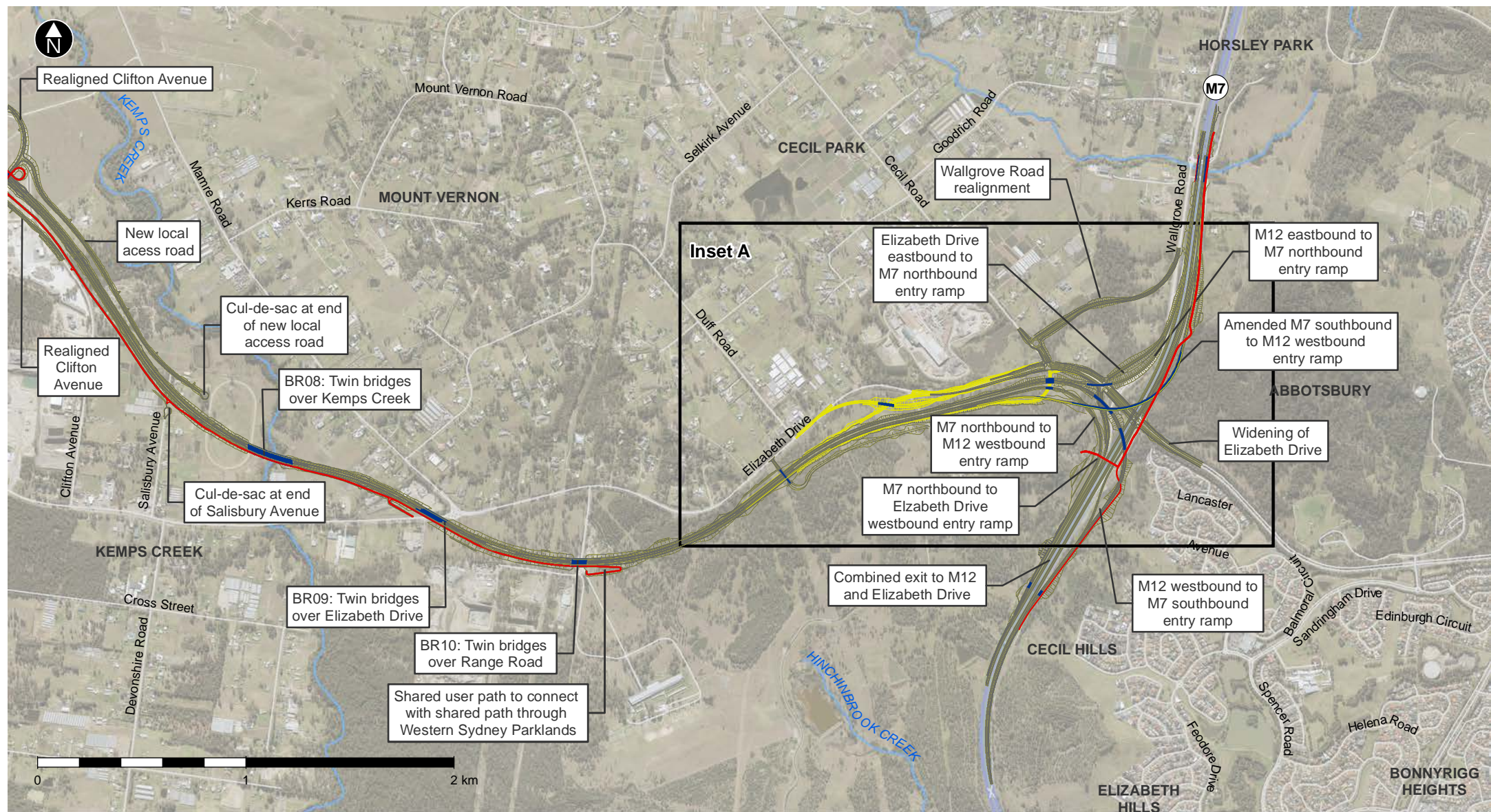
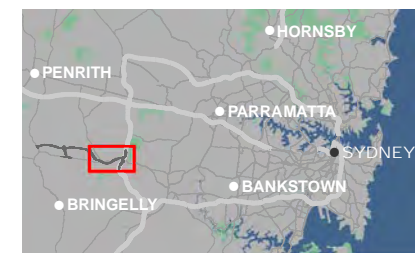
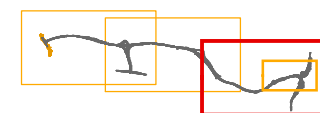
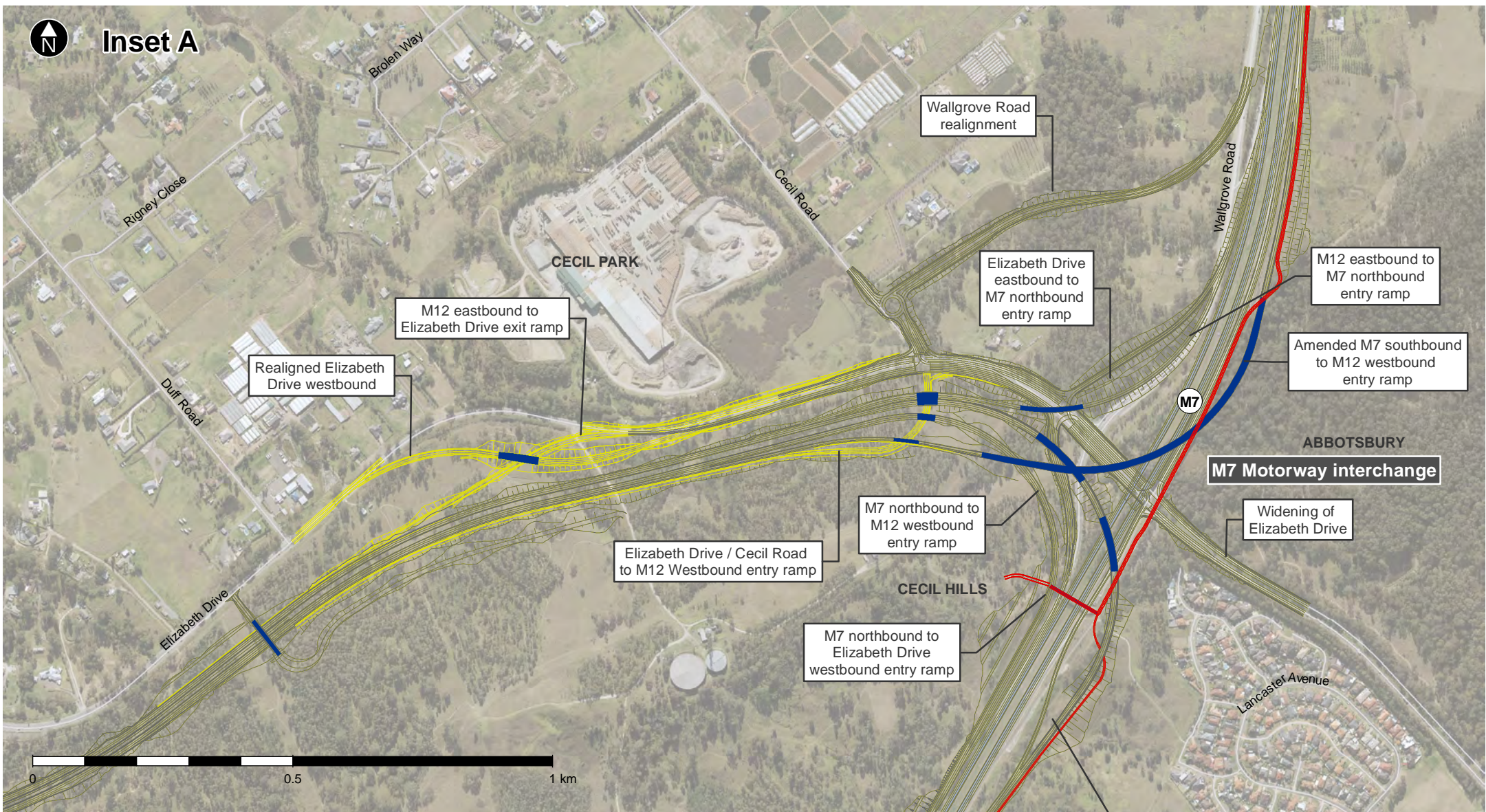
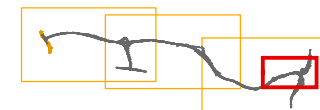


Figure A-1 Key features of the amended project





- The amended project
- The amended project with Elizabeth Drive connection
- Shared user path
- Bridges
- Motorway
- Existing roads



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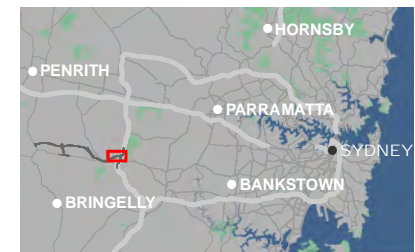


Figure A-1 Key features of the amended project

While the amended project has aimed to avoid or reduce potential environmental impacts, impacts to the environment and community during construction and operation of the project would still be experienced. The EIS identified a range of comprehensive environmental management measures to avoid, manage, mitigate, offset and/or monitor these impacts. Where required, additional or revised environmental management measures are proposed to manage variations in impacts due to the amended project.

The key adverse and beneficial impacts identified which are different to those described in the EIS are outlined below.

Biodiversity

Where practicable, biodiversity impacts have been avoided and/or minimised during development of the amended project. However, some impacts could not be avoided due to design constraints such as existing and proposed land uses. The amended project would result in the following:

- Direct removal of an additional seven hectares of native vegetation (about 80.6 hectares in total)
- Direct removal of an additional 6.8 hectares of threatened ecological communities (TECs) listed under the *Threatened Species Conservation Act 1995* (about 80 hectares in total); this is inclusive of an additional 3.99 hectares of Commonwealth listed TECs
- Indirect impact to an additional 0.79 hectares of native vegetation through edge effects resulting in 13.52 hectares of indirect impact overall
- Impacts to two threatened plant species including:
 - Direct removal of an additional 10 individuals of *Pultenaea parviflora* (up to 100 individuals in total)
 - Indirect impact through edge effects to an additional 124 individuals of *Pultenaea parviflora* (about 142 plants in total) and an additional 801 individuals of *Dillwynia tenuifolia* (about 850 plants in total)
- Removal of an additional 9.83 hectares of fauna habitat (about 344.15 hectares in total) including woodland, riparian, native and exotic grassland and aquatic habitat. This is inclusive of the following threatened fauna habitat removal:
 - An additional 3.36 hectares of Cumberland Plain Land Snail habitat (5.22 hectares in total)
 - An additional 0.04 hectares of Southern Myotis breeding habitat (0.96 hectares in total) and an additional 0.84 hectares of foraging habitat (4.53 hectares in total)
 - An additional 7 hectares of foraging habitat for five threatened microbat species and the grey headed flying fox (62.58 hectares in total).

Additional exclusion zones have been incorporated into the environmental management measures for the amended project, particularly to minimise indirect impacts to threatened flora. Biodiversity offset requirements have increased slightly as a result of the amended project, from a total of 8,354 credits for the project as described in the EIS to 8,810 credits for the amended project.

Transport and traffic

The land use and demographics data used to inform traffic modelling for the amended project assessment has been updated to more recent and now available traffic data (based on 2016 land use forecasts by DPIE and adjusted to include Western Sydney International Airport forecast data).

The traffic forecasts for western Sydney utilised strategic models that were developed subsequent to the EIS that are considered to be more robust for the western Sydney area. With the updated models, land use and demographics data, the model indicates a reduction in future trips to the South West Growth Area in western Sydney. The forecast traffic volumes using the amended project and the surrounding network have reduced as a result.

Compared to the project as described in the EIS, most intersections would perform better during construction of the amended project. This change is a result of those updated (reduced) traffic forecasts.

The provision of a connection to the M12 Motorway from Elizabeth Drive in option 2 would generally improve network performance by allowing more traffic to access the high-speed M12 Motorway.

In 2036, the amended project would result in a decrease of total travel time in peak periods through the study area by up to eight per cent compared to existing conditions and an increase in average speeds through the study area by up to nine per cent. These changes reflect the change to the demand growth in the updated traffic model that has resulted in forecast traffic volumes being lower.

For the amended project all intersections would perform at a satisfactory Level of Service in 2026 and 2036. Compared to the project as described in the EIS, the performance of all intersections for the amended project improves. This is also due to the lower forecast traffic volumes associated with the updated traffic model. The exception to this is The Northern Road / M12 Motorway intersection under option 2. In this scenario the performance of this intersection is expected to be poorer as a result of more traffic using the M12 Motorway under option 2 and less traffic using Elizabeth Drive.

The environmental management measures established for the project as described in the EIS would continue to be implemented for the amended project. No additional or revised traffic management measures are proposed as part of the amendment report.

Socio-economic, land use and property

The amended project would directly impact on an additional eight properties (three temporary leases and five partial acquisitions) resulting in 49 properties being impacted overall. One additional dwelling would also be demolished resulting in a total of 10 dwellings being demolished by the amended project overall.

Changes to property access would be required due to realignment of Wallgrove Road in the amended project resulting in an increase to travel distance of up to 550 metres for some properties.

Changes to the construction and operational footprints for the amended project would result in an additional 86.8 hectares and 26.2 hectares of land being impacted respectively, with urban and rural residential land being the main land uses affected. The addition of ancillary facilities would increase the impact on three businesses identified in the EIS (TreeServe, a farm on Salisbury Avenue and Barra Lodge) and the Western Sydney Parklands).

The additional ancillary facilities are also likely to increase disruptions and local amenity for residents in Cecil Park, Luddenham and Kemps Creek as well as to a number of social infrastructure facilities in the vicinity of the amended project. Increased visual amenity impacts would also be expected for residents of Cecil Park due to the Wallgrove Road realignment.

The environmental management measures established for the project as described in the EIS would continue to be implemented for the amended project. No additional socio-economic, land use and property management measures are proposed as part of the amendment report.

Non-Aboriginal heritage

The amended project would extend about 18 metres further into the curtilage of the Cecil Park Complex archaeological site than the project as described in the EIS. However, the overall 'major' level of impact for this item remains unchanged from the EIS assessment. A salvage methodology for the site has been prepared and is included within the amendment report.

While the amended project would also encroach further (about 65 metres) into the locally listed Luddenham Road corridor, the overall impact is still considered to be 'negligible', which remains unchanged from the project as described in the EIS.

The environmental management measures established for the project as described in the EIS would continue to be implemented for the amended project. No additional non-Aboriginal heritage management measures are proposed as part of the amendment report.

Noise and vibration

Construction

The amended project is mostly consistent with the project as described in the EIS, however, both option 1 and option 2 would result in additional construction noise impacts to receivers situated in Noise Catchment Area (NCA) 02 in Cecil Hills, due to proposed widening works on Elizabeth Drive.

Additional construction activities at ancillary facilities were assessed for the amended project including the use of batching plants and crushing and screening equipment. These activities result in 'moderate' to 'high' construction noise impacts.

The receivers with 'high' or 'moderate' construction impacts during the day-time and night-time periods is generally consistent with the EIS, with the exception of a few discrete areas around the Wallgrove Road realignment in NCA04 (Cecil Park), the Elizabeth Drive works to the east of the M7 Motorway in NCA02 (Cecil Hills) and adjacent to the ancillary facility AF10 in NCA10 (Luddenham).

Eleven receivers (for option 1) and fourteen receivers (for option 2) may be highly noise affected due to the amended project. This is an increase of four and seven receivers respectively when compared to the project as described in the EIS. Irfan College may experience moderate (option 1) to high (option 2) construction noise impacts due to the amended project, which is an increase from the minor impact expected from the EIS assessment. The increase in impact is due to additional proposed work on Elizabeth Drive.

Operation

The amended project generally results in similar predicted day-time noise levels and a reduction in the predicted night-time operational noise levels when compared to the corresponding period in the EIS. Whilst the 'build' scenario (with the project) is generally predicted to reduce by up to four dB across all noise catchment areas (NCAs) in the night-time period, the 'no build' scenario (without the project) is also predicted to reduce by up to six dB to that compared in the EIS.

The reduction in noise levels is due to the reduction in forecast traffic volumes from the updated data used in both the traffic and noise modelling for the amended project.

Whilst the overall operational noise levels in the amended project are lower, there are some areas where the realignment or changes to localised traffic volumes (Wallgrove Road, Salisbury Avenue and Duff Road) result in increased levels to those presented in the EIS. Maximum noise levels are predicted to increase by up to 15 dB over existing levels at dwellings adjacent to the realigned

Wallgrove Road, compared with up to eight dB at these receivers in the EIS. This is due to the realigned Wallgrove Road moving closer to the dwellings under the amended project. The amended project also results in an increase of triggered receivers eligible for consideration of additional noise mitigation (212 buildings for option 1 and 220 buildings for option 2) when compared to the EIS (183 buildings). The increase is mainly due to an expansion of the operational assessment study area.

Three noise barriers have been identified for further reasonable and feasible consideration during detailed design. This is a decrease from the four barriers identified in the EIS. One barrier has been removed as updated noise modelling results for the amended project showed the barrier no longer met the noise benefit principles outlined under the TfNSW Noise Mitigation Guidelines. This is consistent for both option 1 and option 2.

The environmental management measures established for the project as described in the EIS would continue to be implemented for the amended project and feasible and reasonable design features implemented to mitigate operational and construction impacts. No additional noise and vibration management measures are proposed as part of the amendment report and these measures will apply to the expanded study area to account for the amended project.

Flooding

The modelling of the main creeks shows there is minimal increase to existing afflux levels as a result of the amended project and that surrounding land use would be unaffected by this minimal increase. However, modelling of the minor drainage lines indicates that an increase in volumes and rates of flow would potentially impact surrounding land use. This would be consistent with the project as described in the EIS and would be managed through mitigation such as detention basins and scour protection, which would be considered during detailed design.

The amended project would extend further into the Badgerys Creek floodplain than the project as described in the EIS and would result in an increase in flood levels on the upstream side of Elizabeth Drive of about 50 millimetres in the floodplain area in the 100-year annual recurrence interval (ARI) event. The maximum predicted flood level in Badgerys Creek channel upstream of the existing bridge would increase by about 75 millimetres. Downstream of Elizabeth Drive, a decrease in flood levels of up to 25 millimetres is predicted due to the reduced overtopping of the road.

During operation of the amended project, Elizabeth Drive at Badgerys Creek would have a flood immunity up to and including the five-year ARI flood event. It would be overtopped in the 20 year ARI event with a flood depth of about 160 millimetres above the crown of the road and depths of up to 350 millimetres on the west-bound carriageway.

Additional management measures have been included in the amendment report and involve refining the Elizabeth Drive design to minimise flood affectation at Badgerys Creek floodplain and further consultation with the Western Sydney International Airport regarding their flood management.

Groundwater quality and hydrology

Two additional areas of cut for the amended project around the Western Sydney International Airport interchange have been identified as having potential to interact with the groundwater table (overall this makes three areas of cut with potential for groundwater interaction). Potential groundwater inflows at these cuts are assessed to be low with a low level of accompanying groundwater level drawdown predicted. Consistent with the EIS, impacts to groundwater at these locations are anticipated to be minor and localised.

The environmental management measures established for the project as described in the EIS would continue to be implemented for the amended project. Additional management measures related to monitoring groundwater in the areas of newly identified cut are proposed as part of the amendment report.

Cumulative impacts

The main area that would experience adverse cumulative impacts, particularly construction fatigue, would continue to be the western portion of the project. The interaction with major projects including the Western Sydney International Airport and Sydney Metro - Western Sydney Airport (previously known as the Sydney Metro Greater West) would occur for much of the amended project construction program in this area.

In particular, the amended project would extend the use of an existing ancillary facility in Luddenham currently in use for The Northern Road Upgrade project. The use of this would prolong the duration of construction activities in this location by about four years. This would extend possible disruptions for residents of nearby rural residential properties at Gates Road and The Northern Road associated with construction noise, dust and traffic.

Extension of construction impacts at the existing ancillary facility at Luddenham would be managed through the Construction Fatigue Protocol and Community Communication Strategy being prepared for the project. Preparation of these documents was identified in the environmental management measures in the EIS. No additional or revised management measures for cumulative impact are proposed as part of the amendment report.

How can I comment on the amended proposal?

The Department of Planning, Industry and Environment (DPIE) will place this amendment report on public exhibition for a minimum of 14 days in accordance with the EP&A Regulation. This will give the community and other stakeholders the opportunity to provide comment on the amended project, assessment undertaken, and management measures proposed to minimise impacts from the amended project. During this period, the document will be available for inspection at the DPIE website <https://www.planningportal.nsw.gov.au/major-projects/project/10226>, and on the TfNSW project website <http://rms.nsw.gov.au/m12>.

To provide feedback on the amended project, a person may make submissions to the Secretary of the DPIE during the exhibition period. All submissions received will be placed on the DPIE website. To make a submission, use the online form available at www.planningportal.nsw.gov.au/major-projects/projects/on-exhibition.

Glossary of terms and abbreviations

Term	Meaning
AEI	Area of environmental interest
AEP	Annual exceedance probability: the chance of a flood of a given or larger size occurring in any one year, usually expressed as a percentage. For example, if a peak flood discharge of 500 cubic metres per second has an AEP of 5 per cent, then there is a 5 per cent chance of that discharge event (or larger event) occurring in any one year.
AF	Ancillary facility
AHD	Australian height datum
AHIMS	Aboriginal Heritage Information Management System
airport access road	Part of the M12 Motorway connecting the Western Sydney International Airport interchange with the Western Sydney International Airport
ARD	Archaeological Research Design
ARI	Average recurrence interval: The long term average number of years between the occurrence of a flood as big as, or larger than, the selected event. For example, floods with a discharge as great as, or greater than, the 20 year ARI flood event will occur on average once every 20 years. ARI is another way of expressing the likelihood of occurrence of a flood event.
BAR	Biodiversity assessment report
BC Act	<i>Biodiversity Conservation Act 2016</i> (NSW)
BH	Borehole
BOD	Biological oxygen demand
BR	Bridge
BTEX	Ethylbenzene and xylene
CEEC	Critically endangered ecological community
CEMP	Construction environment management plan
CFFMP	Construction flora and fauna management plan
Construction footprint	The construction footprint is the area required to build the project. This includes the area required for temporary work such as sedimentation basins, drainage lines, access roads, construction ancillary facilities.

Term	Meaning
CPTED	Crime prevention through environmental design
CRD	Cumulative rainfall deviation
CTTMP	Construction transport and traffic management plan
DAWE	Department of Agriculture, Water and the Environment <i>Former Department of Environment and Energy (DoEE)</i>
DECCW	Department of Environment, Climate Change and Water
DGA	Dense graded asphalt
DoEE	Former Department of the Environment and Energy <i>Now Department of Agriculture, Water and the Environment (DAWE)</i>
DP	Deposited plan
DPC (Heritage)	Department of Premier and Cabinet (Heritage) <i>Formerly Office of Environment and Heritage (OEH)</i>
DPIE	Department of Planning, Industry and Environment <i>Formerly Department of Planning and Environment (DPE)</i>
DPIE (Regions, Industry, Agriculture & Resources)	Department of Planning, Industry and Environment (Regions, Industry, Agriculture & Resources) <i>Formerly Department of Primary Industries (DPI) – Agriculture</i> <i>Formerly Department of Primary Industries (DPI) – Fisheries</i>
DPIE (Water)	Department of Planning, Industry and Environment (Water) <i>Formerly NSW Office of Water / Natural Resources Access Regulator</i>
DSI	Detailed site investigation
ED	Elizabeth Drive
EEC	Endangered ecological community
EESG	Environment, Energy and Science Group of the Department of Planning, Industry and Environment <i>Formerly NSW Office of Environment and Heritage</i>
EIS	Environmental impact statement
EPA	Environmental Protection Authority

Term	Meaning
EP&A Act	<i>Environmental Planning and Assessment Act 1979 (NSW)</i>
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth).</i>
ESD	Ecologically sustainable development
Exclusion zones	Exclusion zones are areas of environmental importance (eg threatened vegetation or heritage items) that need to be protected. Exclusion zones are shown on figures throughout this amendment report where relevant. These exclusion zones are defined as no-go areas and are to be protected for the duration of construction in that particular footprint area.
FBA	Framework for Biodiversity Assessment
GDE	Groundwater dependent ecosystems
GHG	Greenhouse gas
HCP	Habitat compensation plan
ICOMOS	International Council on Monuments and Sites
Jacobs	Jacobs Group (Australia) Pty Ltd
LALC	Local Aboriginal Land Council
LCZ	Landscape character zone
LEP	Local Environmental Plan
LGA	Local government area
LoS	Level of Service
LU14	The 2014 version of land use (population and employment) projections for the Sydney Greater Metropolitan Area produced by the Transport and Performance Analytics section of TfNSW.
LU16	The 2016 version of land use (population and employment) projections for the Sydney Greater Metropolitan Area produced by the Transport and Performance Analytics section of TfNSW.
LUIIP	Land Use Infrastructure and Implementation Plan
the M12 Motorway	The proposed M12 Motorway which is the subject of this document (also known as 'the project')

Term	Meaning
the M7 Motorway	The M7 Motorway is a major connecting road on Sydney's orbital motorway network. It runs for 40 km and links the M5 Motorway with the M4 Motorway and the M2 Motorway
NCA	Noise catchment area
NCG	Noise Criteria Guideline
NML	Noise management level
NSW	New South Wales
OCP	Organochlorine pesticides
OEH	Office of Environment and Heritage
OGA	Open graded asphalt
Operational footprint	Generally includes the M12 Motorway and additional areas required for operation and maintenance of the project
OPP	Organophosphorus pesticides
PACHCI	Procedure for Aboriginal cultural heritage consultation and investigation (Roads and Maritime, 2011)
PAD	Potential archaeological deposit
PAH	Poly-aromatic hydrocarbons
PCB	Polychlorinated biphenyls
PCT	Plant community type
PMA	Personal Manager - Acquisition
PMF	Probable maximum flood
POEO Act	<i>Protection of the Environment Operations Act 1997</i> (NSW)
Proposed changes	The changes to the project as described in the EIS that are being proposed as part of the Amendment Report. Proposed changes include both include design changes and construction updates
PSA	Public safety area
RNP	Road Noise Policy

Term	Meaning
Roads and Maritime	Roads and Maritime Services; now known as Transport for NSW
SEARs	Secretary's environmental assessment requirements
SEPP	State environmental planning policy
shared user path	The area designated for active transport catering to both pedestrian and cyclists.
SMZ	Selected material zone
SMPM	Sydney Strategic Motorway Planning Model
SPT	Borehole Standard Penetration Test
STM	Sydney Strategic Travel Model
study area	The term study area is used to describe the locations investigated. The study area varies based on the specific areas of interest targeted for each environmental issue (eg ecology, heritage, noise, visual amenity etc). The study area relevant to particular environmental issues is shown on figures where relevant.
TECs	Threatened ecological communities
TfNSW	Transport for New South Wales
the project	M12 Motorway
TNR	The Northern Road
TRAQ	Tool for Roadside Air Quality
TRH	Total recoverable hydrocarbons
TSC Act	<i>Threatened Species Conservation Act 1995</i> (NSW) (repealed) but relevant for this assessment due to being saved under the BC Transitional arrangements
UDLP	Urban design and landscape plan
UIA	Horsley Park and Cecil Park Urban Investigation Area
UK IAQM	United Kingdom Institute of Air Quality Management
VOC	Volatile organic compound

Term	Meaning
Western Sydney Aerotropolis	As defined in the Western Sydney Aerotropolis Stage 1 Plan, the Aerotropolis surrounds the Western Sydney International Airport site at Badgerys Creek and will comprise industrial, commercial and residential development.
Western Sydney Parklands Biobank Site	Area shown on Figure 6-1 (Biobanking Agreement Site ID 119).
WRTM	WestConnex Road Toll Model
WSA Co	WSA Co is a Government Business Enterprise that was established in August 2017 to build the Western Sydney International Airport in Badgerys Creek
WSAP	Draft Western Sydney Aerotropolis Planning Package
Wylde Mountain Bike Trail	The Wylde Mountain Bike Trail is a publicly accessible mountain bike riding trail located in the Western Sydney Parklands which caters for intermediate, competent and advanced standard mountain bike riders.

1 Introduction and background

1.1 The project

Transport for New South Wales (TfNSW; formerly Roads and Maritime Services) proposes to build the M12 Motorway between the M7 Motorway at Cecil Hills and The Northern Road at Luddenham (the project), over a distance of about 16 kilometres.

The project would provide the main access from the Western Sydney International Airport at Badgerys Creek to Sydney's motorway network and is expected to be opened to traffic before the opening of the Western Sydney International Airport. The timing of opening of the M12 Motorway is subject to planning approval and the completion of detailed design. However, the project is expected to open in 2025. **Figure 1-1** shows the project as described in the EIS in its regional context.

An environmental impact statement (EIS) was prepared to assess the potential impacts of the project and recommend management measures to appropriately address those impacts. The project, as described and assessed by the EIS, included the following key features:

- A new dual-carriageway motorway between the M7 Motorway and The Northern Road with two lanes in each direction with a central median allowing future expansion to six lanes
- Motorway access via three interchanges/intersections:
 - A motorway-to-motorway interchange at the M7 Motorway and associated works (extending about four kilometres within the existing M7 Motorway corridor)
 - A grade-separated interchange referred to as the Western Sydney International Airport interchange, including a dual-carriageway four-lane airport access road (two lanes in each direction for about 1.5 kilometres) connecting with the Western Sydney International Airport Main Access Road
 - A signalised intersection at The Northern Road with provision for grade separation in the future
- Bridge structures across Ropes Creek, Kemps Creek, South Creek, Badgerys Creek and Cosgroves Creek
- A bridge structure across the M12 Motorway into the Western Sydney Parklands to maintain access to the existing water tower and mobile telephone / other service towers on the ridgeline in the vicinity of Cecil Hills, to the west of the M7 Motorway
- Bridge structures at interchanges and at Clifton Avenue, Elizabeth Drive, Luddenham Road and other local roads to maintain local access and connectivity
- Inclusion of active transport (pedestrian and cyclist) facilities through provision of pedestrian bridges and an off-road shared user path, including connections to existing and future shared user path networks
- Modifications to the local road network, as required, to facilitate connections across and around the M12 Motorway, including:
 - Realignment of Elizabeth Drive at the Western Sydney International Airport, with Elizabeth Drive bridging over the airport access road and the future passenger rail line to the airport
 - Realignment of Clifton Avenue over the M12 Motorway, with associated adjustments to nearby property access

- Relocation of the Salisbury Avenue cul-de-sac, on the southern side of the M12 Motorway
- Realignment of Wallgrove Road north of its intersection with Elizabeth Drive to accommodate the M7 Motorway northbound entry ramp
- Adjustment, protection or relocation of existing utilities
- Ancillary facilities to support motorway operations, smart motorways operation in the future and the existing M7 Motorway operation, including gantries, electronic signage and ramp metering
- Other roadside furniture including safety barriers, signage and street lighting
- Adjustments of waterways, where required, including Kemps Creek, South Creek and Badgerys Creek
- Permanent water quality management measures including swales and basins
- Establishment and use of temporary ancillary facilities, temporary construction sedimentation basins, access tracks and haul roads during construction
- Permanent and temporary property adjustments and property access refinements as required.

Figure 1-2 provides an overview of the key features of the project as presented in the EIS. A detailed description of the project is provided in Chapter 5 of the EIS.

1.2 Environmental impact statement exhibition

The EIS was exhibited by the NSW Department of Planning, Industry and Environment (DPIE) for 34 days from 16 October 2019 to 18 November 2019 to give the community and stakeholders the opportunity to provide comment. The exhibition was advertised in the following publications:

- The Australian on 16 October 2019
- The Sydney Morning Herald on 16 October 2019
- The Daily Telegraph on 16 October 2019
- The Western Weekender Penrith on 18 October 2019
- Fairfield Advance on 16 October 2019
- Fairfield City Champion on 16 October 2019
- Liverpool Leader on 16 October 2019
- Penrith Press on 17 October 2019.

The EIS was exhibited at the following locations:

- TfNSW office – 20-44 Ennis Road, Milsons Point
- DPIE – 320 Pitt Street, Sydney
- Nature Conservation Council – 14/338 Pitt Street, Sydney
- Western Sydney International Airport Experience Centre – Eaton Road, Luddenham
- Fairfield City Council – 86 Avoca Road, Wakeley
- Liverpool City Council – 33 Moore Street, Liverpool
- Penrith City Council – Civic Centre, 601 High Street, Penrith
- Camden Council – 70 Central Avenue, Oran Park
- St Clair Library – Shop 12, St Clair Shopping Centre, Bennett Road and Endeavour Avenue
- Wetherill Park Library – 561-583 Polding Street, Wetherill Park
- Carnes Hill Library – 600 Kurrajong Road, Carnes Hill.

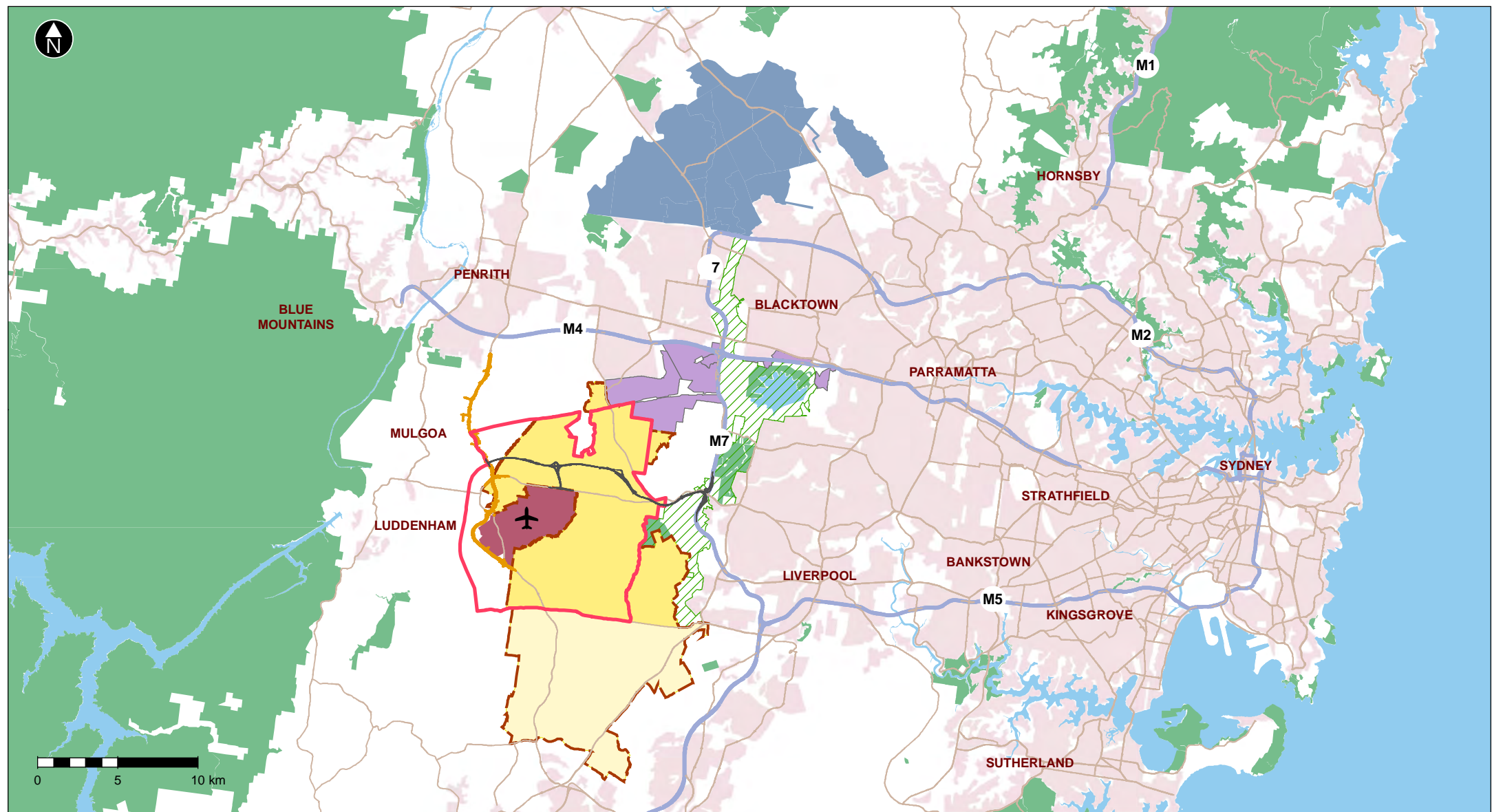
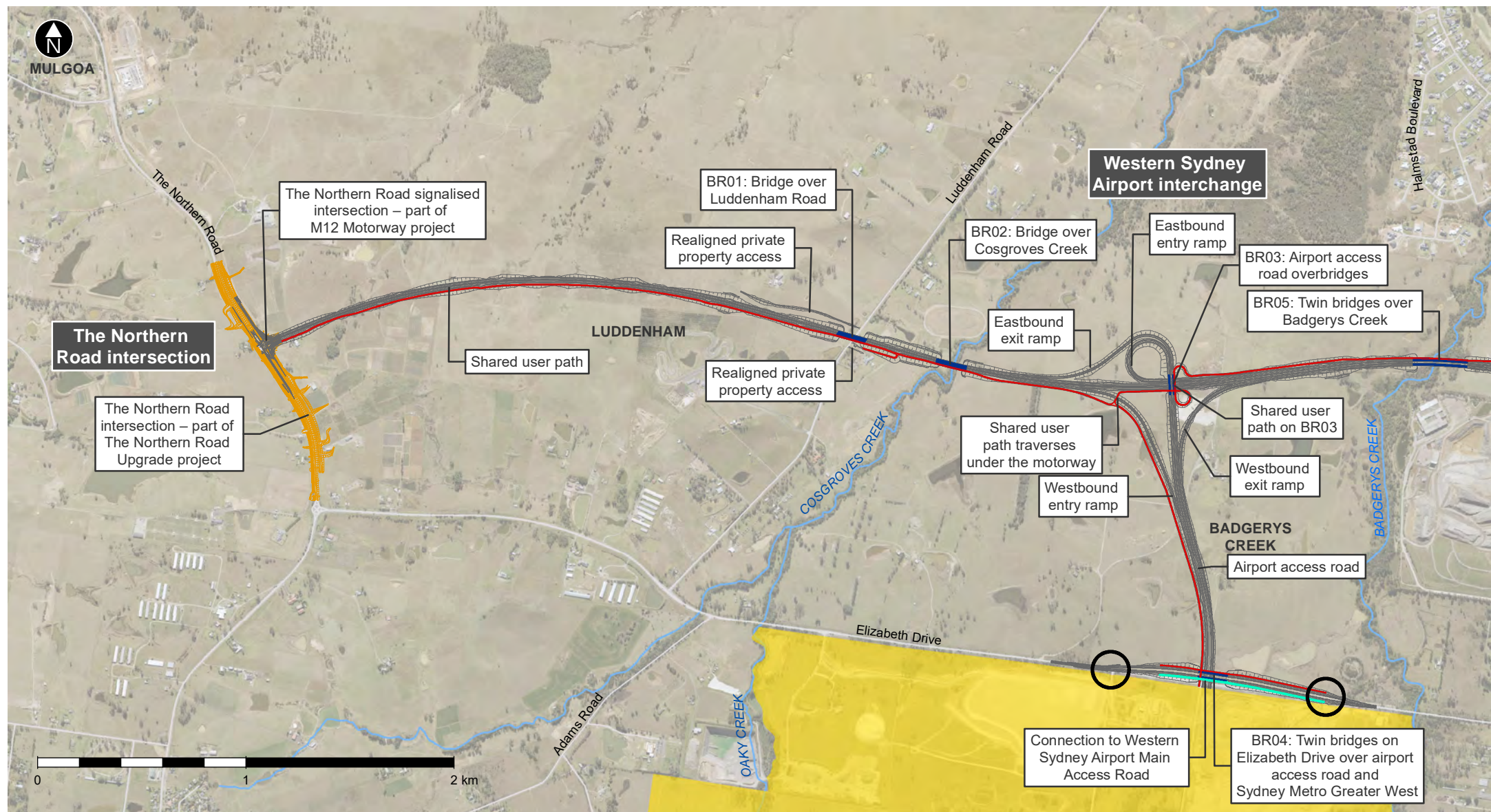
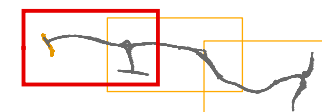


Figure 1-1 Project regional context as presented in the EIS



- The project
- Part of The Northern Road upgrade project
- Shared user path
- Future shared user path (by others)
- Motorway
- Existing roads
- Waterways
- Bridges
- Western Sydney Airport
- Note. The roads within this zone are being removed as part of airport construction.
- Potential future intersections (by others)
- Note: Locations to be confirmed



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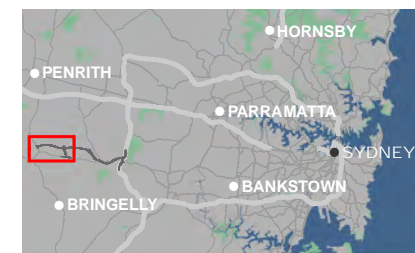
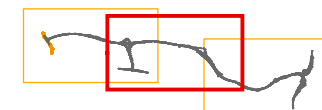
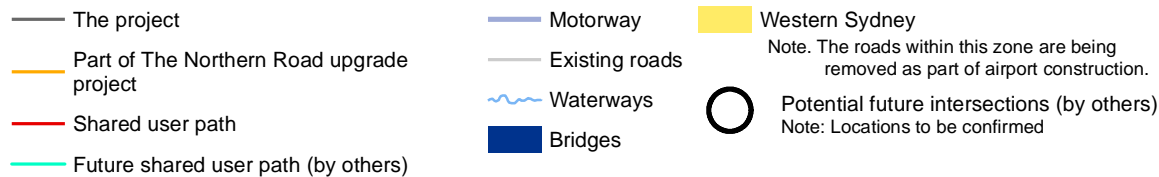
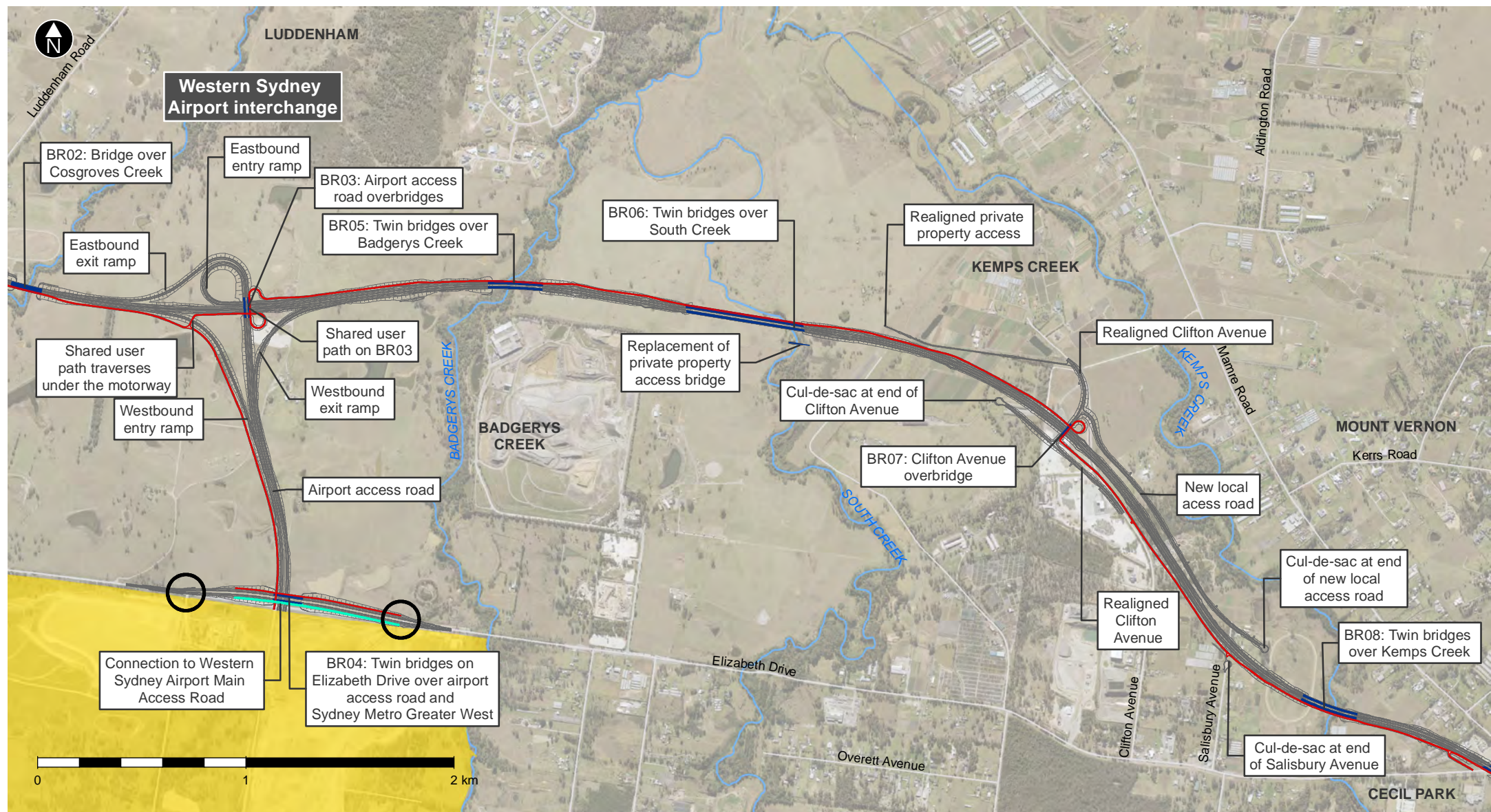


Figure 1-2 Project overview as presented in the EIS



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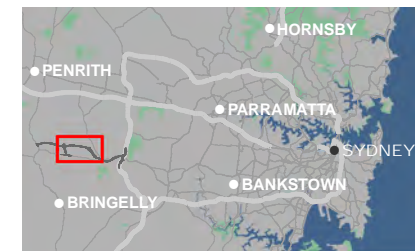


Figure 1-2 Project overview as presented in the EIS

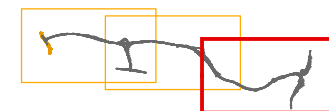
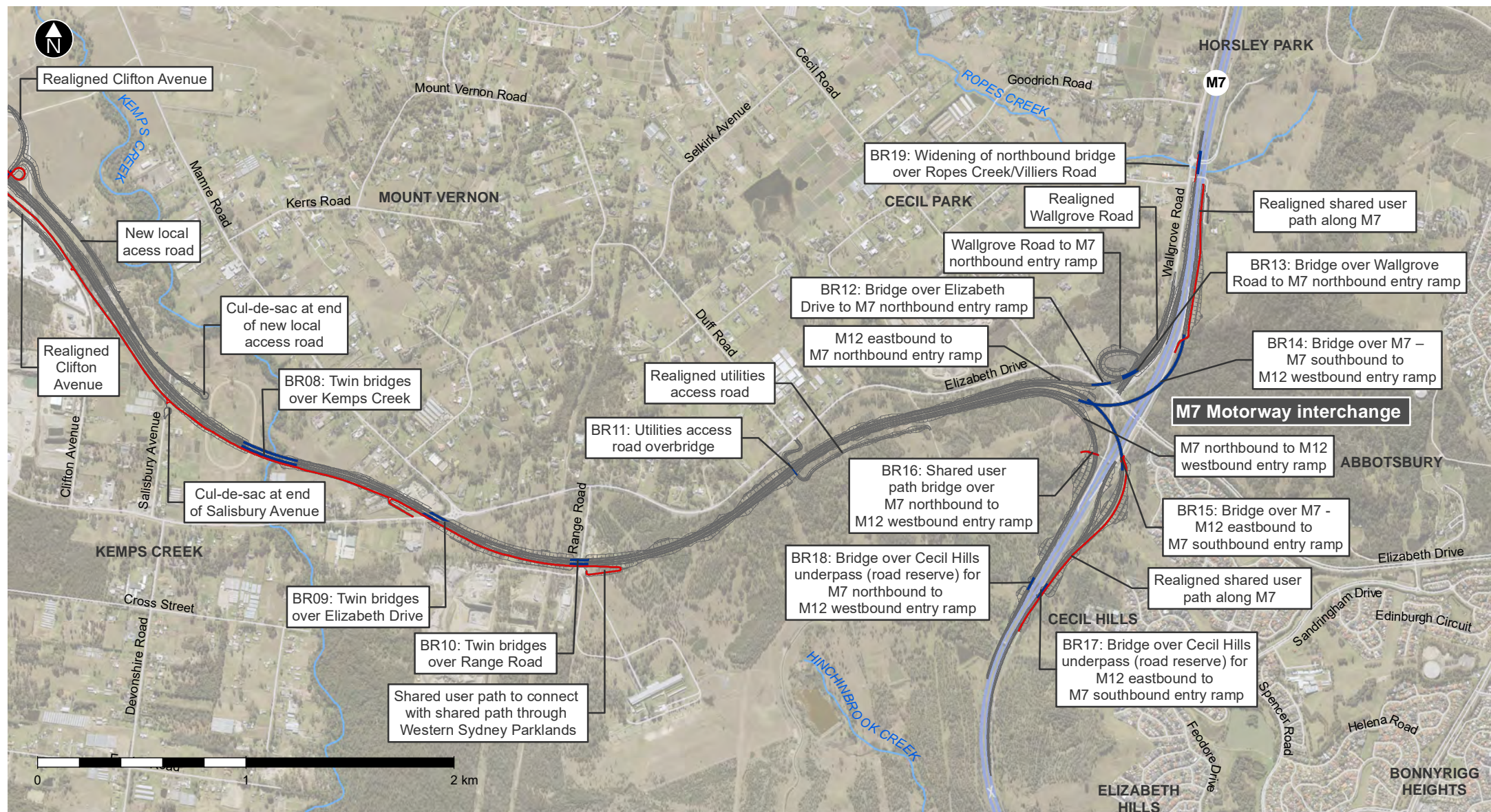


Figure 1-2 Project overview as presented in the EIS

Electronic copies were displayed on the DPIE's Major Projects Website (<https://www.planningportal.nsw.gov.au/major-projects>) and Service NSW Centres.

Affected property owners were contacted by TfNSW during the week the EIS was placed on exhibition, to inform them that exhibition of the EIS had commenced. Other consultation that was carried out is described in **Section 5**.

During the exhibition of the EIS, 50 submissions were received. These submissions are detailed in the M12 Motorway Submissions Report (available on the DPIE website here:

<https://www.planningportal.nsw.gov.au/major-projects/project/10226>), which describes the issues raised during exhibition and provides responses to those issues.

1.3 Overview of proposed changes

TfNSW proposes to amend the project following further design development since the exhibition of the EIS. An amendment application was submitted to DPIE on 20 May 2020. In accordance with clause 192(2) of the EP&A Regulation, the Secretary of DPIE gave approval to amend the project on 28 May 2020.

The proposed changes include design changes and construction updates. These provide functional improvements to the design and improved integration with surrounding major transport infrastructure projects and potential future development. They also respond to issues raised in community and stakeholder submissions, and, in some instances, further reduce the potential impacts of the project as described in the EIS.

The proposed changes to the project as described in the EIS are outlined below:

- Amendments to the motorway-to-motorway interchange at the M7 Motorway, including:
 - Changes to Elizabeth Drive and Cecil Road intersections, proposed exit ramps, the Wallgrove Road connection to Elizabeth Drive and proposed shared user path realignments
 - The widening of Elizabeth Drive under the M7 Motorway and approaches
- An option to provide a new connection between the M12 Motorway and Elizabeth Drive near the M7 Motorway interchange
- Two new signalised intersections into the Western Sydney International Airport, with provisions for future connection to potential developments north of the Western Sydney International Airport; the delivery of these will be subject to funding from the WSA Co and adjoining developers
- Additional ancillary facilities to support the delivery of the project.

Refinements to the project as described in the EIS have also been made as part of the ongoing development of the project since the EIS was exhibited. Refinements are changes that are consistent with the parameters of the project description in the EIS. For completeness, however, these refinements have been factored into the amended construction and operational footprint and included in the impact assessment shown in this amendment report.

These refinements include:

- Lowering the height of the M12 Motorway in and around the Western Sydney International Airport interchange
- Reduction in the scope of work associated with the M12 Motorway and The Northern Road intersection
 - This intersection would still be constructed, but the main infrastructure work would be delivered as part of The Northern Road upgrade project

- Relocation of utilities
- Changes to property access and acquisition
- Changes to drainage
- Adjustments to construction access, hours, haulage, timing and material quantities.

The proposed amendments are summarised in **Chapter 2** and are described in detail in **Chapter 3** and **Chapter 4**.

The project with all proposed changes is referred to as the amended project.

1.4 Purpose of the document

In accordance with Clause 192 of the Environmental Planning and Assessment Regulation 2000 (EP&A Regulation), an amendment report has been prepared for the project.

As outlined in Chapter 5 of the EIS, the project description and assessment is based on a concept design and is subject to ongoing refinement. The purpose of this amendment report is to outline the proposed changes to the project since the exhibition of the EIS and the associated environmental assessment. **Chapter 2** describes the key features of the amended project and **Chapter 3** provides a detailed description of the proposed design changes made since the exhibition of the EIS. The required updates to the construction of the project are discussed in **Chapter 4**.

Information regarding further community and stakeholder engagement carried out since the EIS is provided in **Chapter 5**.

Chapter 6 describes the assessment of potential impacts associated with the proposed changes to the project as described in the EIS. Where required, additional or revised environmental management measures have been identified to address potential impacts associated with the proposed changes and these are outlined in **Chapter 7**.

This amendment report will be placed on exhibition for 14 days to give the community and other stakeholders the opportunity to provide comment on the amended project, assessment undertaken, and any management measures proposed to minimise impacts from the amended project. The approval process under Part 5, Division 5.2 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) is illustrated in **Figure 1-3**.

DPIE will place this amendment report on public exhibition for a minimum of 14 days in accordance with the EP&A Regulation. During this period, it will be available for inspection at the DPIE website <https://www.planningportal.nsw.gov.au/major-projects/project/10226>, and via the TfNSW project website <http://rms.nsw.gov.au/m12>.

To provide feedback on the amended project, a person may make submissions to the Secretary of the DPIE during the exhibition period. All submissions received will be placed on the DPIE website. To make a submission, use the online form. This is available at www.planningportal.nsw.gov.au/major-projects/projects/on-exhibition.

PREPARATION AND ASSESSMENT

TfNSW prepared and submitted a State Significant Infrastructure (SSI) application to the Secretary of the Department of Planning, Industry and Environment (DPIE) and a referral to the Commonwealth Department of Agriculture, Water and the Environment (DAWE) (formerly Department of Energy and Environment)

DAWE determines that the project is a controlled action and DPIE issued Secretary's Environmental Assessment Requirements (SEARs) as part of the NSW-Commonwealth Bilateral agreement

TfNSW prepared an Environmental Impact Statement (EIS)

EXHIBITION, CONSULTATION AND AMENDMENT TO PROJECT

EIS placed on public exhibition (minimum 28 days)

TfNSW prepares a submissions report and an amendment report following a request to amend the SSI application due to project changes

DPIE makes submissions report available to public

WE
ARE
HERE

Amendment report placed on public exhibition (14 days)

DPIE provides submissions received on the amendment report to TfNSW

TfNSW prepares a supplementary submissions report (if required)

DPIE makes supplementary submissions report available to the public

APPROVAL

DPIE prepares Secretary's assessment report

NSW Minister for Planning and Public Spaces and Australian Government Minister for the Environment determine whether or not to approve project, any modifications that must be made and the conditions to be attached to any approval

Figure 1-3 Approvals process under Part 5, Division 5.2 of the EP&A Act and amendment report process

2 Amended project

2.1 Overview

The amended project would continue to provide the main access from the Western Sydney International Airport at Badgerys Creek to Sydney's motorway network and be located between The Northern Road in the west and the M7 Motorway in the east. The amended project includes an option for a direct connection between the M12 Motorway and Elizabeth Drive at the eastern extent of the project. Therefore, two options are being proposed for the amended project at the interchange with the M7 Motorway.

The two options for the amended project would be consistent from The Northern Road in the west until Duff Road in the east. At the motorway-to-motorway interchange with the M7 Motorway, the project is proposed to be either:

- Option 1 – Without Elizabeth Drive connection
 - Interchange provides entry and exit ramps between the M12 Motorway and the M7 Motorway; in addition, it would maintain the existing connection of the M7 Motorway to Elizabeth Drive with new entry and exit ramps
- Option 2 – With Elizabeth Drive connection
 - Interchange as per option 1 and also provides entry and exit ramps between the M12 Motorway and Elizabeth Drive, Cecil Road and Wallgrove Road.

This section of the amended project is shown in **Figure 2-1**, with the Elizabeth Drive connection associated with option 2 shown in a different colour and detailed in inset A.

The decision on which option would be built is dependent on funding being available to include the Elizabeth Drive connection. This would be defined during the detailed design phase of the project and prior to award of the construction contract. The key features of each option are described in the following sections.

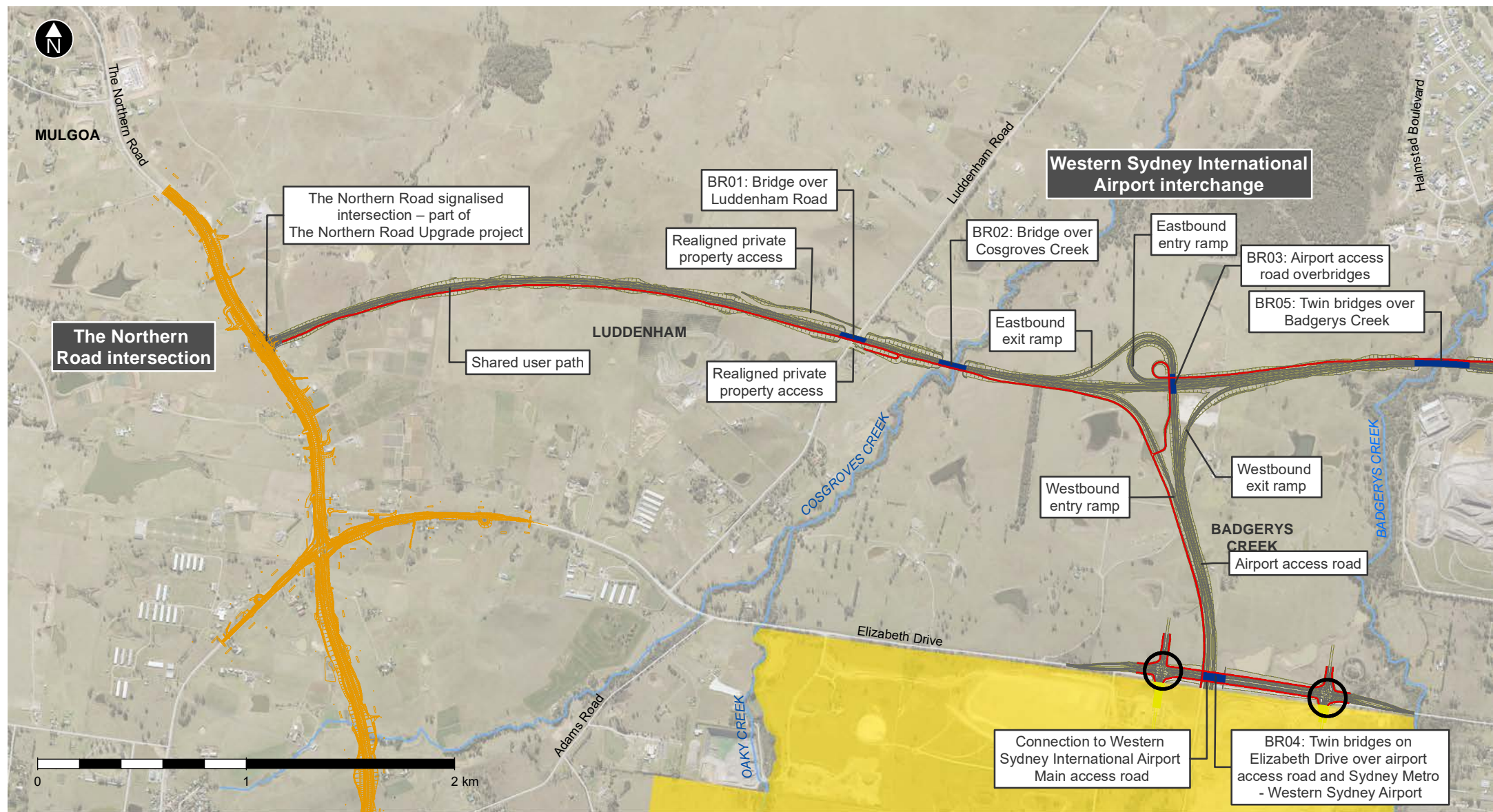
2.2 Key features of the amended project

The key features of the amended project are listed below. Where the description of the proposed amended project key features differs from the description listed in the EIS, those changes are shown in **bold** text:

- A new dual-carriageway motorway between the M7 Motorway and The Northern Road with two lanes in each direction with a central median allowing future expansion to six lanes
- Motorway access via three interchanges/intersections:
 - A motorway-to-motorway interchange at the M7 Motorway and associated works (extending about four kilometres within the existing M7 Motorway corridor) **with the following options:**
 - **Option 1 – without connection between the M12 Motorway and Elizabeth Drive**
 - **Option 2 – with connection between the M12 Motorway and Elizabeth Drive**

- A grade-separated interchange referred to as the Western Sydney International Airport interchange, including a dual-carriageway four-lane airport access road (two lanes in each direction for about 1.5 kilometres) connecting with the Western Sydney International Airport Main Access Road
- A signalised intersection at The Northern Road with provision for grade separation in the future
- Bridge structures across Ropes Creek, Kemps Creek, South Creek, Badgerys Creek and Cosgroves Creek
- A bridge structure across the M12 Motorway into the Western Sydney Parklands to maintain access to utilities, including the existing water tower and mobile telephone/other service towers on the ridgeline in the vicinity of Cecil Hills, to the west of the M7 Motorway
- Bridge structures at interchanges and at Clifton Avenue, Elizabeth Drive, Luddenham Road and other local roads to maintain local access and connectivity
- Inclusion of active transport (pedestrian and cyclist) facilities through provision of pedestrian bridges and an off-road shared user path, including connections to existing and future shared user path networks
- Modifications to the local road network, as required, to facilitate connections across and around the M12 Motorway including:
 - Realignment of Elizabeth Drive at the Western Sydney International Airport, with Elizabeth Drive overpassing the airport access road and rail infrastructure
 - **Two new signalised intersections from Elizabeth Drive into the Western Sydney International Airport, with provisions for future connection to potential developments to the north**
 - **Widening of Elizabeth Drive under the M7 Motorway and approaches**
 - Realignment of Clifton Avenue over the M12 Motorway, with associated adjustments to nearby property access
 - Relocation of Salisbury Avenue cul-de-sac, on the southern side of the M12 Motorway
 - **Realignment of Wallgrove Road to connect to Cecil Road, including a connection between Elizabeth Drive and Wallgrove Road via Cecil Road with a signalised intersection with Elizabeth Drive**
- Adjustment, protection or relocation of existing utilities
- Ancillary facilities to support motorway operations, smart motorways operation in the future and the existing M7 Motorway operation, including gantries, electronic signage and ramp metering
- Other roadside furniture including safety barriers, signage and street lighting
- Adjustments of waterways, where required, including Kemps Creek, South Creek and Badgerys Creek
- Permanent water quality management measures including swales and basins
- Establishment and use of temporary ancillary facilities, temporary construction sedimentation basins, access tracks and haul roads during construction
- Permanent and temporary property adjustments and property access refinements as required.

An overview of the key features of the amended project is provided in **Figure 2-1**. Additional figures presented throughout Chapter 3 show the changes from the project as described in the EIS.



- The amended project
- Existing roads
- Part of The Northern Road upgrade project
- Waterways
- Shared user path
- Bridges
- Western Sydney International Airport
- Signalised intersections into the Western Sydney International Airport
Note: Indicative, subject to detailed design



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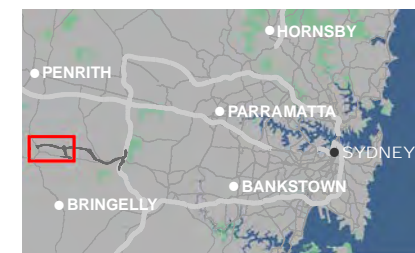
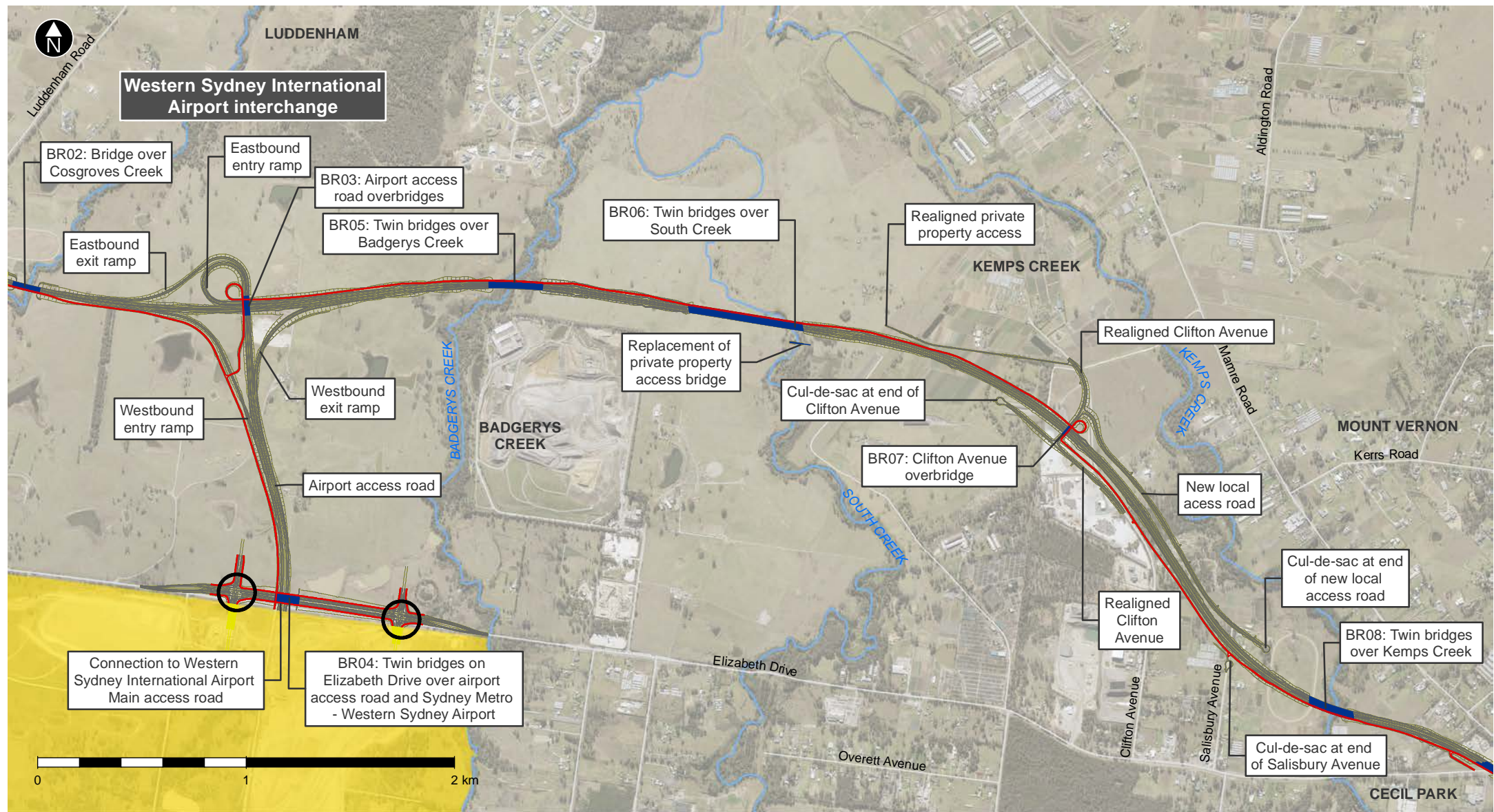
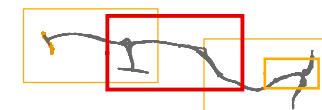


Figure 2-1 Key features of the amended project



- The amended project
- Existing roads
- Western Sydney International Airport
- Shared user path
- Waterways
- Signalised intersections into the Western Sydney International Airport
- Note: Indicative, subject to detailed design
- Bridges



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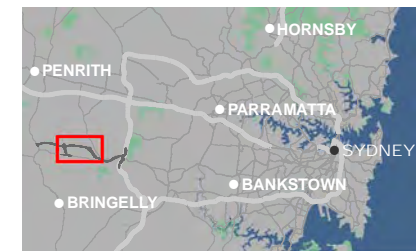
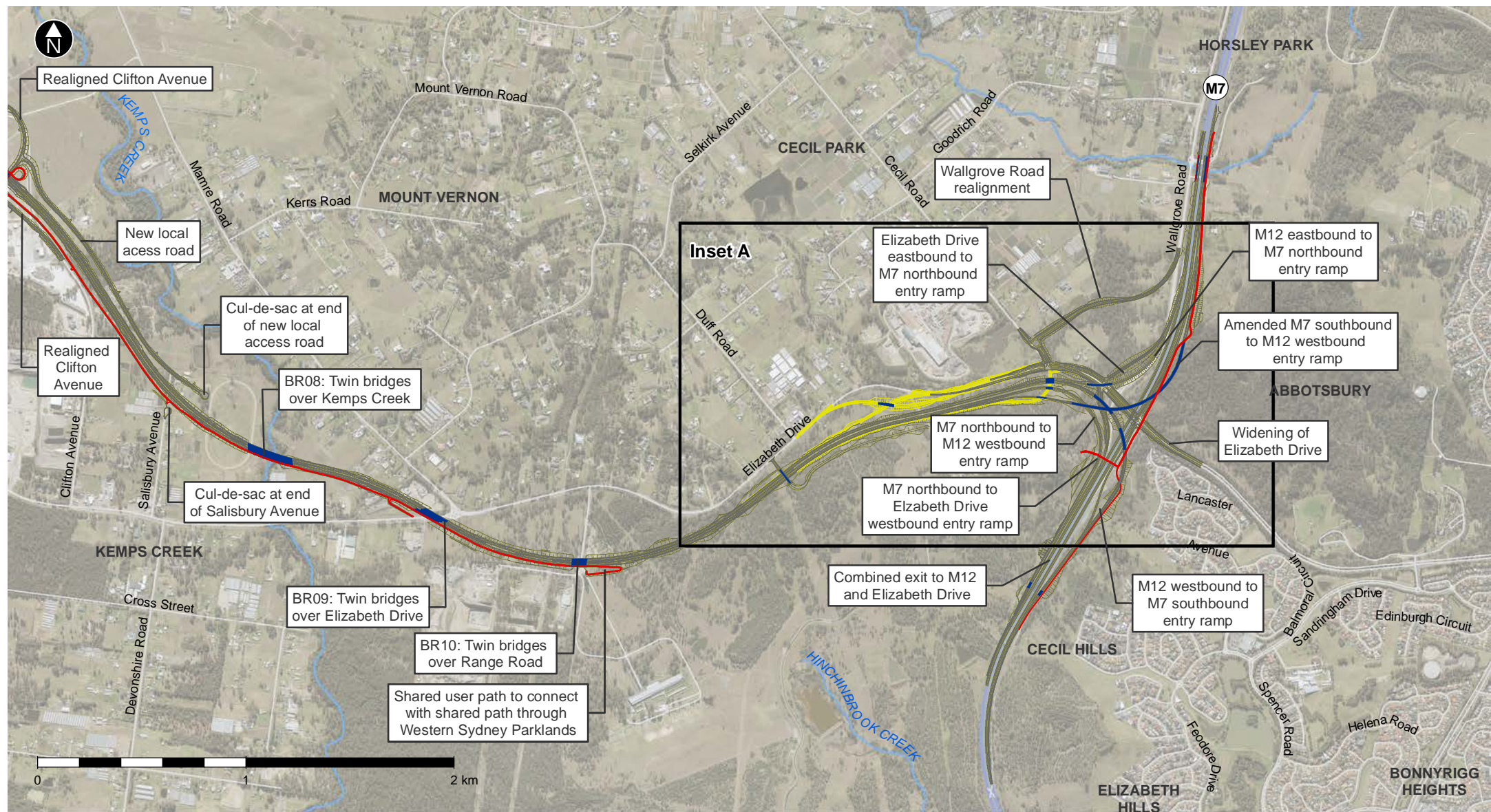
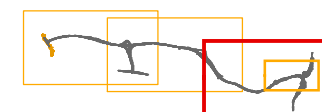


Figure 2-1 Key features of the amended project

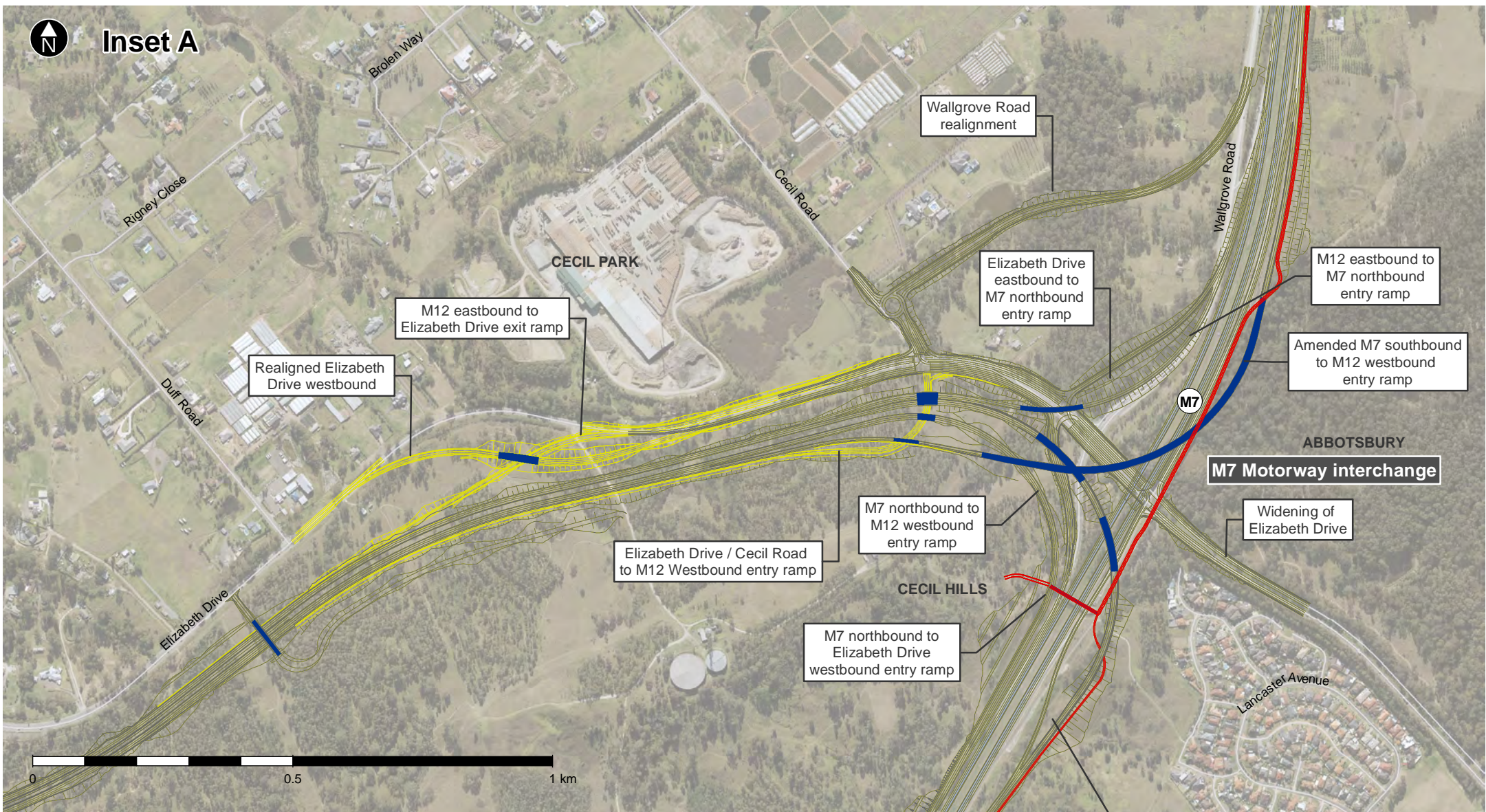


- The amended project
- The amended project (Elizabeth Drive connection)
- Shared user path
- Bridges
- Motorway
- Existing roads
- Waterways

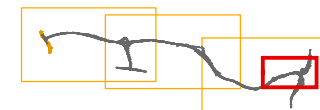


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Figure 2-1 Key features of the amended project



- The amended project
- The amended project with Elizabeth Drive connection
- Shared user path
- Bridges
- Motorway
- Existing roads



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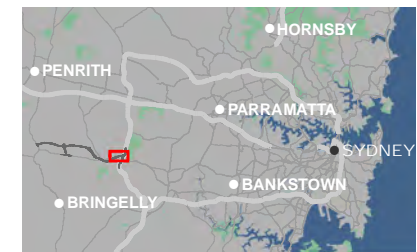


Figure 2-1 Key features of the amended project

3 Proposed design changes

This chapter describes the proposed design changes associated with the amended project. The changes:

- Amendments to the motorway-to-motorway interchange at the M7 Motorway including an option to connect the M12 Motorway to Elizabeth Drive
- Signalised intersections into the Western Sydney International Airport (subject to funding)
- Other minor changes as part of the progression of project development that are consistent with the parameters of the project description in the EIS.

These proposed design changes are described in detail in the sections that follow.

3.1 Amendments to motorway-to-motorway interchange at the M7 Motorway

3.1.1 Project as described in the EIS

A motorway-to motorway interchange between the M12 Motorway and the M7 Motorway was described in Section 5.10.1 of the EIS as a grade-separated interchange to provide a free-flowing connection to and from the M7 Motorway which, in turn, links to the wider Sydney motorway network that includes the M5 Motorway, the M4 Motorway and the M2 Motorway. Exit and entry ramps for this motorway are shown in **Figure 3-1** and included the following:

- Entry and exit ramps between the M7 Motorway and Elizabeth Drive
- Entry and exit ramps between the M7 Motorway and the M12 Motorway
- Realignment of Wallgrove Road connection to the M7 Motorway from Elizabeth Drive, with a G-loop on-ramp
- Realignment of the existing M7 Motorway shared user path
- Water quality treatment basins.

3.1.2 Proposed design change

Two options are proposed for the motorway-to-motorway interchange at the M7 Motorway as part of the amended project described in **Chapter 2**. Both options would comprise a motorway-to-motorway interchange, however option 2 (with Elizabeth Drive connections) would have an additional connection between the M12 Motorway and Elizabeth Drive (see **Section 3.1.2.2**).

Figure 3-1 shows a comparison between the motorway-to-motorway interchange at the M7 Motorway as described in the EIS, and the two options proposed as part of the amended project. The key changes for this interchange are discussed in the following sections.

3.1.2.1 Option 1 interchange

The proposed design change for option 1 of the motorway-to-motorway interchange at the M7 Motorway consists of the following and is shown in **Figure 3-1**:

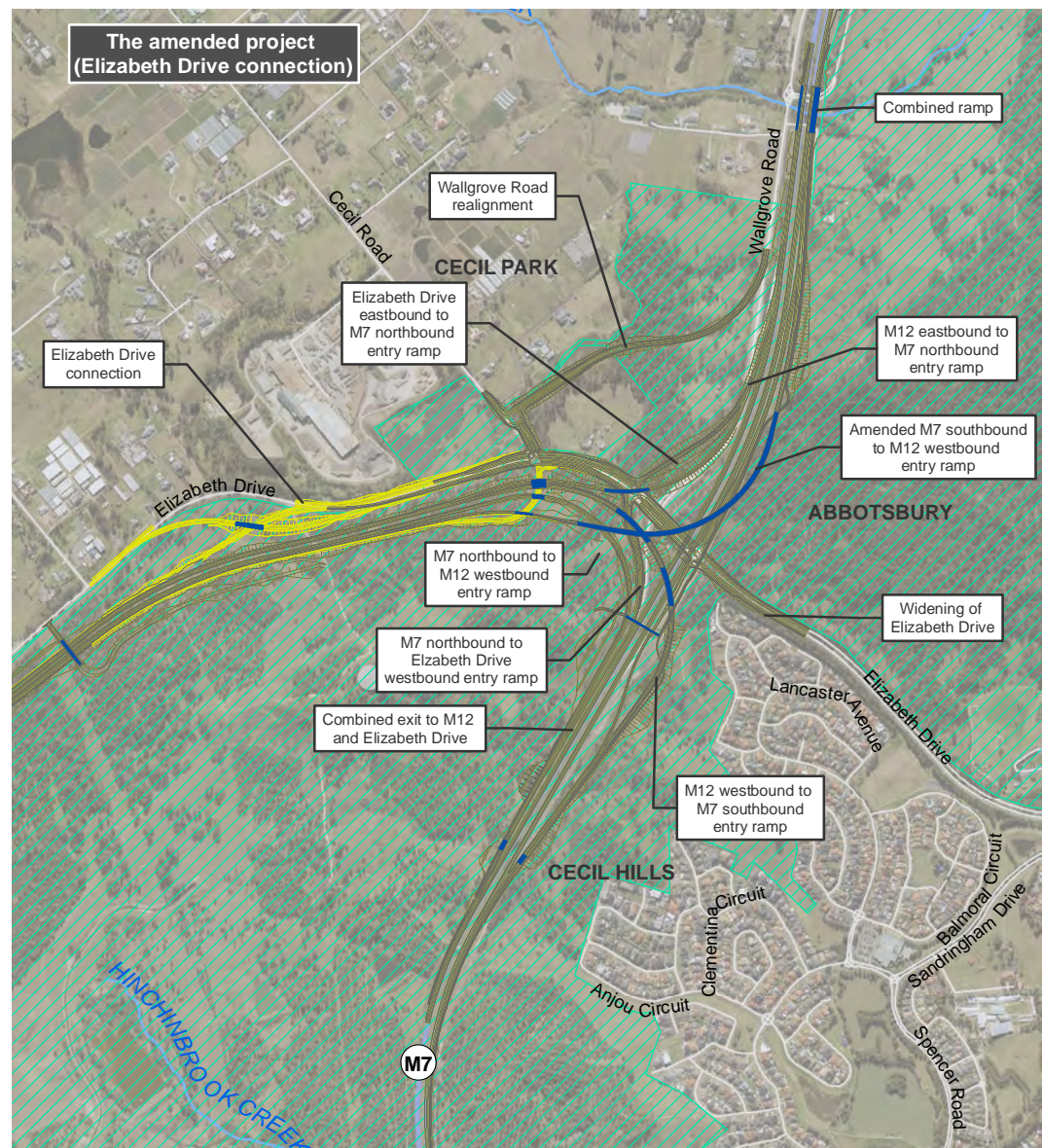
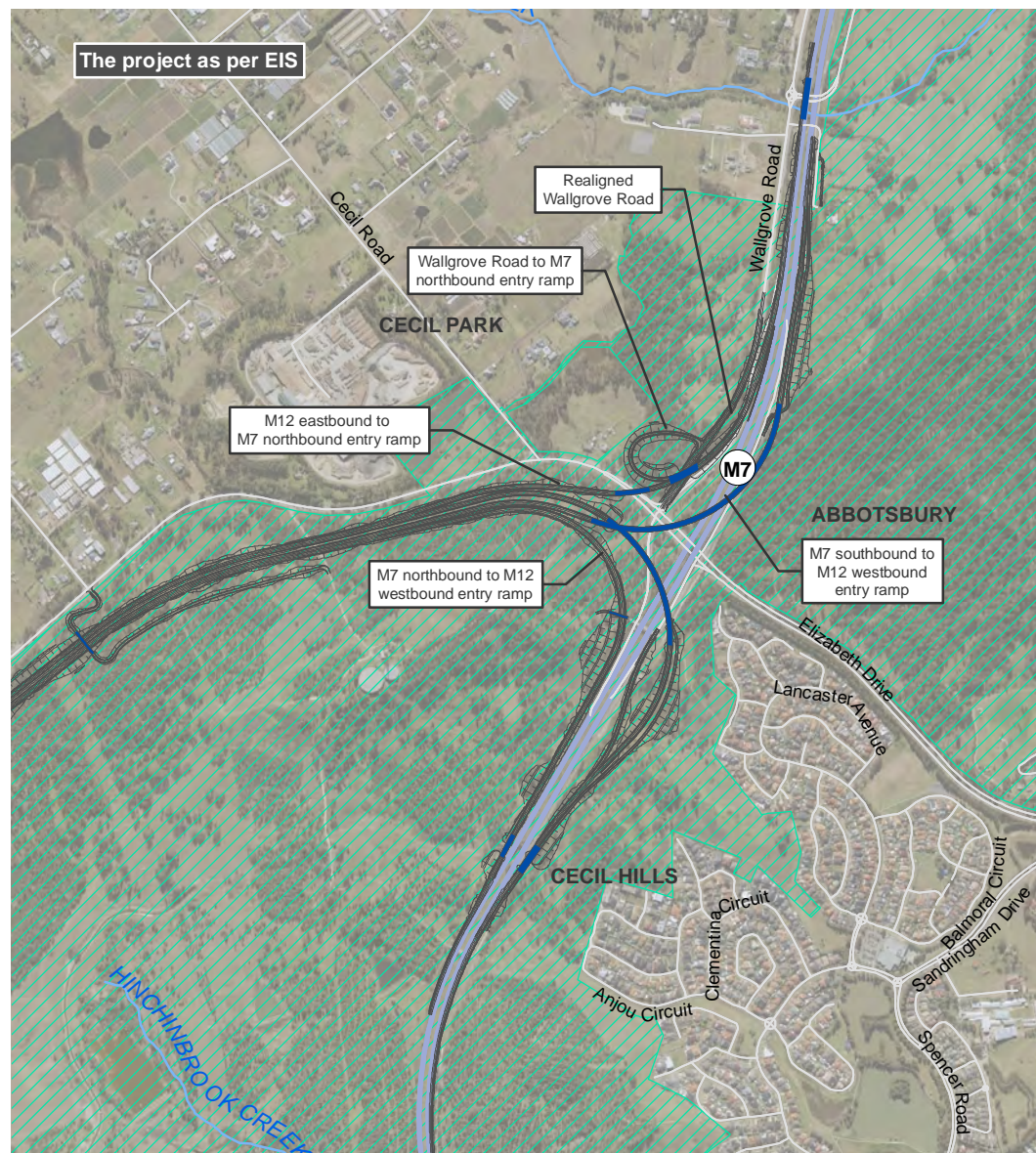
- Two amended intersections of Elizabeth Drive to the M7 Motorway, including changes to the lane configuration of the existing M7 Motorway connection to Elizabeth Drive as follows:
 - Updated lane configuration of the existing intersection of the M7 Motorway southbound and Elizabeth Drive
 - Changes to the existing intersection of the M7 Motorway and Wallgrove Road with Elizabeth Drive, including:
 - Changes to lane configuration
 - Removal of the loop ramp
 - Realignment of Wallgrove Road to connect to Cecil Road, including a connection between Elizabeth Drive and Wallgrove Road via Cecil Road with a signalised intersection with Elizabeth Drive
 - Direct connection from Elizabeth Drive to the M7 Motorway northbound
- Widening of Elizabeth Drive under the M7 Motorway and approaches
- Amended exit ramps from the M7 Motorway to the M12 Motorway and Elizabeth Drive
 - The exit ramps would provide a combined exit to both the M12 Motorway and Elizabeth Drive, and would then diverge to provide separated entry to the M12 Motorway and Elizabeth Drive
- Realignment of the existing M7 Motorway shared user path from the alignment proposed in the EIS
- Changes to the proposed M12 Motorway road alignment at the lead up to the interchange including modifications to bridges, culverts and other structures
- Changes to some of the existing and proposed water quality treatments.

These changes to the design of the motorway-to-motorway interchange have been developed to provide improved operational performance and connectivity to the M12 Motorway.

Combining two M7 Motorway off-ramps into a single exit point from the motorway before diverging for access to M12 Motorway or Elizabeth Drive would improve operational performance and driver safety. This is due to the reduction in locations where vehicles would be merging left and decelerating to exit the motorway. A single exit point would also reduce driver confusion. Similarly for the ramps exiting the M12 Motorway, the combination into a single exit point from the motorway before diverging would improve safety and performance.

The high point of the amended interchange ramps (see **Figure 3-1**) would be lower than the high point of the interchange ramps as described in the EIS. The high point of the amended M7 Motorway southbound to M12 Motorway westbound ramp would be lowered by about five metres when compared to the project as described in the EIS, and the high point of the amended M12 Motorway Eastbound to M7 Motorway southbound ramp would be lowered by about four metres when compared to the project as described in the EIS. It is noted this may be further amended in detailed design.

The widening of Elizabeth Drive under the M7 Motorway is proposed to provide additional capacity for the motorway-to-motorway interchange.



- The amended project
- The amended project (Elizabeth Drive connection)
- The project as per EIS
- Motorway
- Existing roads
- Waterways
- Bridges
- Western Sydney Parklands

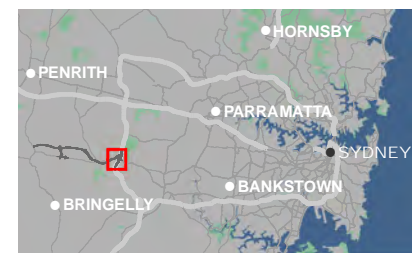
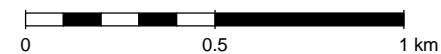


Figure 3-1 M12 Motorway to M7 Motorway Interchange

The existing intersection of Wallgrove Road and Elizabeth Drive has been shown to have major delays in the AM and PM peak periods (see Appendix F of the EIS). The addition of a connection to the M12 Motorway at, or in close proximity to, the existing signalised intersection of Wallgrove Road and Elizabeth Drive would result in further deterioration in the performance of this intersection to unacceptable levels. In order to avoid reduced intersection performance, an additional intersection with Elizabeth Drive near Cecil Road would provide the connection to the M12 Motorway. The realignment of Wallgrove Road to this intersection would separate traffic accessing the M7 Motorway from Wallgrove Road. The access to the M7 Motorway would also be a straight ramp which would provide improved performance over the loop ramp that was proposed in the EIS. The design of the Wallgrove Road realignment would be further refined in consultation with adjacent landowners.

The described amendments to the motorway-to-motorway interchange at the M7 Motorway would result in changes to bridges as they were described in Section 5.12 of the EIS. Bridge 13 would no longer be required, and five additional bridges are proposed, primarily to facilitate a connection between the M12 Motorway and Elizabeth Drive, bringing the total number of bridges constructed to 23. The additional bridges would be constructed in the form of a multi-span precast concrete super-T girder, an example of which is shown in Figure 5-10 of the EIS. Details of the new bridges are listed in **Table 3-1** and shown in **Figure 3-2**.

Table 3-1 Proposed additional bridges

Bridge reference and description	Indicative structure type	Indicative length (L) and width (W) in metres (m)
Bridge 20 Widening of the existing the Villiers Road bridge (Bridge 19) at the M7 Motorway southbound Configuration would be one additional traffic lane and shared user path	Multi-span precast concrete super- T girder	L = about 120 m W = about 8 m
Bridge 21 M7 Motorway northbound entry ramp from M12 Motorway eastbound Bridge over M12 Motorway westbound entry ramp from Elizabeth Drive Configuration would be one lane and shoulder	Multi-span precast concrete super- T girder	L = about 36 m W = about 6 m
Bridge 22 M7 Motorway southbound entry ramp from M12 Motorway eastbound bridge over M12 Motorway westbound entry ramp from Elizabeth Drive Configuration would be two lanes and shoulder	Multi-span precast concrete super- T girder	L = about 36 m W = about 10 m
Bridge 23 M7 Motorway northbound exit ramp to M12 Motorway westbound bridge over M12 Motorway westbound entry ramp from Elizabeth Drive Configuration would be two lanes and shoulder	Multi-span precast concrete super- T girder	L = about 36 m W = about 10 m
Bridge 24 M7 Motorway southbound exit ramp to M12 Motorway westbound bridge over M12 Motorway westbound entry ramp from Elizabeth Drive Configuration would be two lanes and shoulder	Multi-span precast concrete super- T girder	L = about 36 m W = about 10 m

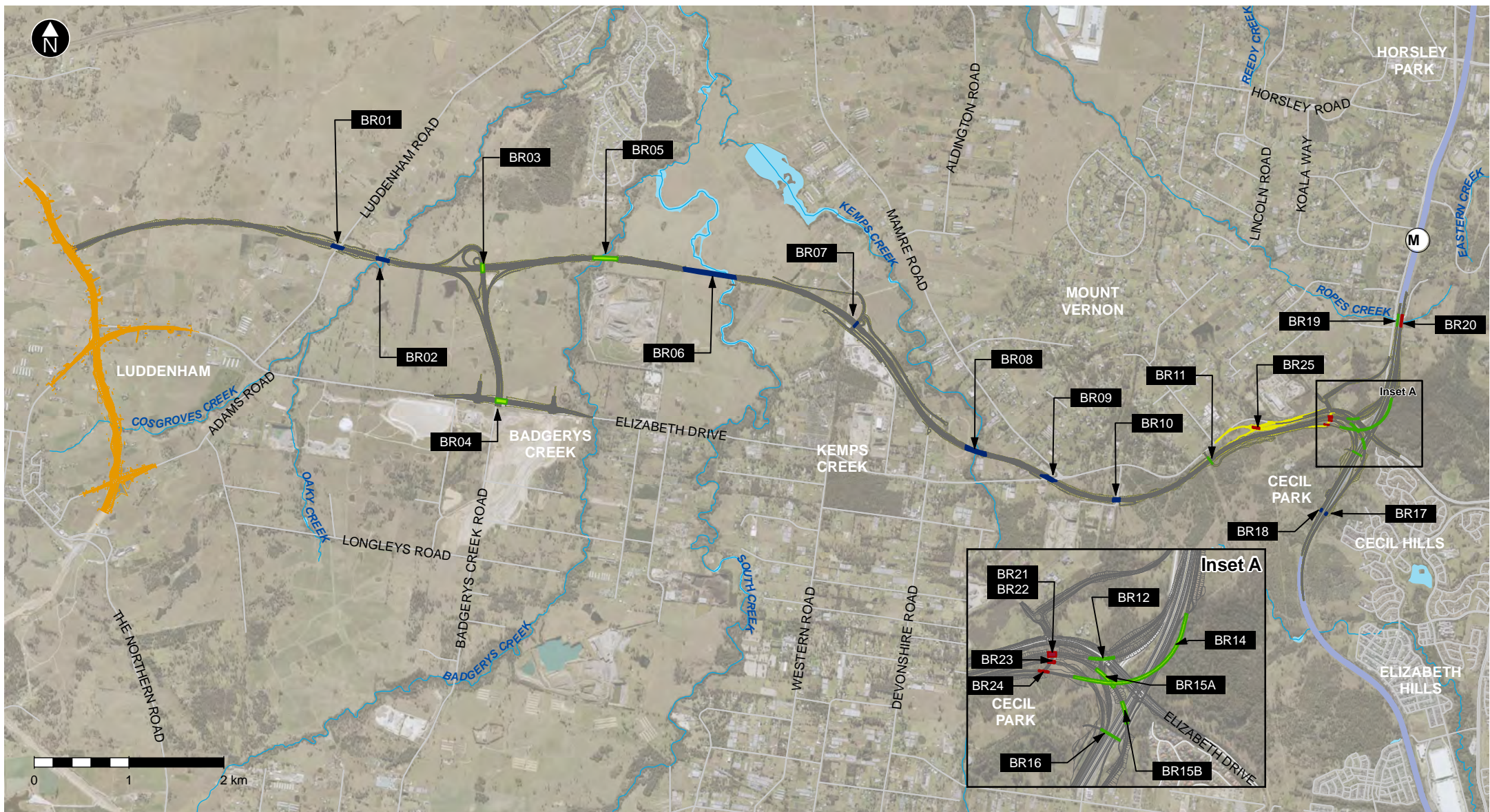


Figure 3-2 Proposed amended project bridges

3.1.2.2 Option 2 interchange

The proposed amendments to the motorway-to-motorway interchange at the M7 Motorway provide opportunity for a direct connection between the M12 Motorway and Elizabeth Drive. This connection would increase the accessibility of the M12 Motorway, particularly for vehicles travelling to and from areas to the east of the amended project. It would allow vehicles to access the M12 Motorway at the eastern end of the amended project without having to utilise the tolled M7 Motorway. The traffic modelling has shown that, compared to the project as described in the EIS, traffic volumes on the M12 Motorway would be lower for option 1 (without Elizabeth Drive connections) and higher for option 2 (with Elizabeth Drive connections). This would also provide additional capacity along Elizabeth Drive for local and regional trips in the area.

The proposed design changes for option 2 (with Elizabeth Drive connections) of the motorway-to-motorway interchange at the M7 Motorway consists of the following and is shown in **Figure 3-1**. The proposed changes to the design of option 2 when compared to option 1 are shown in **bold text**.

- Two amended intersections of Elizabeth Drive to the M7 Motorway, including changes to the lane configuration of the existing M7 Motorway connection to Elizabeth Drive as follows:
 - Updated lane configuration of the existing intersection of the M7 Motorway southbound and Elizabeth Drive
 - Changes to the existing intersection of the M7 Motorway and Wallgrove Road with Elizabeth Drive, including:
 - Changes to lane configuration
 - Removal of the loop ramp
 - Realignment of Wallgrove Road to connect to Cecil Road, including a connection between Elizabeth Drive and Wallgrove Road via Cecil Road with a signalised intersection with Elizabeth Drive
 - Direct connection from Elizabeth Drive to the M7 Motorway northbound
- Widening of Elizabeth Drive under the M7 Motorway and approaches
- **Direct connection between the M12 Motorway and Elizabeth Drive at the motorway-to-motorway interchange at the M7 Motorway via the following ramps:**
 - **M12 Motorway westbound from Elizabeth Drive entry ramp connection to a combined Cecil Road and Wallgrove Road signalised intersection Elizabeth Drive**
 - **M12 Motorway eastbound to Elizabeth Drive off ramp via a realigned Elizabeth Drive, including:**
 - Lane configuration of existing Elizabeth Drive to a two lane eastbound alignment
 - Further widening and realignment of Elizabeth Drive westbound between Duff Road and Cecil Road
 - M12 Motorway eastbound to Elizabeth Drive off ramp under passing the realigned Elizabeth Drive westbound, connecting to Elizabeth Drive eastbound via a third lane
- Amended exit ramps from the M7 Motorway to the M12 Motorway and Elizabeth Drive
 - The exit ramps would provide a combined exit to both the M12 Motorway and Elizabeth Drive, and would then diverge to provide separated entry to the M12 Motorway and Elizabeth Drive
- Realignment of the existing M7 Motorway shared user path from the alignment proposed in the EIS

- Changes to the proposed M12 Motorway road alignment at the lead up to the interchange including modifications to bridges, culverts and other structures
- Changes to some of the existing and proposed water quality treatments.

The proposed changes to the design of option 2, when compared to option 1, are shown in **Figure 3-3**. The amended project to the west of Duff Road would be consistent between option 1 and option 2.

Option 2 (with Elizabeth Drive connections) would allow road users to access the M12 Motorway from Elizabeth Drive and provide a toll-free option for motorway access to the Western Sydney International Airport from the east. The decision on which option would be built is dependent on available funding. This will be determined during the detailed design and construction phase of the project.

Option 2 (with Elizabeth Drive connections) would result in an additional bridge, Bridge 25, bringing the total number of bridges constructed to 24. The additional bridge would be constructed in the form of a multi-span precast concrete super-T girder, an example of which is shown in Figure 5-10 of the EIS. Details of the new bridge are listed in **Table 3-2** and shown in **Figure 3-2**.

Table 3-2 Proposed additional bridge (Elizabeth Drive connection)

Bridge reference and description	Indicative structure type	Indicative length (L) and width (W)
Bridge 25 Elizabeth Drive westbound Bridge over M12 Motorway eastbound exit ramp to Elizabeth Drive Configuration would be two lanes and shoulder.	Multi-span precast concrete super-T girder	L = about 36 metres W = about 10 metres

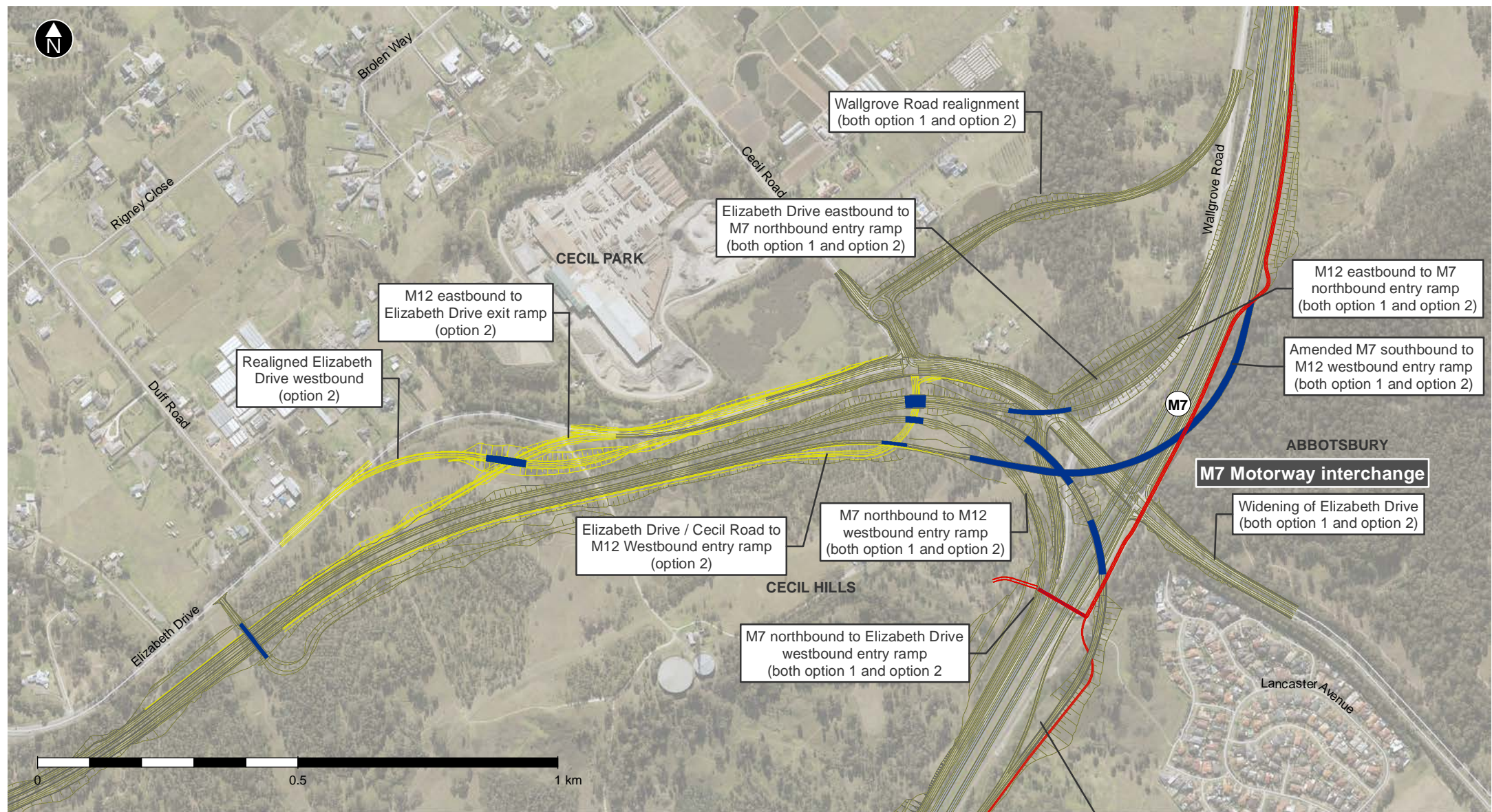
3.2 Signalised intersections into the Western Sydney International Airport

3.2.1 Project as described in the EIS

The design as described in the EIS included an allowance for future provision of two intersections for new access roads into the Western Sydney International Airport from Elizabeth Drive. The construction of the intersections would be undertaken as part of the construction of the Western Sydney International Airport.

The signalised intersections into the Western Sydney International Airport were described in Section 5.11.1 of the EIS. In summary, Elizabeth Drive would be realigned and upgraded from about 1000 metres east of the airport access road for about 1800 metres. It would then bridge across the airport road and future Sydney Metro - Western Sydney Airport (previously known as the Sydney Metro Greater West) corridor via twin bridges (Bridge 04).

The realignment of Elizabeth Drive as described in the EIS is shown in **Figure 3-4**.



- The amended project
- The amended project with Elizabeth Drive connection
- Shared user path
- Bridges
- Motorway
- Existing roads

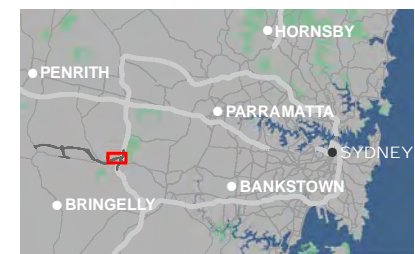
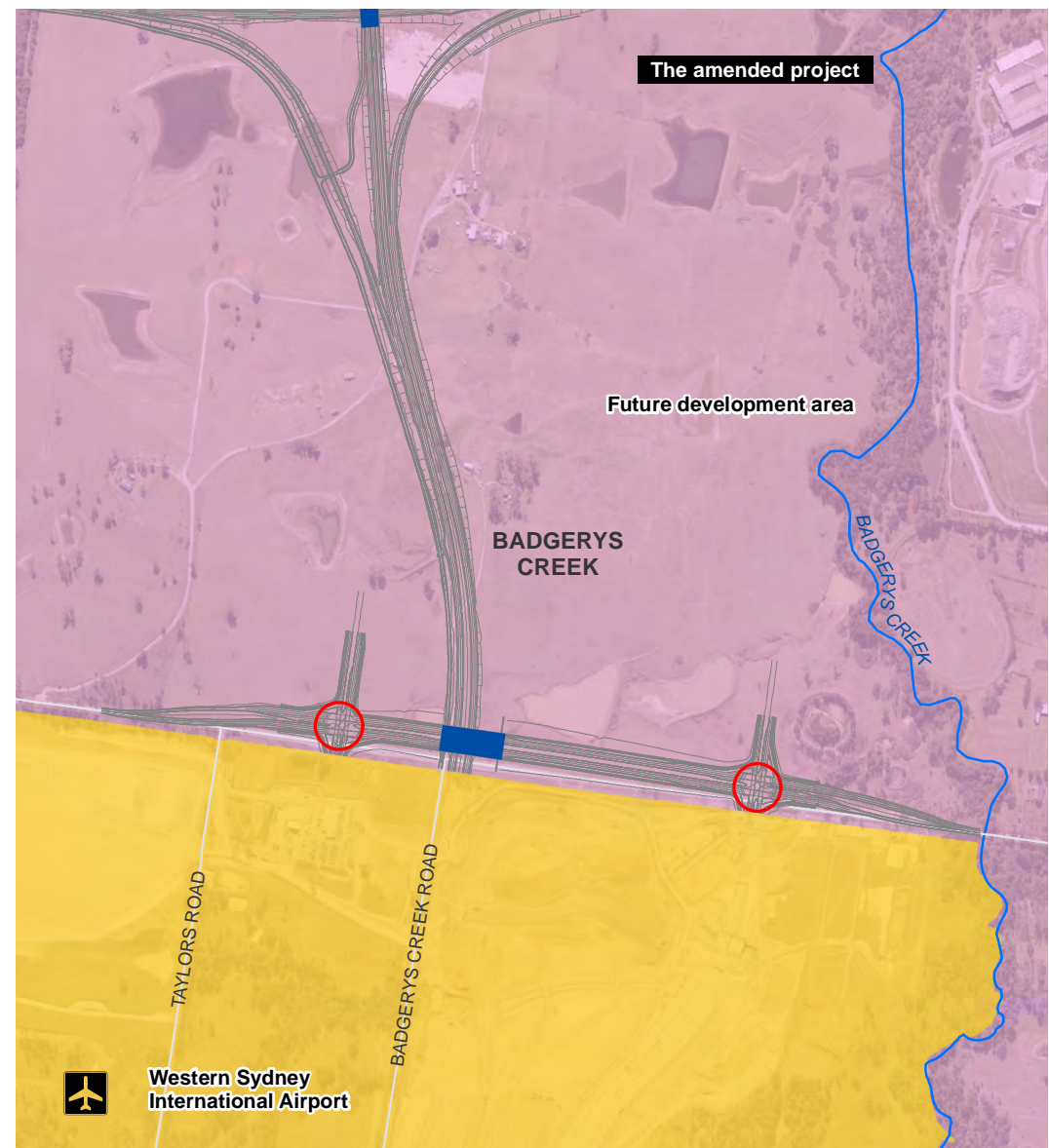
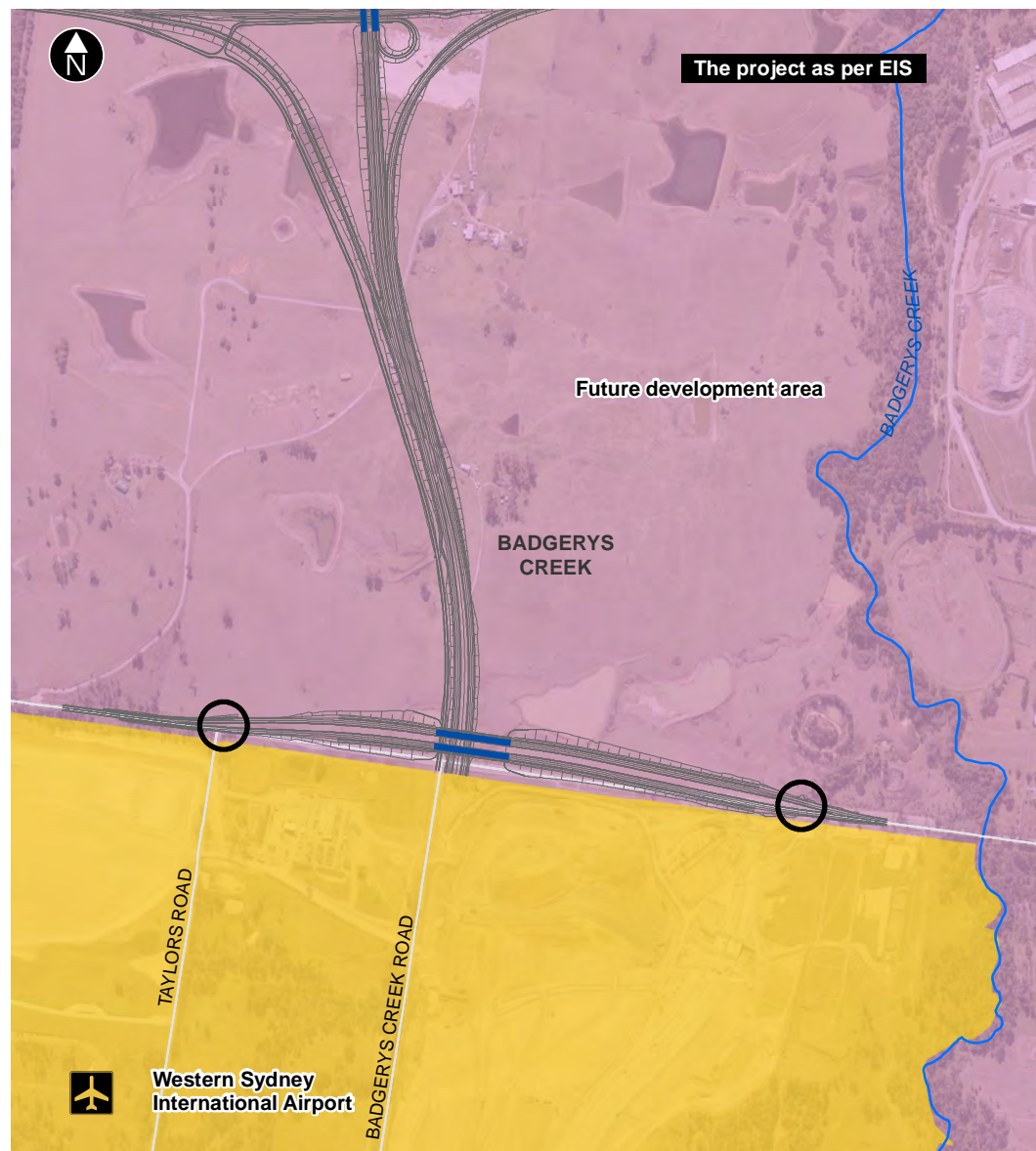


Figure 3-3 Key differences between option 1 and option 2 of the amended project



- The project as per EIS
- The amended project
- Bridges
- Existing roads
- ~ Waterways
- Western Sydney International Airport
- Western Sydney Aerotropolis
- Potential future intersections (by others)
Note: Locations to be confirmed
- Intersection connecting into the Western Sydney International Airport
Note: Indicative, subject to detailed design

0 0.5 1 km

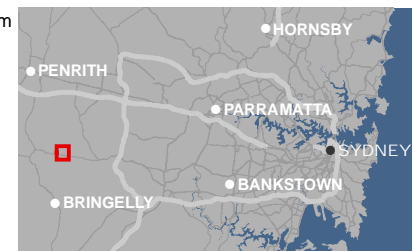
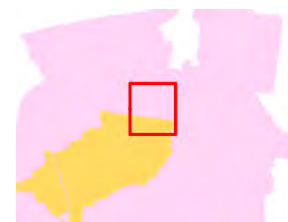


Figure 3-4 Signalised intersections into the Western Sydney International Airport

3.2.2 Proposed design change

Instead of the signalised intersections from Elizabeth Drive into the Western Sydney International Airport being constructed by WSA Co, the amended project would incorporate the construction and operation of these intersections where funding is available from WSA Co and adjoining developers.

Being constructed as part of the amended project would allow for improved access to the Western Sydney International Airport. It would also reduce complexity and safety risks during construction as it would reduce the number of contractors working at the interface between Elizabeth Drive and the Western Sydney International Airport. The intersections would also include provisions for future connection to potential developments to the north. Tie-in works required for the intersections would be constructed on Commonwealth land under the Western Sydney International Airport Plan with relevant approvals from WSA Co.

The two new signalised intersections that are proposed subject to funding from WSA Co and adjoining developers as part of the amended project are shown in **Figure 3-4**, alongside the design described in the EIS.

3.3 Other design changes

3.3.1 Lowering in and around the Western Sydney International Airport Interchange

The M12 Motorway at its interchange with the Western Sydney International Airport access road would be lowered by about eight metres when compared to the interchange design as described in the EIS. This design change is in response to further project integration and design development with the Sydney Metro - Western Sydney Airport project (previously known as the Sydney Metro Greater West).

The lowered section of the amended M12 Motorway and the interchange with the airport access road would commence about one kilometre to the west of Bridge 03 and continue to approximately two kilometres to the east of Bridge 03, under passing the proposed Sydney Metro - Western Sydney Airport approximately 500 metres to the east of Bridge 03. The proposed amended Western Sydney International Airport interchange is shown in **Figure 3-5**.

This would provide the following benefits to the amended project:

- Optimisation of the vertical alignment of the M12 Motorway between Luddenham Road and Badgerys Creek
- Reduction in height, total fill material (see **Table 4-3**) and construction materials required for Bridge 03 and associated entry and exit ramps
- Reduction in construction heavy vehicle movements and maximisation of construction efficiency due to the reduction in total fill material and construction materials required (see **Section 4.2.6**).

In addition, the design and construction of an at-grade alignment for the Sydney Metro - Western Sydney Airport would reduce the earthworks and maximise the efficiency of the Sydney Metro - Western Sydney Airport project.



- The project as per EIS
- The amended project
- Existing roads
- Western Sydney International Airport
- Proposed transport corridors**
- ▨ Sydney Metro - Western Sydney Airport

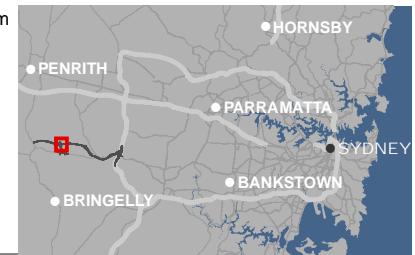
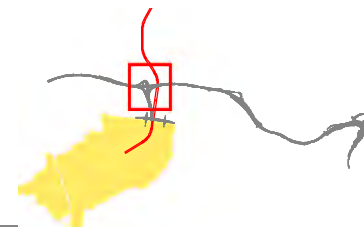
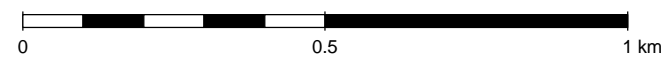


Figure 3-5 Proposed amended Western Sydney International Airport interchange

3.3.2 Shared user path

In order to facilitate the lowering of the Western Sydney International Airport interchange, the alignment of the shared user path would also need to be altered. The proposed shared user path for the amended project would underpass the M12 Motorway westbound entry ramp from the airport access road about 300 metres further south than in the design described in the EIS. From this underpass, the shared user path would travel north along the western side of the Western Sydney International Airport access road, bridging over the M12 Motorway and forming a loop to decrease in elevation and continue along the northern side of the M12 Motorway as far as Clifton Avenue.

The amended shared user path alignment is shown in **Figure 3-6**.

3.3.3 Infrastructure works at the intersection of the M12 Motorway and The Northern Road

The M12 Motorway would terminate at a signalised T-intersection with The Northern Road. This intersection would be constructed as part of the construction of Stage 6 of The Northern Road upgrades. The construction of The Northern Road upgrades would include a stub from this intersection that would extend east of The Northern Road boundary by approximately 40 metres. The stub would have two lanes in each direction separated by a central median and two left slip lanes from and onto The Northern Road. The stub would then connect with the M12 Motorway as shown in **Figure 2-1**.

Infrastructure works at this intersection would still be constructed as part of the M12 Motorway project and would include pavement works and line markings and installation of traffic signals, road signs and lighting.

3.3.4 Relocation of utilities

The proposed design of the amended project would result in additional utility impacts as described in **Table 3-3**. As noted in the EIS, the extent of utility impacts cannot be confirmed until detailed design is finalised, and TfNSW will continue to carry out ongoing consultation with utility providers with a view to refining potential utility modifications and utility protection measures during detailed design.

As discussed in 5.24.4 of the EIS, a number of activities would be carried out as early works prior to the start of construction. In particular, TfNSW would prioritise adjusting, relocating and protecting utilities around existing road corridors such as Elizabeth Drive and at the M7 Motorway interchange to minimise construction interface issues.

3.3.5 Property access, acquisition and temporary leases

Access would continue to be maintained to all properties where existing access arrangements are impacted by the amended project during operation. Proposed access arrangements to support the construction of the amended project are described in **Section 4.2.5**.

The proposed changes described throughout this chapter may result in additional or amended access impacts to properties. TfNSW will continue to consult with affected property owners about temporary and permanent changes to property access as a result of the amended project.



- The project as per EIS
- The amended project
- Shared user path as per EIS
- Amended project shared user path
- Western Sydney International Airport
- Proposed transport corridors**
- Sydney Metro - Western Sydney Airport

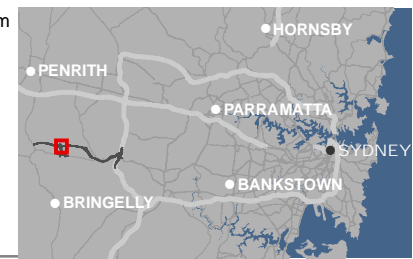
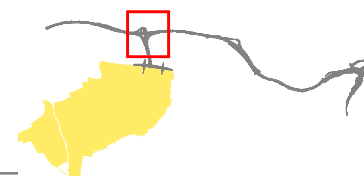
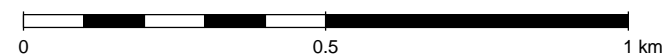


Figure 3-6 Proposed amended shared user path alignment

Table 3-3 Proposed additional utility modifications for the amended project

Asset owner	Asset type	Location	Potential impact and indicative protection strategy
Endeavour	Overhead electrical transmission lines	Ropes Creek – Transmission line runs east–west just south of Villiers Road	The transmission pole is impacted by widening of the bridge along the M7 Motorway over Villiers Road. The utility pole is proposed to be relocated clear of the proposed bridge widening.
Endeavour Energy	Street Lighting and associated underground electrical lines	Elizabeth Drive intersection with Wallgrove Road	The utility is impacted by the road widening works and is proposed to be relocated into the new verge.
Endeavour Energy	Street Lighting and associated underground electrical lines	Elizabeth Drive – runs east–west in both the northern and southern verge	The utility is impacted by the road widening works and is proposed to be relocated into the new verge.
Endeavour Energy	Street Lighting and associated underground electrical lines	Villiers Road – located to the east of the M7 Motorway	The utility is impacted by the bridge widening works and is proposed to be relocated into the new verge.
Endeavour Energy	Overhead Powerline	Elizabeth Drive – runs east–west in the northern verge	The utility is impacted by road widening between Cecil Road and Wallgrove Road, and is proposed to be relocated into the new verge.
Endeavour Energy	Overhead Powerline	Elizabeth Drive – runs north–south in the western verge	The utility is impacted by the proposed embankment for the M7 Motorway northbound entry ramp. The utility would be protected or relocated clear of the embankment.
Endeavour Energy	Overhead Electrical Powerline	Cecil Road – runs north–south in the western verge	The utility is impacted by the roundabout at the intersection between Cecil Road and the realigned Wallgrove Road. The impacted pole and electrical line is proposed to be relocated clear of the roundabout.

Asset owner	Asset type	Location	Potential impact and indicative protection strategy
TPG	Underground Telecommunication cables	Elizabeth Drive – runs east-west in the northern under the M7 Motorway overpass and then crosses to the southern verge on either side of the M7 Motorway	Elizabeth Drive is proposed to be widened which potentially impacts this utility. The utility is proposed to be relocated into the new verge.
TfNSW (formerly Roads and Maritime Services)	ITS communications power supply	Shared user path on the east side of the M7 Motorway between existing bridge over Villiers Road/Ropes Creek and Elizabeth Drive	Relocate the communications and power supply to below the realigned shared user path parallel to the M7 Motorway southbound to M12 Motorway exit ramp.
TfNSW (formerly Roads and Maritime Services)	ITS communications power supply	Shared user path on the east side of the M7 Motorway between Elizabeth Drive and a point about 1.9 kilometres south of Elizabeth Drive	Relocate the communications and power supply to below the realigned shared user path parallel to the M12 Motorway to M7 Motorway southbound entry ramp.
TfNSW (formerly Roads and Maritime Services)	Traffic Control Signals	Traffic Signals at Elizabeth Drive, Wallgrove Road and the M7 motorway northbound entry ramp	The utilities are impacted by the relocation of the intersection. The utility is proposed to be relocated into the verge of the proposed intersection.
TfNSW (formerly Roads and Maritime Services)	Traffic Control Signals	Traffic Signals at Elizabeth Drive and M7 Motorway southbound exit ramp	The utilities are impacted by the widening of the intersection. The utility will be relocated into the verge of the proposed intersection.
Jemena	Eastern Gas Pipeline (Transmission Gas Main)	Cecil Park – runs north-south across Elizabeth Drive, and on the western verge of Wallgrove Road	<p>The utility runs under the existing Elizabeth Drive which is proposed to be widened.</p> <p>The realigned Wallgrove Road crosses over the utility further to the north.</p> <p>Further consultation will be carried out with the utility authority at detailed design to confirm any protection requirements associated with building over the utility.</p>

Asset owner	Asset type	Location	Potential impact and indicative protection strategy
Jemena	Wilton to Horsley Pipeline (Trunk Main)	Cecil Park – runs north–south under the existing M7 Motorway northbound exit ramp to Elizabeth Drive, under Elizabeth Drive and under the M7 Motorway	<p>The realignment of the M7 Motorway northbound exit ramp to Elizabeth Drive crosses over the utility further to the west of the existing crossing.</p> <p>The utility runs under the existing Elizabeth Drive which is proposed to be widened.</p> <p>Further consultation will be carried out with the utility authority at detailed design to confirm any protection requirements associated with building over the utility.</p>
Jemena	Secondary Main	Elizabeth Drive – runs east–west on the northern verge	<p>Elizabeth Drive is proposed to be widened, which could potentially impact the existing utility in the verge.</p> <p>The utility is proposed to be relocated into the new verge.</p>
Jemena	Secondary Main	Wallgrove Road – runs north–south on the western verge	<p>The utility is impacted by the proposed embankment for the M7 Motorway northbound entry ramp. The utility could be protected or relocated clear of the embankment.</p>
WaterNSW	WaterNSW – Cecil Hills Tunnel	Cecil Park – runs north–south within an easement and crosses under Elizabeth Drive and Wallgrove Road	<p>The realignment of the M7 Motorway northbound exit ramp to Elizabeth Drive cross over the easement and the tunnel.</p> <p>Further consultation will be carried out with the utility authority at detailed design to confirm any requirements associated with building over the utility.</p>
Sydney Water	500 mm diameter water main	Cecil Park – runs north–south. It is located within the WaterNSW easement south of Elizabeth drive, crosses Elizabeth drive and runs along the western verge of Wallgrove Road	<p>The utility is impacted by the proposed embankment for the M7 Motorway northbound entry ramp. The utility could be protected or relocated clear of the embankment.</p> <p>Elizabeth Drive is proposed to be widened, which could potentially impact the existing utility where it crosses Elizabeth drive. The utility could be protected or relocated depending on the depth of utility. This can be determined at detailed design.</p>

Asset owner	Asset type	Location	Potential impact and indicative protection strategy
Sydney Water	150 mm diameter water main	Elizabeth Drive – runs east–west in the northern verge	Elizabeth Drive is proposed to be widened which potentially impacts this utility. The utility is proposed to be relocated into the new verge.
Sydney Water	150 mm diameter water main	Cecil Road – runs north–south in the eastern verge	The utility is impacted by the realignment of Cecil Road and the new roundabout between Cecil Road and the realigned Wallgrove Road. The utility is proposed to be relocated into the new verge.
Telstra	Underground Telecommunication cables	Elizabeth Drive – runs in the southern verge west of Wallgrove Road, and in the northern verge east of Wallgrove Road	Elizabeth Drive is proposed to be widened which potentially impacts this utility. The utility is proposed to be relocated into the new verge.
Telstra	Underground Telecommunication cables/Overhead cables	Cecil Road – runs north–south in the eastern verge	The main is impacted by the realignment of Cecil Road and the new roundabout between Cecil Road and the realigned Wallgrove Road. The main is proposed to be relocated into the new verge.
Telstra	Underground Telecommunication cables	Wallgrove Road – runs north–south in the western verge	The utility is impacted by the proposed embankment for the M7 Motorway northbound entry ramp. The utility could be protected or relocated clear of the embankment.
NBN	Underground Telecommunication cables	Wallgrove Road – runs north–south in the western verge	The utility is impacted by the proposed embankment for the M7 Motorway northbound entry ramp. The utility could be protected or relocated clear of the embankment.
NBN	Underground Telecommunication cables	Elizabeth Drive – runs in the southern verge west of Wallgrove Road, and in the northern verge east of Wallgrove Road	Elizabeth Drive is proposed to be widened which potentially impacts this utility. The utility is proposed to be relocated into the new verge.
Optus	Underground Telecommunication cables	Elizabeth Drive – runs in the southern verge west of Wallgrove Road, and in the northern verge east of Wallgrove Road	Elizabeth Drive is proposed to be widened which potentially impacts this utility. The utility is proposed to be relocated into the new verge.

Asset owner	Asset type	Location	Potential impact and indicative protection strategy
Optus	Underground Telecommunication cables	Cecil Road – runs north–south in the eastern verge	The main is impacted by the realignment of Cecil Road and the new roundabout between Cecil Road and the realigned Wallgrove Road. The main is proposed to be relocated into the new verge.
Optus	Underground Telecommunication cables	Wallgrove Road – runs north–south in the western verge	The utility is impacted by the proposed embankment for the M7 Motorway northbound entry ramp. The utility could be protected or relocated clear of the embankment.
Uecomm	Underground Telecommunication cables	Wallgrove Road – runs north–south in the eastern verge	The utility is impacted by the proposed embankment for the M7 Motorway northbound entry ramp. The utility could be protected or relocated clear of the embankment.
Uecomm	Underground Telecommunication cables	Elizabeth Drive – runs in the northern verge west of the M7 Motorway, and in the southern verge east of the M7 Motorway	Elizabeth Drive is proposed to be widened which potentially impacts this utility. The utility is proposed to be relocated into the new verge.
M7 Motorway	ITS communications power supply	Shared user path on the east side of the M7 Motorway between existing bridge over Villiers Road/Ropes Creek and Elizabeth Drive	Relocate the communications and power supply to below the realigned shared user path parallel to the M7 Motorway southbound to M12 Motorway exit ramp.
M7 Motorway	ITS communications power supply	Shared user path on the east side of the M7 Motorway between Elizabeth Drive and a point about 1.9 kilometres south of Elizabeth Drive	Relocate the communications and power supply to below the realigned shared user path parallel to the M12 Motorway to M7 Motorway southbound entry ramp.
M7 Motorway	Underground power supply (street lighting)	M7 Motorway interchange, northbound entry ramp	Remove and relocate the existing underground power supply.
M7 Motorway	Underground power supply (street lighting)	M7 Motorway interchange, southbound entry ramp	Remove and relocate the existing underground power supply.

Properties that would be acquired or temporarily leased by TfNSW are described in Table 5-11 of the EIS. The proposed changes described throughout this chapter would result in additional and amended properties being acquired or temporarily leased for the amended project, as described in **Table 3-4**. Where property acquisition and temporary leases have not changed from those described in Table 5-11 of the EIS, they are not repeated in **Table 3-4**.

The extent of property impacts would be confirmed during detailed design, in consultation with the property owners. For partial acquisitions, property adjustment plans would be developed in consultation with the property owner. Following consultation with property owners, some of the lots listed as requiring partial acquisition may be totally acquired.

In addition to the properties in **Table 3-4**, there would be an additional 11 parcels of land that are currently owned by TfNSW and used as road reserves that would be impacted by the amended project. This would increase the number of TfNSW affected parcels from 16 as described in the EIS to 27.

3.4 Amended operational footprint

3.4.1 Project as described in the EIS

The operational footprint generally includes the M12 Motorway and additional areas required for operation and maintenance of the project. The operational footprint of the project as described in the EIS is shown in **Figure 3-7**, and would comprise about 285 hectares.

3.4.2 Proposed design change

The operational footprint as described in the EIS is proposed to be amended as a result of the proposed design changes described throughout this chapter. Where relevant, and as discussed throughout Chapter 6 and the appendices to this amendment report, the amended operational footprint has been used as a basis for the environmental assessment of the amended project.

This updated footprint is referred to as the amended operational footprint and would comprise about 317 hectares. This is an increase of about 32 hectares. Both the amended operational footprint and the operational footprint as described in the EIS are shown in **Figure 3-7** for ease of comparison.

Table 3-4 Additional and amended properties to be acquired or temporarily leased for the amended project

ID	Lot (lot or section/ DP)	Ownership	Existing land use	Total property area (hectares)	Area of land within amended operational footprint (hectares) (proportion of property in brackets)	Area of land subject to temporary lease (hectares) (proportion of property in brackets)	Property improvements affected (eg dwellings, sheds, farm dams, shade houses)	Change from EIS
2	1/DP1240402	Private (company)	Rural	315.2	13.5 (4.3%)	9.3 (3.0%)	-	Increase in property area affected by construction with the temporary lease of the area currently used for The Northern Road upgrade (Stage 5 and 6) construction ancillary facility (9.3 hectares)
4	25/DP604586	Private	Agriculture – grazing	12.8	4.7 (36.4%)	0.2 (1.6%)	Farm dams (two)	Increase in the property area affected by construction with the temporary lease of 0.2 hectares to fully incorporate a farm dam that would be impacted by the amended project
6	1/DP235124	Private (now owned by TfNSW)	Commercial (former Karingal Training Stables – no longer operating)	17.6	5.2 (29.8%)	5.4 (30.7%)	Sheds, horse paddocks/ stables, farm dams, training facilities, training track, internal roads/tracks	Increase in the property area affected by construction (by 5.0 hectares) for a construction ancillary facility (AF 11) following acquisition of the property by TfNSW

ID	Lot (lot or section/ DP)	Ownership	Existing land use	Total property area (hectares)	Area of land within amended operational footprint (hectares) (proportion of property in brackets)	Area of land subject to temporary lease (hectares) (proportion of property in brackets)	Property improvements affected (eg dwellings, sheds, farm dams, shade houses)	Change from EIS
7	35/DP211842	Private	Agriculture – intensive animal husbandry (horses)	11.3	1.0 (8.7%)	0.7 (6.2%)	Farm dams	Change to the property area affected by temporary lease (from 0.6 hectares to 0.7 hectares) to fully incorporate the farm dams that would be impacted by the amended project
8	101/DP848215	Private (company)	Agriculture – grazing, commercial (quarrying, waste management and/or resource recovery)	343.4	47.7 (13.8%)	13.1 (3.8%)	Farm dams, quarry, farm dams (two), internal roads/tracks	Minor adjustment in operational footprint to accommodate amended design of airport interchange (47.2 hectares to 47.5 hectares). Reduction in the property area subject to temporary lease (from 13.4 hectares to 13.1 hectares), which is partly due to adjustments in the operational footprint
9	63/DP1087838, 62/DP1087838, 3/DP164242, 1/DP74574, 21/DP258414, 1/DP88836	Private	Rural land – The University of Sydney farms	343.9	34.0 (9.9%)	23.2 (6.7%)	Farm dams	Change to the operational footprint (from 30.9 hectares to 33.6 hectares) at Elizabeth Drive to incorporate intersections into the Western Sydney International Airport and connection to future development to the north of Elizabeth Drive.

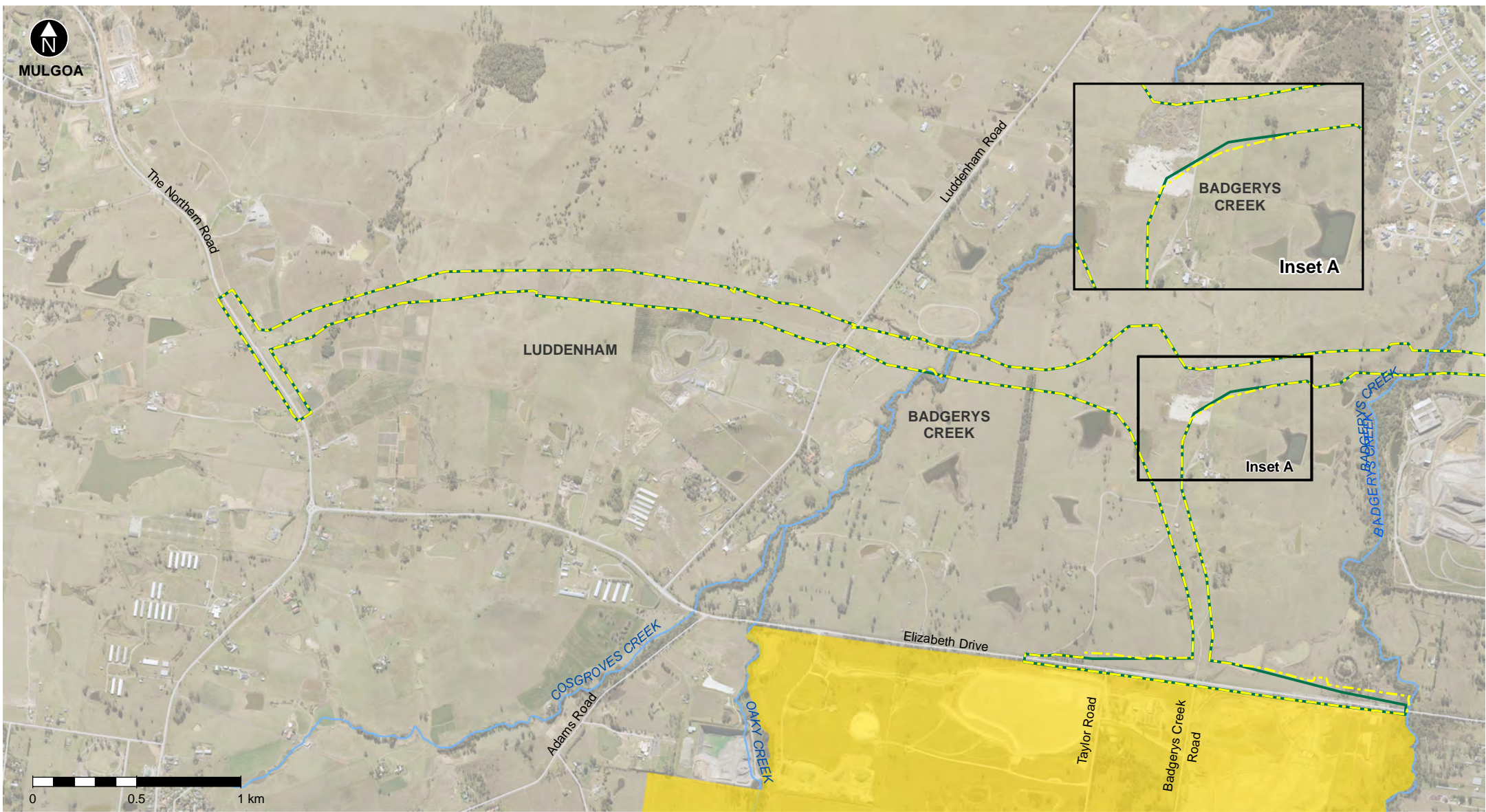
ID	Lot (lot or section/ DP)	Ownership	Existing land use	Total property area (hectares)	Area of land within amended operational footprint (hectares) (proportion of property in brackets)	Area of land subject to temporary lease (hectares) (proportion of property in brackets)	Property improvements affected (eg dwellings, sheds, farm dams, shade houses)	Change from EIS
								Reduction in the area subject to temporary lease (from 27.9 hectares to 23.2 hectares), which is mainly due to the change in the operational footprint
12	1/DP587135, 2/DP587135, 7/DP812284	Private (company)	Agriculture – horticulture, grazing (identified for future urban development)	88.1	10.8 (12.2%)	0.1 (0.1%)	Horticultural gardens, internal roads	Minor increase in the property area affected by construction with the temporary lease of 0.1 hectares to fully incorporate a shed impacted by the amended project
13	47/DP734584	Private (company)	Rural land	10.7	6.1 (56.8%)	4.6 (43.0%)	-	Change to the property area subject to temporary lease (from 3.0 hectares to 4.6 hectares), to incorporate residual land within the construction ancillary facility (AF 12)
14	3/DP812284	Private (company)	Recycling facility, commercial (TreeServe)	12.8	0.8 (6.3%)	12.0 (93.8%)	-	Increase in the property area affected by construction with the temporary lease of 12.0 hectares for an ancillary facility (AF 12), in response to approach from owner offering lease

ID	Lot (lot or section/ DP)	Ownership	Existing land use	Total property area (hectares)	Area of land within amended operational footprint (hectares) (proportion of property in brackets)	Area of land subject to temporary lease (hectares) (proportion of property in brackets)	Property improvements affected (eg dwellings, sheds, farm dams, shade houses)	Change from EIS
20	1/DP981720	Private	Agriculture – horticulture	2.1	0.2 (9.0%)	0.2 (10.0%)	Shade houses, farm dam	Increase in the property area affected by construction with the temporary lease of 0.2 hectares to fully incorporate a farm dam and a small number of additional shade houses (up to five in total)
21	1/DP736951	Private	Commercial (horse training)	1.9	1.05 (56.8%)	0.03 (1.6%)	Dwellings (two), sheds/ stables, horse paddocks	Change to the construction footprint to fully incorporate a shed impacted by the amended project, increasing the property area affected from 1.05 hectares to 1.08 hectares
23	B/DP416720, 39/A/DP2566	Private	Commercial (horse training facility – Bara Lodge)	2.2	1.0 (45.4%)	1.2 (54.5%)	Horse paddocks, shed, internal roads/tracks	Increase in the property area affected by construction with the temporary lease of 1.2 hectares to include additional area for a construction ancillary facility (AF 13)
36	26/DP30265, 25/DP30265	Private	Commercial (Hi-Quality Group Head Office)	4.2	2.2 (51.6%)	2.0 (47.6%)	Shed, office, hardstand	Increase in the property area affected by construction by 2.0 hectares to incorporate the whole of this property

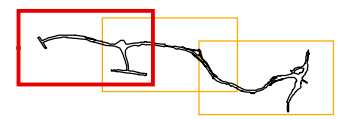
ID	Lot (lot or section/ DP)	Ownership	Existing land use	Total property area (hectares)	Area of land within amended operational footprint (hectares) (proportion of property in brackets)	Area of land subject to temporary lease (hectares) (proportion of property in brackets)	Property improvements affected (eg dwellings, sheds, farm dams, shade houses)	Change from EIS
37	9/DP1054778, 8/DP1054778, 7/DP1054778, 6/DP1054778, 5/DP1054778, 4/DP1054778, 3/DP1054778, 2/DP1054778, 1/DP1054778	Private	Agriculture – grazing	18.9	8.3 (43.7%)	1.7 (9.0%)	-	Increase in the property area affected by construction with the temporary lease of 1.7 hectares to incorporate land south of the M12 Motorway into a construction ancillary facility (AF 15)
38/40	3/DP1087825, 1/DP875790, 2/DP922940, 28/DP654786, 1/DP308358, 6/DP629798, 5/DP629798, 1/DP1041390, 2/DP1041390, 10/DP1021940, 11/DP1021940, 12/DP1021940, 14/DP1021940, 1/DP724970, 11/DP860893, 13/DP1021940 1/DP522269,	Public (Western Sydney Parklands Trust)	Western Sydney Parklands	801.3	53.5 (6.7%)	20.4 2.5%)	Wylde Mountain Bike Trail and other recreation uses, International Shooting Centre, car parking area, vegetated areas, orchard trees, dwelling, sheds, farm dams (two)	Increase in the property area affected by construction with the temporary lease of an additional 13.9 hectares of land to incorporate the existing Wylde Mountain Bike Trail car park area (which would be relocated) into construction ancillary facility (AF 16), land east of the M7 Motorway (AF 9), and other minor adjustments. Increase in the property area affected by the operational footprint from 46.1 hectares to 53.5 hectares, to accommodate the amended project at Elizabeth Drive

ID	Lot (lot or section/ DP)	Ownership	Existing land use	Total property area (hectares)	Area of land within amended operational footprint (hectares) (proportion of property in brackets)	Area of land subject to temporary lease (hectares) (proportion of property in brackets)	Property improvements affected (eg dwellings, sheds, farm dams, shade houses)	Change from EIS
39	21/DP1109551, 26/DP1109551, 22/DP1109551	Public	WaterNSW	9.5	2.1 (22.6%)	-	-	Minor change to the operational footprint east of the M7 Motorway, increasing the property area affected from 2.0 hectares to 2.1 hectares
42 New	33/A/DP2566		Rural residential	1.5	-	1.5 (100%)	-	Property to be used for construction ancillary facility (AF 14)
43 New	2/4/DP2954	Private	Rural residential	7.4	3.3 (45.4%)	-	Vegetated area, farm dam	Change to the operational footprint for the realignment of Wallgrove Road
44	7/DP629798, 1/DP1222339, 26B/DP387529, 26A/DP387529, 25/4/DP2954, 24/DP1152887	Public (Western Sydney Parklands Trust)	Rural and rural residential	14.9	2.9 (19.6%)	4.3 (28.9%)	Dwelling, sheds, vegetated area	Change to the operational footprint for the connection to Wallgrove Road and temporary lease of 4.3 hectares for an additional construction ancillary facilities (AF 17 and AF 18)
45 New	302/DP1122172 303/DP1122172 304/DP1122172	Private	Residential	4.3	0.02 (0.5%)	0.02 (0.5%)	-	Minor adjustment to driveway access at Cecil Road Temporary lease of 0.02 hectares of land to incorporate whole of dam
46 New	301/DP1122172	Private	Residential	1.3	0.02 (1.6%)	-	-	Minor adjustment to driveway access at Cecil Road
47 New	300/DP1122172	Private	Residential	1.0	0.01 (1.3%)	-	-	Minor adjustment to driveway access at Cecil Road

ID	Lot (lot or section/ DP)	Ownership	Existing land use	Total property area (hectares)	Area of land within amended operational footprint (hectares) (proportion of property in brackets)	Area of land subject to temporary lease (hectares) (proportion of property in brackets)	Property improvements affected (eg dwellings, sheds, farm dams, shade houses)	Change from EIS
48 New	303/DP1122172	Private	Residential	1.2	0.004 (0.4%)	-	-	Minor adjustment to driveway access at Cecil Road
49 New	91/DP1101411	Private	Commercial (quarry)	7.7	-	0.1 (1.3%)	-	Minor adjustment to driveway access at Range Road



- The project operational footprint as per the EIS
- The amended project operational footprint
- ~~~~~ Waterways
- Western Sydney International Airport
- Existing roads



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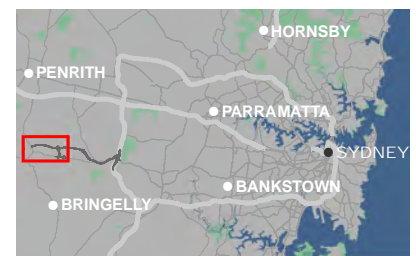
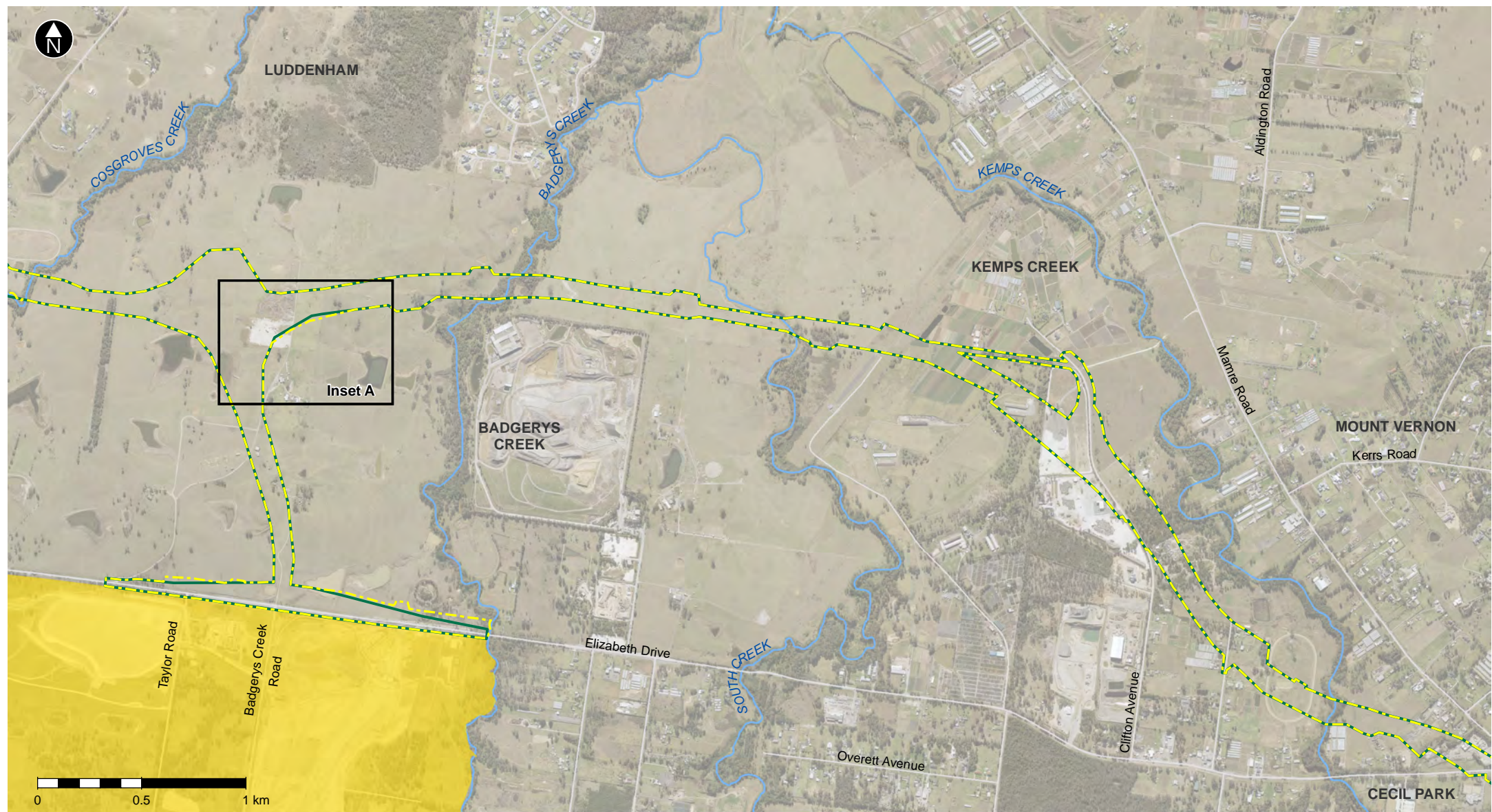
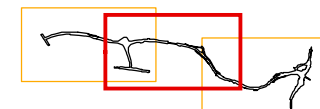


Figure 3-7 Amended operational footprint



- The project operational footprint as per the EIS
- The amended project operational footprint
- ~ Waterways
- Western Sydney International Airport
- Existing roads



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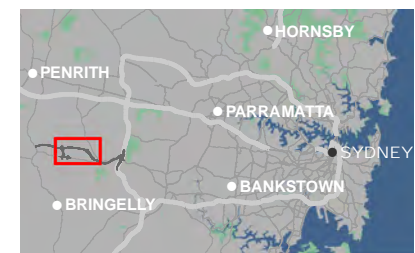
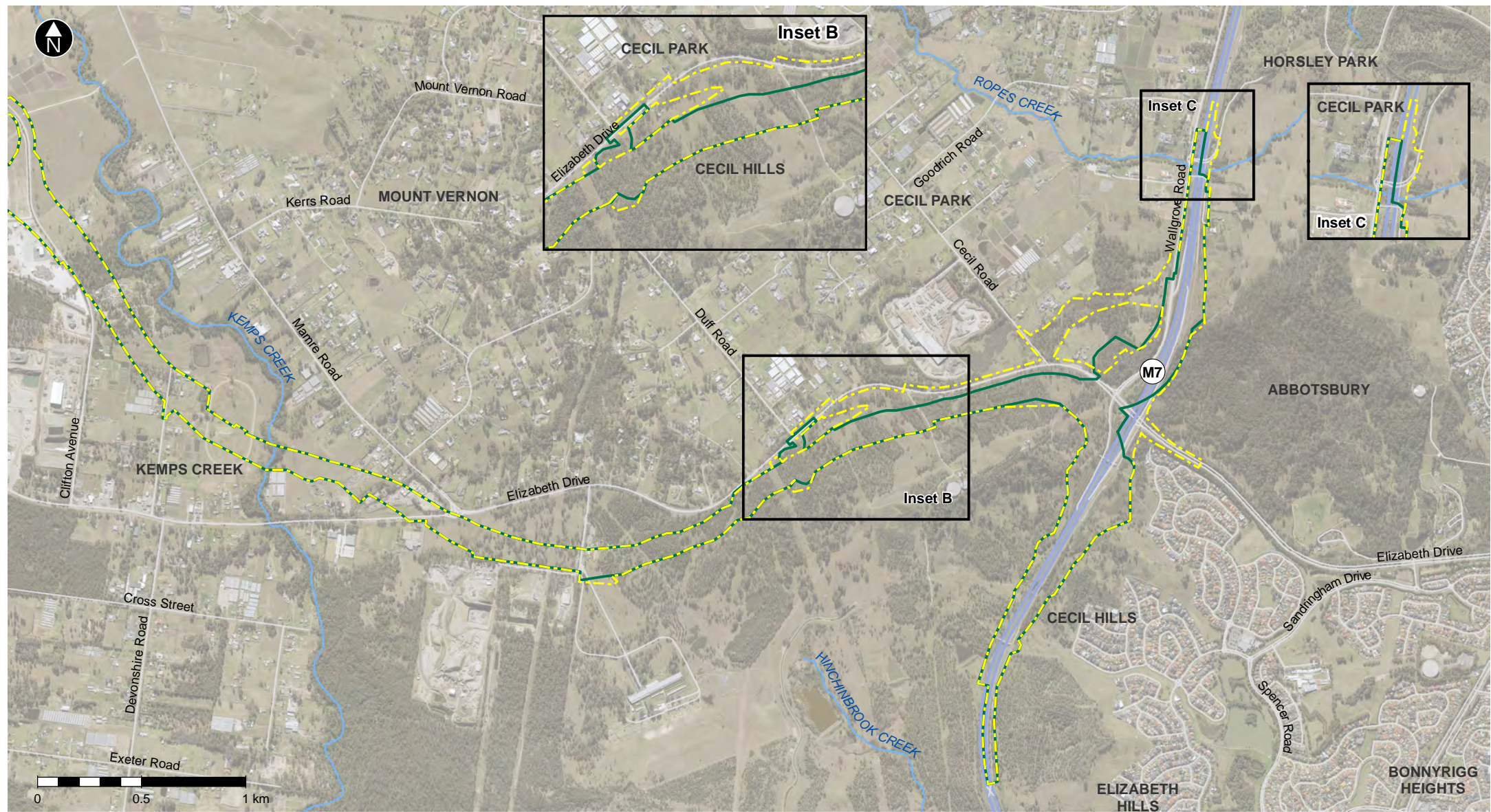
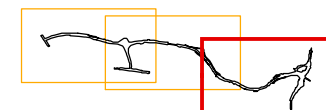


Figure 3-7 Amended operational footprint



- The project operational footprint as per the EIS
- The amended project operational footprint
- ~~~~~ Waterways
- Motorway
- Existing roads



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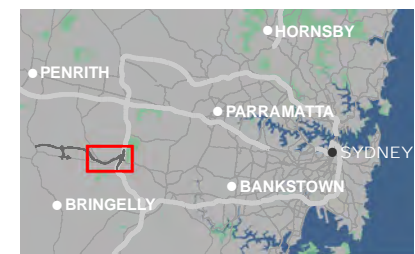


Figure 3-7 Amended operational footprint

4 Proposed construction updates

This chapter describes proposed updates to the construction of the project as described in the EIS. The updates are due to the proposed changes described in **Chapter 3** as well as further development of the project's procurement and delivery strategy. As a result of industry briefings to inform the project's procurement strategy, it was determined that instead of the project being the subject of a single design and construct contract, it would be divided into multiple contracts to maximise efficiency.

Proposed updates are listed below and are described in detail in the following sections:

- Additional construction ancillary facilities
- Amended earthwork quantities
- Amended drainage works
- Additional temporary leases
- Out-of-hours work
- Amended construction access
- Amended haulage routes and heavy vehicle movements
- Amended construction resources
- An amended construction program
- An amended construction footprint.

Where construction details have been described in the EIS and are not proposed to change, they have not been replicated in this chapter. Only those construction aspects that would change as a result of the amended project and further development of the procurement and delivery strategy have been described in this chapter.

4.1 Additional and amended construction ancillary facilities

4.1.1 Project as described in the EIS

Section 5.24.3 of the EIS describes the ancillary facilities that would be required at different locations across the construction footprint to support the construction of the project as described in the EIS. The ancillary facilities comprised:

- Temporary buildings including offices and meeting rooms, amenities and first aid facilities, a main project office and secondary offices, and material testing laboratories; the size and number of office facilities at the main compound would be greater than at the secondary compounds
- Hardstand parking areas with sufficient space to accommodate the numbers of construction workers expected at any site
- Materials laydown, storage and handling areas, including purpose-built temporary structures as required and appropriately bunded storage for hazardous and non-hazardous substances
- Secure perimeter fencing, including visual screening of construction compounds where necessary
- Bridge construction support areas
- Workshops with appropriate safety and environmental controls for servicing plant and equipment
- Concrete precast elements casting yards and concrete and/or asphalt batching plants.

A total of nine ancillary facilities were proposed in the EIS.

4.1.2 Proposed change

In order to support the construction of the amended project, including change to the procurement strategy described above, nine additional construction ancillary facilities would be required (see **Table 4-1**). In addition, the following changes would be made to the ancillary facilities described in the EIS:

- AF 1 – Material crushing and screening activities would take place within the ancillary facility
- AF 2 – Material crushing and screening activities would take place within the ancillary facility
- AF 4 – A concrete/asphalt batching plant would be located within the ancillary facility
- AF 9 – Size would be increased, and crushing and screening activities would take place within the ancillary facility.

The additional and amended ancillary facilities and their locations are described in **Table 4-1** (with changes to the ancillary facilities as described in the EIS shown in **bold text**) and **Figure 4-1**.

Table 4-1 also details the purpose of each ancillary facility, while **Figure 4-2** shows the indicative layout. Proposed access arrangements to the additional construction ancillary facilities are described in **Section 4.2.5**. The remaining ancillary facilities described in the EIS that would not be amended have not been included in **Table 4-1**.

These additional ancillary facilities and their purposes are indicative only. The final type, use, location and number of ancillary facilities would be determined by the construction contractor and identified in a site establishment management plan.

Table 4-1 Amended and additional ancillary facilities and their purposes (bold text shows change from EIS)

Ancillary facility	Location	Approximate size (ha)	Purpose
AF 1	East of The Northern Road	6.4	Plant servicing workshop Stockpile and laydown area (including crushing and screening activities) Secondary offices Amenities Vehicular access Car park
AF 2	North of Elizabeth Drive opposite the Elizabeth Drive/Badgerys Creek Road intersection	23.2	Plant servicing workshop Stockpile and laydown area (including crushing and screening activities) Main office Amenities Vehicular access Car park

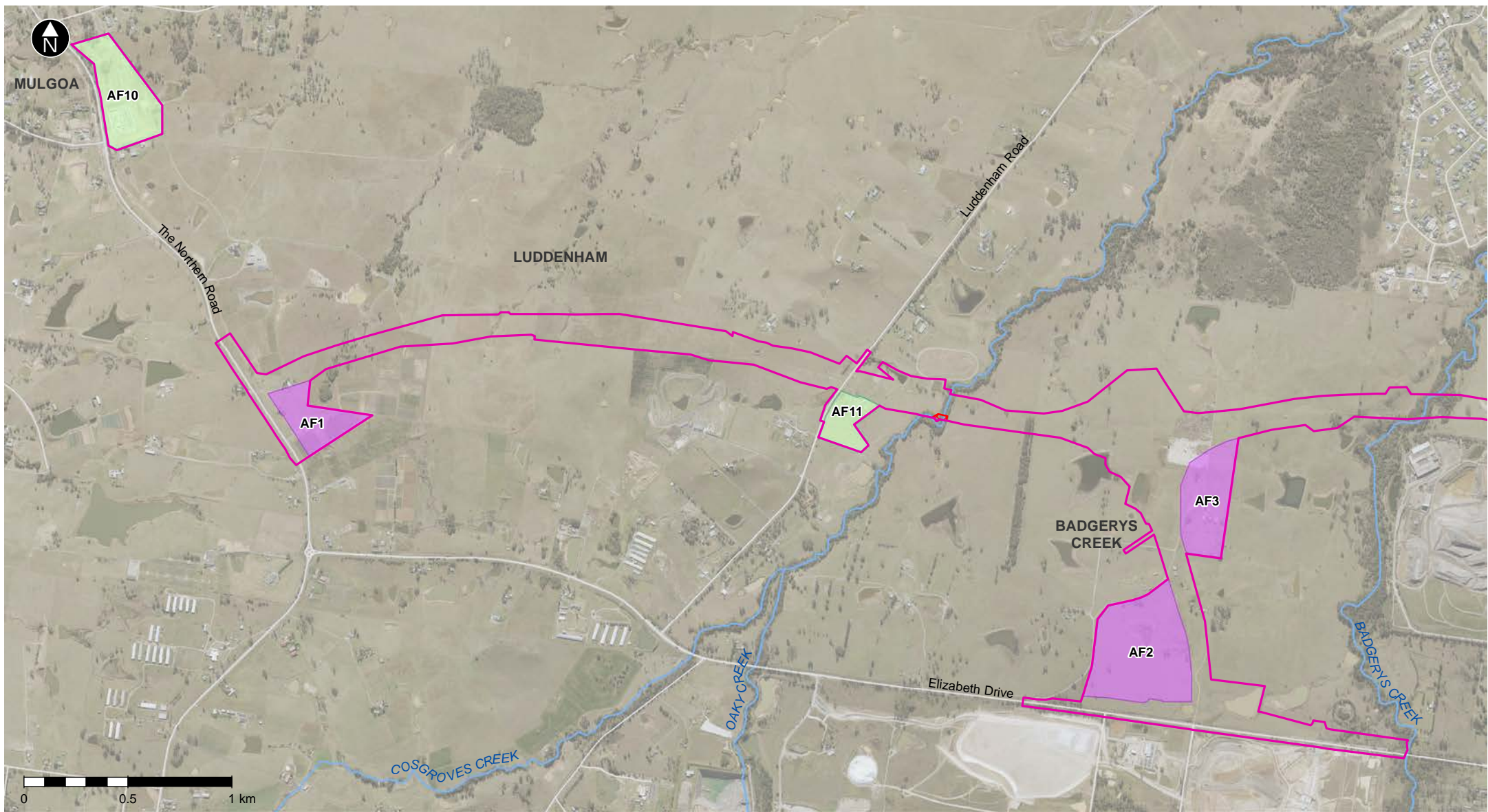
Ancillary facility	Location	Approximate size (ha)	Purpose
AF 4	West of Clifton Avenue	3.0	Concrete/asphalt batching plant Plant servicing workshop Stockpile and laydown area Secondary offices Amenities Vehicular access Car park
AF 9	East of the M7 Motorway	14.0	Stockpile and laydown area Site offices Amenities Vehicular access Car park
AF 10	East of The Northern Road, South of Gates Road. Existing ancillary facility for construction of Stages 5 and 6 of The Northern Road	12.2	Concrete/asphalt batching plant Stockpile and laydown area (including crushing and screening activities) Site offices Amenities Vehicular access Car park
AF 11	East of Luddenham Road	4.6	Stockpile and laydown area Site offices Amenities Vehicular access Car park
AF 12	West of Clifton Avenue	14.0	Stockpile and laydown area Amenities Vehicular access Car park
AF 13	East of Salisbury Avenue	4.1	Stockpile and laydown area Site offices Amenities Vehicular access Car park
AF 14	West of Salisbury Avenue	1.5	Stockpile and laydown area Vehicular access Car park

Ancillary facility	Location	Approximate size (ha)	Purpose
AF 15	South of the intersection of Elizabeth Drive and Mamre Road	2.08	Stockpile and laydown area Site offices Amenities Vehicular access Car park
AF 16	Within the carpark of the Wylde Mountain Bike Trail	1.0	Stockpile and laydown area Site offices Amenities Vehicular access Car park
AF 17	West of the M7 Motorway	4.5	Stockpile and laydown area Amenities Vehicular access Car park
AF 18	West of the M7 Motorway	1.1	Stockpile and laydown area Site offices Amenities Vehicular access Car park

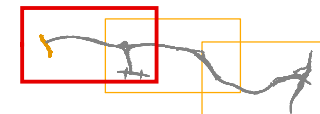
Where possible, additional ancillary facilities have been nominated in locations that:

- Are more than 50 metres from a waterway
- Are within or adjacent to land where the project is being carried out
- Have ready access to the road network
- Minimise the need for heavy vehicles to travel through residential areas
- Are on relatively level land
- Are separated from nearest residences by at least 200 metres (or at least 300 metres for a temporary batching plant)
- Do not require vegetation clearing beyond that already required for the project alignment
- Avoid and minimise impact on heritage items (including areas of archaeological sensitivity)
- Do not unreasonably affect the land use of adjacent properties
- Are above the one in 20 year ARI flood level unless a contingency plan to manage flooding is prepared and implemented
- Provide sufficient area for the storage of raw materials to minimise, to the greatest extent practical, the number of deliveries required outside standard construction hours.

This is consistent with the assessment undertaken for the project as described in the EIS. An assessment of the proposed ancillary facilities against the considerations above is summarised in **Figure 4-1**.



- The amended project construction footprint
- Ancillary facilities as per the EIS
- Additional ancillary facilities
- The amended project exclusion zones
- Waterways
- Motorway
- Existing roads



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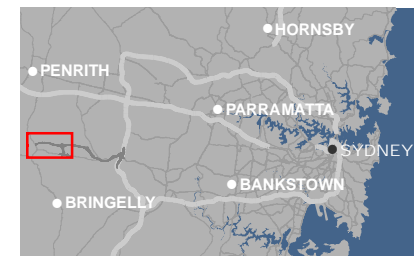
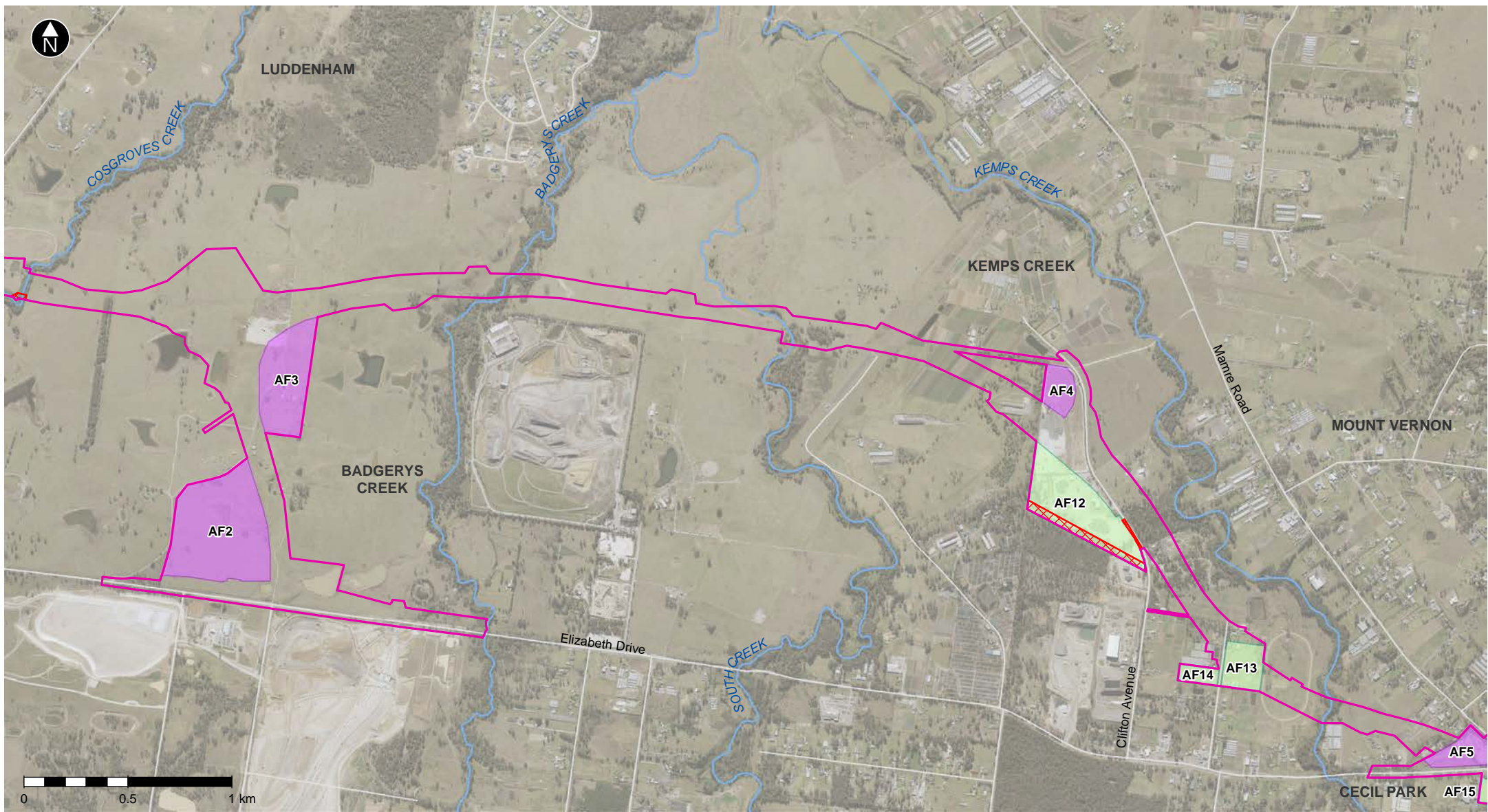
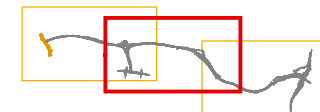


Figure 4-1 Location of ancillary facilities as described in the EIS and proposed additional and amended ancillary facilities



- The amended project construction footprint
- Ancillary facilities as per the EIS
- Additional ancillary facilities
- The amended project exclusion zones
- ~ Waterways
- Motorway
- Existing roads



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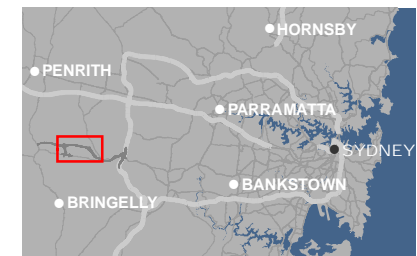
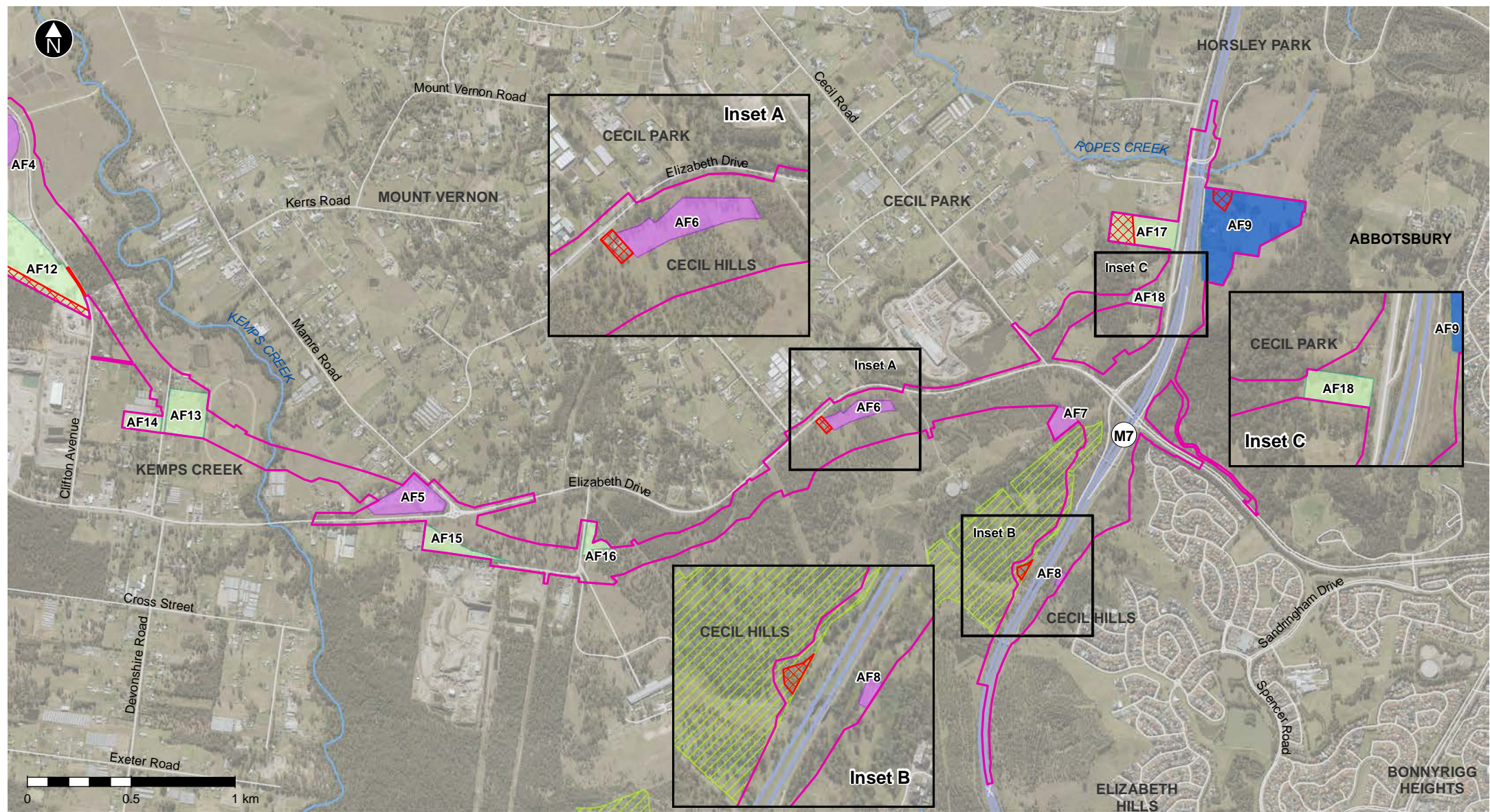
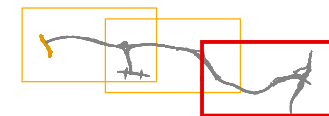


Figure 4-1 Location of ancillary facilities as described in the EIS and proposed additional and amended ancillary facilities



- The amended project construction footprint
- Ancillary facilities as per the EIS
- Additional ancillary facilities
- Amended ancillary facilities
- The amended project exclusion zones
- ~ Waterways
- Motorway
- Existing roads
- WSPT Biobanking site



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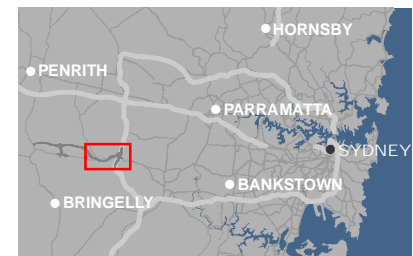
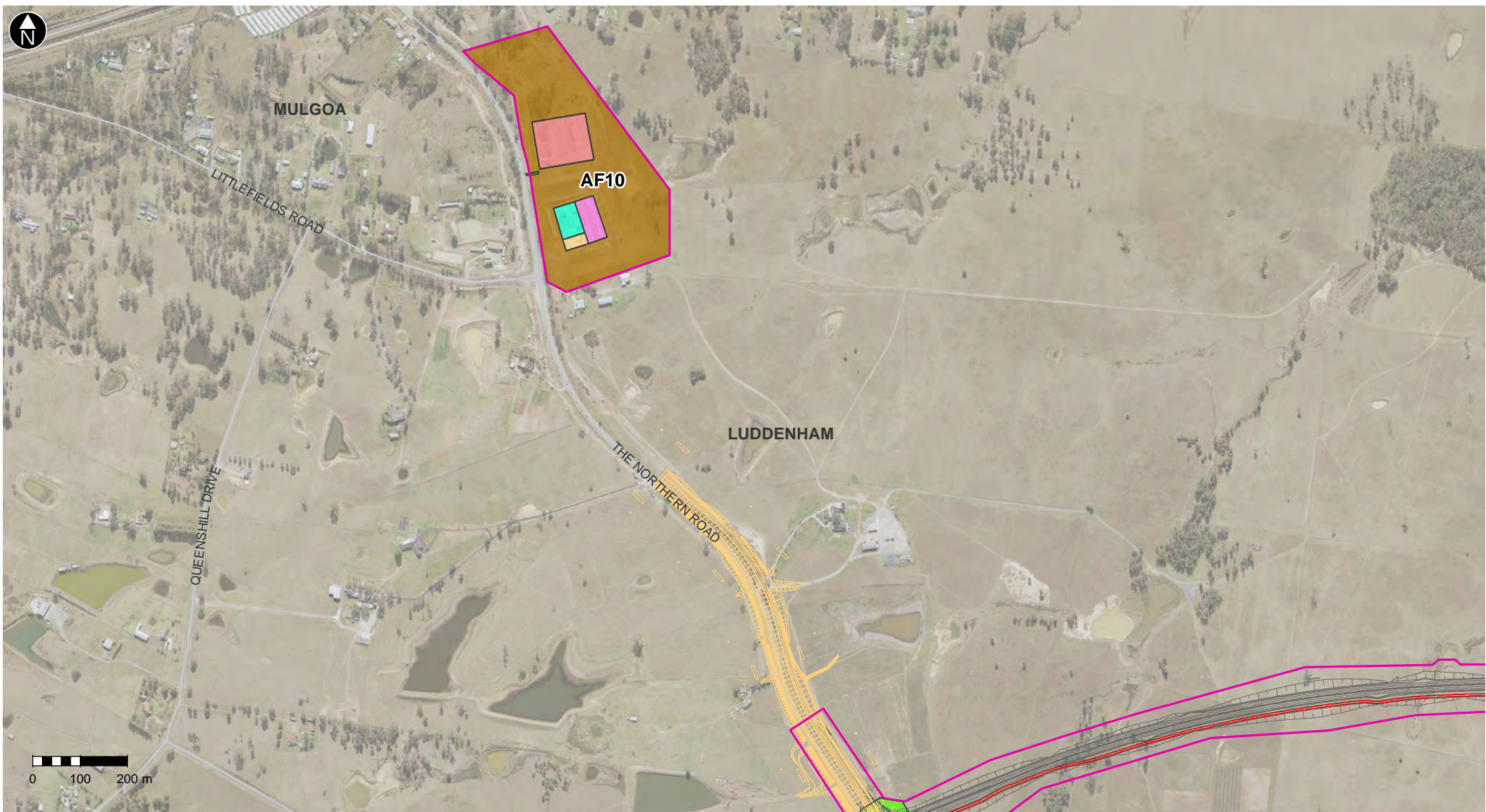


Figure 4-1 Location of ancillary facilities as described in the EIS and proposed additional and amended ancillary facilities



- | | | |
|--|---------------------------------|--|
| The amended project construction footprint | Amenities | Site offices |
| The amended project (option 2) | Car park | Plant servicing workshop |
| Amended project shared user path | Concrete/asphalt batching plant | Vehicular access to ancillary facilities |
| Existing roads | Stockpile and laydown area | |



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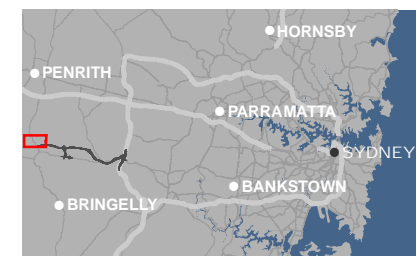


Figure 4-2 Indicative site layout of proposed ancillary facilities

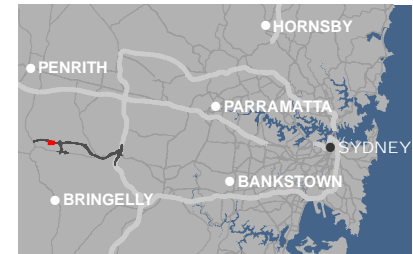
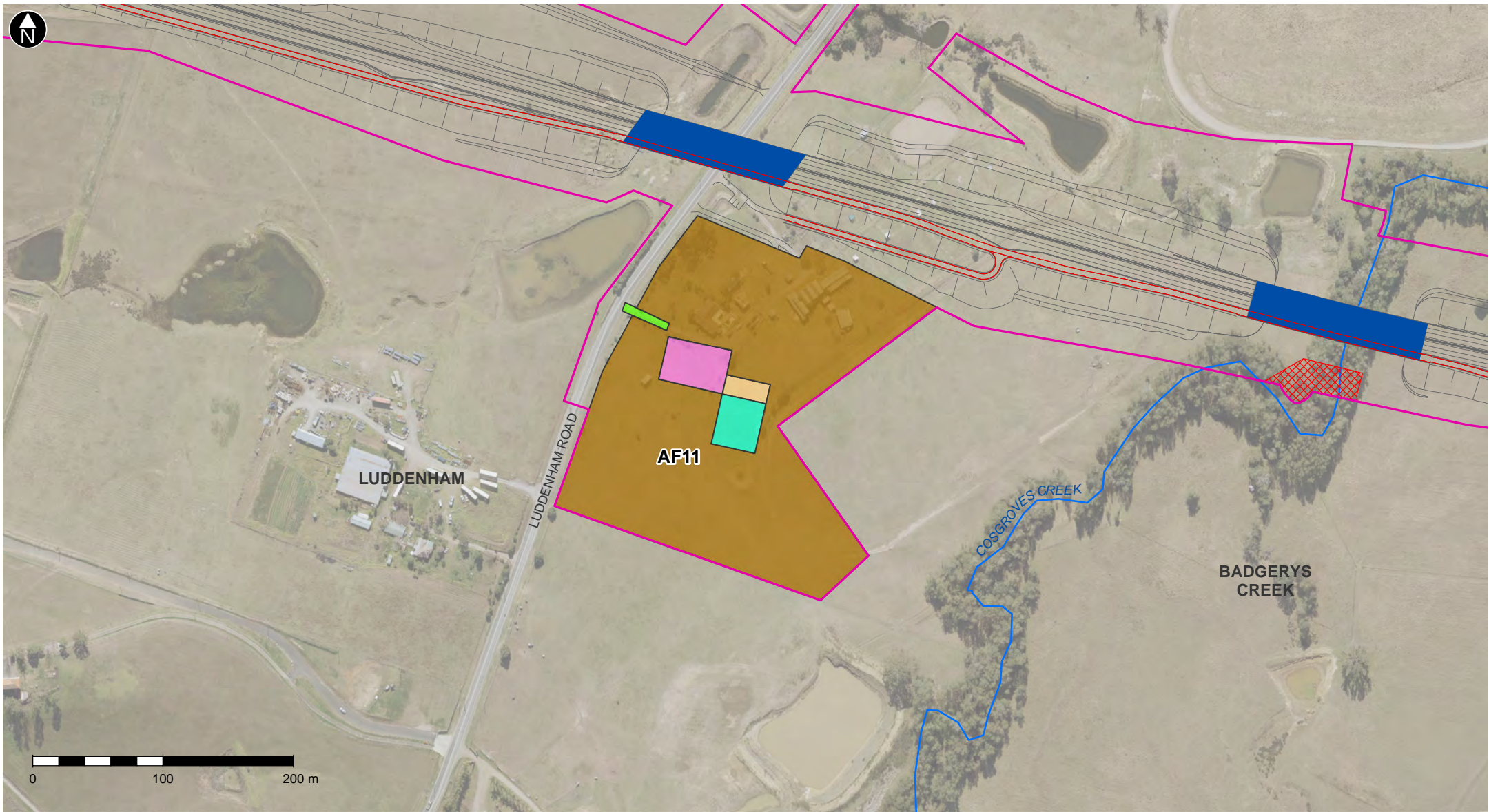
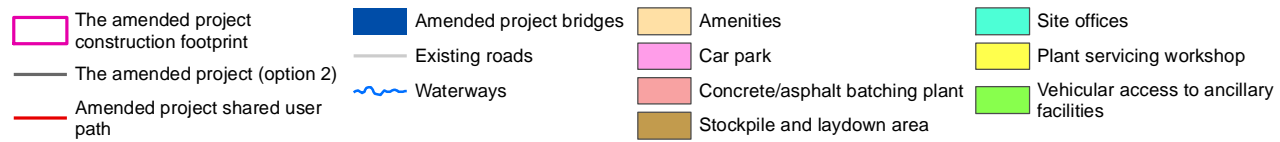
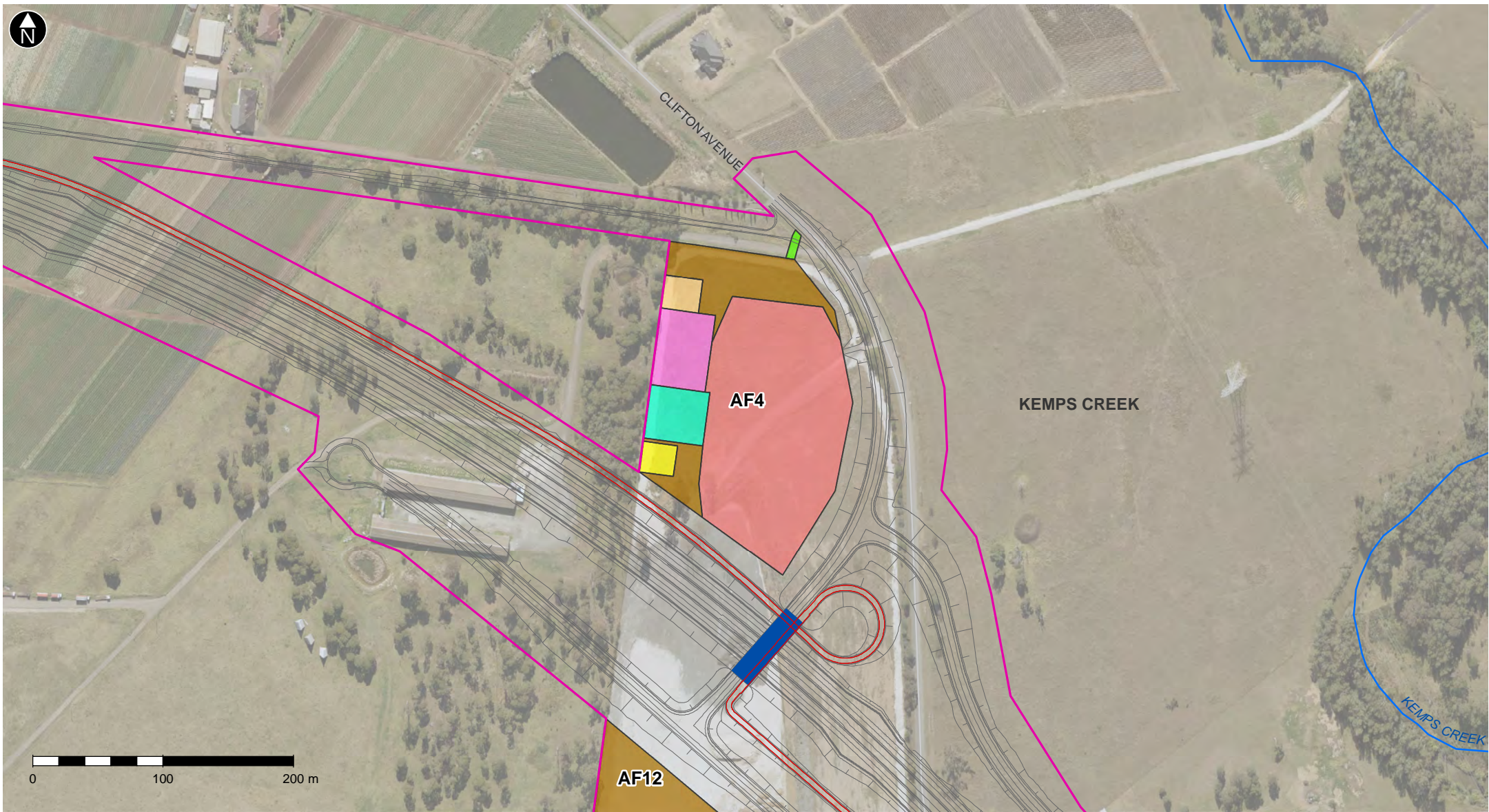


Figure 4-2 Indicative site layout of proposed ancillary facilities



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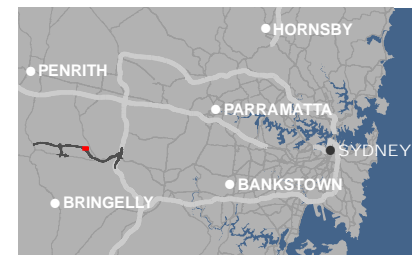
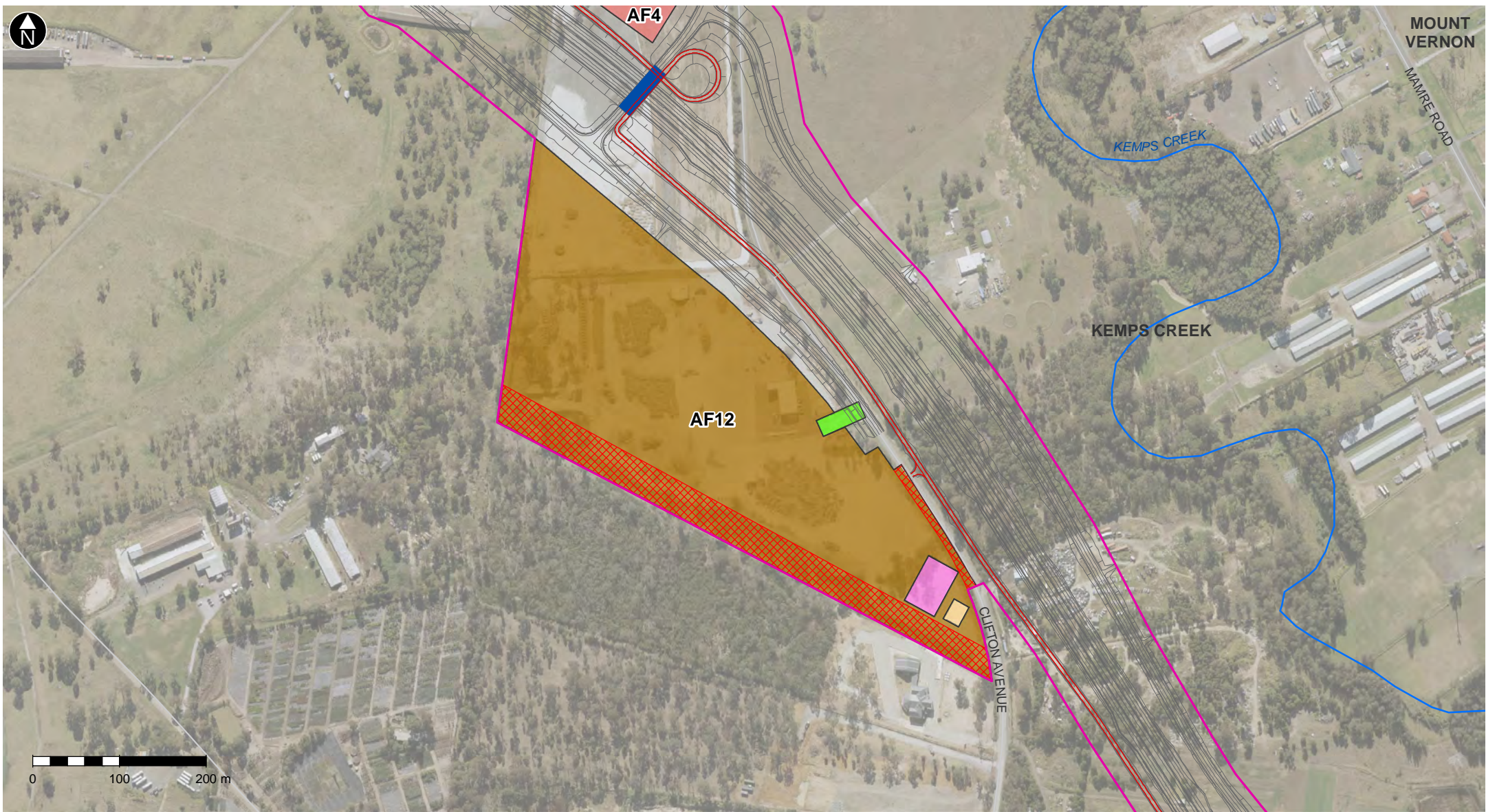


Figure 4-2 Indicative site layout of proposed ancillary facilities



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|--|-------------------------------------|---------------------------------|--|
| The amended project construction footprint | Amended project bridges | Amenities | Site offices |
| The amended project (option 2) | The amended project exclusion zones | Car park | Plant servicing workshop |
| Amended project shared user path | Existing roads | Concrete/asphalt batching plant | Vehicular access to ancillary facilities |
| Waterways | Stockpile and laydown area | | |

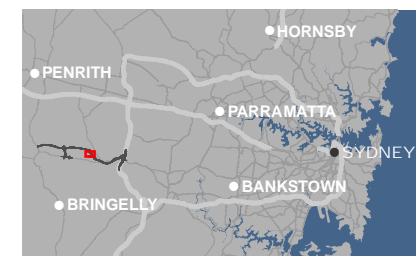
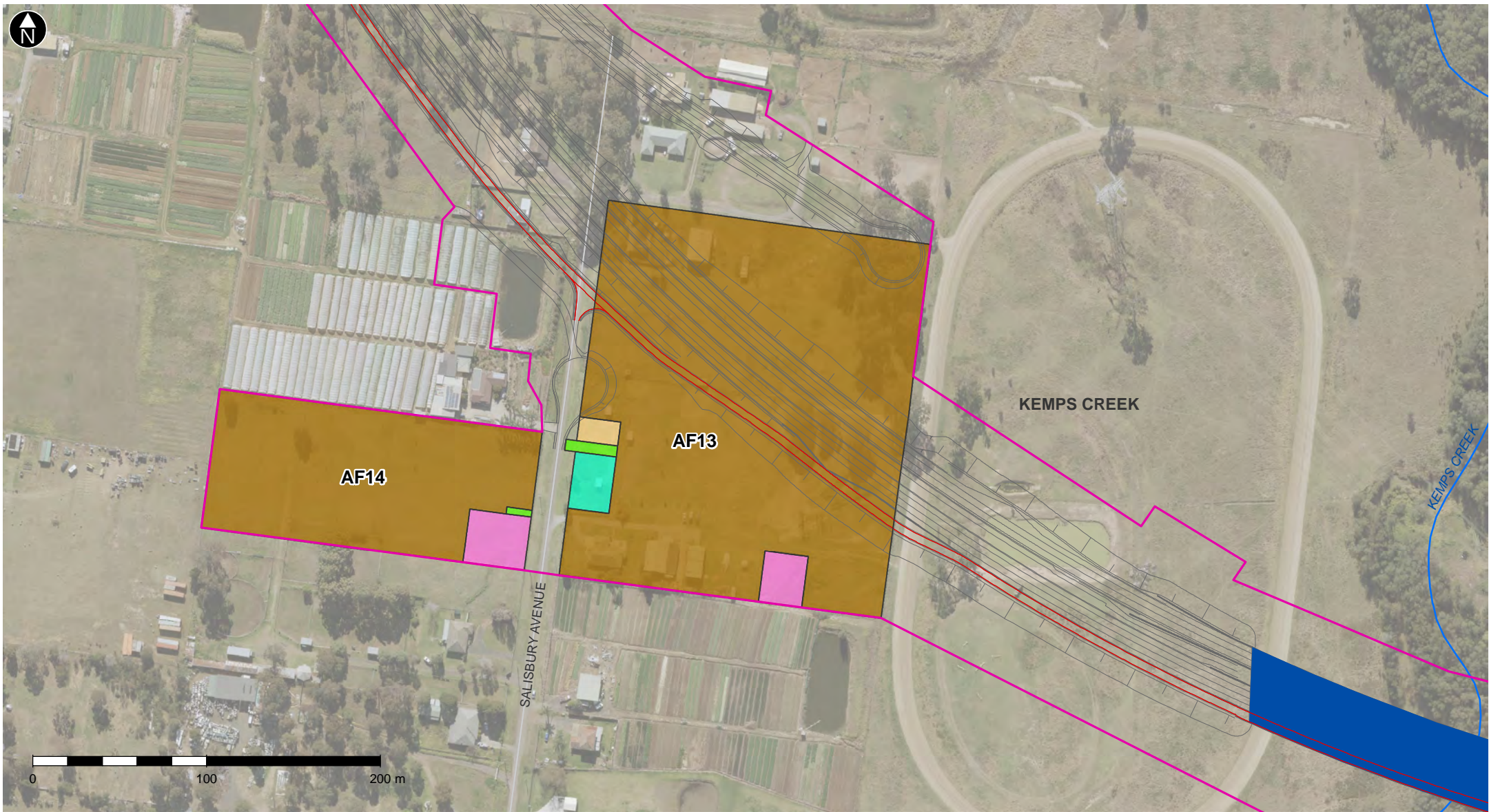


Figure 4-2 Indicative site layout of proposed ancillary facilities



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|--|-------------------------|---------------------------------|--|
| The amended project construction footprint | Amended project bridges | Amenities | Site offices |
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| Amended project shared user path | Waterways | Concrete/asphalt batching plant | Vehicular access to ancillary facilities |
| | | Stockpile and laydown area | |

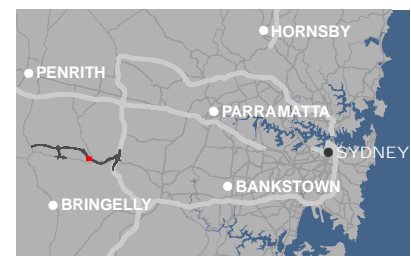
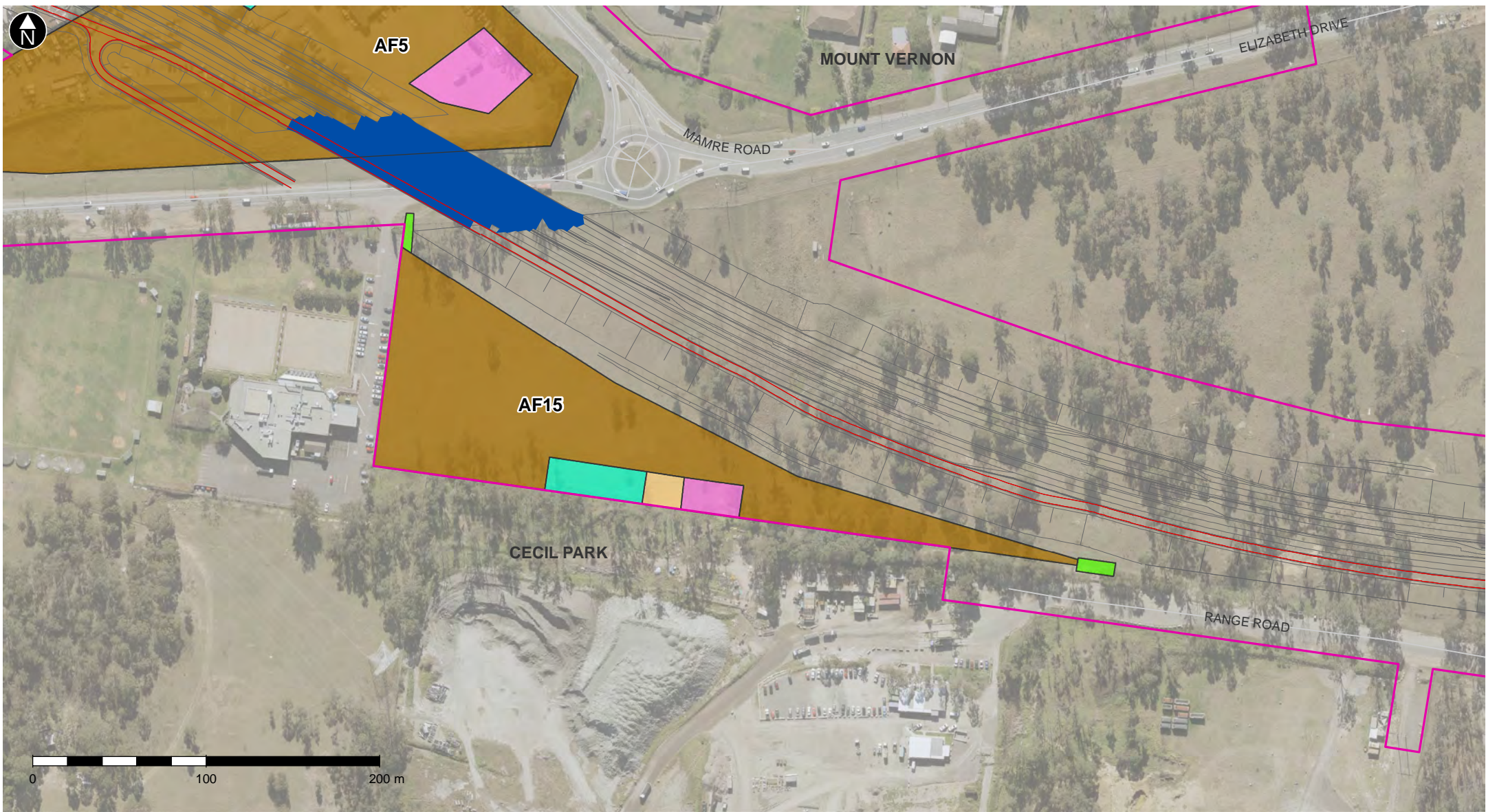


Figure 4-2 Indicative site layout of proposed ancillary facilities



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|--|-------------------------|---------------------------------|--|
| The amended project construction footprint | Amended project bridges | Amenities | Site offices |
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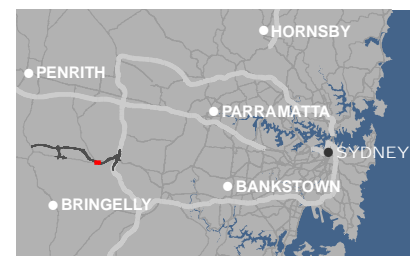


Figure 4-2 Indicative site layout of proposed ancillary facilities

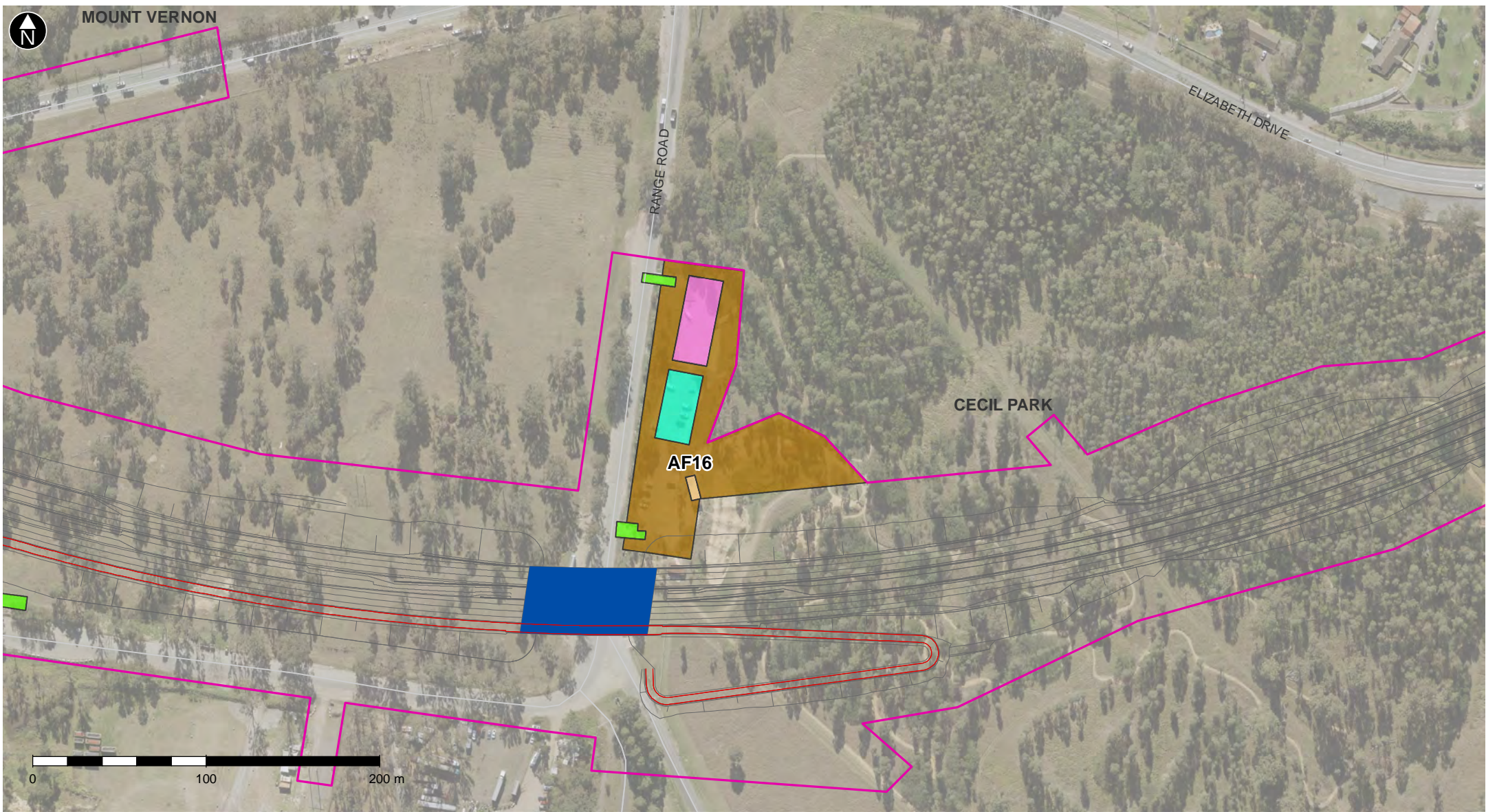
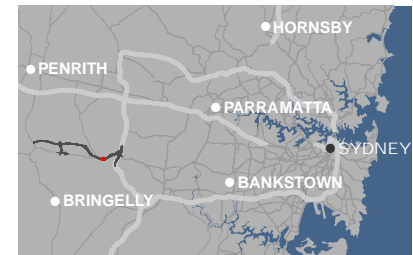


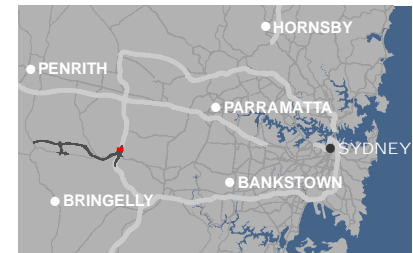
Figure 4-2 Indicative site layout of proposed ancillary facilities





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|--|-------------------------------------|---------------------------------|--|
| The amended project construction footprint | Amended project bridges | Amenities | Site offices |
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Figure 4-2 Indicative site layout of proposed ancillary facilities





- | | | | |
|--|-------------------------|---------------------------------|--|
| The amended project construction footprint | Amended project bridges | Amenities | Site offices |
| The amended project (option 2) | Existing roads | Car park | Plant servicing workshop |
| Amended project shared user path | | Concrete/asphalt batching plant | Vehicular access to ancillary facilities |
| | | Stockpile and laydown area | |

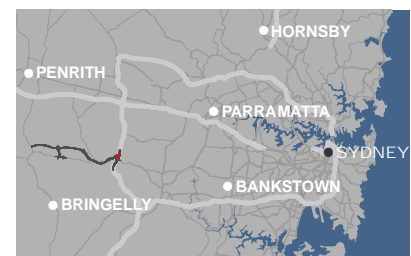
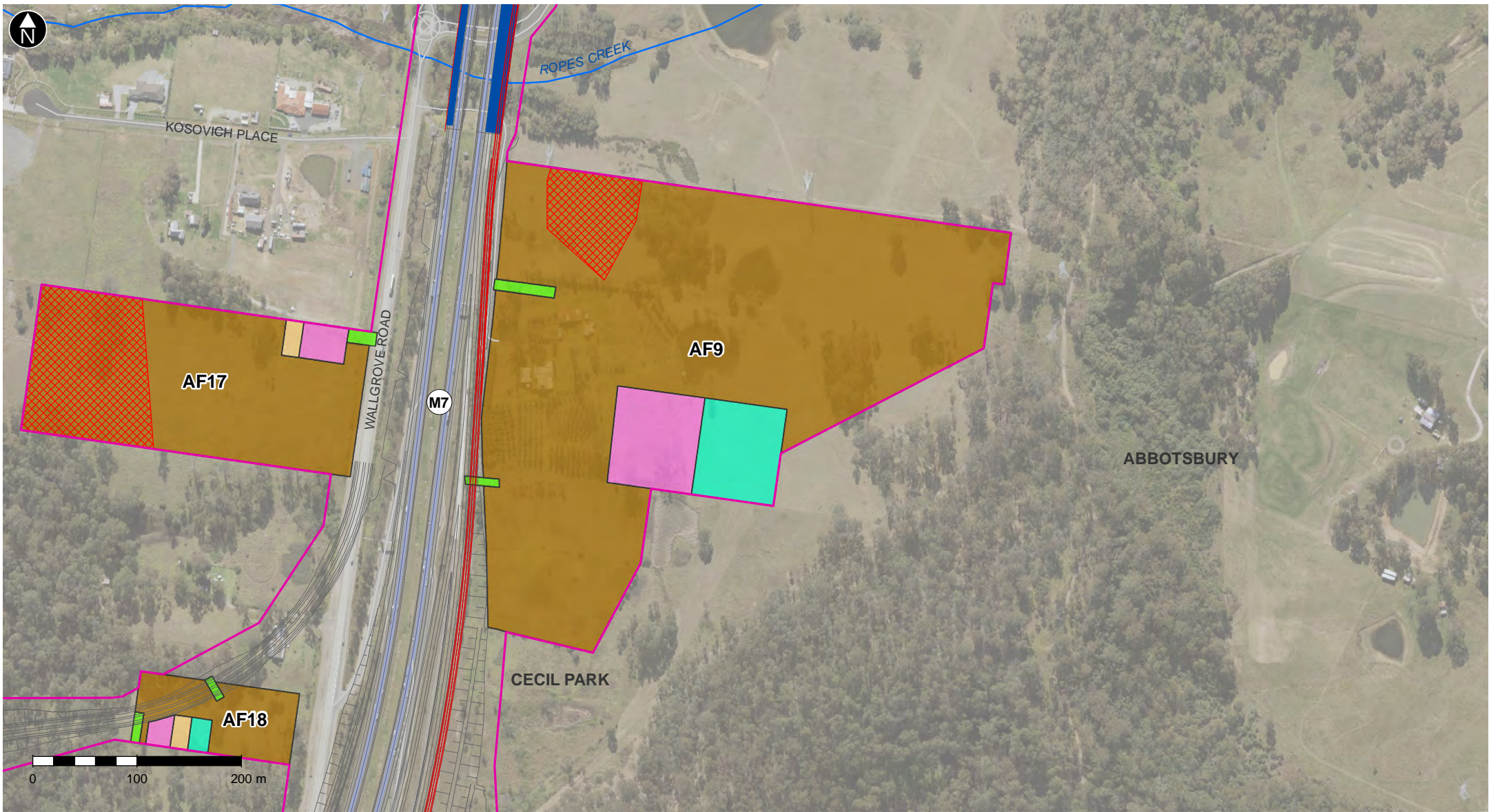


Figure 4-2 Indicative site layout of proposed ancillary facilities



- | | | | |
|--|-------------------------------------|---------------------------------|--|
| The amended project construction footprint | Amended project bridges | Amenities | Site offices |
| The amended project (option 2) | The amended project exclusion zones | Car park | Plant servicing workshop |
| Amended project shared user path | Existing roads | Concrete/asphalt batching plant | Vehicular access to ancillary facilities |
| Waterways | Stockpile and laydown area | | |

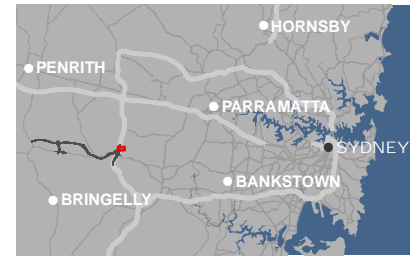


Figure 4-2 Indicative site layout of proposed ancillary facilities

Table 4-2 Environmental considerations when selecting amended or additional ancillary facilities

Consideration	Expanded AF 9	AF 10	AF 11	AF 12	AF 13	AF 14	AF 15	AF 16	AF 17	AF 18
Located more than 50 metres from a waterway	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Located within or next to land where the project is being carried out	Y	N Currently established AF for The Northern Road upgrade project; located along The Northern Road at Luddenham	Y	Y	Y	Y	Y	Y	Y	Y
Ready access to the road network	Y	Y	Y	Y	Y	Y	N Access would be provided through the project construction footprint	Y	Y	Y
Located to minimise the need for heavy vehicles to travel through residential areas	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Sited on relatively level land	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

Consideration	Expanded AF 9	AF 10	AF 11	AF 12	AF 13	AF 14	AF 15	AF 16	AF 17	AF 18
Separated from nearest residences by at least 200 metres (or at least 300 metres for a temporary batching plant)	N	N	N	N	N	N	Y	Y	N	Y
Not requiring vegetation clearing beyond that already required by the project	N	Y	N	Y Biodiversity exclusion zone located within this AF	Y TEC located within this AF	N	N	N	N	N Threatened species located within this AF
Avoiding and minimising impact on heritage items (including areas of archaeological sensitivity)	Y Aboriginal heritage exclusion zone located within this AF	Y	N	Y	Y	Y	Y	Y	Y Aboriginal heritage exclusion zone located within this AF	Y
Not unreasonably affecting the land use of nearby properties	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

Consideration	Expanded AF 9	AF 10	AF 11	AF 12	AF 13	AF 14	AF 15	AF 16	AF 17	AF 18
Above the 20-year ARI (five per cent AEP) flood level unless a contingency plan to manage flooding is prepared and implemented	N	N	Y	Y	Y	Y	Y	Y	N	N

It is noted that AF 12 contains a biodiversity exclusion area. This area is a restricted conservation area identified under the DA14/0024.01 Modification of Consent Conditions at 90-145 Clifton Avenue, Kemps Creek (Lot 3 DP 812284). The conservation area is subject to a section 88B restriction of the *Conveyancing Act 1919* (NSW). No project-related activities would take place within the exclusion area.

In addition, AF 9 and AF 17 would include Aboriginal heritage exclusion zones as determined by the Aboriginal heritage assessment described in **Section 6.5**. No project-related activities would take place within those exclusion areas.

4.2 Other changes

4.2.1 Amended earthworks quantities

Changes to the approximate total bulk earthwork quantities are described in **Table 4-3**. The spoil management approaches described in Section 5.24.5 of the EIS would not be altered, and material excavated during project earthworks would be reused in construction where possible. Potential for spoil reuse would be confirmed during detailed design.

The approximate total bulk earthwork quantities described in the EIS (see Section 5.24.5 of the EIS) included only the earthworks associated with the M12 Motorway. It did not include the earthworks associated with proposed local road changes and upgrades. These quantities have been revised to include the proposed local road changes and updates and are provided in **Table 4-3**. These quantities are shown alongside the total bulk earthwork quantities for the amended project, incorporating both the M12 Motorway and local roads. **Table 4-3** also provides the change between the project as described in the EIS and the amended project.

Table 4-3 Amended approximate total bulk earthwork quantities

Type of material	Approximate quantity (cubic metres)			
	Project as per EIS (M12 Motorway only)	Project as per EIS (M12 Motorway and local roads)	Amended project (M12 Motorway and local roads)	Change between EIS and amended project (M12 Motorway and local roads)
Total fill material required	3,128,000	3,589,000	3,322,000	-267,000 (Decrease)
Total cut material to be excavated	1,396,000	1,410,000	2,144,000	734,000
Total fill deficit ¹ to be imported	1,732,000	2,179,000	1,178,000	-1,001,000 (Decrease)
Topsoil (balance)	182,000 ²	209,000	271,000	62,000
Selected material zone (SMZ) (import)	127,000	150,000	194,000	44,000
Pavement (import)	200,000	231,000	290,000	59,000

¹ Total fill material minus total cut material

² This was incorrectly stated in the EIS as 1,820,000 cubic metres.

4.2.2 Amended drainage works

The amended project would impact one additional farm dam that would be located within the amended construction and operational footprints (see **Figure 4-3**). As a result, a total of up to 16 farm dams may require de-watering and either full or partial infilling to construct the amended project.

4.2.3 Additional temporary leases for ancillary facilities

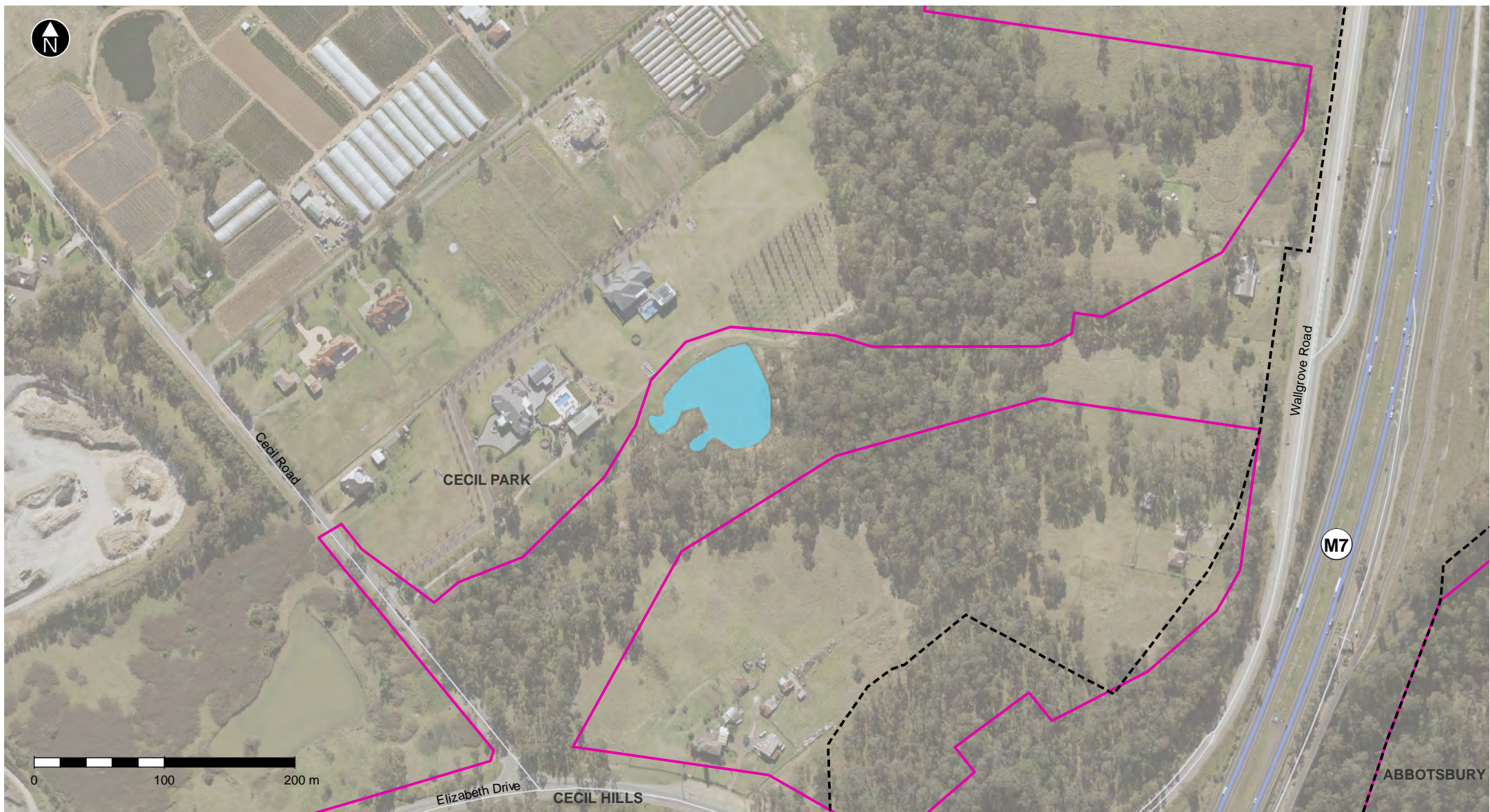
As described in **Section 4.1.2**, nine additional ancillary facilities, as well as the expansion of AF 9, would be required to support the construction of the proposed changes described throughout **Chapter 3**. Two properties used for additional ancillary facilities will not be leases as land for AF 11 has already been acquired by TfNSW and land for AF 13 will be acquired by TfNSW following landholder consultation. As a result, an additional three properties would need to be leased during construction (see **Table 4-4** and **Section 3.3.5**). Properties impacted in relation to the construction footprint of the amended project are presented in **Figure 6-24**, while properties impacted in relation to the operational footprint of the amended project are shown in **Figure 6-25**.

In addition the temporary lease of AF 9 would comprise a larger area of the total property. AF 10 is an existing construction ancillary facility for Stages 5 and 6 of The Northern Road upgrade project. As such, the property on which AF 10 is located is already being leased by TfNSW. This lease would be extended as a result of the amended project in consultation with the landowner.

The number and location of leases would be confirmed during detailed design and in consultation with property owners.

Table 4-4 Potential additional properties subject to temporary leases during construction

Construction ancillary facility	Property ID	Lots subject to temporary lease (lot/deposited plan)	Existing land use
AF 9 and AF 16	38	Lot 58 DP1110579 Lot 59 DP1110579 Lot 11 DP1021940 Lot 12 DP1021940 Lot 13 DP1021940 Lot 14 DP1022954	Wylde Mountain Bike Trail and other recreation uses, International Shooting Centre, car parking area, vegetated areas
AF 10	2	Lot 1 DP1240402 Lot 2 DP1240402	Construction ancillary facility for Stages 5 and 6 of The Northern Road upgrade works
AF 12	13	Lot 47 DP734584 Lot 3 DP812284	Commercial
AF 14	23	Lot 33 DP2566	Rural/agriculture
AF 15	37	Lot 7 DP1054778 Lot 8 DP1054778 Lot 9 DP1054778	Rural/agriculture
AF 17 and AF 18	44	Lot 26B DP387529 Lot 24 DP1152887	Rural/agriculture



- The project construction footprint as per the EIS
- Additional farm dam to be impacted
- The amended project construction footprint
- Motorway
- Existing roads

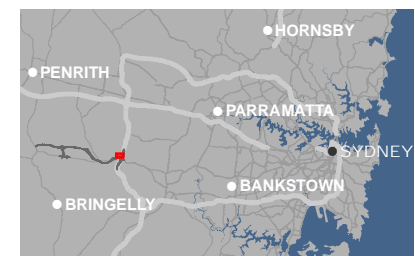


Figure 4-3 Additional farm dam to be impacted as part of amended project

4.2.4 Out-of-hours work

As a result of the proposed changes described in **Chapter 3**, TfNSW is also proposing to be able to carry out works at four of the construction ancillary facilities 24 hours a day, seven days per week, in addition to the extended construction hours proposed in Section 5.24.15 of the EIS. The construction ancillary facilities that may require out-of-hours work include:

- AF 2
- AF 6
- AF 7
- AF 9.

The works that would be carried out outside of standard working hours during the 24-hour period would be consistent with those listed in Section 5.24.16 of the EIS. In addition, TfNSW is proposing to include the following activities:

- Stockpiling of soil within ancillary facilities
- Deliveries of concrete to the ancillary facilities.
- Deliveries of large prefabricated material (eg bridge girders).

It is noted that these activities are indicative only, and would be subject to confirmation following construction methodologies being developed by the construction contractor. No concrete batching activities or crushing, grinding and screening activities would be undertaken at any ancillary facility outside of standard working hours.

The 24-hour operation would allow the project to take advantage of opportunities to transfer high quality spoil from transport tunnelling projects in the Sydney area. These other projects often operate a 24-hour construction program. This would reduce costs for the project and would provide increased opportunities for recycling and, as such, would improve sustainability outcomes. Deliveries of large items out of hours would also reduce impacts on the wider traffic network by the operation of wide and oversized vehicles.

4.2.5 Amended construction access

Access to ancillary facilities AF 1 to AF 9 would remain unchanged for the amended project to what was described in the EIS. In order to access the additional ancillary facilities described in **Section 4.1.2**, namely AF 10 to AF 18, additional construction access would be required as described in **Table 4-5**. The access points to the additional and amended construction ancillary facilities are shown in **Figure 4-2**. No other construction access as described in the EIS would be altered as a result of the amended project.

Table 4-5 Additional construction access to ancillary facilities

Ancillary facility	Access
AF 10	Access from The Northern Road, via the existing ancillary facility access point
AF 11	Access from Luddenham Road via an existing property access
AF 12	Access via Clifton Avenue via an existing property access
AF 13	Access via Salisbury Avenue via an existing property access

Ancillary facility	Access
AF 14	Access via Salisbury Avenue via an access road to be constructed
AF 15	Access via Range Road via an access road to be constructed
AF 16	Access via Range Road via an existing access to the carpark of the Wylde Mountain Bike Trail
AF 17	Access via Wallgrove Road via an access point to be constructed
AF 18	Access along the proposed project alignment Vehicles would enter AF 17 and travel through the amended construction footprint to AF 18

4.2.6 Amended haulage routes and heavy vehicle movements

In order to transport materials to the amended construction footprint and access the additional ancillary facilities described in **Section 4.1.2**, three additional haulage routes would be required. These are described in **Table 4-6** and **Figure 4-4**.

Other haulage arrangements at key locations as described in the EIS would not be altered as a result of the amended project.

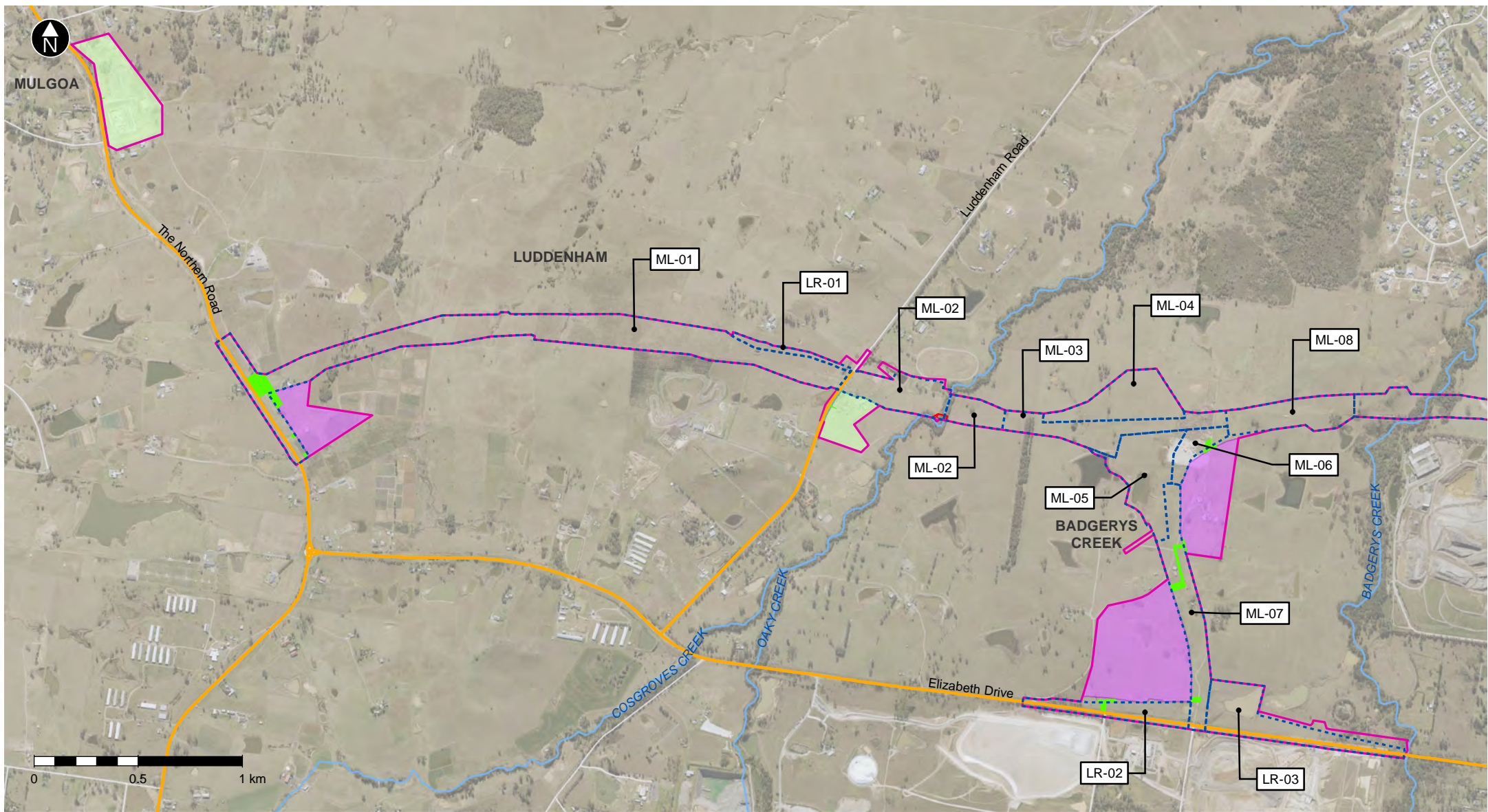
Table 4-6 Additional haulage arrangements at key locations within the construction footprint ¹

Key location	Haulage arrangements
Wallgrove Road	Wallgrove Road would be used as a haulage route to access the amended AF 9
Salisbury Avenue	Salisbury Avenue would be used as a haulage route to access the amended construction footprint via AF 13 and AF 14
Luddenham Road	Luddenham Road to Elizabeth Drive would be used as a haulage route to access AF 11

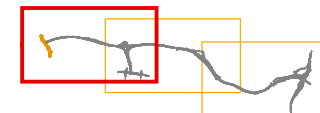
¹ While The Northern Road was not stated as a haulage route in Table 5-20 of the EIS, it was identified as a haulage route in Figure 5-24 of the EIS and assessed in Section 7.2 and Appendix F of the EIS. As a result, it is not considered an additional haulage route for the amended project

Amended haulage routes and predicted truck movements outside the construction footprint for option 1 and option 2 are described in **Table 4-7**. As described in **Section 3.1.2**, option 2 would provide a direct connection between the M12 Motorway and Elizabeth Drive at the motorway-to-motorway interchange at the M7 Motorway, as shown in **Figure 3-3**.

The construction of the amended project would result in an average of 229 truck movements per day. This is an increase of about 15 truck movements per day from the project as described in the EIS. This number would be consistent between option 1 and option 2 of the amended project.



- | | | |
|--|--|----------------|
| The amended project construction footprint | Haulage routes | Waterways |
| Ancillary facilities as per the EIS | Work zones | Motorway |
| Additional ancillary facilities | Vehicular access to ancillary facilities | Existing roads |
| The amended project exclusion zones | | |



Page 1 of 3

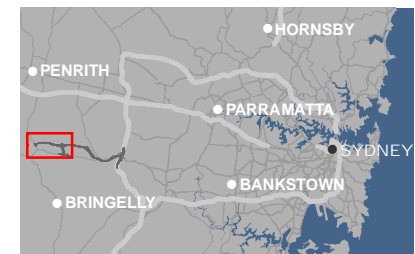
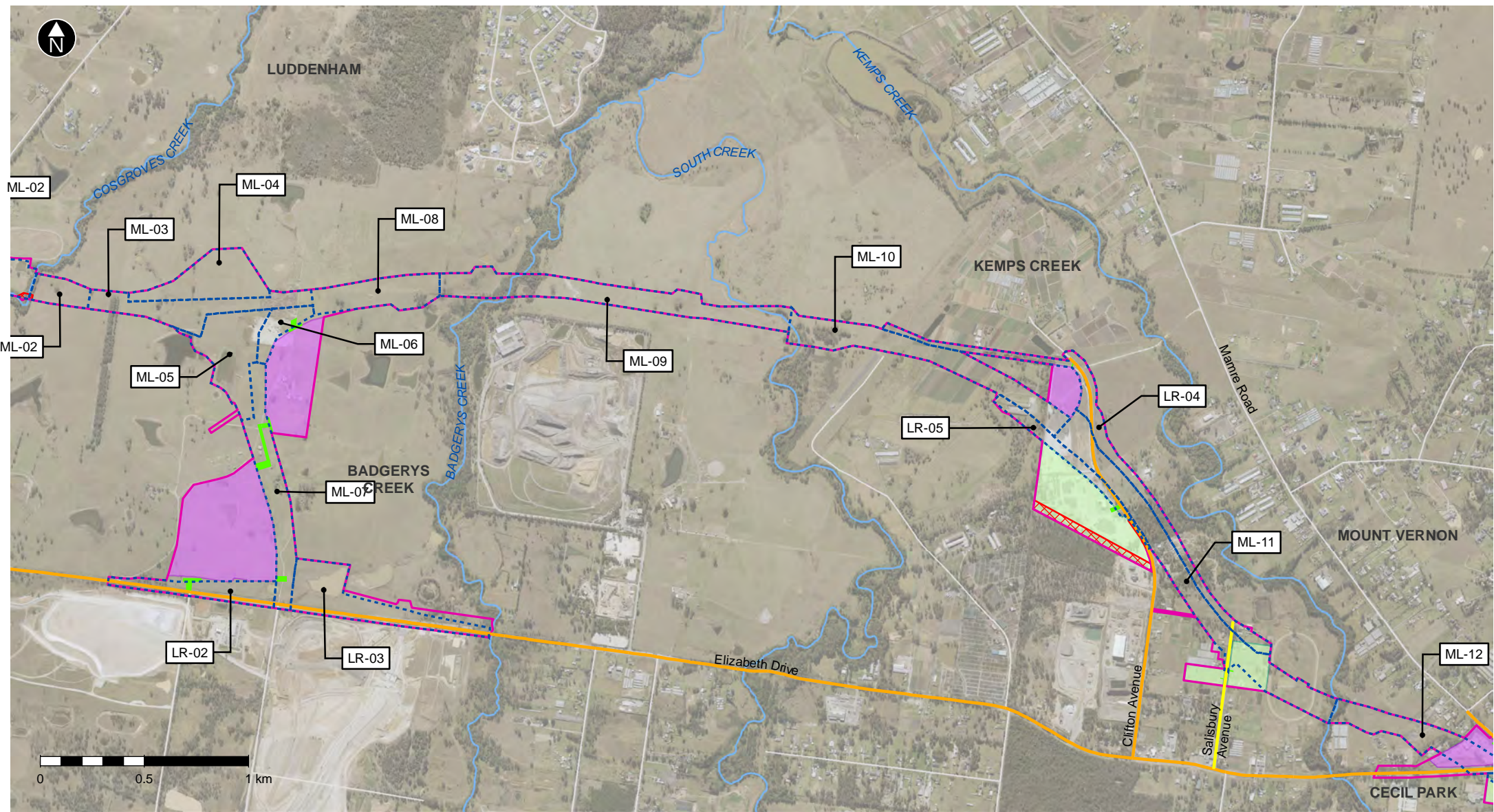
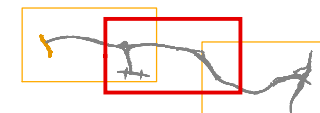


Figure 4-4 Amended haulage arrangements



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| The amended project construction footprint | Haulage routes | Waterways |
| Ancillary facilities as per the EIS | Amended project haulage route | Motorway |
| Additional ancillary facilities | Work zones | Existing roads |
| The amended project exclusion zones | Vehicular access to ancillary facilities | |



Page 2 of 3

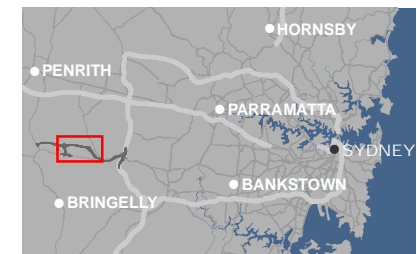
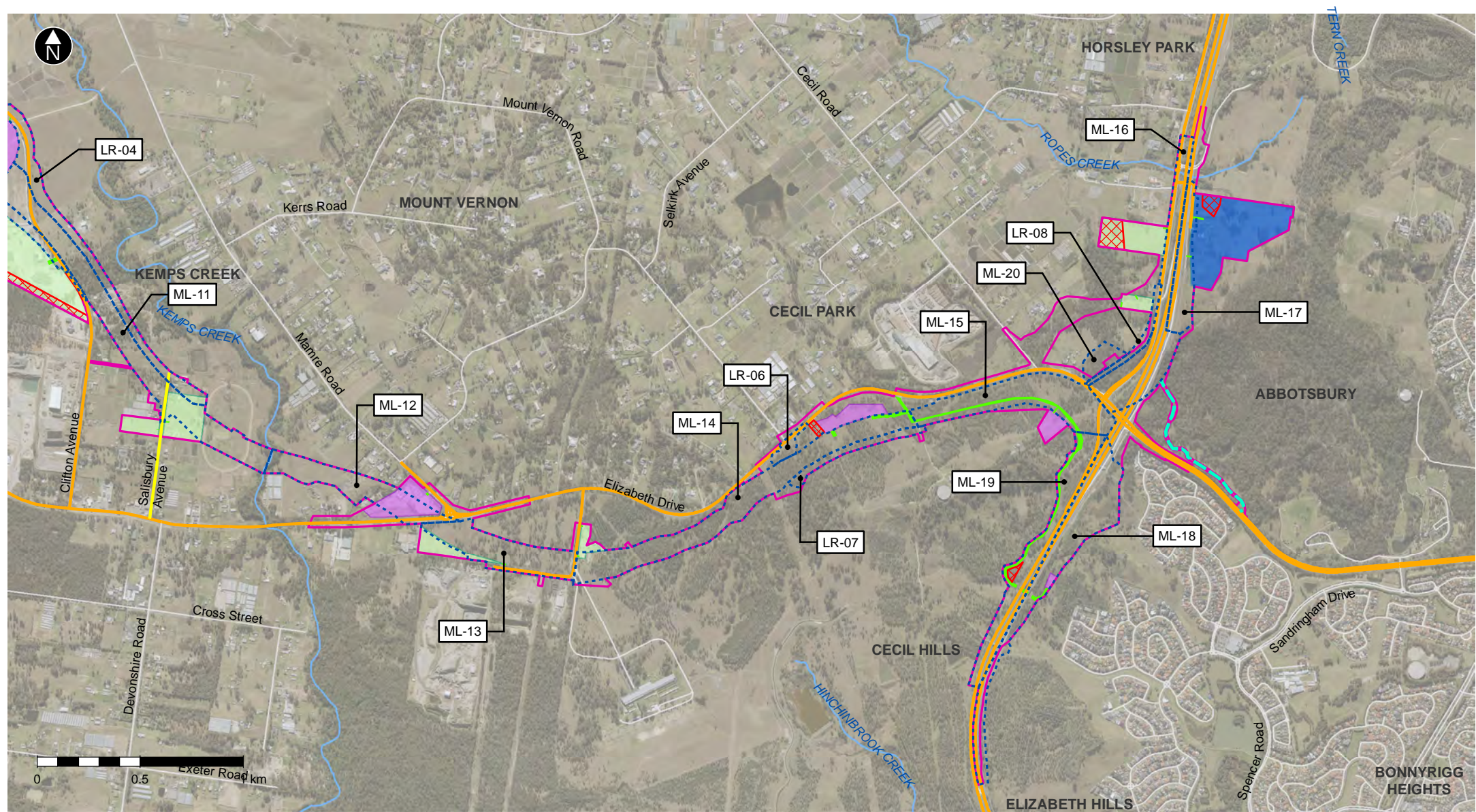
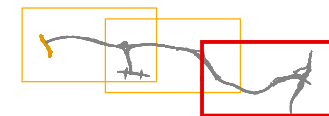


Figure 4-4 Amended haulage arrangements



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|--|---|----------------|
| The amended project construction footprint | Haulage routes | Waterways |
| Ancillary facilities as per the EIS | Amended project haulage route | Motorway |
| Additional ancillary facilities | Temporary haulage route for bridge construction | Existing roads |
| Amended ancillary facilities | Work zones | |
| The amended project exclusion zones | Vehicular access to ancillary facilities | |



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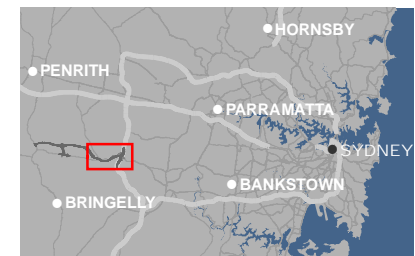


Figure 4-4 Amended haulage arrangements

Table 4-7 Amended key haulage routes and predicted truck movements outside the construction footprint

Project as per EIS				Amended project				
Haulage Routes	Site access via	Work zone and location	Approximate total truck movements	Haulage Routes	Site access via	Work zone and location	Approximate total truck movements	
							Option 1	Option 2
M7 Motorway, Elizabeth Drive and The Northern Road	AF 1	ML-01 The Northern Road to Luddenham Road	7,856	M7 Motorway, Elizabeth Drive and The Northern Road	AF 1 (and AF 10)	ML-01 The Northern Road to Luddenham Road	16,671	16,671
		ML-02 Luddenham Road to South Creek bridge						
-	-	-	-	M7 Motorway, Elizabeth Drive, The Northern Road, and Luddenham Road	AF 11	ML-02 Luddenham Road to Cosgroves Creek bridge	18,566	18,566
						LR-01 Luddenham Road's private access driveway		

Project as per EIS				Amended project				
Haulage Routes	Site access via	Work zone and location	Approximate total truck movements	Haulage Routes	Site access via	Work zone and location	Approximate total truck movements	
							Option 1	Option 2
M7 Motorway and Elizabeth Drive	AF 2 (and AF 3)	ML-03, ML-05, ML-06, ML-08 South Creek bridge to Badgerys Creek	83,065	M7 Motorway and Elizabeth Drive	AF 2 (and AF 3)	ML-03, ML-05, ML-06, ML-08 Cosgroves Creek bridge to Badgerys Creek	30,124	30,124
		ML-04 Airport interchange north of the M12 Motorway main line				ML-04 Airport interchange north of the M12 Motorway main line		
		ML-07 Western Sydney International Airport access road				ML-07 Western Sydney International Airport access road		
		LR-02 Elizabeth Drive, west of the Western Sydney International Airport access road				LR-02 Elizabeth Drive, west of the Western Sydney International Airport access road		
		LR-03 Elizabeth Drive, east of the Western Sydney International Airport access road				LR-03 Elizabeth Drive, east of the Western Sydney International Airport access road		
		ML-09 Badgerys Creek to South Creek bridge				ML-09 Badgerys Creek to South Creek bridge		

Project as per EIS				Amended project				
Haulage Routes	Site access via	Work zone and location	Approximate total truck movements	Haulage Routes	Site access via	Work zone and location	Approximate total truck movements	
							Option 1	Option 2
M7 Motorway, Elizabeth Drive and Clifton Avenue	AF 4	ML-10 South Creek bridge to Clifton Avenue	12,893	M7 Motorway, Elizabeth Drive and Clifton Avenue	AF 4 (and AF 12)	ML-10 South Creek bridge to Clifton Avenue	20,095	20,095
		LR-04 Clifton Avenue north of the M12 Motorway main line				LR-04 Clifton Avenue north of the M12 Motorway main line		
		LR-05 Clifton Avenue south of the M12 Motorway main line				LR-05 Clifton Avenue south of the M12 Motorway main line		
		ML-11 Clifton Avenue to Kemps Creek		M7 Motorway, Elizabeth Drive and Salisbury Avenue	AF 13 (and AF 14)	ML-11 Clifton Avenue to Kemps Creek	9,293	9,293
M7 Motorway, Elizabeth Drive and Mamre Road	AF 5	ML-12 Kemps Creek to Elizabeth Drive	3,805	M7 Motorway, Elizabeth Drive and Mamre Road	AF 5	ML-12 Kemps Creek to Elizabeth Drive	3,811	3,811

Project as per EIS				Amended project				
Haulage Routes	Site access via	Work zone and location	Approximate total truck movements	Haulage Routes	Site access via	Work zone and location	Approximate total truck movements	
							Option 1	Option 2
M7 Motorway, Elizabeth Drive and Range Road	Range Road	ML-13 Elizabeth Drive to Range Road	26,498	M7 Motorway, Elizabeth Drive and Range Road	AF 15	ML-13 Elizabeth Drive to Range Road	26,506	26,506
	-	-	-		AF 16	ML-14 Range Road to existing utility access road	1,140	1,140
M7 Motorway and Elizabeth Drive	AF 6	ML-14 Range Road to existing utility access road	16,074	M7 Motorway and Elizabeth Drive	AF 6	-	-	-
		ML-15 Existing utility access road to M7 interchange ramp bridges				ML-15 Existing utility access road to M7 interchange ramp bridges	6,891	5,587
		ML-19 M7 Motorway northbound exit ramp				-		
		ML-18 M7 Motorway southbound entry ramp				-		

Project as per EIS				Amended project				
Haulage Routes	Site access via	Work zone and location	Approximate total truck movements	Haulage Routes	Site access via	Work zone and location	Approximate total truck movements	
							Option 1	Option 2
<i>M7 Motorway and Elizabeth Drive continued...</i>		-		<i>M7 Motorway and Elizabeth Drive continued...</i>		LR-06 Western Sydney Parklands Utility access road to the north	-	-
		-				LR-07 Western Sydney Parklands Utility access road to the south	-	-
M7 Motorway, Elizabeth Drive, Wallgrove Road and the existing M7 Motorway underpass opposite Kosovich Place	AF 9	ML-17 M7 Motorway southbound exit ramp	4,567	-	-	-	-	-

Project as per EIS				Amended project				
Haulage Routes	Site access via	Work zone and location	Approximate total truck movements	Haulage Routes	Site access via	Work zone and location	Approximate total truck movements	
							Option 1	Option 2
M7 Motorway and Elizabeth Drive	Wallgrove Road	ML-16 M7 Motorway northbound entry ramp	9,244	M7 Motorway and Elizabeth Drive	AF 7 (and AF 8)	ML-16 M12 Motorway Westbound Entry Ramp from Elizabeth Drive bridge to the M7 Motorway Northbound Exit Ramp to Elizabeth Drive	7,038	6,353
		LR-08 Wallgrove Road				-		
		ML-20 Wallgrove Road G-loop ramp				-		
		-				ML-17 M7 Motorway Northbound Exit Ramp to Elizabeth Drive M7 Motorway Southbound Entry Ramp from the M12 Motorway and Elizabeth Drive		
		-				M7 Motorway Southbound Entry Ramp from the M12 Motorway and Elizabeth Drive		

Project as per EIS				Amended project				
Haulage Routes	Site access via	Work zone and location	Approximate total truck movements	Haulage Routes	Site access via	Work zone and location	Approximate total truck movements	
							Option 1	Option 2
<i>M7 Motorway and Elizabeth Drive continued</i>		-		<i>M7 Motorway and Elizabeth Drive continued</i>		ML-19 M7 Motorway Northbound Exit Ramp to the M12 Motorway Westbound		
						ML-21 M7 Motorway Northbound Exit Ramp to Elizabeth Drive		
-	-	-	-	M7 Motorway, Elizabeth Drive, Wallgrove Road and the existing M7 Motorway underpass opposite Kosovich Place	AF 9	ML-23 M7 Motorway Southbound Exit Ramp to the M12 Motorway Westbound	10,299	10,299
						ML-24 M7 Motorway Interchange - M7 Motorway Southbound Exit Ramp to Elizabeth Drive		

Project as per EIS				Amended project				
Haulage Routes	Site access via	Work zone and location	Approximate total truck movements	Haulage Routes	Site access via	Work zone and location	Approximate total truck movements	
							Option 1	Option 2
-	-	-	-	M7 Motorway, Elizabeth Drive and Wallgrove Road	AF 17 (and AF 18)	ML-22 M7 Motorway Northbound Entry Ramp from the M12 Motorway and Elizabeth Drive	14,645	16,657
		-				LR-09 Elizabeth Drive East to Bridge over M12 Motorway Eastbound Exit Ramp to Elizabeth Drive		
		-				LR-10 Cecil Road and roundabout at Wallgrove Road Intersection		
		-				LR-11 Wallgrove Road Realignment		
Total			164,002	Total			165,079	165,102

4.2.7 Amended construction materials

The construction of the amended project would continue to use the range of materials and pre-cast elements described in Section 5.24.18 of the EIS. However, as a result of the proposed changes associated with the amended project, the estimated total water use during construction would be amended as described in **Table 4-8**. The total water use during construction of the amended project would be 822 megalitres, 146 megalitres more than that estimated for the project as described in the EIS. Consistent with the project as described in the EIS, construction water sources would be confirmed during detailed design. These are likely to include a combination of potable mains supply and recycled water, drawn from sources internal and external to the amended construction footprint.

Table 4-8 Amended estimated water use during construction

Construction activity	Water use volume (megalitres)		
	As described in the EIS	Amended project	Change in water use
Dust suppression	270	320	50
Earthworks compaction	270	320	50
Concrete/asphalt batching plants for pavements	38	46	8
Potable water at main ancillary facility	10	10	0
Potable water at outpost sites (eight sites)	16	32	16
Concrete batching plants for bridges	63	76	13
Wheel washing (nine sites)	9	18	9
Total	676	822	146

4.2.8 Amended construction program

As a result of the change in construction contracts, an amended indicative construction program is proposed which allows certain construction activities to begin earlier. This is shown in

Figure 4-5, with amendments shown in grey.

The project may be delivered in stages under multiple contracts, with the priority being to deliver the connection between the M7 Motorway and the Western Sydney International Airport prior to the Airport opening in 2026.

It is noted that the proposed construction schedule would be subject to change, and that the construction program is anticipated to apply to both option 1 and option 2.

Construction activity	M12 Indicative construction program																			
	2022				2023				2024				2025				2026			
Mobilisation/ Site compounds/ Early works																				
Property adjustments																				
Utilities relocation																				
Fencing																				
Demolition/Clearing																				
Bulk earthworks																				
Bridge works																				
Drainage																				
Pavements																				
Barriers																				
Landscaping																				
Intelligent transport systems																				
Lighting																				
Signage																				
Decommission ancillary facilities																				



Construction program as presented in the EIS



Amendments to the construction program

Figure 4-5 Amended construction program

4.3 Amended construction footprint

4.3.1 Project as described in the EIS

The construction footprint is the total area required to construct the project. The construction footprint is generally broader than the operational footprint, and includes those areas required for roadworks, bridge works, access for construction vehicles and plant, drainage infrastructure, temporary sediment basins, utilities and services adjustments, temporary stockpiles, property adjustments and temporary construction ancillary facilities.

The construction footprint as described in the EIS, including ancillary facilities, would comprise about 354¹ hectares. The construction footprint as described in the EIS is shown in **Figure 4-6**.

4.3.2 Proposed change

As a result of the proposed changes described in **Chapter 3**, it is proposed to amend the construction footprint to:

- Accommodate the updated construction requirements of the proposed design changes described throughout **Chapter 3**
- Include the additional ancillary facilities described in **Section 4.1**
- Include the full extent of buildings and dams that would be impacted by the project. The construction footprint as described in the EIS included only the partial extents of buildings and dams that would be directly impacted by the project. This has been updated to account for the full extent of this impact.

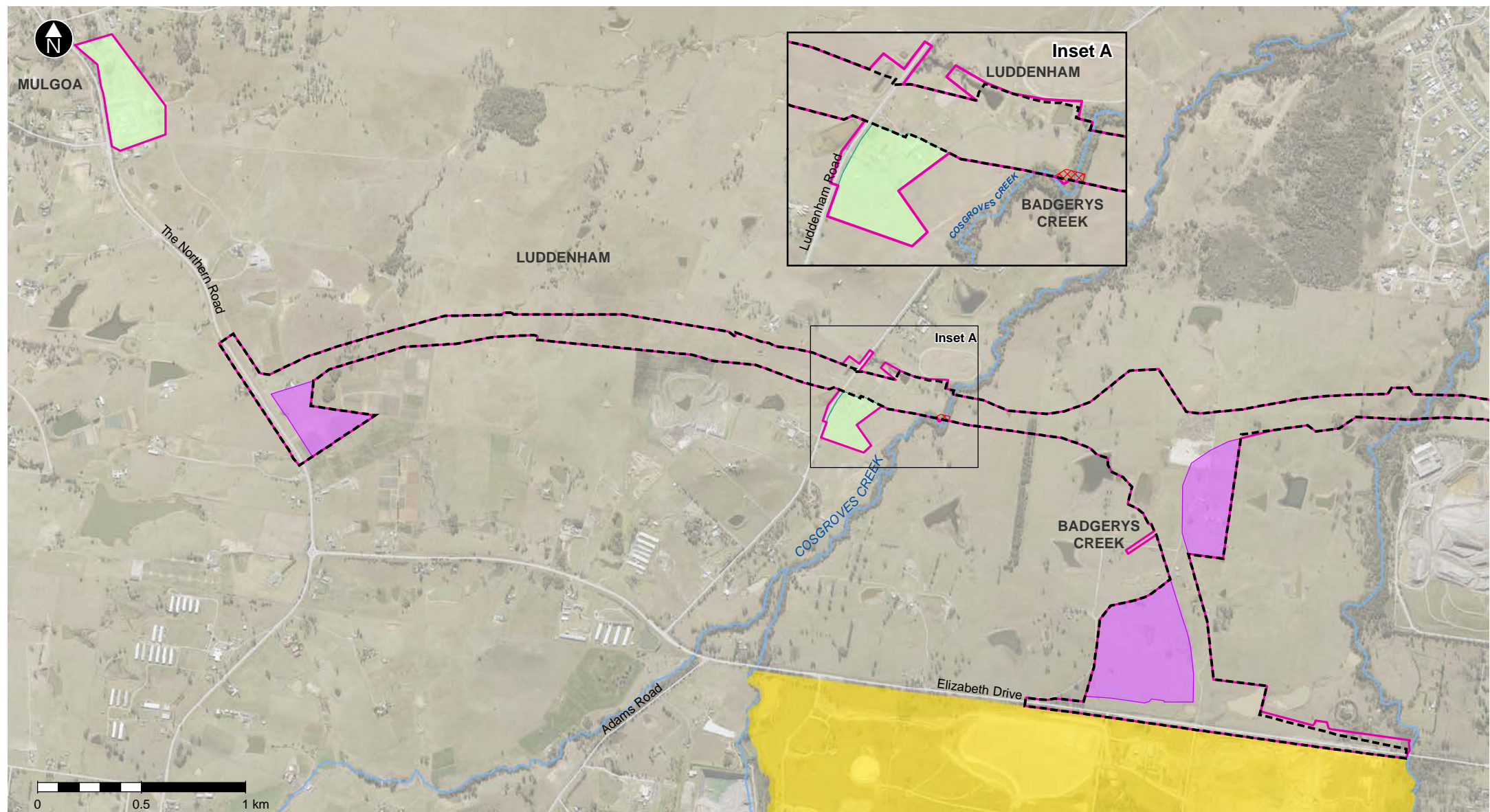
This updated footprint is referred to as the amended construction footprint. A comparison of the amended construction footprint and the construction footprint as described in the EIS, is shown in **Figure 4-6**. Where relevant, and as discussed throughout Chapter 6 and the appendices to this amendment report, the amended construction footprint has been used as a basis for the environmental assessment of the amended project. The amended construction footprint would comprise about 441 hectares, which is about 87 hectares larger than the project construction footprint as described in the EIS.

Where sensitive environmental constraints fall within the amended construction footprint, environmental protection exclusion zones would be established. These exclusion zones would ensure that these areas will be protected for the duration of construction. **Table 4-9** describes the exclusion zones within the amended construction footprint. It also shows whether these exclusion zones have been amended from those described in Section 5.24.1 of the EIS. In summary, there would be six exclusion zones, three of which would be additional to those described in the EIS and one of which would be amended from that described within the EIS. These exclusion zones are shown within **Figure 4-6**.

¹ This number was incorrectly stated in the EIS as 350 hectares.

Table 4-9 Exclusion zones within the amended construction footprint

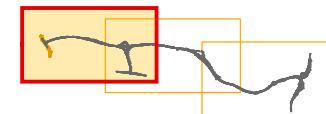
Exclusion zone location	Reason for exclusion	Change from the EIS
Immediately east of AF 11	Avoid construction activity close to Cosgroves Creek	Exclusion zone previously described in the EIS
Within AF 12	Avoid the restricted conservation area identified under the DA14/0024.01 Modification of Consent Conditions at 90-145 Clifton Avenue, Kemps Creek (Lot 3 DP812284	Exclusion zone additional to those described in the EIS
Immediately west of AF 6	Avoid impacts to utilities	Exclusion zone previously described in the EIS, amended as a result of the amended project
Immediately west of AF 8	Limit impacts to vegetation within the Western Sydney Parklands	Exclusion zone previously described in the EIS
Within AF 17	Avoid impacts to Aboriginal heritage	Exclusion zone additional to those described in the EIS
Within AF 9	Avoid impacts to Aboriginal heritage	Exclusion zone additional to those described in the EIS



- The project construction footprint as per the EIS
- The amended project construction footprint
- The amended project exclusion zones

- Ancillary facilities as per the EIS
- Amended ancillary facilities
- Western Sydney International Airport

- ~ Waterways
- Existing roads



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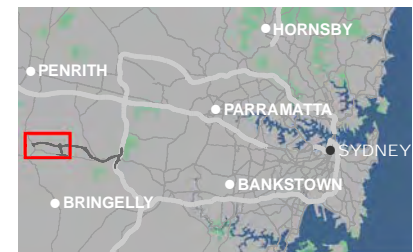
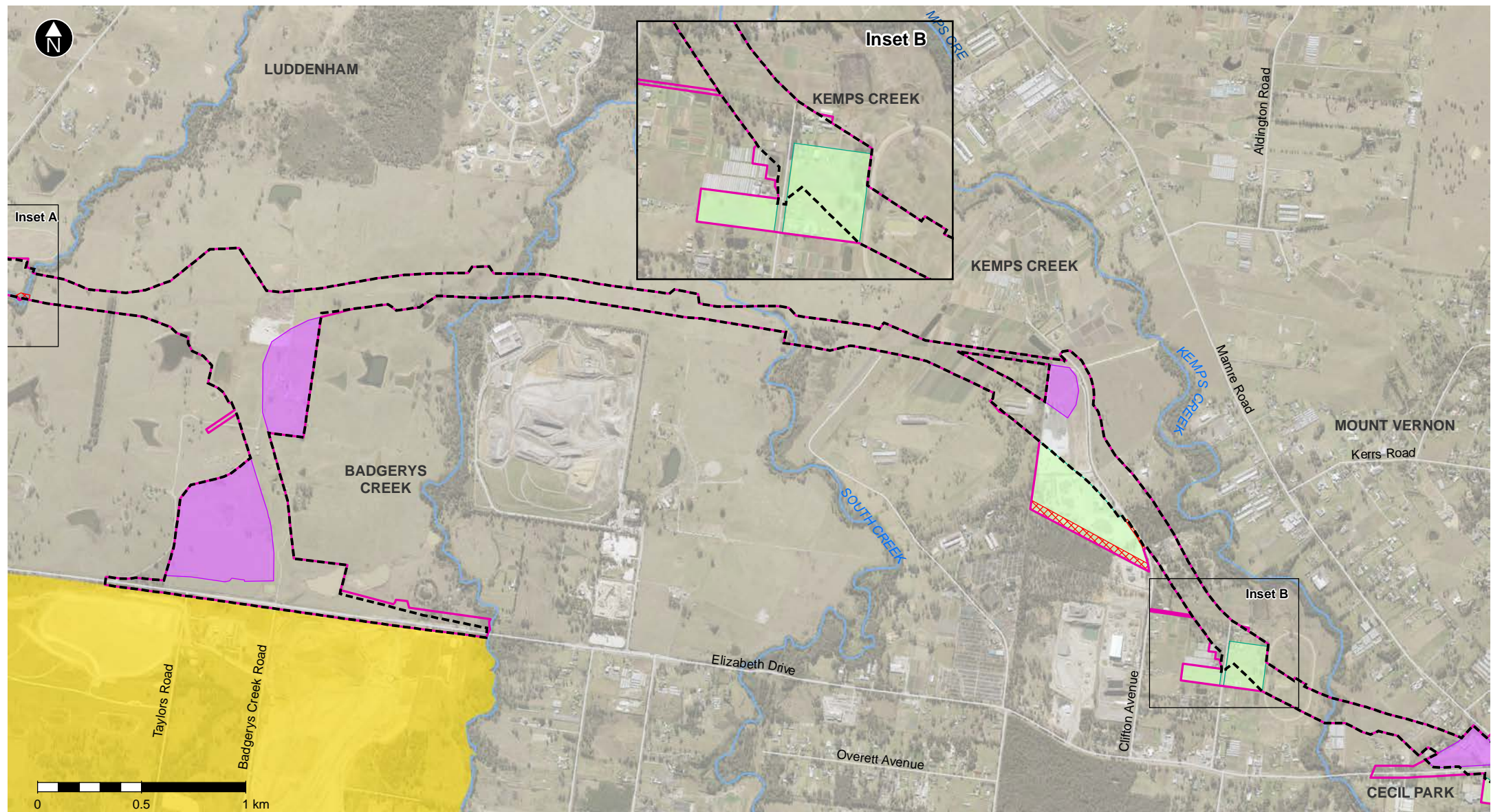
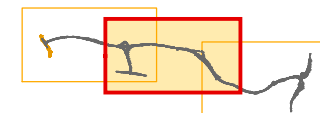


Figure 4-6 Amended construction footprint



- The project construction footprint as per the EIS
- The amended project construction footprint
- The amended project exclusion zones
- Ancillary facilities as per the EIS
- Amended ancillary facilities
- Western Sydney International Airport

- Waterways
- Existing roads



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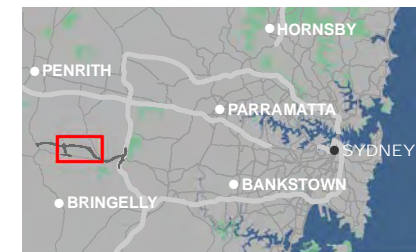
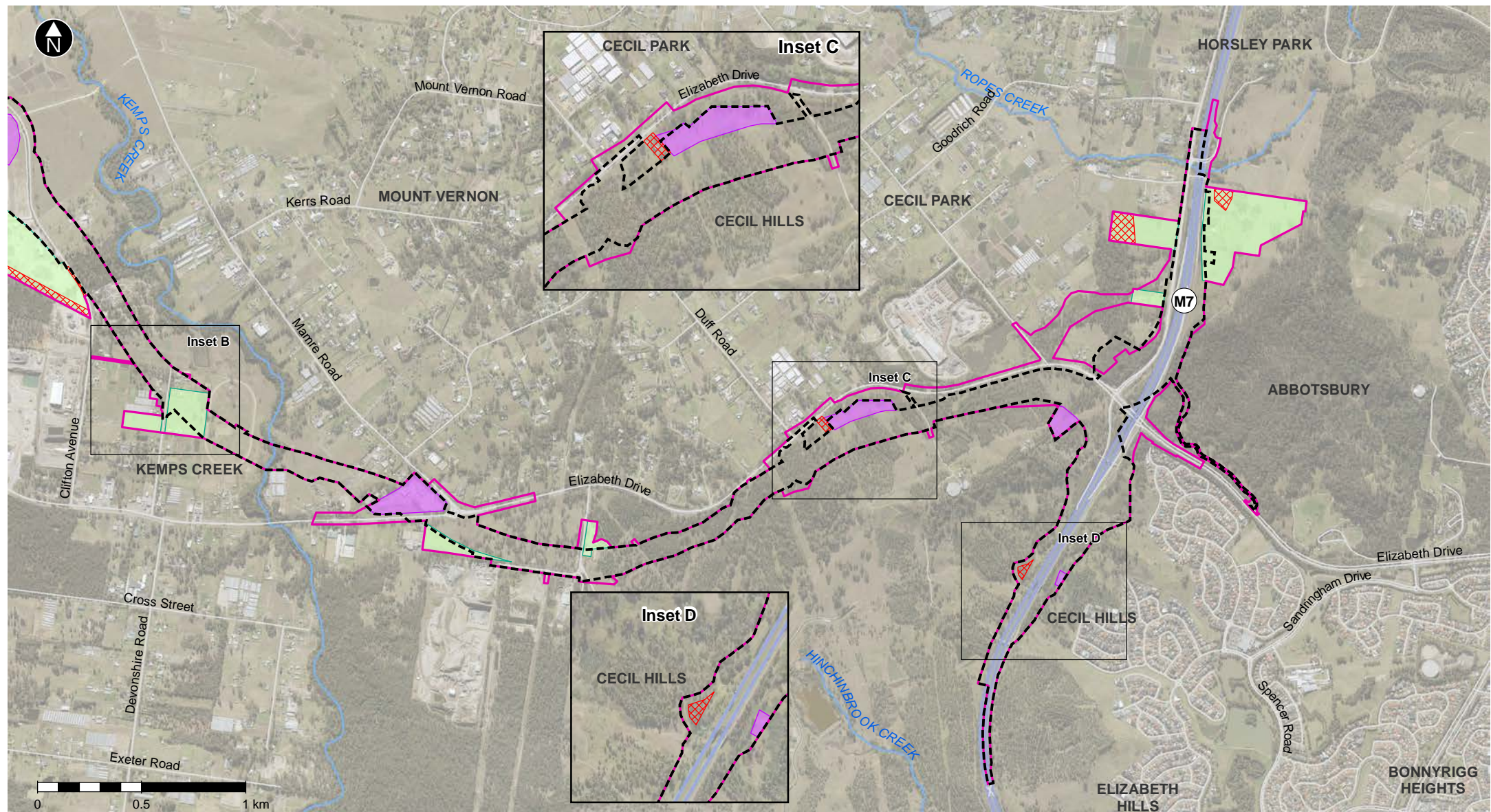
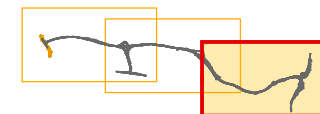


Figure 4-6 Amended construction footprint



- The project construction footprint as per the EIS
- The amended project construction footprint
- The amended project exclusion zones

- Ancillary facilities as per the EIS
- Amended ancillary facilities
- ~~~~~ Waterways
- Existing roads



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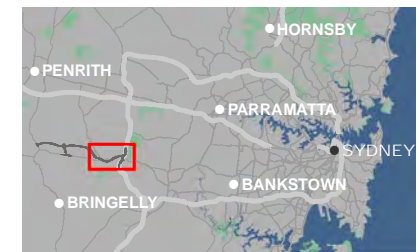


Figure 4-6 Amended construction footprint

5 Consultation

Chapter 6 of the EIS described the consultation that was carried out prior to the exhibition of the EIS.

This chapter provides a summary of the consultation that has been carried out following the exhibition of the EIS with a focus on the proposed changes described in **Chapter 3** and construction updates outlined in **Chapter 4**. It also summarises the ongoing engagement with Western Sydney Parklands, government agencies and utility and service providers. The consultation carried out is in accordance with the SEARS and consistent with the consultation guidelines outlined in Section 6.1 of the EIS.

A number of consultation activities were carried out with a range of stakeholders including the local community, directly impacted landowners and residents, government agencies, local government authorities, utility and service providers, Aboriginal stakeholders and business and industry stakeholders.

Key consultation activities have been carried out with the following stakeholders:

- Western Sydney Parklands Trust to discuss acquisition, progress of the delivery of the new Wylde Mountain Bike Trail (MBT), progress of the Mirror Dam cycleway concept design and collaborative community consultation event for the Wylde MBT
- Landowners and residents directly impacted by the project regarding property adjustment plans, and ongoing investigations including geotechnical investigations and cadastral surveys
- WSA Co in relation to ongoing construction developments onsite, road impacts during airport construction and general information sharing
- Regular liaison with Westlink M7 Motorway to discuss technical matters in relation to the M12 Motorway to M7 Motorway interchange design, arranging technical workshops to discuss potential traffic impacts to the M7 Motorway
- Regular liaison with Sydney Metro regarding Sydney Metro – Western Sydney Airport, including discussions of technical matters in relation to the interface of the M12 Motorway and the Sydney Metro – Western Sydney Airport and general information sharing
- Western Sydney Planning Partnership via regular meetings to discuss the M12 Motorway project in relation to the Land Use Infrastructure and Implementation Plan (LUIIP) for the Western Sydney Aerotropolis
- Utility and service providers to construction planning and proposed changes to the project.

In addition to the above, this amendment report will be placed on exhibition for 14 days as described in **Section 1.4**. Exhibition of this amendment report will be an opportunity for all stakeholders to provide feedback on the amended project and the Secretary may require a further report to be prepared responding to any submissions received.

5.1 Community consultation

Community consultation carried out prior to and during preparation of the EIS is discussed in Chapter 6 of the EIS. Further details of community consultation during the exhibition of the EIS are described in Section 1.3 of the submissions report.

Since the EIS exhibition, there has been no further widespread engagement activities with the wider public. Community engagement has focused on one-on-one liaison with impacted property owners and government agencies in relation to acquisition, design development and proposed changes to the project.

Aside from the collaborative public session with Western Sydney Parklands Trust at Wylde MBT on 22 February 2020 which has included press and social media promotion, further public consultation is scheduled for mid-2020 with the release of the amendment report and the submissions report.

5.2 Directly impacted landowners and residents

In addition to the land identified as being impacted by the project as described in the EIS (see Table 5-11 of the EIS), privately owned land would be impacted in order to accommodate the proposed changes of the amended project described throughout **Chapter 3**. Residents, landowners and developers who may be potentially impacted by the additional land impacts were notified via letters sent between April and May 2020. Additional consultation with directly impacted landowners and residents would be carried out as required.

A number of properties would be impacted to accommodate additional or amended ancillary facilities as described in **Section 4.1** and described in **Table 4-4**. Residents, landowners and developers who may be potentially impacted by the additional land impacts resulting from these additional or amended ancillary facilities were notified via written correspondence sent in between April and May 2020. In addition, property owners and/or residents in close proximity to ancillary facilities would also be notified in advance of any impacts via door knocking and posted material.

All acquisition required for the project would be carried out in accordance with the requirements set out in the *Land Acquisition (Just Terms Compensation) Act 1991 (NSW)* (Just Terms Act), the Land Acquisition Information Guide (NSW Government, 2014), and the land acquisition reforms announced by the NSW Government in 2016.

A TfNSW Personal Manager – Acquisition (PMA), has been assigned to the M12 Motorway and will continue to assist landowners and residents who may be affected by property impacts for the project. The PMA would continue to maintain regular contact with potentially impacted landowners and residents to provide updates on the process and respond to queries and concerns, and to work with the affected landowners and residents once acquisition requirements are confirmed to offer assistance and support through the acquisition process.

5.3 Key interface stakeholders

Consultation with key interface stakeholders is ongoing. **Table 5-1** provides a summary of the consultation activities carried out following exhibition of the EIS.

Table 5-1 Consultation with key interface stakeholders

Key interface stakeholder	Purpose of consultation	Frequency	Issues raised and where addressed
Western Sydney Parklands	Closure of the Wylde Mountain Bike Trail, new trail designs, M12 Motorway construction plans, property acquisition and installation of M12 Motorway boundary fencing	Ongoing regular interface meetings	<p><u>Issues</u></p> <p>Concern about impact of the M12 Motorway on the Western Sydney Parklands and seeking to minimise and/or mitigate impacts.</p> <p><u>Response</u></p> <p>The realignment of Wallgrove Road realignment removed the G-loop as discussed in Section 3.1.2.</p> <p>The provision of Elizabeth Drive connections as part of option 2 (with Elizabeth Drive connections) would provide improved access and connectivity to M12 Motorway near the Western Sydney Parklands entry.</p> <p>Utilising land between M12 Motorway and Elizabeth Drive and along Wallgrove Road for ancillary facilities would support the commercial needs of the Western Sydney Parklands Trust.</p> <p>Ongoing discussions have been undertaken with Western Sydney Parklands, including those regarding the design of the relocation of Wylde Mountain Bike Trails and property adjustment plans (see Section 6.4).</p>
Westlink M7	Proposed design changes and traffic and construction impacts	Ongoing regular interface meetings	<p><u>Issues</u></p> <p>Concern about impacts of construction and operation on the M7 Motorway traffic flows and existing M7 Motorway assets.</p> <p><u>Response</u></p> <p>The following design changes have been implemented to improve traffic flow along the M7 Motorway:</p> <ul style="list-style-type: none"> • Design changes to M7 Motorway exit and entry ramps to the M12 Motorway • Realignment of Wallgrove Road and addition of Elizabeth Drive connections • Changes to procurement and construction packaging have been implemented for the design and construct phase of the project to better manage of risks M7 Motorway interface risks.

Key interface stakeholder	Purpose of consultation	Frequency	Issues raised and where addressed
WSA Co	Proposed design changes, airport design progression, construction staging and general project updates and information sharing	Interface meetings held monthly	<p><u>Issues</u></p> <p>Concern about connectivity to Western Sydney International Airport from the M12 Motorway and Elizabeth Drive.</p> <p>Integration of the M12 Motorway and Western Sydney International Airport design and construction project designs.</p> <p><u>Response</u></p> <p>The amended project includes provision of intersections into Western Sydney International Airport Business Park (see Section 3.2).</p> <p>Option 2 (with Elizabeth Drive connections) provides a potential inclusion of the Elizabeth Drive connection near the M7 Motorway.</p> <p>Review of construction program and procurement strategy to improve project delivery outcomes at the interface with Western Sydney International Airport.</p>
Sydney Metro - Western Sydney Airport	Proposed design changes, Metro design progression, construction staging and general project updates and information sharing	Interface meetings held monthly	<p><u>Issues</u></p> <p>Integration of M12 Motorway and Metro design and construction work.</p> <p><u>Response</u></p> <p>Lowering of the Western Sydney International Airport access road by about eight metres to facilitate Metro design bridging over the M12 Motorway (see Section 3.3.1).</p>

5.4 Local government authorities

The amended project would be located within the following Local Government Areas (LGAs):

- Fairfield LGA (Fairfield City Council)
- Liverpool LGA (Liverpool City Council)
- Penrith LGA (Penrith City Council).

As described in **Section 3.1**, the motorway-to-motorway interchange between the M12 Motorway and the M7 Motorway would be changed as a result of the amended project. TfNSW briefed Liverpool City Council staff and community members at the Liverpool District Forum on 12 March 2020 in regard to impacts from the interchange and TfNSW's intent to refine the design.

In addition, briefings were provided to Fairfield City Council, Liverpool City Council and Penrith City Council prior to the exhibition of the amendment report and publication of the submissions report in June 2020.

5.5 Utility and service providers

Consultation with utility and service providers was carried out to further understand potential impacts to assets as a result of the project, as well as discuss project timing and requirements for adjustments and protection. Consultation with relevant utility and service providers, including the following, has been ongoing since the EIS was exhibited and would continue to be carried out as needed:

- Jemena
- Airservices Australia
- WaterNSW
- Sydney Water
- Telstra Corporation Ltd
- Optus
- Uecomm
- Transgrid
- Endeavour Energy
- NBN Co.

5.6 Aboriginal stakeholders

Aboriginal stakeholder engagement was carried out to address the requirements of the TfNSW Procedure for Aboriginal Cultural Heritage Consultation and Investigation (PACHCI) in accordance with relevant statutory requirements and Government policies, including the Aboriginal Cultural Heritage Consultation Requirements for Proponents (DECCW 2010).

The Deerubbin Local Aboriginal Land Council (LALC) was engaged in January 2020 to carry out site visits with the project archaeologist and the TfNSW Aboriginal Cultural Heritage Officer on the additional areas impacted by the proposed design and construction changes (see **Section 6.5**).

5.7 Business and industry stakeholders

In addition to the community consultation described in **Section 5.1**, consultation with business and industry stakeholders would be carried out as needed at a broad project level. In addition, business and industry stakeholders that would be impacted by additional or amended ancillary facilities are discussed in **Section 5.2**, and further detail of impacted business and industry stakeholders is described in **Section 6.4**.

6 Additional assessment

Chapter 7 of the EIS provided an assessment of the key environmental issues for the project as identified in the SEARs. These assessments were carried out on the project as described in Chapter 5 of the EIS.

The amended project, as described in **Chapter 3** and **Chapter 4**, was assessed against each of the key issues and other issues as set out in the SEARs issued for the project on 30 October 2018 by the Secretary of DPIE. A request to amend the project was submitted to DPIE on 20 May 2020. In response, DPIE confirmed on 28 May 2020 that an amendment report is appropriate to address the environmental impacts associated with the amended project. No additional or updated SEARs were issued by DPIE. This amendment report and its appendices have been prepared in accordance with the SEARs issued for the project on 30 October 2018.

This chapter provides a summary of these additional assessments. These additional assessments have been carried out to identify and assess the potential construction, operational and cumulative impacts associated with the amended project, focusing on potential changes to the expected impacts as a result of the proposed changes to the project discussed in **Chapter 3**. Where required, additional or revised environmental management measures are proposed.

These assessments are supported by detailed investigations and have been documented in the updated/supplementary technical assessment memorandums and reports in **Appendix A** to **Appendix L**.

6.1 Biodiversity

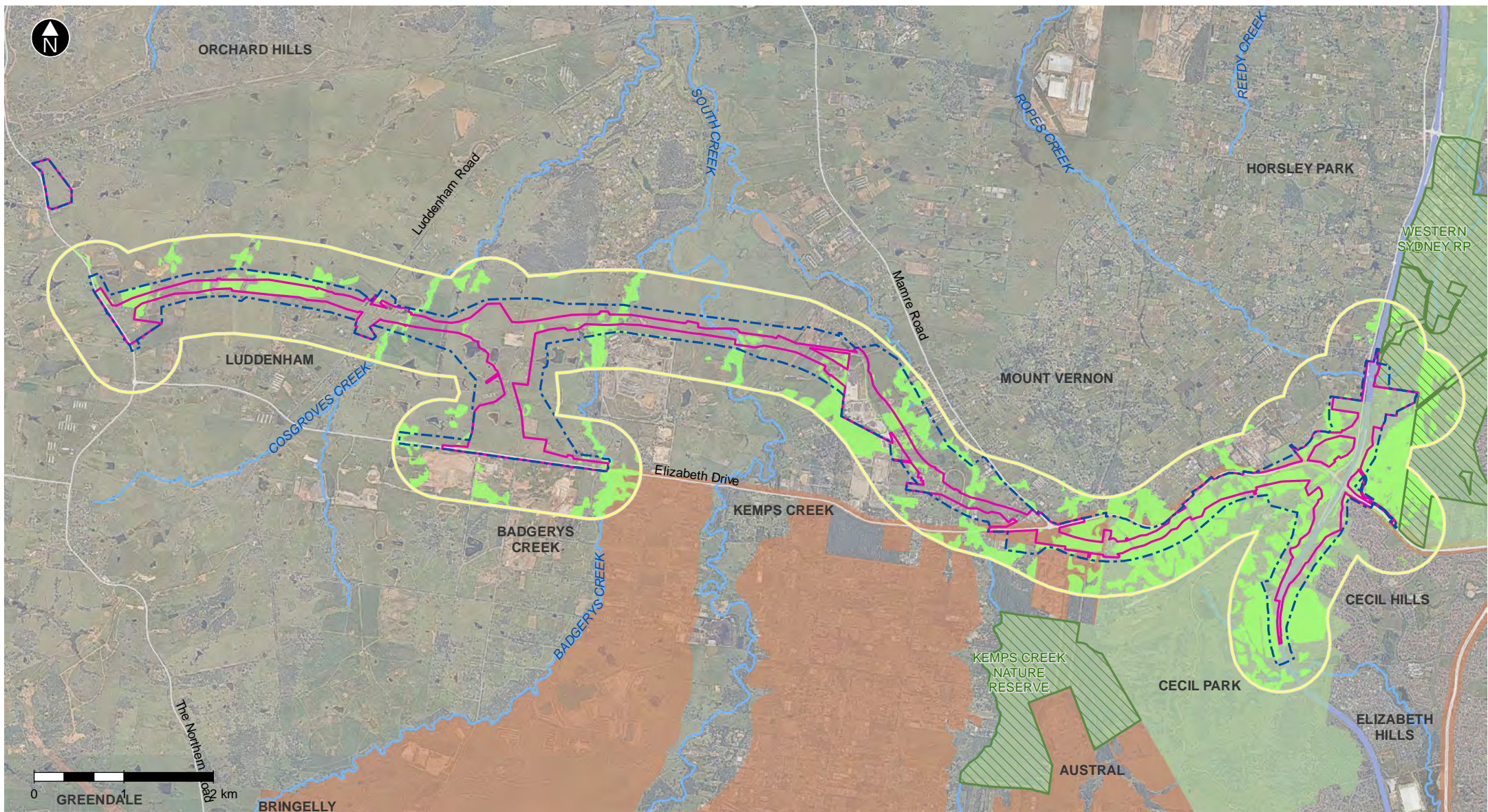
A biodiversity supplementary technical report has been prepared to provide the results of additional field surveys, review of threatened species and ecological communities that occur within the amended construction footprint, assess biodiversity impacts and update calculations for biodiversity offsets for the amended project, in comparison to those of the project as described in the EIS. The biodiversity supplementary technical report is provided in **Appendix A**, and a summary is provided below. This section should be read in conjunction with Section 7.1 of the EIS and the biodiversity assessment report provided in Appendix E of the EIS.

It is noted that TfNSW applied to have the project defined as a 'pending or interim planning application' under Clause 27(1) of the Biodiversity Conservation (Savings and Transitional) Regulation 2017. This was based on having carried out 'substantial environmental assessment' prior to the commencement of the *Biodiversity Conservation Act 2016* (NSW) (BC Act), which came into effect on August 2017. This application was granted by a delegate of the Secretary of the DPIE (Planning and Assessment) on 5 April 2018.

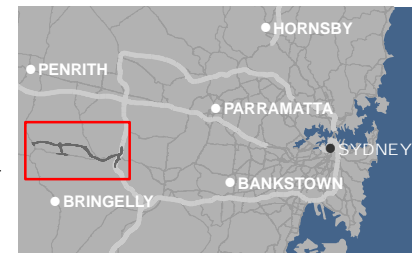
Accordingly, the former planning provisions (being the *Threatened Species Conservation Act 1995* (NSW) (TSC Act)), the NSW Biodiversity Offsets Policy for Major Projects (2014) and the Framework for Biodiversity Assessment 2014 (FBA) continue to apply to the amended project.

6.1.1 Assessment methodology

The study area for the assessment has been updated to accommodate the proposed changes for the amended project. The amended biodiversity study area is shown on **Figure 6-1**. The amended construction footprint includes exclusion zones defined as 'no-go' areas that would be protected for the duration of construction, amounting to about 0.62 hectares. The vegetation calculations for this assessment have therefore been updated to remove areas mapped within the exclusion zones.



- | | |
|--|---|
| The amended project construction footprint | Native vegetation |
| Amended study area corridor | NPWS Reserves |
| 550m landscape assessment buffer | Western Sydney Parklands |
| ~~~~~ Waterways | Biodiversity certified land |



*Entire map extent is covered by the IBRA 7 Region - Sydney Basin, and IBRA 7 Subregion - Cumberland. No SEPP 14 Coastal Wetlands or Ramsar Wetlands are present in the entire map extent.

Figure 6-1 Amended biodiversity study area

A desktop review and field surveys were carried out for this supplementary assessment in January 2020. The desktop review involved an updated database search to identify State and Commonwealth records of threatened entities and Commonwealth Matters of National Environmental Significance within 10 kilometres of the amended construction footprint.

About seven hectares of additional native vegetation has been added to the construction footprint as a result of the amended project when compared to the area assessed in the EIS. As a result, three additional field surveys were conducted between 16 January and 29 January 2020.

The field surveys were comprised of:

- Three plot-based floristic surveys
- Two Cumberland Plain Land Snail (*Meridolum corneovirens*) surveys
- One terrestrial fauna habitat assessment.

The location of these additional field surveys are shown on **Figure 6-2**.

6.1.2 Existing environment

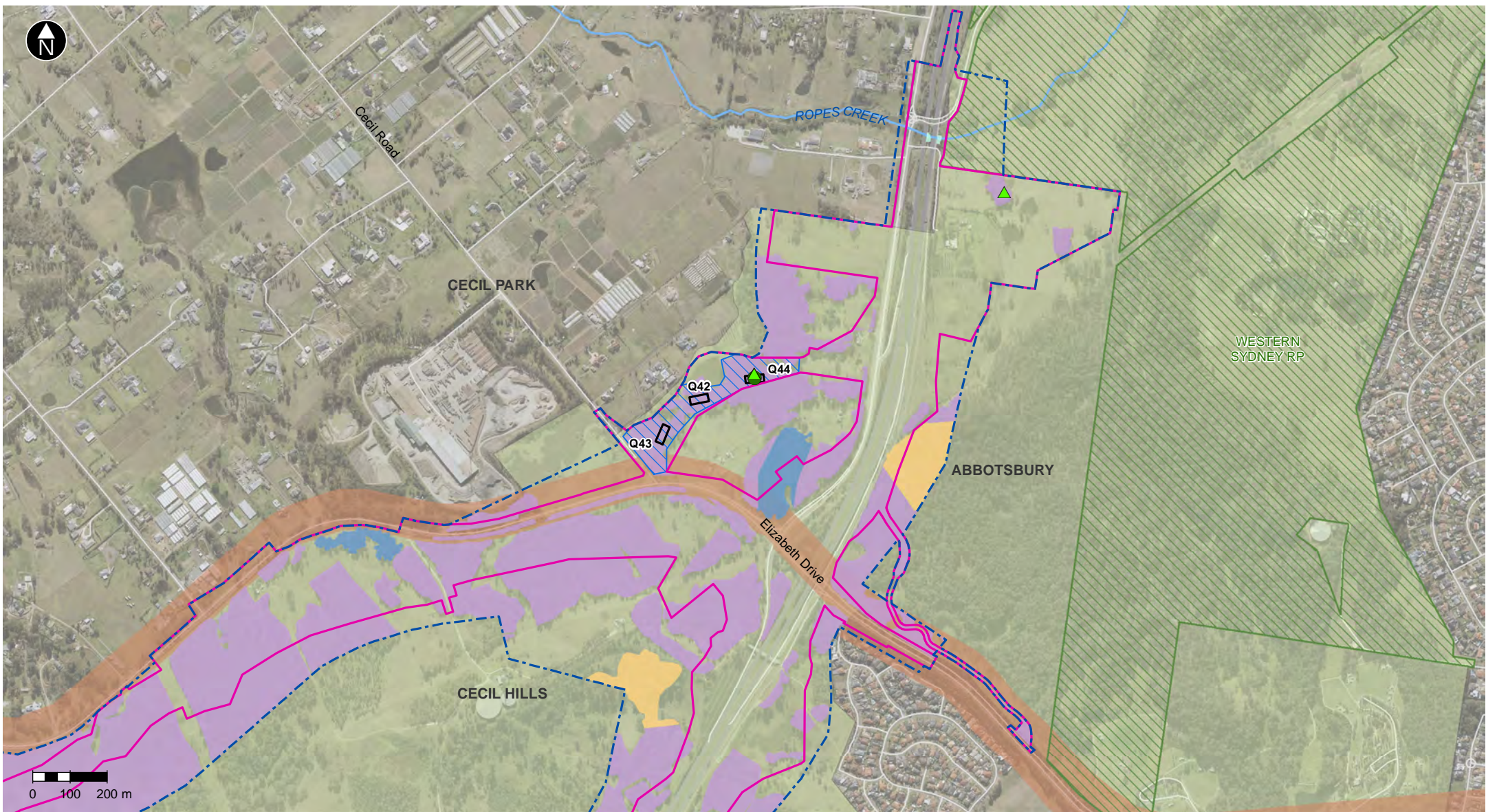
Section 7.1.3 of the EIS describes the existing environment of the EIS study area in relation to biodiversity. This section has focused on the existing environment of the additional areas that now form part of the amended construction footprint. The aspects of the existing environment that have changed from the EIS are described in this section and are listed below:

- Landscape features
- Terrestrial flora
 - Native vegetation communities
 - TECs listed under the TSC Act
 - TECs listed under the EPBC Act
 - Threatened flora species
- Terrestrial fauna
 - Fauna habitat
 - Threatened fauna species.

Some aspects of the existing environment were determined through desktop review and additional field surveys to be consistent with those discussed in Section 7.1.3 of the EIS. These are described in **Appendix A** and not discussed further in this section.

6.1.2.1 Landscape Features

Two of the 10 landscape features identified in Table 7-6 of the EIS have been revised to reflect the amended biodiversity study area. These are described in **Table 6-1**. The description of the other eight features remain unchanged from the EIS and are not repeated in this report.



- The amended project construction footprint
- Amended study area corridor
- Western Sydney Parklands
- NPWS Reserves
- Biodiversity certified land

January 2020

- ▲ Threatened snail survey
- Terrestrial habitat assessment
- Additional targeted flora survey
- Additional vegetation plot
- ~ Waterways

Plant Community Type (PCT)

- Forest Red Gum - Grey Box shrubby woodland on shale of the southern Cumberland Plain, Sydney Basin Bioregion
- Grey Box - Forest Red Gum grassy woodland on flats of the Cumberland Plain, Sydney Basin Bioregion

- Grey Box - Forest Red Gum grassy woodland on shale of the southern Cumberland Plain, Sydney Basin Bioregion
- Swamp Oak open forest on riverflats of the Cumberland Plain and Hunter valley

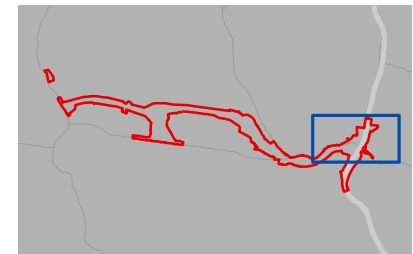


Figure 6-2 Additional field survey locations

Table 6-1 Updated landscape features for the amended project

Landscape feature	EIS study area	Amended biodiversity study area
Soils and geology	<p>Four soil landscape types are present in the EIS study area:</p> <ul style="list-style-type: none"> • Luddenham • Blacktown • South Creek • Picton. <p>Disturbed Terrain is also present.</p>	<p>In addition to the four soil landscapes (and disturbed terrain) the amended ancillary facilities between Clifton Avenue and Salisbury Avenue are within the Berkshire Park soil landscape type.</p> <p>This is discussed further in Section 6.11.2.</p>
Wetlands	<p>Within the EIS study area:</p> <ul style="list-style-type: none"> • Artificial wetlands (ie farm dams, detention basins, roadside drains, effluent treatment systems) including 28 dams • Coastal Wetland (ID 117) listed under the State Environmental Planning Policy (Coastal Management SEPP) 2018 • An unnamed tributary of Hinchinbrook Creek passes through the southern extent of the EIS BAR study area and flows into a Coastal Wetland (ID 276) about 1.8 kilometres to the southeast of the EIS BAR study area. 	<p>The amended construction footprint (including additional ancillary facilities) are likely to impact additional dams and dam areas including:</p> <ul style="list-style-type: none"> • One additional small farm dam in the north-western extent of the amended project, east of The Northern Road • One additional small farm dam in the central extent of the amended project, east of Salisbury Avenue • Two additional small farm dams in the north-eastern extent of the amended project, east of the M7 Motorway • A greater impact area for one farm dam in the west of the amended project, between Luddenham Road and Cosgroves Creek.

6.1.2.2 Terrestrial flora

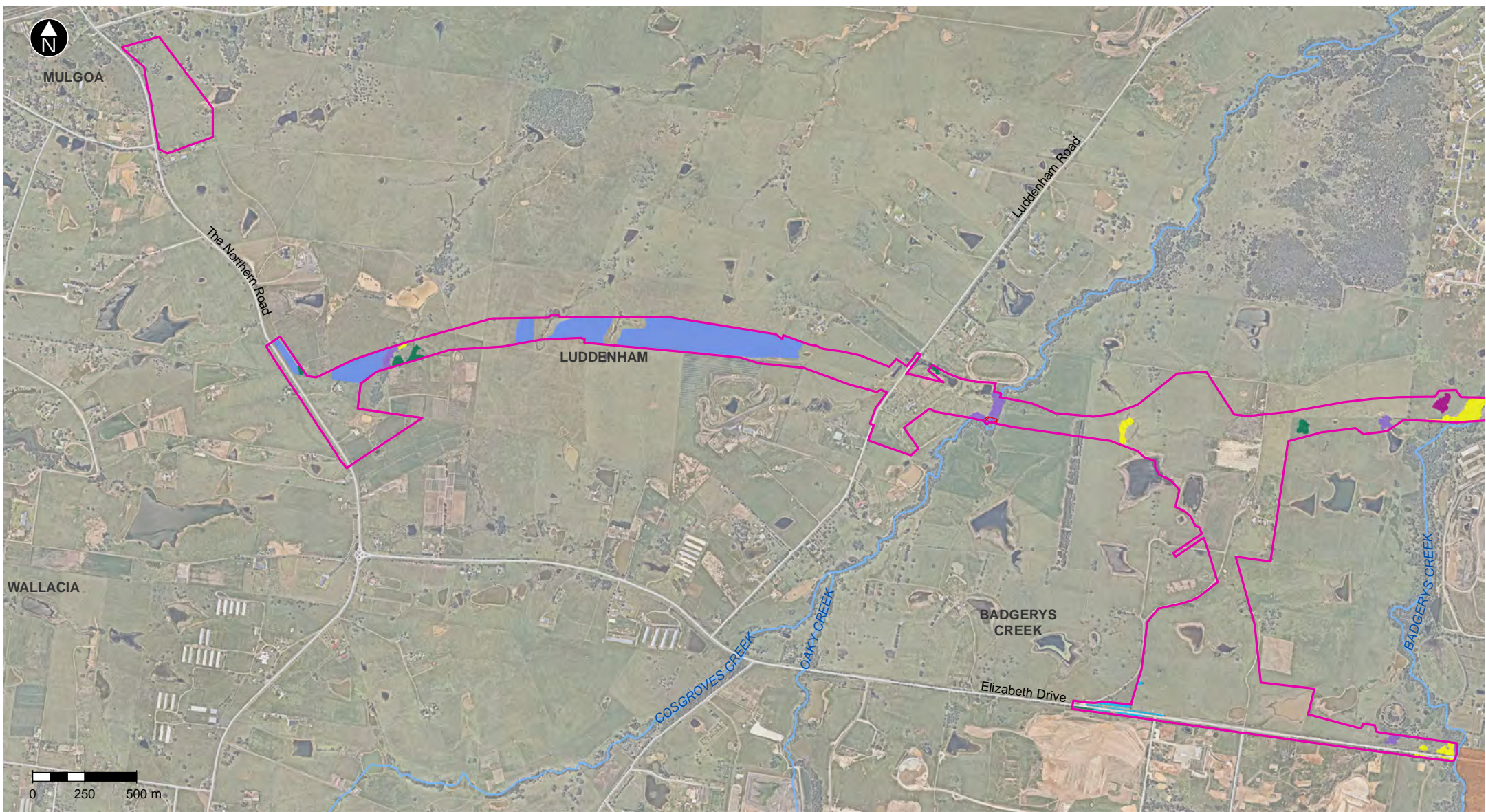
Native vegetation communities

The EIS identified seven Plant Community Types (PCTs) in the construction footprint as described in the EIS. No additional PCTs were identified in the amended construction footprint.

About 74 hectares of native vegetation would be located within the construction footprint as described in the EIS. For the amended project, an additional seven hectares of native vegetation would be located within the amended construction footprint, when compared to the construction footprint as described in the EIS. This would result in a total of about 81 hectares of native vegetation within the amended construction footprint.

All of the native vegetation corresponds with a PCT. The change in area of PCTs between the construction footprint as described in the EIS and the amended construction footprint is shown in **Table 6-2**. The majority of the increase in PCT being removed is located in the area to the north-west of the intersection of the M7 Motorway and Elizabeth Drive (see **Figure 6-3**).

The EIS identified 14 vegetation zones within the construction footprint. One additional vegetation zone has been identified in the amended construction footprint, comprising about 1.34 hectares of the 850 - Moderate/Good_Poor vegetation zone. This vegetation zone is north-west of the intersection of the M7 Motorway and Elizabeth Drive (see **Figure 6-3**) and is associated with Grey Box-Forest Red Gum grassy woodland on shale of the southern Cumberland Plain, Sydney Basin Bioregion.



- The amended project construction footprint
- The amended project exclusion zones
- Biodiversity certified land
- Waterways

Vegetation zones

- 835 - Moderate/Good_Poor
- 849 - Moderate/Good_Poor
- 849 - Moderate/Good_Other (Derived Shrubland)

- 850 - Low
- 850 - Moderate/Good_Medium
- 1800 - Moderate/Good_Poor

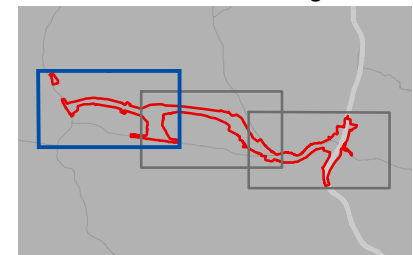
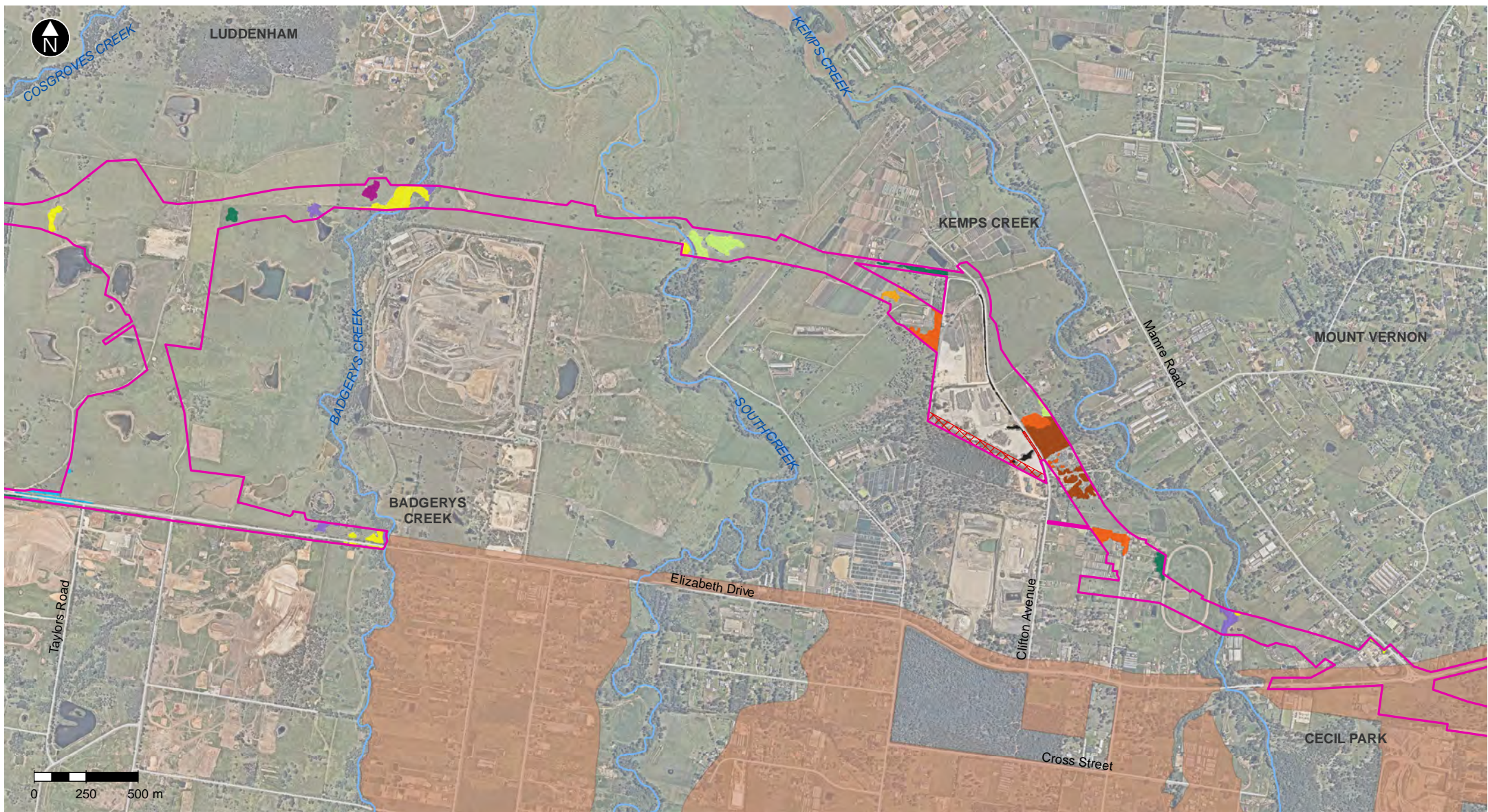


Figure 6-3 PCT and vegetation zones for the amended project



- The amended project construction footprint
- The amended project exclusion zones
- Biodiversity certified land
- ~~~~~ Waterways

Vegetation zones

- 724 - Moderate/Good_High
- 724 - Moderate/Good_Medium
- 724 - Moderate/Good_Poor
- 835 - Moderate/Good_Poor
- 849 - Moderate/Good_Medium

- 849 - Moderate/Good_Poor
- 849 - Moderate/Good_Other (Derived Shrubland)
- 850 - Moderate/Good_Medium
- 883 - Poor
- 1800 - Moderate/Good_Poor

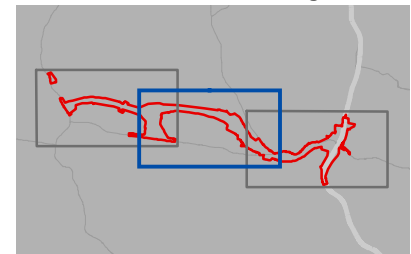
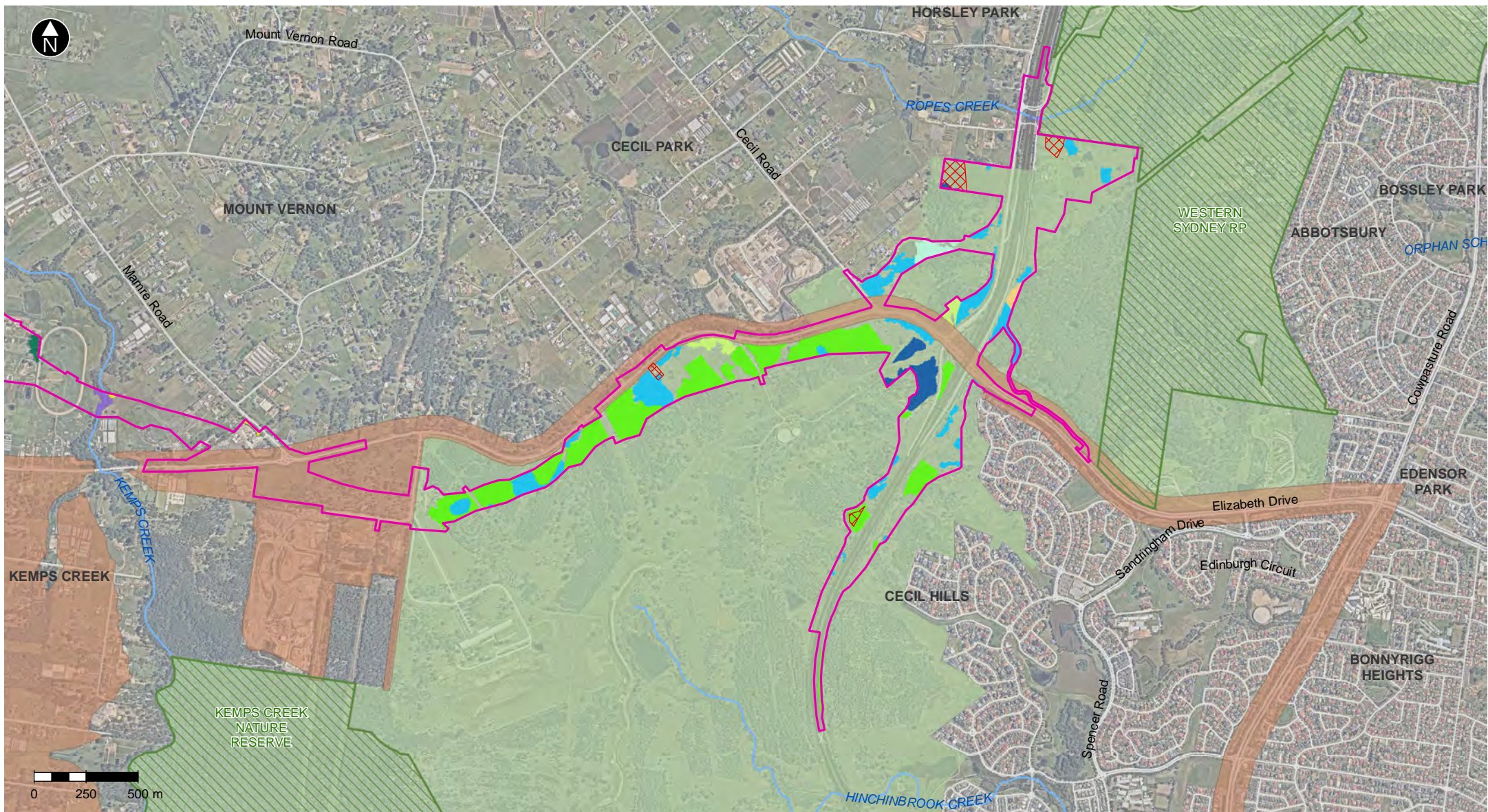


Figure 6-3 PCT and vegetation zones for the amended project



- The amended project construction footprint
- The amended project exclusion zones
- Biodiversity certified land
- NPWS Reserves
- Western Sydney Parklands
- ~~~~~ Waterways

Vegetation zones

- 724 - Moderate/Good_Medium
- 830 - Moderate/Good_Poor
- 835 - Moderate/Good_Poor
- 849 - Moderate/Good_Medium
- 849 - Moderate/Good_Poor

- 850 - Moderate/Good_High
- 850 - Moderate/Good_Medium
- 850 - Moderate/Good_Other (Revegetation)
- 850 - Moderate/Good_Poor
- 1800 - Moderate/Good_Poor

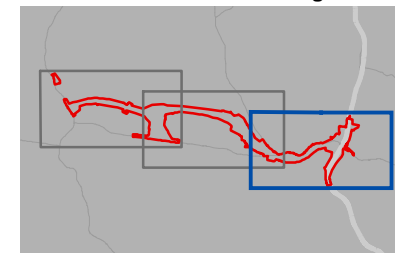


Figure 6-3 PCT and vegetation zones for the amended project

In addition to the additional vegetation zone identified, there were a number of minor changes to the areas covered by the other 14 vegetation zones within the amended construction footprint when compared to the EIS. The largest change is associated with an additional 3.61 hectares (ie an increase from 10.14 hectares to 13.75 hectares) of the 850-Moderate/Good_Medium vegetation zone associated with Grey Box-Forest Red Gum grassy woodland on shale of the southern Cumberland Plain, Sydney Basin Bioregion.

Table 6-2 PCTs identified within the amended construction footprint

PCT No	PCT name	Area (ha) within EIS construction footprint ¹	Area (ha) within amended construction footprint ¹	Difference (ha)
724	Broad-leaved Ironbark - Grey Box - Melaleuca decora grassy open forest on clay/gravel soils of the Cumberland Plain, Sydney Basin Bioregion	6.91	6.89	-0.02 (decrease)
830	Forest Red Gum - Grey Box shrubby woodland on shale of the southern Cumberland Plain, Sydney Basin Bioregion	0.44	0.44	0
835	Forest Red Gum - Rough-barked Apple grassy woodland on alluvial flats of the Cumberland Plain, Sydney Basin Bioregion	3.23	3.01	-0.22 (decrease)
849	Grey Box - Forest Red Gum grassy woodland on flats of the Cumberland Plain, Sydney Basin Bioregion	6.09	6.24	0.15
850	Grey Box - Forest Red Gum grassy woodland on shale of the southern Cumberland Plain, Sydney Basin Bioregion (includes revegetation within Western Sydney Parklands and derived grasslands in Low condition)	54.07	60.67	6.60
883	Hard-leaved Scribbly Gum - Parramatta Red Gum heathy woodland of the Cumberland Plain, Sydney Basin Bioregion	0.38	0.57	0.19
1800	Swamp Oak open forest on river flats of the Cumberland Plain and Hunter valley	2.53	2.82	0.29
Total		73.65	80.64	6.99

¹ excluding certified areas

These changes, including the additional vegetation zone identified, resulted in a total of about seven additional hectares of vegetation zones in the amended construction footprint when compared to the EIS construction footprint (described in **Table 6-2** above).

However most of this additional seven hectares have a relatively lower site value score. Further detail about the changes to vegetation zones and a description of the additional vegetation zone identified is provided in **Appendix A**.

TECs listed under the TSC Act

Six of the PCTs identified in the EIS construction footprint were found to meet the criteria for five threatened ecological communities (TECs) listed under the TSC Act. No additional TECs were identified in the amended construction footprint however there were minor differences in area of TECs within the amended construction footprint, compared to those within the construction footprint as described in the EIS.

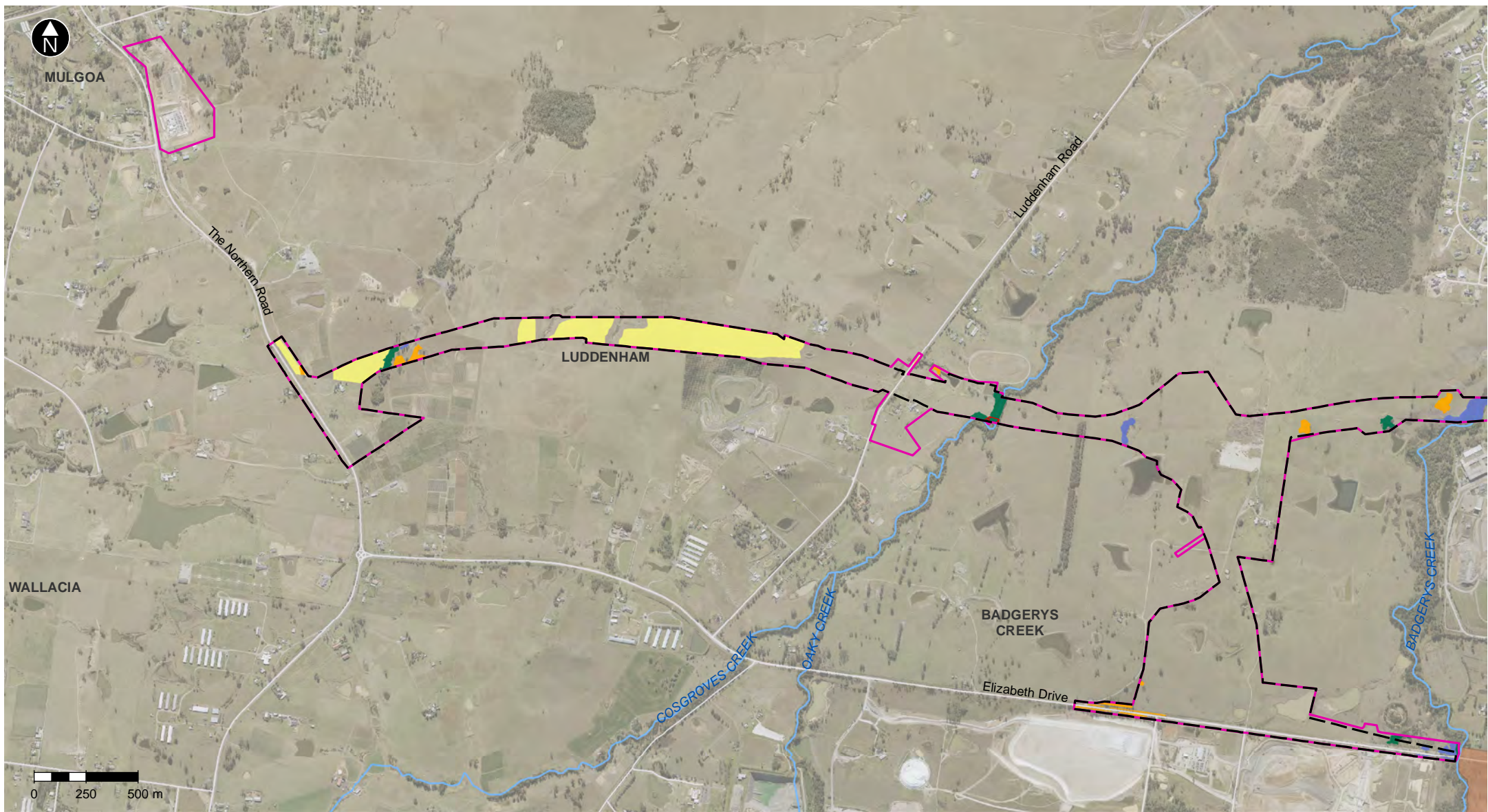
About 73 hectares of TEC would be located within the construction footprint as described in the EIS. For the amended project, an additional 6.80 hectares of TEC would be located within the amended construction footprint, when compared to the project as described in the EIS. This would result in a total of about 80 hectares of TEC within the amended construction footprint.

The majority of the increase is the Cumberland Plain Woodland in the Sydney Basin Bioregion TEC, located in the area to the north-west of the intersection of the M7 Motorway and Elizabeth Drive (see **Figure 6-4**). Anticipated changes in the area covered by TECs as a result of proposed changes to the construction footprint are presented in **Table 6-3**.

Table 6-3 TECs listed under the TSC Act identified within the amended construction footprint

TEC Name	PCT(s)	TSC Act Status	Area (ha) within EIS construction footprint ¹	Area (ha) within amended construction footprint ¹	Difference (ha)
Shale Gravel Transition Forest in the Sydney Basin Bioregion	724	Endangered	6.91	6.89	-0.02 (decrease)
Moist Shale Woodland in the Sydney Basin Bioregion	830	Endangered	0.44	0.44	0
River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	835	Endangered	3.23	3.01	-0.22 (decrease)
Cumberland Plain Woodland in the Sydney Basin Bioregion	849 850	Critically Endangered	60.16 (includes about 22.65 ha of revegetation and about 18.07 ha of derived native grassland in Low condition)	66.91 (includes about 24.31 ha of revegetation and about 18.06 ha of derived native grassland in Low condition)	6.75
Swamp oak floodplain forest of the NSW North Coast, Sydney Basin and South East Corner bioregions	1800	Endangered	2.53	2.82	0.29
Total			73.27	80.07	6.80

¹ excluding certified areas



- Project construction footprint as per EIS
- The amended project construction footprint
- The amended project exclusion zones
- Biodiversity certified land
- Waterways

- Threatened ecological communities (TSC Act)**
- Cumberland Plain Woodland in the Sydney Basin Bioregion
 - Cumberland Plain Woodland in the Sydney Basin Bioregion (derived grassland form)

- River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions
- Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions

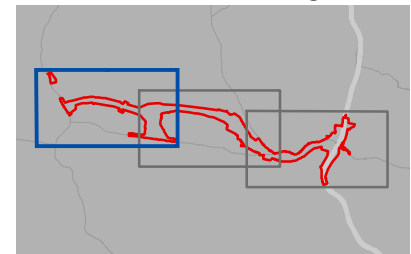
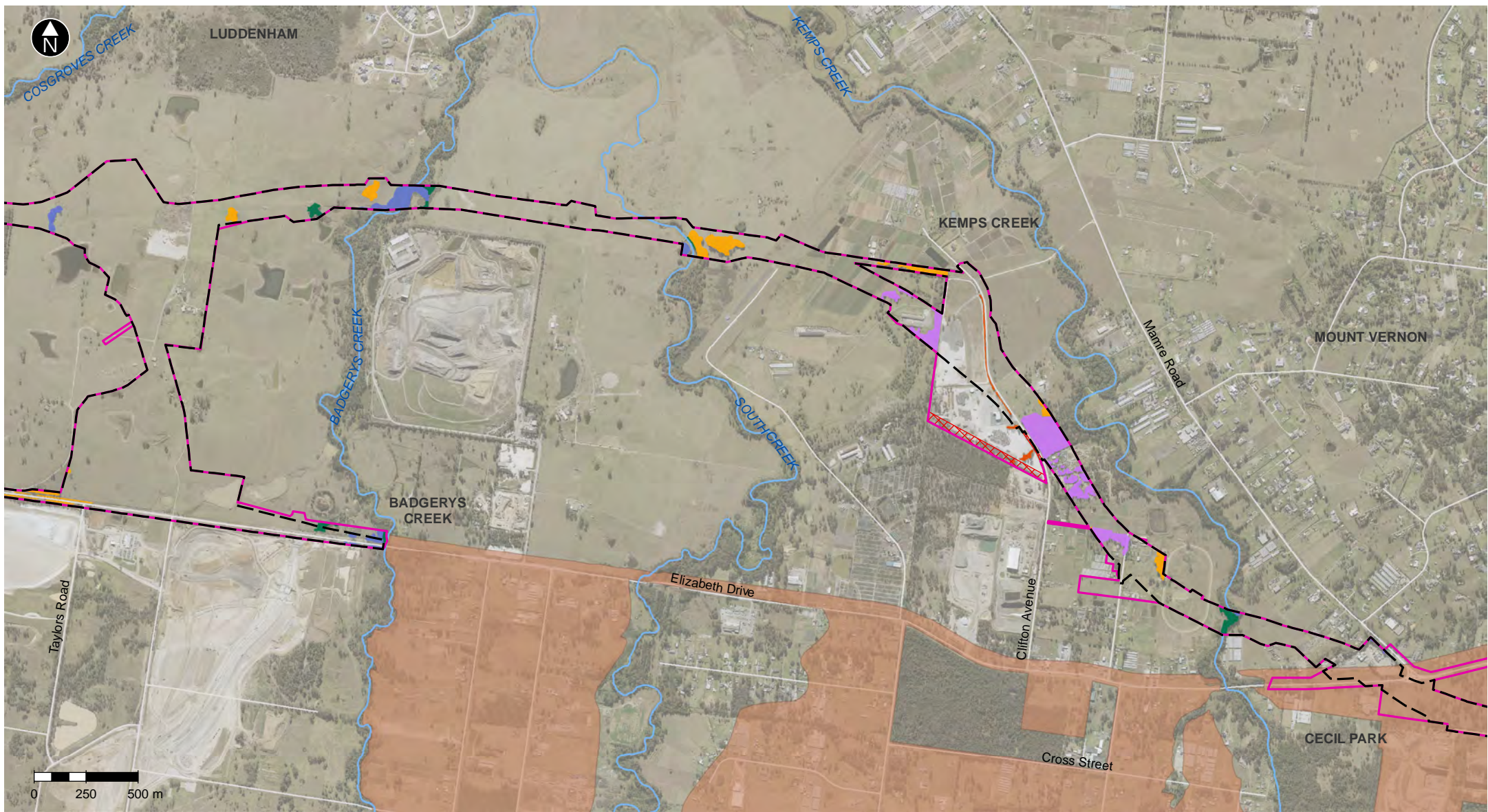


Figure 6-4 TECs listed under the TSC Act for the amended project



- Project construction footprint as per EIS
- The amended project construction footprint
- The amended project exclusion zones
- Biodiversity certified land
- Waterways

Threatened ecological communities (TSC Act)

- Castlereagh Scribbly Gum Woodland in the Sydney Basin Bioregion
- Cumberland Plain Woodland in the Sydney Basin Bioregion

- River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions
- Shale Gravel Transition Forest in the Sydney Basin Bioregion
- Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions

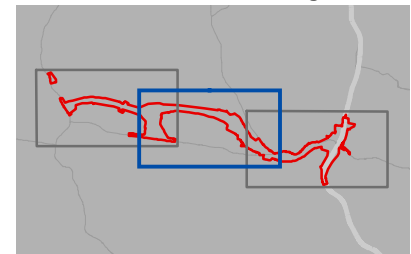
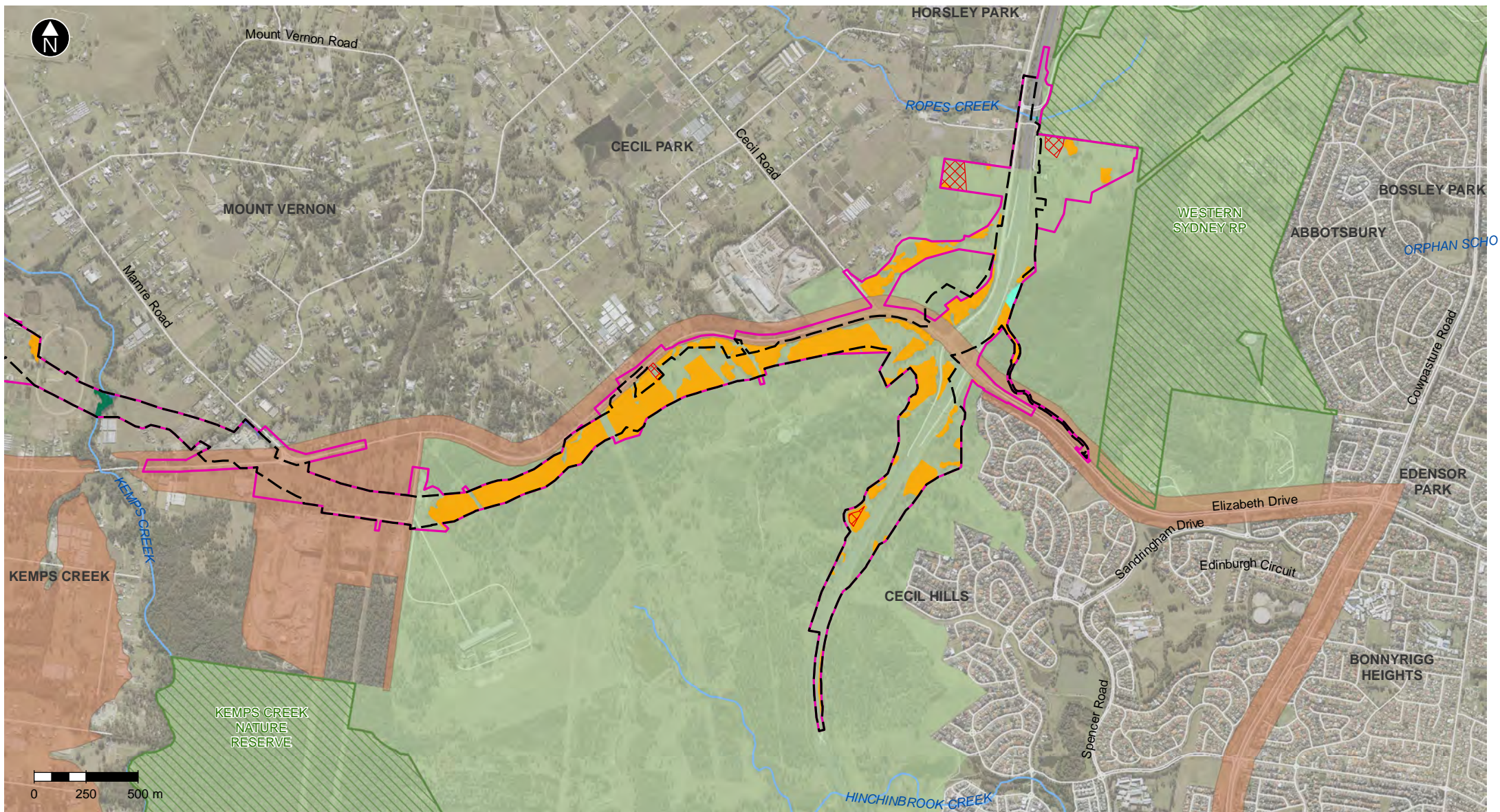


Figure 6-4 TECs listed under the TSC Act for the amended project



- Project construction footprint as per EIS
- The amended project construction footprint
- The amended project exclusion zones
- Biodiversity certified land
- NPWS Reserves
- Western Sydney Parklands
- Waterways

- Threatened ecological communities (TSC Act)**
- Cumberland Plain Woodland in the Sydney Basin Bioregion
 - Moist Shale Woodland in the Sydney Basin Bioregion

- River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions
- Shale Gravel Transition Forest in the Sydney Basin Bioregion
- Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions

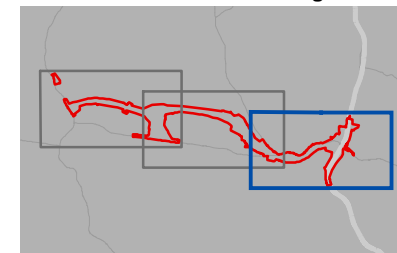


Figure 6-4 TECs listed under the TSC Act for the amended project

TECs listed under EPBC Act

The EIS identified that two TECs within the EIS study area also meet the criteria for listing under the EPBC Act. No additional TECs listed under the EPBC Act were identified in the amended construction footprint.

About 39 hectares of TECs listed under the EPBC Act would be located within the construction footprint as described in the EIS. For the amended project, an additional 3.99 hectares of TECs listed under the EPBC Act would be located within the amended construction footprint, when compared to the project as described in the EIS. This would result in a total of about 43 hectares of TECs listed under the EPBC Act within the amended construction footprint.

The majority of TEC which meets the criteria for listing under the EPBC Act based on diagnostic criteria is located within the Western Sydney Parklands (see **Figure 6-5**). The changes to the areas covered by TECs as a result of proposed changes to the construction footprint are presented in **Table 6-4**.

Table 6-4 TECs listed under the EPBC Act identified within the amended construction footprint

TEC Name	PCT(s)	EPBC Act Status	Area (ha) within EIS construction footprint ¹	Area (ha) within amended construction footprint ¹	Difference (ha)
Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest	849 850 724	Critically Endangered	38.48 (includes 20.21 ha of revegetation)	42.47 (includes 22.04 ha of revegetation)	3.99
Western Sydney Dry Rainforest and Moist Woodland on Shale	830	Critically Endangered	0.44	0.44	0
Total			38.92	42.91	3.99

¹ excluding certified areas

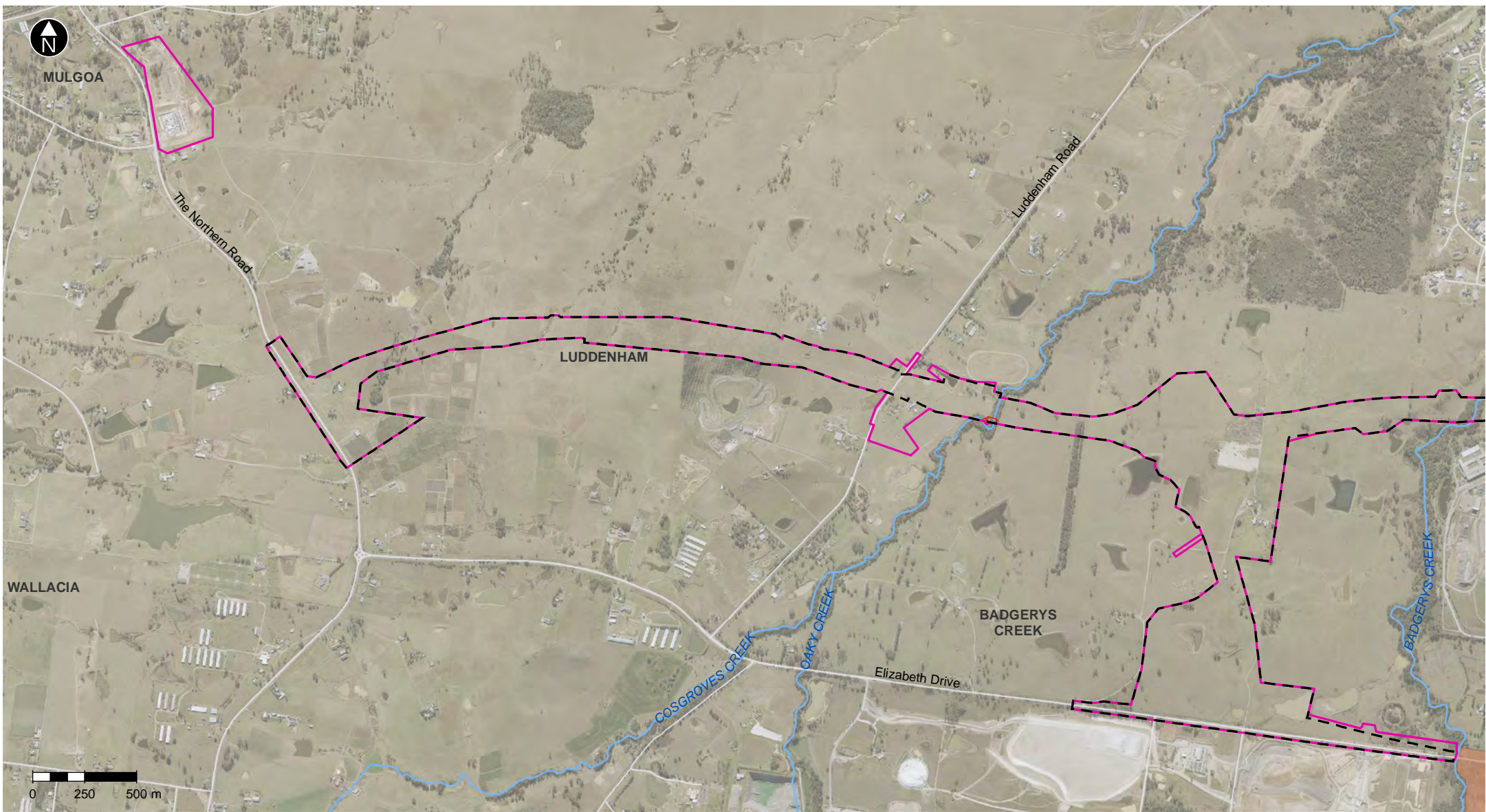
Threatened flora species

The EIS identified two threatened flora species within the construction footprint as per the EIS:

- *Dillwynia tenuifolia* – 244 individuals
- *Pultenaea parviflora* – 90 individuals.

No additional threatened flora species have been recorded within the amended construction footprint. There are, however, additional records of *Dillwynia tenuifolia* (44 individuals) and *Pultenaea parviflora* (139 individuals) within the amended construction footprint. These individuals would be retained and protected, however, within exclusion zones.

A population of 18 *Pultenaea parviflora* individuals that were previously recorded within a certified area in Western Sydney Parklands was reinspected in January 2020. This inspection found only 10 plants of *Pultenaea parviflora* within the certified area. These records are all within five meters of the certification boundary, however. The location of these plants in relation to the certification boundary could be verified by a surveyor to verify that they are within the certified area due to the potential for a GPS error.



- The project construction footprint as per the EIS
- The amended project construction footprint
- The amended project exclusion zones

- Biodiversity certified land
- Waterways

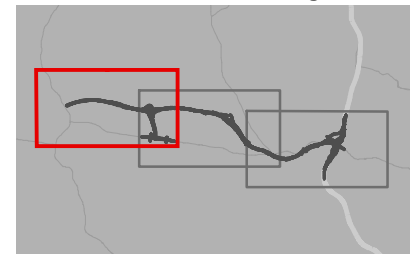
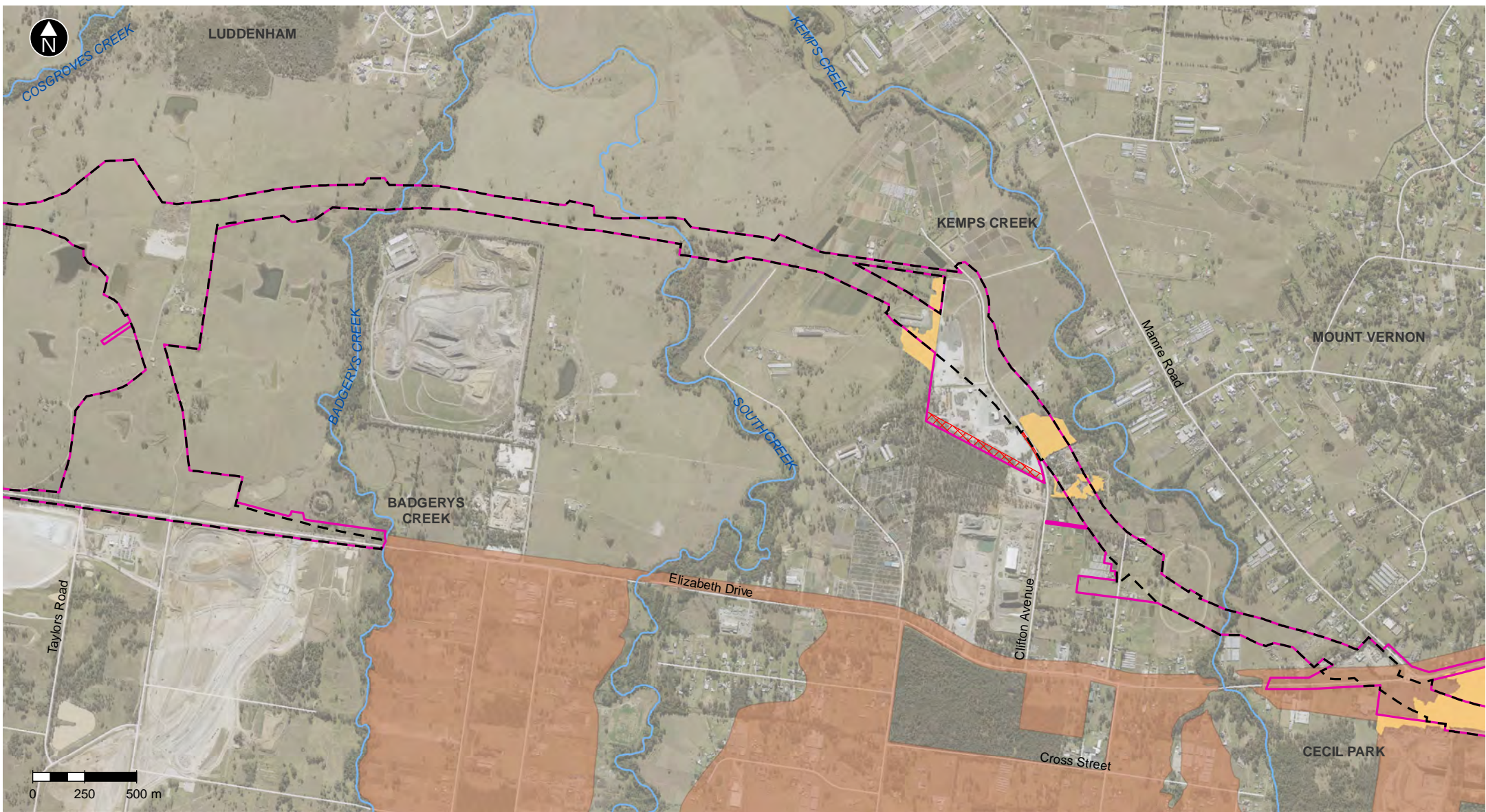


Figure 6-5 TECs listed under the EPBC Act for the amended project



- The project construction footprint as per the EIS
- The amended project construction footprint
- ▤ The amended project exclusion zones

- Biodiversity certified land
- ~ Waterways

- Threatened ecological communities (EPBC Act)**
- Cumberland Plain Shale Woodlands and Shale/Gravel Transition Forest

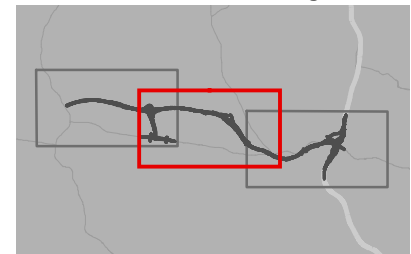
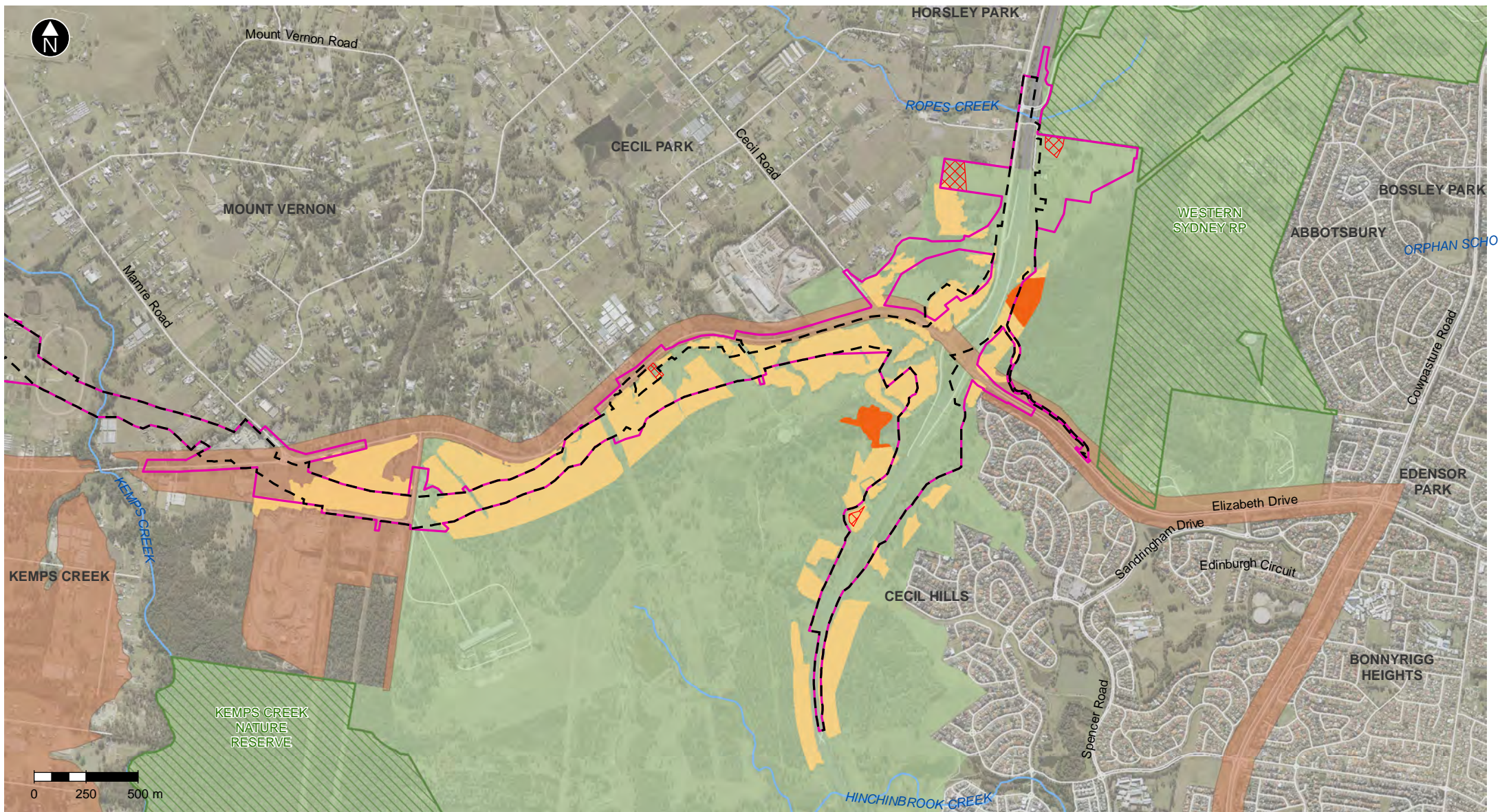


Figure 6-5 TECs listed under the EPBC Act for the amended project



- The project construction footprint as per the EIS
- The amended project construction footprint
- ▨ The amended project exclusion zones
- ▨ NPWS Reserves
- ▨ Western Sydney Parklands

- ▨ Biodiversity certified land
- Waterways

Threatened ecological communities (EPBC Act)

- ▨ Cumberland Plain Shale Woodlands and Shale/Gravel Transition Forest
- ▨ Western Sydney Dry Rainforest and Moist Woodland on Shale

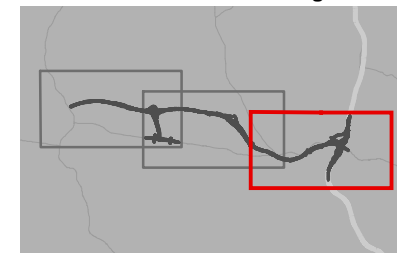


Figure 6-5 TECs listed under the EPBC Act for the amended project

Therefore, based on a precautionary approach, the total threatened flora species located within the amended construction footprint has assumed:

- *Dillwynia tenuifolia* – 244 individuals
- *Pultenaea parviflora* – up to 100 individuals.

In addition to the two recorded threatened flora species listed above, the additional field survey has identified slight increases in potential habitats for the following threatened flora species within the amended construction footprint:

- *Dillwynia tenuifolia* – additional 0.32 hectares (increase from 13.38 hectares to 13.70 hectares)
- *Pultenaea parviflora* – additional 0.17 hectares (increase from 7.29 hectares to 7.46 hectares)
- *Grevillea juniperina subsp. juniperina* – additional 6.94 hectares (increase from 49.38 hectares to 56.32 hectares)
- *Marsdenia viridiflora subsp. viridiflora* in the Bankstown, Camden, Campbelltown, Fairfield, Holroyd, Liverpool and Penrith Local Government Areas – additional 7.38 hectares (increase from 55.20 hectares to 62.58 hectares)
- *Pimelea spicata* – additional 6.77 hectares (increase from 42.53 hectares to 49.30 hectares).

6.1.2.3 Terrestrial fauna

Fauna habitat

No additional habitat types were identified within the amended construction footprint. No additional hollow-bearing trees were recorded during surveys for the amended project.

About 334 hectares of fauna habitat would be located within the construction footprint as described in the EIS. For the amended project, an additional 9.83 hectares of fauna habitat would be located within the amended construction footprint, when compared to the project as described in the EIS. This would result in a total of about 344 hectares of fauna habitat is located within the amended construction footprint.

A summary of the changes to the area of each habitat type as a result of the amended construction footprint is provided in **Table 6-5**.

Table 6-5 Summary of fauna habitat types within EIS and amended biodiversity study area

Habitat type	Area (ha) within EIS construction footprint ¹	Area (ha) within amended construction footprint ¹	Difference (ha)
Woodland	49.82	56.75	6.93
Riparian forest	5.76	5.83	0.07
Grassland	275.05	277.04	1.99
Wetlands and watercourses	3.69	4.53	0.84
Total	334.32	344.15	9.83

¹ excluding certified areas

Threatened fauna species

The EIS identified 10 threatened fauna species within the EIS study area. This comprised of seven threatened fauna species which were recorded, and three species assumed to be present based on the availability of suitable habitat and recent species records.

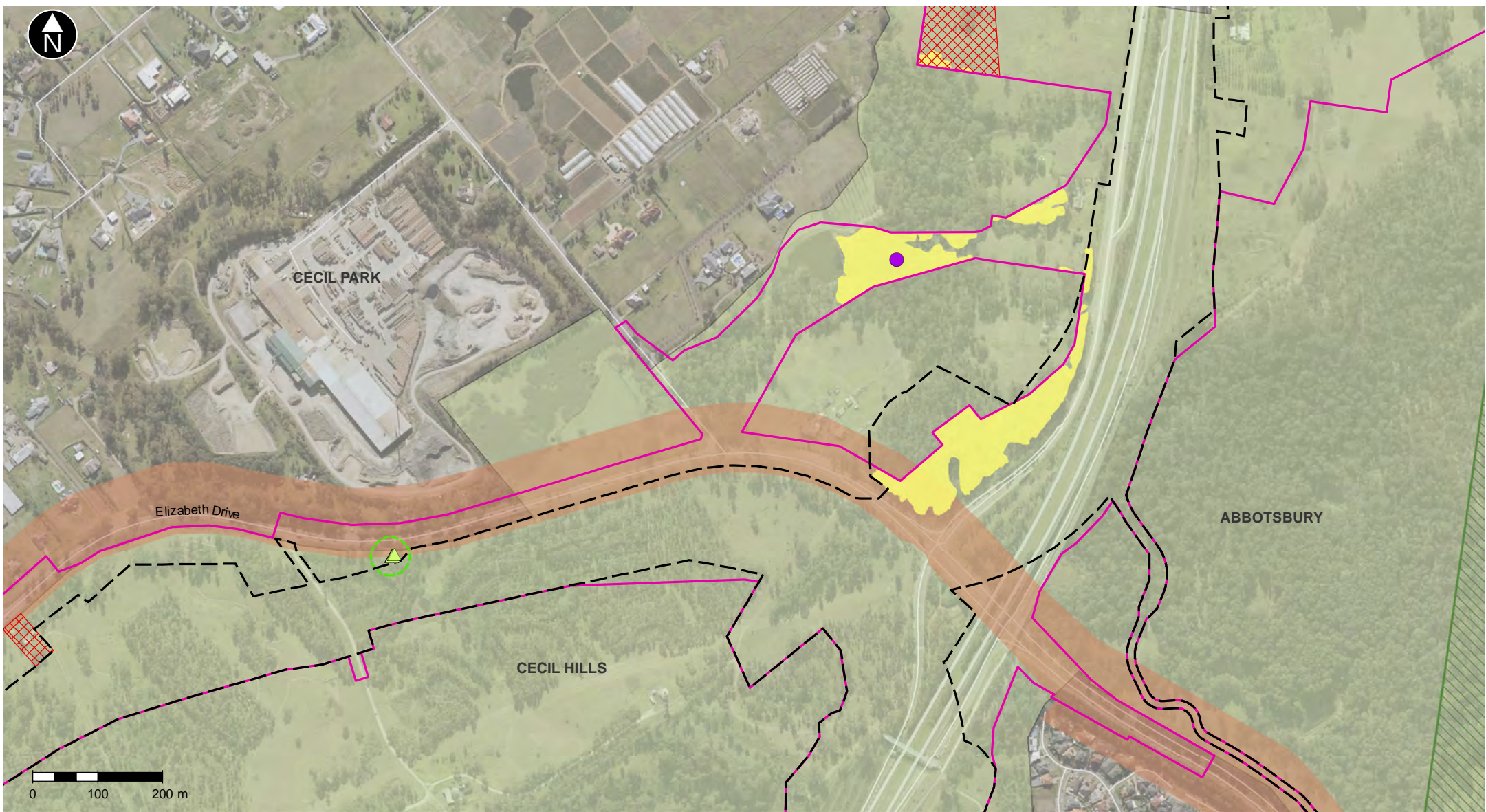
During field surveys for this supplementary assessment, one live individual Cumberland Plain Land Snail was recorded within PCT 850, northwest of the M7 Motorway interchange. As a result, the fauna habitat for the Cumberland Plain Land Snail shown in Figure 7-9 in the EIS has been amended and is shown in **Figure 6-6**. Threatened fauna species recorded or assumed to occur within the amended study area and amended construction footprint is shown in **Table 6-6**.

No other threatened fauna species were recorded within the amended construction footprint.

Table 6-6 Threatened fauna species recorded or assumed to occur within the amended study area and amended construction footprint

Threatened fauna species	Scientific name	Status		Recorded or assumed in EIS	Recorded or assumed for amended project
		TSC Act	EPBC Act		
White-bellied Sea-Eagle	<i>Haliaeetus leucogaster</i>	V	-	Recorded	Recorded
Yellow-bellied Sheath-tail-bat	<i>Saccolaimus flaviventris</i>	V	-	Recorded	Recorded
Eastern Freetail-bat	<i>Mormopterus norfolkensis</i>	V	-	Recorded	Recorded
Greater Broad-nosed Bat	<i>Scoteanax rueppellii</i>	V	-	Recorded	Recorded
Eastern Bentwing-bat	<i>Miniopterus schreibersii oceanensis</i>	V	-	Recorded	Recorded
Little Bentwing-bat	<i>Miniopterus australis</i>	V	-	Recorded	Recorded
Grey-headed Flying-fox	<i>Pteropus poliocephalus</i>	V	V	Recorded	Recorded
Cumberland Plain Land Snail	<i>Meridolum corneovirens</i>	E	-	Assumed	Recorded
Southern Myotis	<i>Myotis macropus</i>	V	-	Assumed	Assumed
Eastern False Pipistrelle	<i>Falsistrellus tasmaniensis</i>	V	-	Assumed	Assumed

Note: Grey cell represents a change from the project as described in the EIS.



- Construction footprint as per the EIS
- The amended project construction footprint
- The amended project exclusion zones
- Western Sydney Parklands
- NPWS Reserves
- Biodiversity certified land

- Threatened flora species (January 2020)**
- ▲ Pultenaea parviflora
 - Pultenaea parviflora area of occupancy

- Threatened fauna species (January 2020)**
- Cumberland Plain Land Snail
 - Cumberland Plain Land Snail habitat

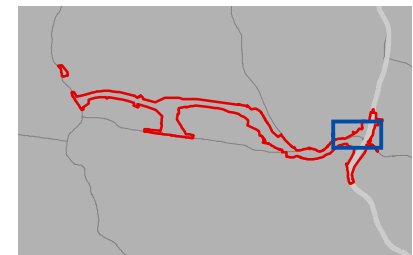


Figure 6-6 Additional recorded threatened species from January 2020 surveys

6.1.3 Assessment of potential impacts

6.1.3.1 Avoidance and minimisation

Where practicable, biodiversity impacts have been avoided and/or minimised during development of the amended project. However, in some instances, biodiversity impacts could not be avoided or minimised due to the design constraints of the amended project.

Design constraints of the amended project include:

- Realignment of Wallgrove Road to connect to Cecil Road, including a connection between Elizabeth Drive and Wallgrove Road via Cecil Road with a signalised intersection with Elizabeth Drive
 - This change would improve intersection performance at the existing signalised intersection of Wallgrove Road and Elizabeth Drive but would require clearing of existing vegetation.
 - The location of the design change has been determined to minimise impact on existing residential properties and land that is currently the subject of a proposed State Significant Development. The location of the proposed design change has aimed to minimise property and land use impacts. As a result, avoidance of biodiversity impacts for this design change has not been practicable. Consultation with landowners has been undertaken and the design would continue to be refined during detailed design phase to minimise biodiversity impacts.
- Direct connection between the M12 Motorway and Elizabeth Drive at the motorway-to-motorway interchange at the M7 Motorway
 - This change would allow road users to access the M12 Motorway from Elizabeth Drive and provide a toll-free option for motorway access to the Western Sydney International Airport from the east, but would require clearing of vegetation.
 - All additional areas of vegetation to be impacted by this design change are areas that were already subject to fragmentation, or that would have been indirectly impacted by the project as described in the EIS.
- Additional and expanded construction ancillary facilities
 - Where practicable, additional ancillary facilities have been proposed for locations that are more than 50 metres from a waterway and do not require vegetation clearing beyond that already required for the project as described in the EIS.
 - One of the additional ancillary facilities contains a population of threatened flora species *Dillwynia tenuifolia* and *Pultenaea parviflora*. The population at this location would be protected within an exclusion area to minimise impacts to these species.

6.1.3.2 Areas not requiring further assessment

Certain areas and activities do not require assessment, as discussed in Section 7.1.4 of the EIS. This includes activities carried out within certified land, in accordance with the terms of the South West Growth Centre Biodiversity Certification Order.

The amended construction footprint includes about 33.57 hectares of certified land (an increase from 17.38 hectares for the construction footprint as described in the EIS). About eight hectares of PCTs are mapped within certified land located within the construction footprint as described in the EIS. For the amended project, an additional 2.52 hectares of PCTs are mapped within certified land located within the amended construction footprint, when compared to the project as described in the EIS. This would result in a total of about 10.71 hectares of PCTs mapped within certified land located within the amended construction footprint. These areas have been excluded from impact assessment calculations.

6.1.3.3 Construction impacts

Section 7.1.4 of the EIS identified a number of potential biodiversity impacts that may occur during construction of the project. This section focuses on the additional impacts that are likely to occur as a result of the amended project when compared to the project described in the EIS. Potential impacts that have changed from the EIS are described in this section and are listed below:

- Removal of native vegetation, including edge effects
- Removal of threatened fauna habitat
- Removal of threatened flora
- Matter for further consideration
- Matters of National Environmental Significance.

Potential impacts that are considered consistent with the EIS, as there is either no or minor changes which can be managed in accordance with existing management measures are not discussed further in this section. Further detail on these impacts is provided in Section 5.5 of **Appendix A**.

Removal of native vegetation

Direct impacts

As discussed in **Section 6.1.2.2**, seven additional hectares of native vegetation (an increase from 74 hectares to 81 hectares) would be located within the amended construction footprint. All areas of native vegetation correspond with a PCT, and would be directly impacted by the amended project.

All additional areas of PCT to be removed, with the exception of PCT 883, fall within the criteria of TECs listed under the TSC Act, resulting in the removal of an additional 6.80 hectares (an increase from 73.27 hectares to 80.07 hectares) compared to the impacts presented in the EIS. This is inclusive of 3.99 hectares that also falls within the criteria of TECs listed under the EPBC Act, an increase from 38.92 hectares to 42.91 hectares when compared to the EIS (see **Table 6-3** and **Table 6-4**).

Indirect impacts

The project would result in indirect impacts to some areas of native vegetation adjoining the amended construction footprint, mainly due to fragmentation of vegetation and creation of new edges, which may result in edge effects.

The analysis of potential edge effects for the project as described in the EIS found that edge effects would be likely within Western Sydney Parklands and east of Clifton Avenue. This supplementary assessment of the amended project has focussed on these two areas. Edge effects were calculated using a 30 metre buffer from the edge of the amended construction footprint and analysis of mapped native vegetation.

The amended project would increase the area of vegetation subject to indirect impacts by about six per cent when compared to the project described in the EIS. A total of 13.31 hectares (an additional 0.89 hectares compared to the EIS) of native vegetation within Western Sydney Parklands and east of Clifton Avenue would experience increased edge effects as a result of the project due to the creation of one or more new edges within previously unfragmented vegetation.

A total of 0.21 hectares (decrease by 0.10 hectares compared to the EIS) of native vegetation within Western Sydney Parklands would experience increased edge effects to the extent they would become unviable due to the small size of remaining patches.

The native vegetation that would be subject to potential edge effects for both the project as described in the EIS and the amended project is summarised in **Table 6-7**. The amended project

The native vegetation that would be subject to potential edge effects for both the project as described in the EIS and the amended project is summarised in Table 6-7. The amended project would result in an additional 0.79 hectares of potential edge effects (an increase from 12.73 hectares to 13.52 hectares) when compared to the edge effects presented in the EIS.

All areas of indirect impact meet the criteria for the TSC Act listed TECs, and 12.38 hectares of the total 13.52 hectares indirectly impacted meets the criteria for the EPBC Act listed TEC.

It should be noted that while the amended construction footprint overlaps a Biobank site in Western Sydney Parklands, the amended construction footprint has not changed in this area when compared to the EIS construction footprint.

Removal of threatened fauna habitat

As discussed in **Section 6.1.2.3**, the amended construction footprint contains an additional 9.83 hectares of fauna habitat compared to the EIS construction footprint (ie an increase from 334.32 hectares to 344.15 hectares) (see **Table 6-5**). This entire area consisting of woodland, riparian forest, grasslands, wetlands and watercourses would be impacted as a result of the amended project.

Species credit species

The removal of additional woodland and riparian fauna habitat has resulted in a change of impact to two species credit threatened fauna species: Cumberland Plain Land Snail and Southern Myotis.

Table 6-8 lists the potential impacts to species credit threatened fauna for both the project as described in the EIS and the amended project, highlighting the differences.

Table 6-7 Native vegetation subject to indirect impacts (potential edge effects)

Location	PCT	Condition	Area of indirect impacts in EIS (ha)	Area of indirect impacts for amended project (ha)	Difference (ha)
Western Sydney Parklands (excluding certified areas)	Non-viable fragments				
	Grey Box – Forest Red Gum grassy woodland on shale of the southern Cumberland Plain, Sydney Basin Bioregion (PCT 850)	Moderate/ Good_Medium	0.01	0.18	0.17
		Moderate/ Good_Other (Revegetation)	0.30	0.03	-0.27 (decrease)
	New edges				
	Forest Red Gum – Grey Box shrubby woodland on shale of the southern Cumberland Plain, Sydney Basin Bioregion (PCT 830)	Moderate/ Good_Poor	0.54	0.61	0.07

Location	PCT	Condition	Area of indirect impacts in EIS (ha)	Area of indirect impacts for amended project (ha)	Difference (ha)
	Grey Box – Forest Red Gum grassy woodland on flats of the Cumberland Plain, Sydney Basin Bioregion (PCT 849)	Moderate/ Good_Medium	0.24	0.57	0.33
	Grey Box – Forest Red Gum grassy woodland on shale of the southern Cumberland Plain, Sydney Basin Bioregion (PCT 850)	Moderate/ Good_High	1.06	1.24	0.18
		Moderate/ Good_Medium	3.33	3.31	-0.02 (decrease)
		Moderate/ Good_Poor	0	1.14	1.14
		Moderate/ Good_Other (Revegetation)	6.73	5.99	-0.74 (decrease)
	Total Western Sydney Parklands		12.21	13.07	0.86
East of Clifton Avenue	Broad-leaved Ironbark – Grey Box – Melaleuca decora grassy open forest on clay/gravel soils of the Cumberland Plain, Sydney Basin Bioregion (PCT 724)	Moderate/ Good_High	0.52	0.45	-0.07
	Total East of Clifton Avenue		0.52	0.45	-0.07
Grand total			12.73	13.52	0.79

¹ excluding certified areas

Table 6-8 Summary of impacts to species credit threatened fauna

Threatened fauna species	Status		Habitat area (ha) within EIS construction footprint ¹	Habitat area (ha) within amended construction footprint ¹	Difference (ha)
	TSC Act	EPBC Act			
Cumberland Plain Land Snail	Endangered	Not listed	1.86	5.22	3.36
Southern Myotis	Vulnerable	Not listed	0.92 (breeding habitat)	0.96 (breeding habitat)	0.04 (breeding habitat)

¹ excluding certified areas

Ecosystem credit species

The project as described in the EIS would result in a number of impacts to ecosystem credit species (see Table 7-14 of the EIS). No additional species would be impacted by the amended project compared to the project described in the EIS.

The amended project would remove an additional seven hectares of woodland and riparian habitat for seven bat species identified in the EIS, bringing the total to 62.58 hectares compared to 55.58 hectares to be impacted.

The amended project would still impact on the following, consistent with the project as described in the EIS (see Section 7.1.4 of the EIS):

- Removal of the 54 hollow bearing trees
- Removal of 3.69 hectares of foraging habitat for the Southern Myotis and White-bellied Sea-Eagle
- One White-bellied Sea-Eagle nest.

Removal of threatened flora

As described in in **Section 6.1.2.2**, no additional threatened flora species have been recorded within the amended construction footprint when compared to the EIS construction footprint.

About 850 individuals of *Dillwynia tenuifolia* (an increase of up to 801 individuals compared to the project as described in the EIS) would experience indirect impacts as a result of the amended project, including:

- About 44 individuals located within the amended construction footprint and protected via the implementation of exclusion zones
- About 49 individuals located within 30 metres of the construction footprint
- About 757 individuals located within a conservation zone as recorded by Ecoplaning (2015); the conservation zone would be located entirely within an exclusion zone.

About 142 individuals of *Pultenaea parviflora* (an increase of up to 124 individuals compared to the project as described in the EIS) would experience indirect impacts as a result of the amended project, including:

- About 139 individuals located within the amended construction footprint and protected via the implementation of exclusion zones.
- About three individuals located within a conservation zone as recorded by Ecoplaning (2015). The conservation zone would be located entirely within an exclusion zone.

As discussed in **Section 6.1.2.2**, there is a slight increase in potential habitats for the following threatened flora species:

- *Dillwynia tenuifolia* – additional 0.32 hectares
- *Pultenaea parviflora* – additional 0.17 hectares
- *Grevillea juniperina subsp. juniperina* – additional 6.94 hectares
- *Marsdenia viridiflora subsp. viridiflora* in the Bankstown, Camden, Campbelltown, Fairfield, Holroyd, Liverpool and Penrith Local Government Areas – additional 7.38 hectares
- *Pimelea spicata* – additional 6.77 hectares.

Matters for further consideration

The amended project would result in a loss of an additional 6.76 hectares of Cumberland Plain Woodland in the Sydney Basin Bioregion critically endangered ecological community (CEEC) under the TSC Act considered to be in moderate to good condition, when compared to the project described in the EIS. This would result in a total 48.85 hectares to be impacted as a result of the amended project. This constitutes an additional 0.02 per cent (total 0.15 per cent) of the total remaining area of Cumberland Plain Woodland identified in the regional vegetation mapping, compared to the project as described in the EIS. This is an additional 0.05 per cent (total 0.45 per cent) of the total remaining area of Cumberland Plain Woodland identified in the Final Determination for this community.

Additional areas of this CEEC identified within the amended construction footprint will be offset in accordance with the FBA, consistent with the management measures described in Section 7.1.6 of the EIS.

An updated assessment of the potential impact to Cumberland Plain Woodland in the Sydney Basin Bioregion CEEC under the TSC Act, based on Framework for Biodiversity Assessment requirements, is included in Section 5.3.2 of **Appendix A**.

Matters of National Environmental Significance

Potential impacts to Matters of National Environmental Significance are described in Section 7.1.4 of the EIS. The assessment of the amended project shows that it would have the following additional impacts on Matters of National Environmental Significance as compared with the project as described in the EIS:

- An additional 3.99 hectares of the TEC Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest would be cleared – an increase from the 38.48 hectares for the project as described in the EIS to 42.47 hectares for the amended project
- Up to 10 additional *Pultenaea parviflora* individuals plants would be cleared – up to 100 individuals total for the amended project compared to 90 individuals for the project as described in the EIS

- An additional 7.38 hectares of foraging habitat for the threatened fauna species Grey-headed Flying-fox would be cleared –an increase from 55.20 hectares for the project as described in the EIS to 62.58 hectares for the amended project
- Additional indirect impact to 124 individual *Pultenaea parviflora* plants – up to 142 individuals in total for the amended project compared to 18 individuals described in the EIS.

However, while there are likely to be these additional impacts to Matters of National Environmental Significance, these impacts have been assessed throughout this section and **Appendix A**.

There is not expected to be any change to the significant impact assessment for any other matters. Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest would continue to be significantly impacted, while the following Matters of National Environmental Significance would not be significantly impacted:

- Western Sydney Dry Rainforest and Moist Woodland on Shale
- *Pimelea spicata*
- Migratory species
- Commonwealth land.

No additional Matters of National Environmental Significance would be impacted as a result of the amended project.

6.1.3.4 Operational impacts

Section 7.1.4 of the EIS identified potential biodiversity impacts during operation of the project including:

- Fauna injury and mortality
- Changes to aquatic habitat and hydrology
- Impacts on riparian corridors
- Noise, light and vibration impacts.

The operation of the amended project would not result in additional impacts to biodiversity compared to the project as described in the EIS. Impacts would be consistent with the operational impacts documented in the EIS. More detail on the above impacts is provided in Section 5.5 of **Appendix A**.

6.1.4 Cumulative impact

The project as described in the EIS would result in substantial cumulative biodiversity impacts with nearby projects, however changes to the cumulative biodiversity impacts as a result of the amended project (when compared to the project described in the EIS) are minor. Amended cumulative biodiversity impacts include an increase in cleared native vegetation of around seven hectares, and corresponding similar increases in fauna habitat impacts. Further detail on the change in impacts associated with other local developments is provided in Chapter 6 of **Appendix A**.

Management measures outlined in Section 7.1.6 of the EIS to minimise cumulative biodiversity impacts, such as the preparation of construction-phase flora and fauna management plans, pre-clearance surveys, revegetation and the purchasing of offsets, are all considered applicable to the amended project.

6.1.5 Environmental management measures

The environmental management measures identified for the project as described in the EIS (see Section 7.1.6 of the EIS) are considered appropriate to manage the biodiversity impacts associated with the amended project. The exception is management measure B24 which has been amended to commit to setting up exclusion zones for all areas of environmental value. The amended environmental management measure for impacts on biodiversity is outlined in **Table 6-9** with additional text shown in **bold** text.

Table 6-9 Revised amended environmental management measures (biodiversity) (bold text shows change from EIS)

Impact	Reference	Environmental management measures	Responsibility	Timing
Edge effects on adjacent native vegetation and habitat	B24	<p>Exclusion zones will be set up at the limit of clearing in accordance with Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects (RTA, 2011) (Guide 2: Exclusion zones).</p> <p>Exclusion zones will be set up to protect potential indirect impacts to threatened flora in accordance with the areas identified in the Environmental Impact Statement and the amendment report (including Figure 1-2 of Appendix A of the amendment report).</p>	Contractor	During construction

6.1.6 Offsetting required

Section 7.1.7 of the EIS detailed the biodiversity offsets that would be required for the project. In summary, under the FBA, any residual impacts that cannot be avoided, minimised or mitigated, must be offset, with the offset requirements quantified as biodiversity credits.

A total of 2,568 ecosystem credits were identified as being required for the project as described in the EIS, comprising 2,414 credits for direct impacts and 154 for indirect impacts. The amended project would require a total of 2,829 ecosystem credits, comprising 2,674 credits for direct impacts and 155 for indirect impacts of the following PCTs:

- Broad-leaved Ironbark - Grey Box - Melaleuca decora grassy open forest on clay/gravel soils of the Cumberland Plain, Sydney Basin Bioregion (PCT 724)
- Forest Red Gum - Grey Box shrubby woodland on shale of the southern Cumberland Plain, Sydney Basin Bioregion (PCT 830)
- Forest Red Gum - Rough-barked Apple grassy woodland on alluvial flats of the Cumberland Plain, Sydney Basin Bioregion (PCT 835)
- Grey Box - Forest Red Gum grassy woodland on flats of the Cumberland Plain, Sydney Basin Bioregion (PCT 849)
- Grey Box - Forest Red Gum grassy woodland on shale of the southern Cumberland Plain, Sydney Basin (PCT 850)
- Swamp Oak open forest on riverflats of the Cumberland Plain and Hunter valley (PCT 1800).

A total of 5,786 species credits were identified as being required for the project as described in the EIS. The amended project would require an increase of 195 credits, totalling of 5,981 species credits for the following species:

- *Dillwynia tenuifolia*
- *Pultenaea parviflora*
- Cumberland Plain Land Snail
- Southern Myotis.

The total offset requirements have increased slightly from 8,354 credits for the project as described in the EIS to 8,810 credits for the amended project, an increase of 456 credits.

Chapter 8 of Appendix A provides a comparison of the ecosystem and species credits calculated for the amended construction footprint with the credit requirements for the project as described in the EIS presented in the EIS BAR.

6.2 Transport and Traffic

The transport and traffic updated technical report is provided in **Appendix B**, and a summary is provided below. This section should be read in conjunction with Section 7.2 of the EIS and the transport and traffic assessment report provided in Appendix F of the EIS.

6.2.1 Assessment methodology

The updated assessment methodology involved the following:

- A revised assessment of construction transport and traffic impacts based on the amended project and additional ancillary facilities to support construction of the amended project
- A revised assessment of future operational performance of the road network without the amended project
- A revised assessment of future operational transport and traffic impacts with the amended project
- A comparison of construction and operational impacts between the project as described in the EIS and the amended project.

The study area, including the broader study area, for the assessment of the amended project is consistent with the EIS.

Changes to the assessment methodology used to carry out the assessment of the amended project compared to that used for the project as described the EIS are discussed in the following sections.

6.2.1.1 Transport forecasting and modelling process

Assessment of the project as described in the EIS was undertaken using WestConnex Road Toll Model (WRTM) version 2.3. Updates of critical inputs and improvements to the modelling process were carried out to produce Sydney Strategic Motorway Planning Model (SMPM) version 1.0, and then version 1.1. These versions substantially improved the predictive robustness of the model for the western Sydney area. As the development of SMPM has included additional data collection, recalibration and validation, it is considered to be an enhanced version of WRTM, rather than a new model. SMPM version 1.1 has been used for the assessment of the amended project.

The critical differences between WRTM version 2.3 and SMPM version 1.1 are:

- Land use and demographics scenario has been updated from LU14 version 4 (developed in 2014 and adjusted for specific developments) to a more recent LU16 (developed in 2016)
- Revised Sydney Strategic Travel Model (STM) (described in Section 3.4.1 of Appendix F of the EIS) runs have been used for the calculation of forecast traffic demands; changes were made within the STM including:
 - New land use (LU) 16
 - Revised port and airport assumptions
 - Update of the freight movement model (undertaken in March 2018)
- Improvements to the development of the SMPM including:
 - Intensive data collection in areas outside the WestConnex corridor
 - Re-estimation of base year demands for all time periods to a 2014 base year (previously 2012)

- Simplification of toll choice parameters
- Network modifications to improve travel time responses to congestion
- Changes to the future demand growth process, correcting for issues with large greenfield areas and improving airport and port growth calculations.

The main implication of the change to SMPM version 1.1 is that the traffic forecasts for western Sydney have been revised. Substantial changes in forecast land use (including a reduction in forecast land-use changes) and improvements in modelling processes, both within STM and SMPM, have resulted in corresponding changes in future traffic demands. As a result, the existing, 'do minimum' and 'with project' scenarios described in Section 7.2.2 of the EIS have been updated and are assessed in this section and in **Appendix B**. Where relevant, these updated scenarios and the scenarios of the project as described in the EIS are described throughout this section.

In particular, the change to the demand growth process in SMPM has resulted in a substantial reduction in future trips to the South West Growth Area and the Western Sydney Employment Area. Forecast traffic volumes using the amended project and the surrounding network have reduced as a result. The revised SMPM version 1.1 traffic forecasts (the revised traffic forecast) for western Sydney are considered to be more robust than the WRTM version 2.3 forecasts. The revised traffic forecasts show that there is substantial growth on most roads. This growth is consistent with anticipated land use changes in the broader western Sydney area. When compared to the assessment carried out for the EIS, the majority of traffic volumes for the 2024 'do minimum' are lower, however (see **Table 6-11** and **Table 6-12**). This is due to the change in demand growth in SMPM version 1.1, which is lower than that used in the WRTM version 2.3.

The assessment included the following as part of the road network assumptions for the 2024 'do minimum' and 2024 'with construction' scenarios:

- Realignment of the western end of Elizabeth Drive
- Upgrade of the existing roundabout at The Northern Road / Elizabeth Drive to traffic signals (as part of The Northern Road upgrade).

6.2.1.2 Modelled scenarios

Traffic modelling of six scenarios has been undertaken to:

- Assess the performance of the road network, both with and without the amended project
- Identify the impacts of the amended project, both under construction and operation.

The purpose of modelling each of these scenarios is to determine the difference in traffic flows and road network performance between the business-as-usual scenario (with the opening of Western Sydney International Airport) and the two project options to determine the impacts of the amended project on the transport network. This was done using revised SMPM version 1.1 traffic forecasts for western Sydney.

These six modelled scenarios are consistent with the EIS and include:

- **2024 'do minimum'** – reflects the forecast transport network and traffic demand without the amended project in 2024, which includes the completion of The Northern Road upgrade between Mersey Road and Jamison Road, and Bringelly Road upgrade between Camden Valley Way and The Northern Road; it also includes forecast traffic growth to 2024 based on the LU16 land use and demographics scenario
- **2024 'with construction'** – as per 2024 'do minimum' but includes construction transport and traffic management measures to facilitate access for construction vehicles to construction ancillary facilities during the peak period of construction

- **2026 ‘do minimum’** – includes The Northern Road upgrade, Bringelly Road upgrade, Elizabeth Drive upgrade between M7 Motorway and Mamre Road, and the opening and operation of the Western Sydney International Airport and two access intersections along Elizabeth Drive between Adams Road and Taylors Road. It also includes forecast traffic growth to 2026 based on the LU16 land use and demographics scenario and WSA Co growth forecasts
- **2026 ‘with amended project’** – as per 2026 ‘do minimum’ but includes operation of the amended project (option 1 – without Elizabeth Drive connection and option 2 – with Elizabeth Drive connection)
- **2036 ‘do minimum’** – includes all upgrades assumed in the 2026 ‘do minimum’ scenario as well as:
 - Upgrade of the M7 Motorway to three lanes in each direction
 - Upgrade of Cowpasture Road between M7 Motorway and Camden Valley Way
 - Realignment and upgrade of the Luddenham Road / Adams Road intersection
 - Realignment of the Mamre Road to Elizabeth Drive/Devonshire Road intersection
 - Upgrade of Elizabeth Drive to four lanes between The Northern Road and Mamre Road
 - Upgrade of Fifteenth Avenue between Cowpasture Road and Fourth Avenue
 - Forecast traffic growth to 2036 based on the LU16 land use and demographics scenario and WSA Co growth forecasts
- **2036 ‘with amended project’** – as per 2036 ‘do minimum’ but includes operation of the amended project (option 1 – without Elizabeth Drive connection and option 2 – with Elizabeth Drive connection).

6.2.1.3 Intersection performance

Level of service (LoS) is a measure to describe the operational conditions and efficiency of a roadway or intersection as perceived by motorists and/or passengers. LoS is rated from A to F. LoS A representing a condition of free flow in which individual drivers are virtually unaffected by the presence of others in the traffic stream. LoS F describing a zone of forced flow, where the amount of traffic approaching the point under consideration exceeds that which can pass it, resulting in flow breakdown, queuing and delays.

6.2.2 Existing environment

The existing environment in relation to traffic and transport as described in Section 7.2.3 of the EIS remains a relevant baseline to assess the amended project. It is noted, however, that since the EIS was prepared, major upgrades to the regional road network have been completed and opened to traffic including:

- The Northern Road Stage 1 between Old Northern Road, Narellan and Peter Brock Drive, Oran Park (opened in April 2018)
- Bringelly Road Stage 1 between Camden Valley Way, Leppington and King Street, Rossmore (opened in December 2018).

In addition, existing traffic volumes have changed due to ongoing development in the broader study area when compared to the existing traffic volumes presented in Section 7.2.3 of the EIS, which were based on traffic counts collected in 2015.

6.2.3 Assessment of potential impacts

6.2.3.1 Construction impacts

Section 7.2.5 of the EIS identified a number of potential transport and traffic impacts that may occur during construction of the project. The following construction impacts associated with the amended project are considered to be consistent with the project as described in the EIS:

- Work site and construction ancillary facility access assumptions
- Road closures, detours and other temporary traffic management
- Construction worker parking and impacts on on-street parking
- Impacts on public transport
- Impacts on pedestrians and cyclists
- Other impacts of construction.

These impacts are considered consistent as there is either no change from the impacts as described in the EIS or the change is minor and can be managed in accordance with existing management measures already outlined in the EIS. They have therefore not been repeated in this section.

The following construction updates (see **Chapter 4**) would result in changes to the construction impacts associated with the amended project:

- Construction stages and program – see **Section 4.2.8**
- Construction footprint – see **Section 4.3** and **Section 4.2.5**
- Haulage routes and additional ancillary sites – see **Section 4.2.6** (**Table 4-6** and **Table 4-7** and shown in **Figure 4-4**).

Construction impacts associated with the amended project that are likely to change compared to the project as described in the EIS are listed below and detailed in the sub-sections that follow:

- Work site and construction ancillary facility traffic generation
- Background traffic volumes and patterns
- Intersection performance.

Work site and construction ancillary facility traffic generation

The forecast light and heavy vehicle traffic generation from each of the ancillary facilities for the amended project is provided in **Table 6-10**. Assumptions for light vehicle traffic generation during the morning peak and spoil haulage vehicles are consistent with those described in Section 7.2.5 of the EIS.

Table 6-10 Construction traffic generation for the amended project (inbound and outbound average)

Site	Average daily heavy vehicle generation	Morning peak light vehicle generation	Morning peak heavy vehicle generation	Evening peak light vehicle generation	Evening peak heavy vehicle generation
AF 1/10	200	93	20	93	20
AF 2/3	180	93	16	93	16
AF 4/12	80	93	8	93	8
AF 5	160	93	16	93	16
AF 6	160	93	16	93	16
AF 7/8	100	-	10	-	10
AF 9	120	-	12	-	12
AF 11	160	93	16	93	16
AF 13/14	160	93	16	93	16
AF 15	160	93	16	93	16
AF 16	200	93	20	93	20
AF 17	160	-	16	-	16
AF 18	120	-	12	-	12
Total	1960	837	194	837	194

Comparing the above with construction traffic generation in Table 7-39 of the EIS, the assessment identifies the following increases in vehicles generation for the amended project:

- Daily heavy vehicle generation – 400 vehicles (increase of 26 per cent)
- Morning peak light vehicle generation – five vehicles (increase of less than one per cent)
- Morning peak heavy vehicle generation – 38 vehicles (increase of 24 per cent)
- Evening peak light vehicle generation – five vehicles (increase of less than one per cent)
- Evening peak heavy vehicle generation – 38 vehicles (increase of 24 per cent).

Increased numbers of heavy vehicles are the result of the increased amended earthwork quantities described in **Section 4.2.1**.

Background traffic volumes and patterns

Peak construction traffic generation for the amended project would occur in 2024. This timing is consistent with the project as described in the EIS. For the amended project, a 2024 'do minimum' scenario has been developed that includes forecast traffic growth to 2024 based on the LU16 land use and demographics scenario. A summary of the forecast background traffic growth on key roads is provided in **Table 6-11** and **Table 6-12**.

Comparing the 2017 base and 2024 'do minimum' traffic volumes for the amended project (see **Table 6-11** and **Table 6-12**), there is substantial growth on most roads that is consistent with anticipated land use changes in the broader western Sydney area. When compared to the EIS, the majority of traffic volumes for the 2024 'do minimum' (see **Table 6-11** and **Table 6-12**) are lower due to the change in demand growth in SMPM version 1.1 (as described in **Section 6.2.1**).

Table 6-11 Traffic growth on key roads in the core study area in 2024 for the amended project (morning peak)

Road location	Direction	Project as per EIS Morning peak (7.30am to 8.30am)			Amended project Morning peak (7.30am to 8.30am)		
		2017 base	2024 'do minimum'	% change	2017 base	2024 'do minimum'	% change
The Northern Road north of Elizabeth Drive	Northbound	685	1,467	114%	685	1405	105%
	Southbound	761	1,205	58%	761	1081	42%
The Northern Road south of Elizabeth Drive	Northbound	866	679	-22%	866	803	-7%
	Southbound	522	654	25%	522	376	-28%
Elizabeth Drive west of Adams Road	Eastbound	611	948	55%	611	980	60%
	Westbound	305	857	181%	305	718	135%
Elizabeth Drive west of Devonshire Road	Eastbound	1,199	1,223	2%	1199	1143	-5%
	Westbound	516	728	41%	516	588	14%
Elizabeth Drive east of Mamre Road	Eastbound	1,407	1,306	-7%	1407	1213	-14%
	Westbound	852	1,063	25%	852	935	10%

Road location	Direction	Project as per EIS Morning peak (7.30am to 8.30am)			Amended project Morning peak (7.30am to 8.30am)		
		2017 base	2024 'do minimum'	% change	2017 base	2024 'do minimum'	% change
Elizabeth Drive east of Wallgrove Road	Eastbound	1,426	1,493	5%	1426	1217	-15%
	Westbound	1,273	1,512	19%	1273	1413	11%
Mamre Road north of Wallgrove Road	Northbound	752	1,064	41%	752	776	3%
	Southbound	502	644	28%	502	495	-1%
Wallgrove Road north of Elizabeth Drive	Northbound	1,191	1,178	-1%	1191	1093	-8%
	Southbound	299	201	-33%	299	285	-5%

Table 6-12 Traffic growth on key roads in the core study area in 2024 for the amended project (evening peak)

Road location	Direction	Project as per EIS Evening peak (5.30pm to 6.30pm)			Amended project Evening peak (5.30pm to 6.30pm)		
		2017 base	2024 'do minimum'	% change	2017 base	2024 'do minimum'	% change
The Northern Road north of Elizabeth Drive	Northbound	801	2,111	164%	801	1220	52%
	Southbound	673	747	11%	673	1565	133%
The Northern Road south of Elizabeth Drive	Northbound	659	1,151	75%	659	549	-17%
	Southbound	933	381	-59%	933	998	7%
Elizabeth Drive west of Adams Road	Eastbound	297	622	109%	297	704	137%
	Westbound	642	1,318	105%	642	813	27%
Elizabeth Drive west of Devonshire Road	Eastbound	511	626	23%	511	606	19%
	Westbound	833	1,257	51%	833	933	12%
Elizabeth Drive east of Mamre Road	Eastbound	718	895	25%	718	786	9%
	Westbound	1,153	1,532	33%	1153	1229	7%
Elizabeth Drive east of Wallgrove Road	Eastbound	1,236	1,962	59%	1236	1375	11%
	Westbound	1,180	1,410	19%	1180	1276	8%
Mamre Road north of Wallgrove Road	Northbound	729	1013	39%	729	751	3%
	Southbound	642	975	52%	642	752	17%
Wallgrove Road north of Elizabeth Drive	Northbound	592	596	1%	592	579	-2%
	Southbound	690	864	25%	690	739	7%

Intersection performance

2024 'do minimum' scenario (without construction)

Overall, when compared to the project described in the EIS, the majority of intersections for the 2024 'do minimum' scenario (without construction) have improved performance. This is due to the change to the demand growth in SMPM version 1.1, amended and additional ancillary facilities, and related changes to construction traffic generation.

The assessment identified that without construction traffic, the following intersections would operate at LoS D or F in 2024:

- Elizabeth Drive / Devonshire Road (morning and evening peak)
- Elizabeth Drive / Badgerys Creek Road (morning peak).

In the 2024 'do minimum' scenario, the Elizabeth Drive / Devonshire Road intersection would perform poorly at LoS F during the morning and evening peaks. This is due to high delays for vehicles turning out of Devonshire Road, which is priority-controlled. LoS at priority-controlled intersections is reported for the worst movement, hence the poor intersection performance reflects high delays for traffic turning out of Devonshire Road during the morning and evening peaks.

The modelling shows a decrease in performance at the Elizabeth Drive / Badgerys Creek Road intersection; however the modelling does not reflect the recent roundabout upgrade that has been installed by WSA Co as part of the Western Sydney Internal Airport construction. This implementation will result in an improved performance for this intersection

All other intersections would perform at a satisfactory LoS.

Modelled intersection performance for the 2024 'do minimum' scenario (without construction) during the morning and evening peaks is summarised in **Table 6-13**.

Table 6-13 Intersection performance – 2024 'do minimum' scenario (without construction)

Intersection	Amended project or project as described in the EIS	2024 'do minimum' morning peak (7.30am to 8.30am)		2024 'do minimum' evening peak (5.30pm to 6.30pm)	
		Average delay (seconds)	LoS	Average delay (seconds)	LoS
Elizabeth Drive / M7 Motorway southbound ramps	Amended Project	31	C	37	C
	Project as per EIS	26	B	49	D
Elizabeth Drive / M7 Motorway northbound ramps / Wallgrove Road	Amended Project	35	C	40	C
	Project as per EIS	43	C	135	F
Elizabeth Drive / Cecil Road	Amended Project	18	B	7	A
	Project as per EIS	9	A	9	A

Intersection	Amended project or project as described in the EIS	2024 'do minimum' morning peak (7.30am to 8.30am)		2024 'do minimum' evening peak (5.30pm to 6.30pm)	
		Average delay (seconds)	LoS	Average delay (seconds)	LoS
Elizabeth Drive / Duff Road	Amended Project	20	B	11	A
	Project as per EIS	20	B	13	A
Elizabeth Drive / Mamre Road	Amended Project	19	B	13	A
	Project as per EIS	28	B	16	B
Elizabeth Drive / Range Road	Amended Project	10	A	20	B
	Project as per EIS	8	A	13	A
Elizabeth Drive / Devonshire Road	Amended Project	311	F	113	F
	Project as per EIS	495	F	1468	F
Elizabeth Drive / Clifton Avenue	Amended Project	14	A	5	A
	Project as per EIS	12	A	4	A
Elizabeth Drive / Western Road	Amended Project	14	A	17	B
	Project as per EIS	16	B	19	B
Elizabeth Drive / Martin Road	Amended Project	9	A	9	A
	Project as per EIS	8	A	13	A
Elizabeth Drive / Lawson Road	Amended Project	9	A	6	A
	Project as per EIS	7	A	9	A
Elizabeth Drive / Badgerys Creek Road	Amended Project	55	D	13	A
	Project as per EIS	61	E	31	C

Intersection	Amended project or project as described in the EIS	2024 'do minimum' morning peak (7.30am to 8.30am)		2024 'do minimum' evening peak (5.30pm to 6.30pm)	
		Average delay (seconds)	LoS	Average delay (seconds)	LoS
Elizabeth Drive / Adams Road	Amended Project	11	A	10	A
	Project as per EIS	9	A	11	A
Elizabeth Drive / Luddenham Road	Amended Project	12	A	8	A
	Project as per EIS	15	A	29	B
Elizabeth Drive / The Northern Road	Amended Project	41	C	41	C
	Project as per EIS	37	C	41	C

Orange shading = LoS D or worse for the amended project, Yellow shading = LoS D or worse for the project as described in the EIS

2024 'do minimum' scenario (with construction)

When compared to the project described in the EIS, there are improvements at the majority of intersections for the 2024 'do minimum' scenario (with construction) for the amended project, particularly during the evening peak.

In the 2024 'with construction' scenario, the following intersections would perform poorly at LoS F for the amended project:

- Elizabeth Drive / Devonshire Road – would remain at LoS F (morning and evening)
- Elizabeth Drive / Badgerys Creek Road – would change from LoS D (as per the EIS) to LoS F (morning peak).

As discussed above, the modelling results do not reflect the recent roundabout upgrade that has been installed by WSA Co at Elizabeth Drive / Badgerys Creek Road as part of the Western Sydney International Airport construction, which would result in an improved performance for this intersection (greater than a LoS F).

The assessment also identified a decreased level of intersection performance at Elizabeth Drive / Cecil Road and Elizabeth Drive / Range Road due to the additional compounds sites in Western Sydney Parklands. Decreases in intersection performance at Elizabeth Drive / Western Road are due to changes to background traffic assumptions in SMPM version 1.1.

Increases in delays at these intersections are a result of the addition of construction-related heavy vehicle traffic. Additional delays would be experienced for vehicles waiting for a gap in traffic when turning right or left. Due to their length, construction-related heavy vehicles require longer gaps in traffic to safely turn from minor roads at priority-controlled intersections.

Development of the CTTMP would include a review of the Devonshire Road / Elizabeth Drive / Salisbury Avenue intersection to determine if feasible additional traffic control measures would be required to be implemented to safely manage construction movements and reduce delays at the intersection.

Modelled intersection performance for the 2024 'do minimum' scenario (with construction) during the morning and evening peaks is summarised in **Table 6-14**.

6.2.3.2 Operational impact

Section 7.2.6 of the EIS identified a number of potential transport and traffic impacts that may occur during operation of the project. The following operational impacts associated with the amended project are considered to be consistent with the project as described in the EIS:

- Assessment of impacts without the project
 - Changes to the road network
 - Changes to the public transport network
 - Changes to the pedestrian and cycle network
 - Changes to parking and access
 - Induced demand
- Assessment of impacts with the project
 - Impacts on public transport
 - Impacts on active transport
 - Impacts on road safety
 - Impacts on local roads and access
 - Impacts on parking.

These impacts are considered consistent with the project as described in the EIS, as there is either no change from the impacts as described in the EIS or the change is minor and can be managed in accordance with existing management measures already outlined in the EIS. They have therefore not been repeated in this section.

Operational impacts associated with the design changes of the amended project (described in **Chapter 3**) that have changed from the EIS are listed below and detailed in the sub-sections that follow:

- Assessment of impacts without the project
 - Changes to regional road network volumes
 - Changes to heavy vehicle volumes
 - Changes to network performance
 - Changes to intersection performance
 - Changes to general traffic travel times
- Assessment of impacts with the project
 - Changes to regional road network volumes
 - Changes to network performance statistics
 - Changes to intersection performance
 - Changes to general traffic travel times
 - Impacts on freight transport.

Table 6-14 Intersection performance – 2024 ‘with construction’ scenario

Intersection	Morning peak (7.30am to 8.30am)						Evening peak (5.30pm to 6.30pm)					
	2024 ‘do minimum’ no construction		2024 project as per EIS ‘with construction’		2024 amended project ‘with construction’		2024 ‘do minimum’ no construction		2024 project as per EIS ‘with construction’		2024 amended project ‘with construction’	
	Average delay (secs)	LoS	Average delay (secs)	LoS	Average delay (secs)	LoS	Average delay (secs)	LoS	Average delay (secs)	LoS	Average delay (secs)	LoS
Elizabeth Drive / M7 Motorway southbound ramps	31	C	28	B	34	C	37	C	81	F	42	C
Elizabeth Drive / M7 Motorway northbound ramps / Wallgrove Road	35	C	48	D	41	C	40	C	> 100	F	51	D
Elizabeth Drive / Cecil Road	18	B	15	A	23	B	7	A	> 100	F	14	A
Elizabeth Drive / Duff Road	20	B	29	C	24	B	11	A	77	F	20	B
Elizabeth Drive / Mamre Road	19	B	34	C	23	B	13	A	30	C	18	B
Elizabeth Drive / Range Road	10	A	13	A	35	C	20	B	33	C	45	D

Intersection	Morning peak (7.30am to 8.30am)						Evening peak (5.30pm to 6.30pm)					
	2024 'do minimum' no construction		2024 project as per EIS 'with construction'		2024 amended project 'with construction'		2024 'do minimum' no construction		2024 project as per EIS 'with construction'		2024 amended project 'with construction'	
	Average delay (secs)	LoS	Average delay (secs)	LoS	Average delay (secs)	LoS	Average delay (secs)	LoS	Average delay (secs)	LoS	Average delay (secs)	LoS
Elizabeth Drive / Devonshire Road	311	F	465	F	368	F	113	F	1675	F	771	F
Elizabeth Drive / Clifton Avenue	14	A	15	B	20	B	5	A	49	D	21	B
Elizabeth Drive / Western Road	14	A	20	B	24	B	17	B	26	B	36	C
Elizabeth Drive / Martin Road	9	A	9	A	10	A	9	A	15	A	13	A
Elizabeth Drive / Lawson Road	9	A	9	A	11	A	6	A	14	A	10	A
Elizabeth Drive / Badgerys Creek Road	55	D	63	E	124	F	13	A	55	D	19	B
Elizabeth Drive / Adams Road	11	A	9	A	13	A	10	A	23	B	24	B

Intersection	Morning peak (7.30am to 8.30am)						Evening peak (5.30pm to 6.30pm)					
	2024 'do minimum' no construction		2024 project as per EIS 'with construction'		2024 amended project 'with construction'		2024 'do minimum' no construction		2024 project as per EIS 'with construction'		2024 amended project 'with construction'	
	Average delay (secs)	LoS	Average delay (secs)	LoS	Average delay (secs)	LoS	Average delay (secs)	LoS	Average delay (secs)	LoS	Average delay (secs)	LoS
Elizabeth Drive / Luddenham Road	12	A	16	B	17	B	8	A	> 100	F	17	B
Elizabeth Drive / The Northern Road	41	C	38	C	41	C	41	C	43	C	41	C

Orange shading = LoS D or worse for the amended project

Changes to regional road network volumes – without the project

The total 'do minimum' scenario traffic volume forecasts (without the project) for key primary arterial roads in the study area are provided in **Table 6-15** and **Table 6-16**. Taken as groups, these locations define three major 'screen lines' that can be used to compare the changes in directional and two-way demands across the study area at a strategic level. The screen lines are shown in **Figure 6-7**. A full breakdown of the traffic volume forecasts along each screen line is provided in Table 6-10 to Table 6-13 of **Appendix B**.

Analysis of the 'do minimum' traffic volumes across each of the screen lines shows the following:

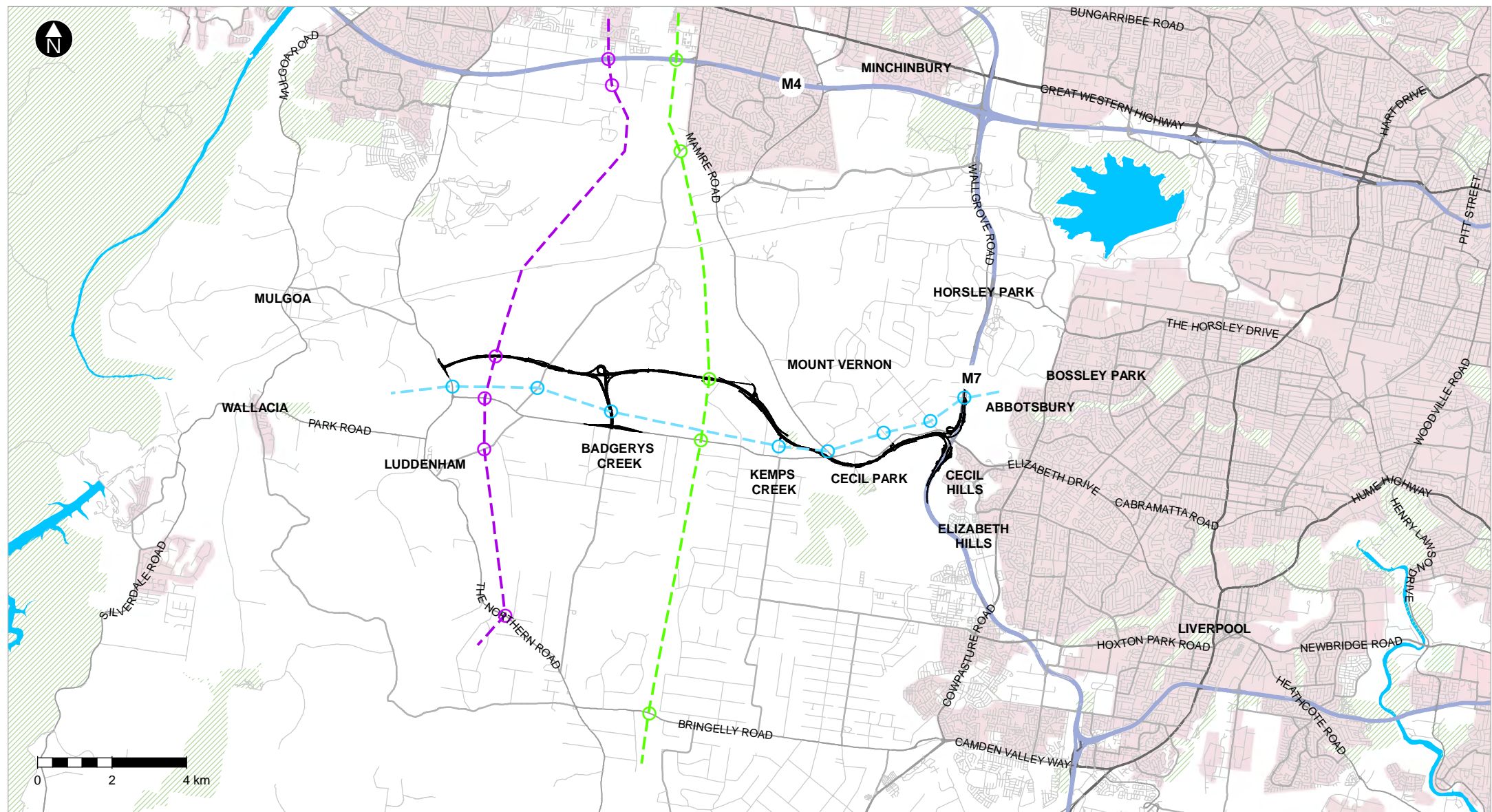
- Total north-south traffic volumes across the study area are forecast to increase by over 50 per cent between 2017 and 2036
 - The majority of this growth in north-south traffic would occur on the M7 Motorway, Mamre Road and The Northern Road, which are the primary north-south arterial roads through the study area. This reflects the substantial increase in forecast land use in and around the study area as part of the Western Parkland City
- The assumed widening of the M7 Motorway to three lanes by 2036 in each direction (consistent with the traffic modelling in the EIS) would substantially reduce traffic volumes on Mamre Road north of the proposed Devonshire Street connection
 - As a result of this realignment, the north-south traffic that currently travels between Devonshire Road and Mamre Road would travel directly north-south along the extension of Devonshire Road at a new intersection with Elizabeth Drive
- Traffic volumes along Luddenham Road would increase substantially by 2036
 - This is reflective of increased traffic from Western Sydney International Airport and also due to the realignment and connection of Luddenham Road to Adams Road and through to The Northern Road. This creates an alternative route to The Northern Road for trips travelling to the M4 Motorway and the Great Western Highway via Mamre Road
- Total east-west traffic volumes are forecast to increase by about 100 per cent by 2036
 - Most of this growth in east-west traffic would occur on the M4 Motorway, Luddenham Road, Elizabeth Drive and Bringelly Road
- Increased traffic volumes along Elizabeth Drive are primarily a result of the Western Sydney International Airport.

The majority of forecast 'do minimum' north-south and east-west traffic volumes for the amended project are lower when compared to the project described in the EIS. This reflects the change to the demand growth in SMPM version 1.1 that has resulted in forecast traffic volumes being lower. These lower volumes are the main reasons there is improved operational performance for the amended project compared to the project as described in the EIS.

Changes to heavy vehicle volumes – without the project

The Western Sydney International Airport will be a substantial attractor of heavy vehicle traffic, generating new freight movements between air and road freight modes. Elizabeth Drive, The Northern Road and M7 Motorway all carry high proportions of heavy vehicles, with heavy vehicles making up between 15 and 20 per cent of daily traffic volumes on these roads.

Freight volumes are likely to increase as a result of general economic growth in western Sydney and across Greater Sydney as described in the Greater Sydney Region Plan. A summary of forecast daily heavy vehicle volumes on key roads in the study area for the 2026 and 2036 'do minimum' scenarios is presented in **Table 6-17**.



- The project
- - - East-West Screen Line
- - - Eastern North-South Screen Line
- - - Western North-South Screen Line

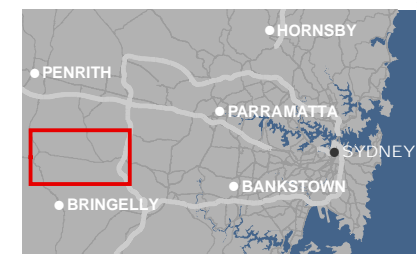


Figure 6-7 Screen lines for the amended project

Table 6-15 Morning peak 'do minimum' screen line volume summary

Screen line	Amended project or project as described in the EIS	Total number of vehicles					
		2017 base		2026 'do minimum'		2036 'do minimum'	
		7am to 8am	8am to 9am	7am to 8am	8am to 9am	7am to 8am	8am to 9am
Morning peak 'do minimum' (east-west screen line)							
East-west screen line (southbound)	Amended Project	4772	4579	6143	5879	8040	7681
	Project as per EIS	4772	4579	6822	6847	8574	8261
East-west screen line (northbound)	Amended Project	5714	5825	5557	5820	9303	8991
	Project as per EIS	5714	5825	7323	8230	9004	8946
Morning peak 'do minimum' (north-south screen line)							
Eastern north-south screen line (eastbound)	Amended Project	6085	5645	7361	7520	8388	8070
	Project as per EIS	6085	5645	7378	7896	9600	7891
Eastern north-south screen line (westbound)	Amended Project	3195	3696	5504	6362	6262	7147
	Project as per EIS	3195	3696	5645	6475	7035	7771
Western north-south screen line (eastbound)	Amended Project	4937	4479	5842	6094	6480	6293
	Project as per EIS	4937	4479	5833	6335	7097	6403
Western north-south screen line (westbound)	Amended Project	2976	3332	4192	4974	4662	5518
	Project as per EIS	2976	3332	4162	4903	4781	5301

Table 6-16 Evening peak 'do minimum' screen line volume summary

Screen line	Amended project or project as per EIS	Total number of vehicles					
		2017 base		2026 'do minimum'		2036 'do minimum'	
		4pm to 5pm	5pm to 6pm	4pm to 5pm	5pm to 6pm	4pm to 5pm	5pm to 6pm
Evening peak 'do minimum' (east-west screen line)							
East-west screen line (southbound)	Amended Project	6159	5364	8633	8356	10,850	10,224
	Project as per EIS	6159	5364	8698	8657	10,697	10,185
East-west screen line (northbound)	Amended Project	5482	4842	6726	6446	8060	7547
	Project as per EIS	5482	4842	7568	7445	9215	9630
Evening peak 'do minimum' (north-south screen line)							
Eastern north-south screen line (eastbound)	Amended Project	3769	3557	6075	5988	7714	7489
	Project as per EIS	3769	3557	7691	7285	10,011	9817
Eastern north-south screen line (westbound)	Amended Project	6184	6512	8202	8558	9568	9829
	Project as per EIS	6184	6512	9265	9844	10,434	10,766
Western north-south screen line (eastbound)	Amended Project	3411	3402	4725	4582	5631	5802
	Project as per EIS	3411	3402	4965	4985	7271	7562
Western north-south screen line (westbound)	Amended Project	5118	5412	6107	6449	7277	7602
	Project as per EIS	5118	5412	7200	7667	8385	9312

Table 6-17 Forecast 'do minimum' daily heavy vehicle volumes on key roads in the study area

Road location	Direction	2012* base	Project as per EIS				Revised traffic forecast			
			2026 'do minimum'	% change from 2012	2036 'do minimum'	% change from 2012	2026 'do minimum'	% change from 2012	2036 'do minimum'	% change from 2012
The Northern Road north of Elizabeth Drive	Northbound	600	1430	138%	1370	128%	2560	327%	2940	390%
	Southbound	810	1600	98%	610	-25%	3340	312%	3240	300%
The Northern Road south of Elizabeth Drive	Northbound	620	1120	81%	1290	108%	2130	244%	2520	306%
	Southbound	890	1560	75%	560	-37%	2730	207%	2910	227%
Elizabeth Drive west of Adams Road	Eastbound	180	130	-28%	630	250%	700	289%	390	117%
	Westbound	240	430	79%	600	150%	670	179%	630	163%
Elizabeth Drive west of Devonshire Road	Eastbound	590	610	3%	1540	161%	1190	102%	990	68%
	Westbound	920	1110	21%	1450	58%	720	-22%	1020	11%
Elizabeth Drive east of Mamre Road	Eastbound	840	1290	54%	2390	185%	1620	93%	1870	123%
	Westbound	1460	1610	10%	2420	66%	1350	-8%	1500	3%

Road location	Direction	2012* base	Project as per EIS				Revised traffic forecast			
			2026 'do minimum'	% change from 2012	2036 'do minimum'	% change from 2012	2026 'do minimum'	% change from 2012	2036 'do minimum'	% change from 2012
Elizabeth Drive East of Wallgrove Road	Eastbound	1040	1650	59%	2770	166%	1870	80%	2260	117%
	Westbound	1660	1930	16%	2790	68%	1020	-39%	1120	-33%
Mamre Road north of Wallgrove Road	Northbound	390	1080	177%	2070	431%	310	-21%	150	-62%
	Southbound	220	1270	477%	1720	682%	460	109%	700	218%
Wallgrove Road north of Elizabeth Drive	Northbound	430	1050	144%	810	88%	2070	381%	1940	351%
	Southbound	740	1500	103%	1270	72%	650	-12%	450	-39%

*WRTM calibrated base year is 2012

When compared to the project described in the EIS, the forecast 'do minimum' daily heavy vehicle volumes for the revised traffic forecast shows the following differences:

- Volumes on The Northern Road are substantially higher in 2026 and 2036
- Volumes on Elizabeth Drive and Mamre Road are substantially lower in 2036
- Volumes on Wallgrove Road are substantially higher in 2026 and 2036 in the northbound direction only.

Changes to network performance – without the project

Analysis of 'do minimum' network performance for the revised traffic forecast shows the following:

- Total traffic demand in the study area is forecast to increase by 59 per cent during the morning peak and 59 per cent during the afternoon peak from 2017 to 2036. This is reflective of the large increase in residential land that is planned for release as part of the Western Parkland City, as well as employment land associated with Western Sydney International Airport
- Total travel distance through the study area would increase by 56 per cent during the morning peak and 58 per cent during the evening peak from 2017 to 2036
- Total travel time through the study area would increase by 139 per cent during the morning peak and 143 per cent during the evening peak from 2017 to 2036
- Average speeds through the study area would decrease by 21 per cent during the morning peak and 19 per cent during the evening peak from 2017 to 2036
- Three per cent of forecast demand in the morning peak and four per cent of forecast demand in the evening peak would be unable to enter the network by 2036. This indicates that the future road network would be operating at or near capacity.

When compared to the project described in the EIS, the 'do minimum' network performance for the revised traffic forecast shows the following differences:

- Total traffic demand, total travel distance and total travel time are lower
- Average speeds are higher
- Total unreleased trips are lower.

These changes reflect the change to the demand growth in SMPM version 1.1 that has resulted in forecast traffic volumes being lower.

A summary of network performance statistics for the 2026 and 2036 'do minimum' scenarios, compared to the project as described in the EIS, is presented in **Table 6-18**.

Table 6-18 'Do minimum' network performance statistics for the comparison of the project as described in the EIS to the amended project

Network measures	Revised traffic forecast or project as per EIS	Morning peak			Evening peak		
		2017 base	2026 'do minimum'	2036 'do minimum'	2017 base	2026 'do minimum'	2036 'do minimum'
Network statistics for all vehicles							
Total traffic demand (vehicles)	Revised traffic forecast	193,949	252,184	307,926	223,148	291,873	355,643
	Project as per EIS	193,949	276,206	344,333	223,148	345,296	455,336
Total vehicle kilometres travelled through network	Revised traffic forecast	1,667,587	2,203,429	2,599,067	1,828,324	2,461,544	2,888,246
	Project as per EIS	1,667,587	2,350,227	2,673,216	1,828,324	2,802,008	3,185,503
Total vehicle travel time through the network (hours)	Revised traffic forecast	28,699	43,142	68,597	31,893	50,655	77,562
	Project as per EIS	28,699	60,008	74,249	31,893	78,157	96,743
Average network speed (km/h)	Revised traffic forecast	58	53	46	57	52	46
	Project as per EIS	58	39	36	57	36	33
Total vehicles entering the network	Revised traffic forecast	196,113	248,430	295,510	227,661	285,957	333,605
	Project as per EIS	196,113	268,058	305,541	227,661	332,230	376,363
Unreleased traffic							
Total unreleased trips	Revised traffic forecast	204	241	7484	807	3236	14,293
	Project as per EIS	204	10,383	37,133	807	23,351	80,179
% of demand unreleased	Revised traffic forecast	0%	0%	3%	0%	1%	4%
	Project as per EIS	0%	4%	11%	0%	7%	18%

Changes to intersection performance – without the project

Analysis of 'do minimum' intersection performance for the revised traffic forecast shows the following:

- In the 2026 'do minimum' scenario, the following intersections would perform poorly at LoS E or LoS F:
 - Elizabeth Drive / Mamre Road – LoS F (morning peak)
 - Elizabeth Drive / Wallgrove Road – LoS E (evening peak)
 - Elizabeth Drive / M7 Motorway – LoS F (morning and evening peak)
- In the 2036 'do minimum' scenario, the following intersections would perform poorly at LoS E or LoS F:
 - Elizabeth Drive / Luddenham Road – LoS E (morning peak)
 - Elizabeth Drive / Business Park West – LoS E (morning peak)
 - Elizabeth Drive / Martin Road – LoS F (morning peak)
 - Elizabeth Drive / Western Road – LoS F (morning peak)
 - Elizabeth Drive / Devonshire Road – LoS E (morning and evening peak)
 - Elizabeth Drive / Wallgrove Road – LoS F (morning and evening peak)
 - Elizabeth Drive / M7 Motorway – LoS F (morning and evening peak)
- The proposed eastern and western business park accesses would have sufficient capacity to serve the forecast demand into and out of Western Sydney International Airport in 2026. However, by 2036 the western business park access would be operating at an unsatisfactory LoS E in the morning peak and would therefore be unable to support the level of growth forecast for Western Sydney International Airport
- Overall intersection performance under the 'do minimum' scenario indicates that even with assumed upgrades along Elizabeth Drive, the Elizabeth Drive corridor would have insufficient capacity to carry forecast traffic demand associated with Western Sydney International Airport and related land uses.

When compared to the project described in the EIS, the 'do minimum' intersection performance for the Revised traffic forecast shows the following differences:

- During 2026 and 2036 scenario the performance of the most intersections improves
- During the 2026 scenario, a slight decline in performance at Elizabeth Drive / Business Park West and Elizabeth Drive / Martin Road in the morning peak
- During 2036 scenario, there is a decline at Elizabeth Drive / Luddenham Road, Elizabeth Drive / Martin Road and Elizabeth Drive / Western Road in the morning peak.

These changes reflect the change to the demand growth in SMPM version 1.1 and amended designs for intersections to be upgraded.

A summary of 'do minimum' intersection performance, compared to the project as described in the EIS, is presented in **Table 6-19**.

Table 6-19 Intersection performance – 2026 and 2036 'do minimum' scenarios

Intersection	Revised traffic forecast or project as per EIS	Morning peak (7.30am to 8.30am)						Evening peak (5.30pm to 6.30pm)					
		2017 base		2026 'do minimum'		2036 'do minimum'		2017 base		2026 'do minimum'		2036 'do minimum'	
		Average delay (secs)	Level of Service	Average delay (secs)	Level of Service	Average delay (secs)	Level of Service	Average delay (secs)	Level of Service	Average delay (secs)	Level of Service	Average delay (secs)	Level of Service
Elizabeth Drive / The Northern Road	Revised traffic forecast	12	A	43	D	55	D	11	A	41	C	31	C
	Project as per EIS	12	A	67	E	183	F	11	A	51	D	64	E
Elizabeth Drive / Luddenham Road	Revised traffic forecast	13	A	46	D	66	E	18	B	44	D	55	D
	Project as per EIS	13	A	77	F	41	C	18	B	179	F	66	E
Elizabeth Drive / Business Park East	Revised traffic forecast	N/A	N/A	36	C	32	C	N/A	N/A	30	C	28	B
	Project as per EIS	N/A	N/A	30	C	33	C	N/A	N/A	33	C	34	C
Elizabeth Drive / Business Park West	Revised traffic forecast	N/A	N/A	30	C	66	E	N/A	N/A	26	B	33	C
	Project as per EIS	N/A	N/A	25	B	120	F	N/A	N/A	31	C	31	C

Intersection	Revised traffic forecast or project as per EIS	Morning peak (7.30am to 8.30am)						Evening peak (5.30pm to 6.30pm)					
		2017 base		2026 'do minimum'		2036 'do minimum'		2017 base		2026 'do minimum'		2036 'do minimum'	
		Average delay (secs)	Level of Service	Average delay (secs)	Level of Service	Average delay (secs)	Level of Service	Average delay (secs)	Level of Service	Average delay (secs)	Level of Service	Average delay (secs)	Level of Service
Elizabeth Drive / Martin Road	Revised traffic forecast	9	A	47	D	155	F	12	A	32	C	40	C
	Project as per EIS	9	A	36	C	44	D	12	A	85	F	48	D
Elizabeth Drive / Western Road	Revised traffic forecast	14	A	38	C	171	F	9	A	32	C	36	C
	Project as per EIS	14	A	61	E	42	C	9	A	390	F	45	D
Elizabeth Drive / Devonshire Road	Revised traffic forecast	13	A	35	C	60	E	12	A	27	B	59	E
	Project as per EIS	13	A	126	F	80	F	12	A	166	F	73	F
Elizabeth Drive / Mamre Road	Revised traffic forecast	14	A	75	F	33	C	14	A	36	C	35	C
	Project as per EIS	14	A	190	F	36	C	14	A	56	D	38	C

Intersection	Revised traffic forecast or project as per EIS	Morning peak (7.30am to 8.30am)						Evening peak (5.30pm to 6.30pm)					
		2017 base		2026 'do minimum'		2036 'do minimum'		2017 base		2026 'do minimum'		2036 'do minimum'	
		Average delay (secs)	Level of Service	Average delay (secs)	Level of Service	Average delay (secs)	Level of Service	Average delay (secs)	Level of Service	Average delay (secs)	Level of Service	Average delay (secs)	Level of Service
Elizabeth Drive / Duff Road	Revised traffic forecast	12	A	18	B	18	B	9	A	14	A	20	B
	Project as per EIS	12	A	17	B	23	B	9	A	119	F	26	B
Elizabeth Drive / Wallgrove Road	Revised traffic forecast	31	C	32	C	98	F	48	D	58	E	71	
	Project as per EIS	31	C	45	D	74	F	48	D	117	F	110	F
Elizabeth Drive / M7 Motorway	Revised traffic forecast	20	B	257	F	339	F	17	B	294	F	283	F
	Project as per EIS	20	B	260	F	283	F	17	B	267	F	216	F

Orange shading = LoS E or worse for intersection for the revised traffic forecast

Yellow shading = LoS E or worse for intersection for the project as per EIS

Changes to general traffic travel times

Analysis of 'do minimum' general traffic travel times for the amended project shows the following:

- Travel times on the M7 Motorway, particularly in the vicinity of Elizabeth Drive, would increase substantially by 2026. This is a result of existing capacity issues that are currently observed on the M7 Motorway between Hoxton Park Road and Elizabeth Drive where steep grades, particularly northbound on approach to Elizabeth Drive, cause heavy vehicles to slow down. As traffic volumes increase along the M7 Motorway at these locations, increased delays are expected.
- The assumed widening of the M7 Motorway by 2036 would relieve delays associated with heavy vehicle speeds, allowing trucks to remain in the kerbside lane and provide sufficient passing capacity for general traffic. By 2036, the assumed widening of the M7 Motorway would reduce delays and facilitate travel times along this motorway that are in line with existing performance.
- Travel times on The Northern Road would increase in 2026 and 2036. However, this would largely be limited to the approaches to Elizabeth Drive, which would be the primary access route to Western Sydney International Airport from Penrith.
- Eastbound and westbound travel times on Elizabeth Drive would increase substantially, even with upgrades in 2026 and widening of entire length to four lanes in 2036. These delays are a result of the capacity constraints at the Elizabeth Drive / M7 Motorway interchange, where there is limited scope to increase the capacity of the already constrained double-point interchange. Traffic turning right onto the M7 Motorway from Elizabeth Drive conflicts with through east-west traffic on Elizabeth Drive.

The majority of 'do minimum' general traffic travel times for the amended project are similar or lower when compared to the project described in the EIS. This reflects the change to the demand growth in SMPM version 1.1 that has resulted in forecast traffic volumes being lower.

'Do minimum' general traffic travel times have been re-established for the amended project as described in **Section 6.2.1**, and are shown in **Figure 6-8** to **Figure 6-13**.

M7 Motorway

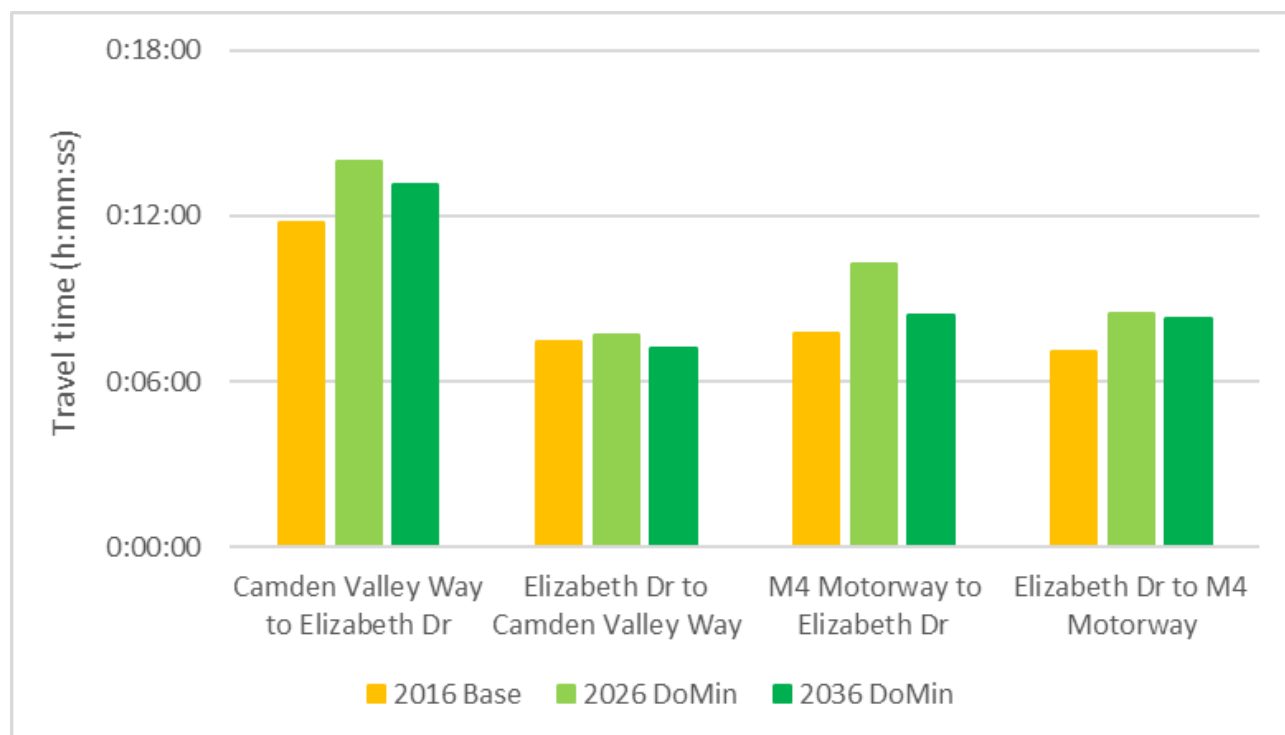


Figure 6-8 M7 Motorway morning peak travel time (8am to 9am)

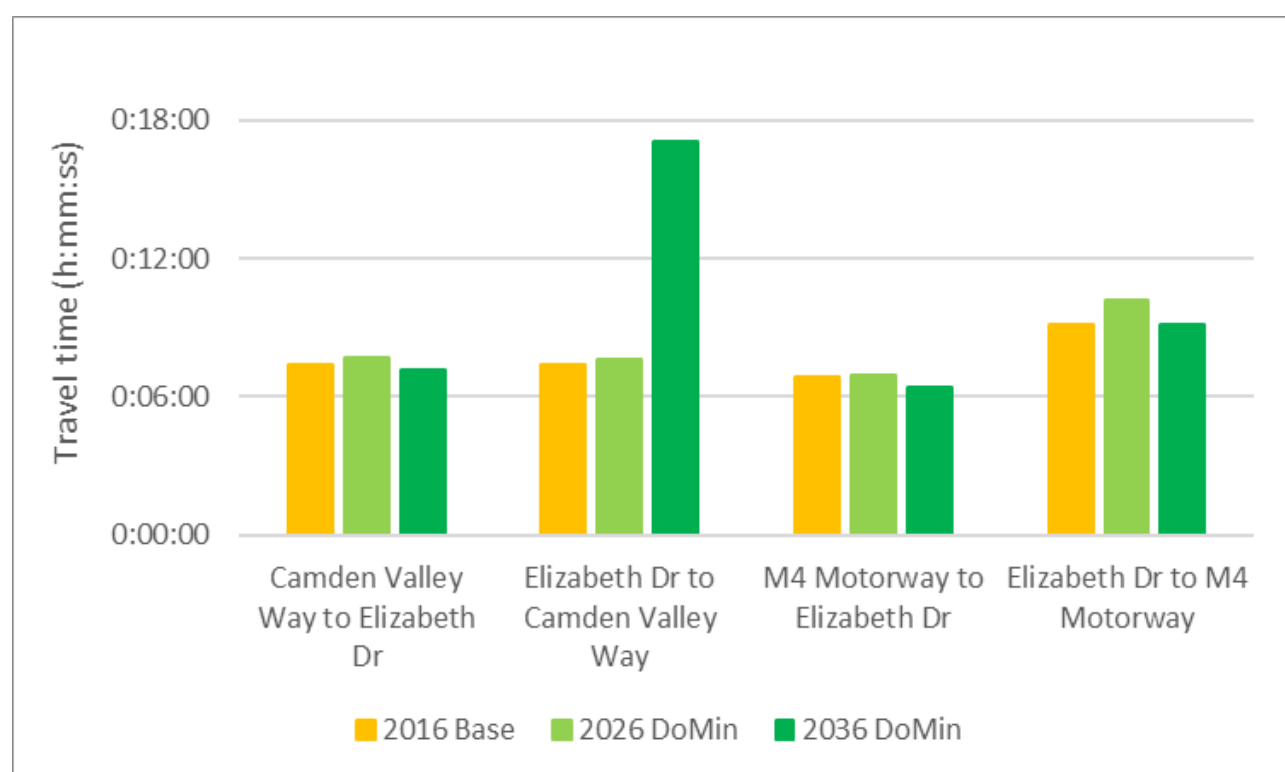


Figure 6-9 M7 Motorway evening peak travel time (5pm to 6pm)

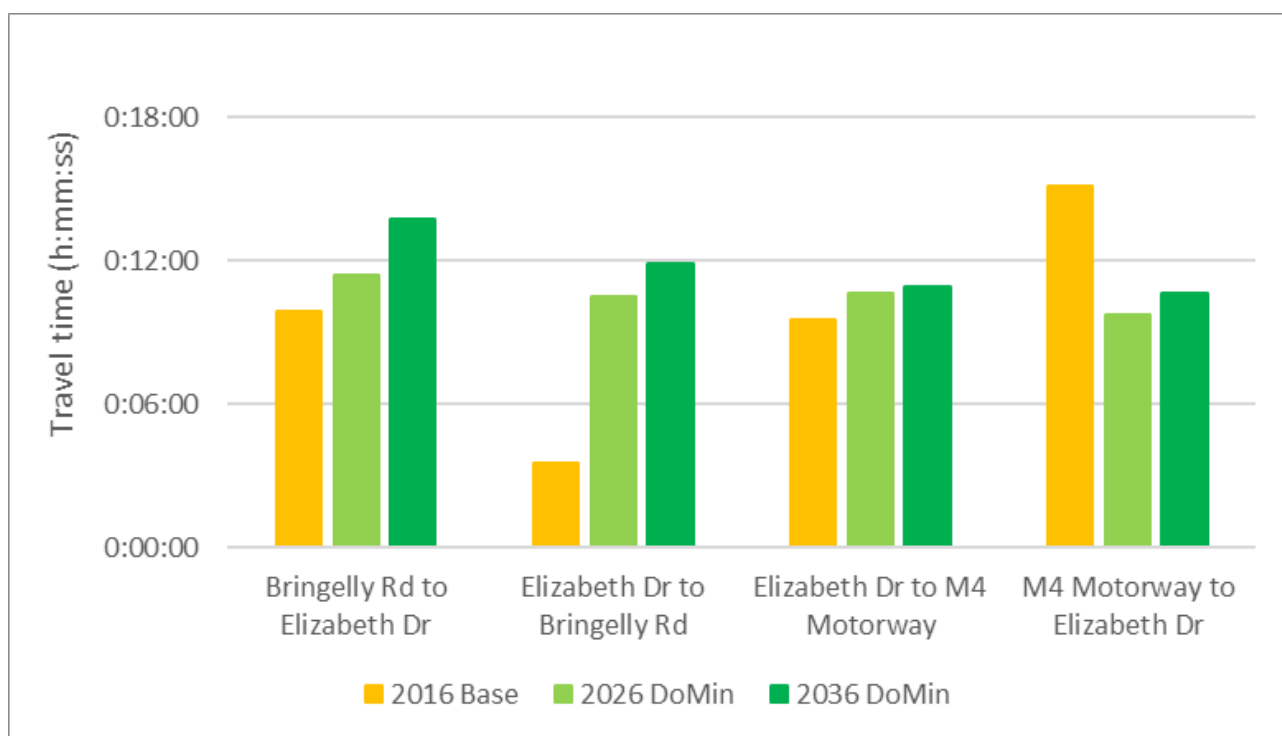


Figure 6-10 The Northern Road morning peak travel time (8am to 9am)

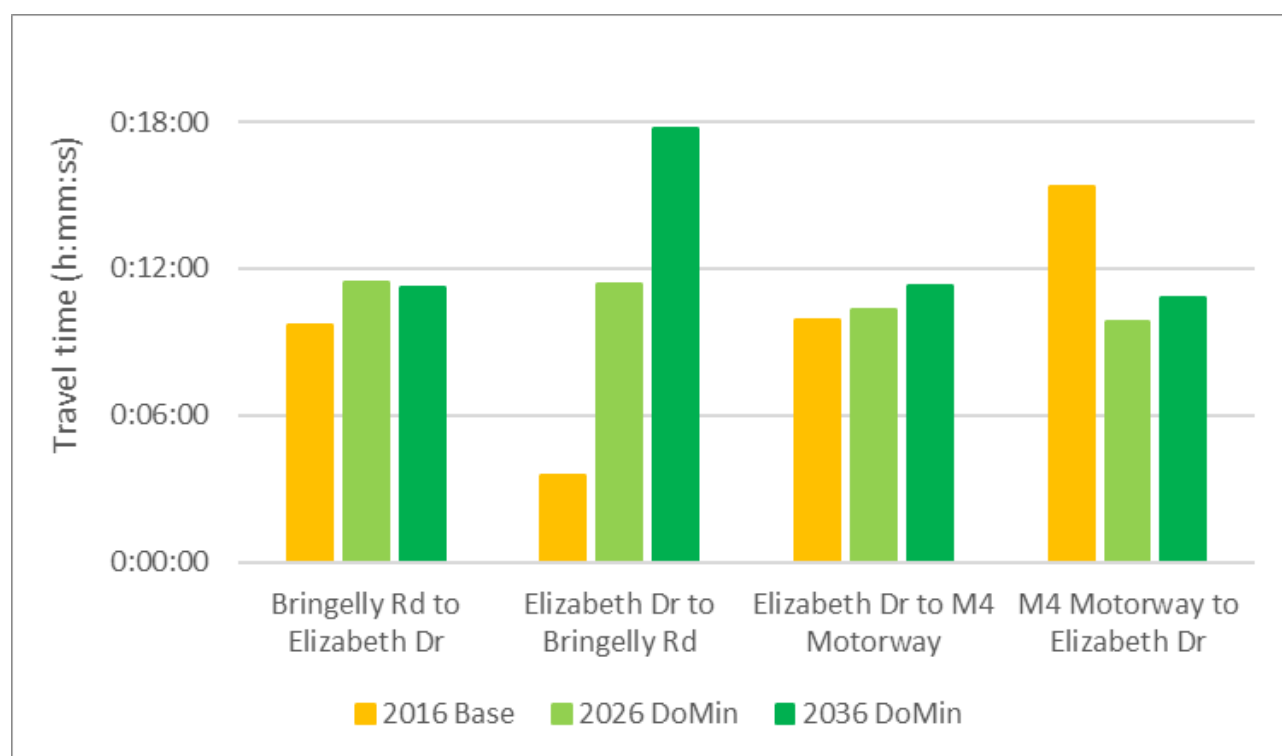


Figure 6-11 The Northern Road evening peak travel time (5pm to 6pm)

Elizabeth Drive

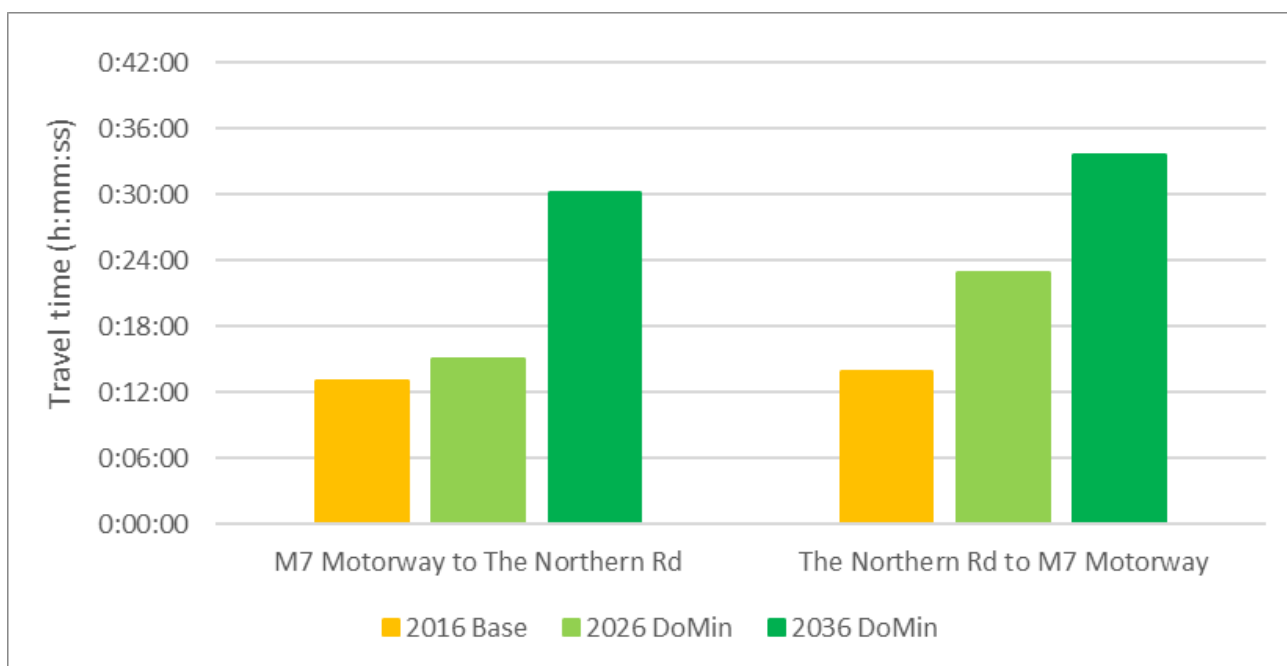


Figure 6-12 Elizabeth Drive morning peak travel time (8am to 9am)

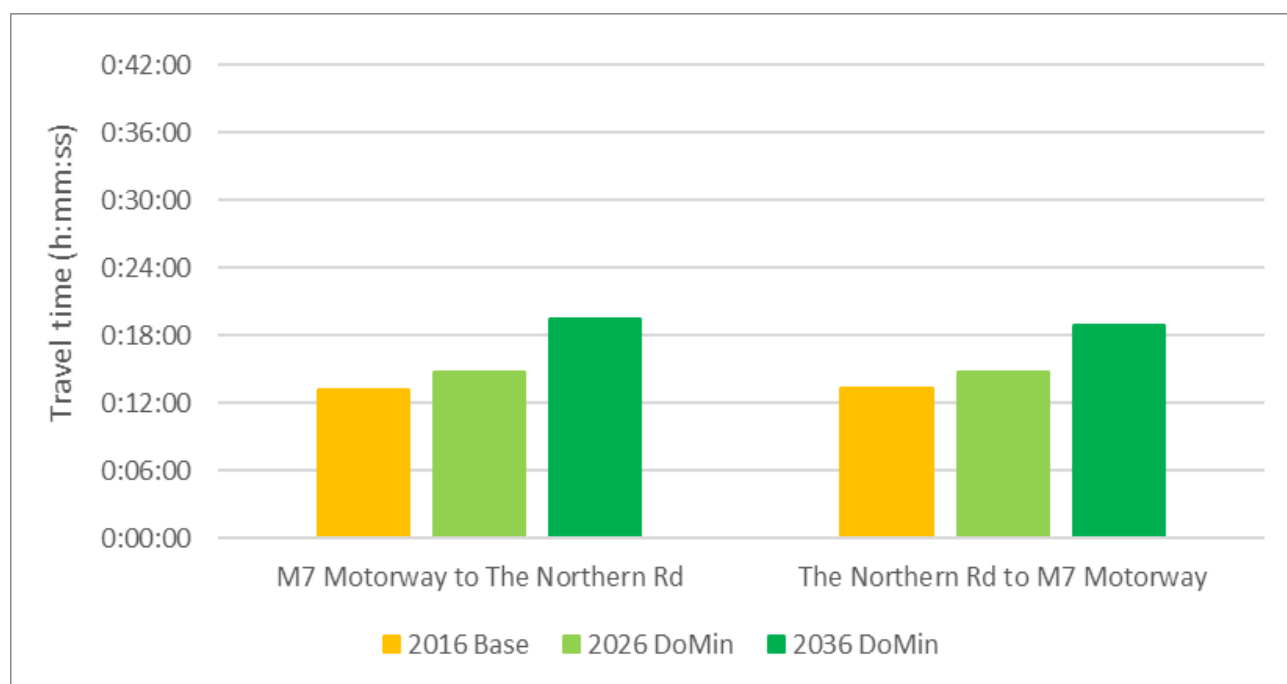


Figure 6-13 Elizabeth Drive evening peak travel time (5pm to 6pm)

Changes to regional road network volumes – with the project

The total 'with amended project' scenario traffic volume forecasts for key primary arterial roads in the study area are provided in **Table 6-20** and **Table 6-21**. A full breakdown of the traffic volume forecasts along each screen line is provided in Table 6-18 to 6-21 of **Appendix B**.

Analysis of the 'with amended project' traffic volumes across each of the screen lines shows the following:

- There would be increased north-south flows across the study area in the morning and evening peak periods due to changes in background demand (see **Table 6-15** and **Table 6-16**)
 - The new M7 Motorway / M12 Motorway interchange would allow for free-flow movement for traffic travelling to and from Western Sydney International Airport via the amended project instead of through the existing Elizabeth Drive interchange, which would reach capacity by 2026 without the project. By 2036 the amended project would allow a much greater volume of traffic to travel along the M7 Motorway, unimpeded by existing capacity constraints at Elizabeth Drive.
- There would be increased east-west flows east of Western Sydney International Airport in the morning and evening peak periods due to changes in background demand (see **Table 6-15** and **Table 6-16**)
 - The majority of this additional traffic would be along the amended project. Up to 60 per cent of traffic that would travel along Elizabeth Drive in the 'do minimum' scenarios would transfer to the amended project, providing additional capacity along Elizabeth Drive.
- The transfer of traffic from Elizabeth Drive to the amended project would reduce right-turning traffic travelling from Elizabeth Drive to the M7 Motorway at the existing interchange.
 - This would allow more traffic to travel east-west along Elizabeth Drive at the M7 Motorway interchange from the east than would be possible without the amended project.
- Comparing option 1 and option 2, option 2 (with Elizabeth Drive connections) would result in more traffic using the amended project and less traffic using Elizabeth Drive. Option 2 would also result in more traffic using Cecil Road and Duff Road.
 - This reflects increased connectivity to the local road network that option 2 provides.

When compared to the project described in the EIS, the forecast 'do minimum' traffic volumes for the amended project shows the following differences:

- Total north-south and east-west traffic volumes are lower
 - This reflects the change to the demand growth in SMPM version 1.1 that has resulted in forecast traffic volumes being lower as described in **Section 6.2.1.1**
- Traffic volumes on the M7 Motorway are higher
 - Lower total traffic volumes on the network would allow a much greater volume of traffic to travel along the M7 Motorway, unimpeded by existing capacity constraints at Elizabeth Drive
- Traffic volumes on the amended project are lower for option 1 and higher for option 2
 - This reflects increased connectivity to the local road network that option 2 provides.

Table 6-20 Morning peak 'with amended project' screen line volume summary

Screen line	Number of vehicles															
	2026 'do minimum'		2026 'with project' as per EIS		2026 'with amended project' – option 1		2026 'with amended project' – option 2		2036 'do minimum'		2036 'with project' as per EIS		2036 'with amended project' – option 1		2036 'with amended project' – option 2	
	7am to 8am	8am to 9am	7am to 8am	8am to 9am	7am to 8am	8am to 9am	7am to 8am	8am to 9am	7am to 8am	8am to 9am	7am to 8am	8am to 9am	7am to 8am	8am to 9am	7am to 8am	8am to 9am
Morning peak 'with amended project' (east-west screen line)																
East-west screen line (southbound)	6143	5879	6704	6582	6377	6346	6598	6368	8040	7681	9414	9541	8956	8933	9678	9524
East-west screen line (northbound)	5557	5820	7548	8966	7866	8279	7860	8468	9303	8991	10,629	10,501	11,268	11,629	11,656	12,120
Morning peak 'with amended project' (north-south screen line)																
Eastern north-south screen line (eastbound)	7361	7520	8391	8626	7568	8139	7954	8325	8388	8070	10,522	10,056	10,702	10,273	10,813	10,662
Eastern north-south screen line (westbound)	5504	6362	5812	6698	5345	6018	5359	5974	6262	7147	7299	8216	7246	7883	7423	8016

Screen line	Number of vehicles															
	2026 'do minimum'		2026 'with project' as per EIS		2026 'with amended project' – option 1		2026 'with amended project' – option 2		2036 'do minimum'		2036 'with project' as per EIS		2036 'with amended project' – option 1		2036 'with amended project' – option 2	
	7am to 8am	8am to 9am	7am to 8am	8am to 9am	7am to 8am	8am to 9am	7am to 8am	8am to 9am	7am to 8am	8am to 9am	7am to 8am	8am to 9am	7am to 8am	8am to 9am	7am to 8am	8am to 9am
Western north-south screen line (eastbound)	5842	6094	6642	6859	5151	5213	5809	6056	6480	6293	7818	8263	6092	5986	7657	7956
Western north-south screen line (westbound)	4192	4974	4366	5203	3803	4333	4046	4737	4662	5518	5112	5883	4871	5331	5598	6065

Table 6-21 Evening peak 'with amended project' screen line volume summary

Screen line	Number of vehicles															
	2026 'do minimum'		2026 'with project' as per EIS		2026 'with amended project' – option 1		2026 'with amended project' – option 2		2036 'do minimum'		2036 'with project' as per EIS		2036 'with amended project' – option 1		2036 'with amended project' – option 2	
	4pm to 5pm	5pm to 6pm	4pm to 5pm	5pm to 6pm	4pm to 5pm	5pm to 6pm	4pm to 5pm	5pm to 6pm	4pm to 5pm	5pm to 6pm	4pm to 5pm	5pm to 6pm	4pm to 5pm	5pm to 6pm	4pm to 5pm	5pm to 6pm
Evening peak 'with amended project' (east-west screen line)																
East-west screen line (southbound)	8633	8356	8555	8747	9363	8646	9653	9190	10,850	10,224	11,357	10,774	11,505	11,746	13,200	13,096
East-west screen line (northbound)	6726	6446	8757	8069	7394	6930	7507	7109	8060	7547	11,635	11,310	9833	9480	9967	9639
Evening peak 'with amended project' (north-south screen line)																
Eastern north-south screen line (eastbound)	6075	5988	8126	7951	6216	6080	6215	6037	7714	7489	11,720	10,539	9072	8707	9112	8727
Eastern north-south screen line (westbound)	8202	8558	9708	10,295	9080	9178	9148	9161	9568	9829	11,202	11,177	10,259	10,810	10,191	11,016

Screen line	Number of vehicles															
	2026 'do minimum'		2026 'with project' as per EIS		2026 'with amended project' – option 1		2026 'with amended project' – option 2		2036 'do minimum'		2036 'with project' as per EIS		2036 'with amended project' – option 1		2036 'with amended project' – option 2	
	4pm to 5pm	5pm to 6pm	4pm to 5pm	5pm to 6pm	4pm to 5pm	5pm to 6pm	4pm to 5pm	5pm to 6pm	4pm to 5pm	5pm to 6pm	4pm to 5pm	5pm to 6pm	4pm to 5pm	5pm to 6pm	4pm to 5pm	5pm to 6pm
Western north-south screen line (eastbound)	4725	4582	5389	5260	4464	4372	4767	4708	5631	5802	8089	7740	5517	5580	6287	6237
Western north-south screen line (westbound)	6107	6449	7596	7883	5902	6093	6617	6900	7277	7602	9482	9230	7081	7425	8342	8903

Changes to network performance – with the project

Analysis of 'with amended project' network performance for the amended project shows the following:

- Network performance statistics between option 1 and option 2 are very similar, with option 2 (with Elizabeth Drive connections) performing marginally better than option 1 in the morning peak by 2036
- The amended project would result in total travel distance through the study area increasing by up to nine per cent during the morning peak (for option 2) and up to eight per cent during the evening peak (for option 2) by 2036; this is due to additional travel distance along the amended project
- The amended project would result in total travel time through the study area decreasing by up to seven per cent during the morning peak (for option 2) and up to eight per cent during the evening peak (for option 2) by 2036
- The amended project would result in average speeds through the study area increasing by up to nine per cent during the morning peak (option 2) and up to seven per cent during the evening peak (for option 2) by 2036
- An increase in total travel distance, decrease in total travel time and increase in average speeds shows the amended project would substantially improve traffic conditions in the study area.

When compared to the project described in the EIS, the 'with amended project' network performance for the amended project shows the following differences:

Total traffic demand, total travel distance and total travel time are lower:

- Average speeds are higher
- Total unreleased trips are lower.

These changes reflect the change to the demand growth in SMPM version 1.1 that has resulted in forecast traffic volumes being lower.

A summary of network performance statistics for the 2026 and 2036 'with amended project' scenarios, compared to the project as described in the EIS, is presented in Table 6-22 and **Table 6-23**.

Changes to intersection performance – with the project

Analysis of 'with amended project' intersection performance shows the following:

- In 2026 the amended project would result in unchanged or improved intersection performance. All intersections would perform at a satisfactory Level of Service with the exception of the Elizabeth Drive / Mamre Road intersection, which would continue to perform poorly at Level of Service F in the morning peak (option 1).
- In 2036 the amended project would result in unchanged or improved intersection performance. All intersections would perform at a satisfactory Level of Service.
- The improvements in intersection performance can be attributed to the amended project reducing traffic volumes along Elizabeth Drive, which would reduce delays at intersections along Elizabeth Drive.
- Comparing option 1 and option 2, option 2 (with Elizabeth Drive connections) would result in improved performance at most intersections. Option 2 would result in more traffic using the amended project and less traffic using Elizabeth Drive compared to option 1, therefore reducing demand and delays along the Elizabeth Drive corridor.

Table 6-22 'With amended project network performance statistics – morning peak

Network measure	Amended project or project as per EIS	2026 ‘do minimum’	2026 ‘with project’ ²		2036 ‘do minimum’	2036 ‘with project’	
			Option 1	Option 2		Option 1	Option 2
Network statistics for all vehicles							
Total traffic demand (vehicles)	Amended Project	252,184	252,435	252,435	307,926	307,545	307,545
	Project as per EIS	276,206	269,769		344,333	338,577	
Total vehicle kilometres travelled through network	Amended Project	2,203,429	2,169,010	2,248,434	2,599,067	2,752,678	2,835,986
	Project as per EIS	2,350,227	2,414,354		2,673,216	2,845,037	
Total vehicle travel time through the network (hours)	Amended Project	43,142	42,986	44,825	68,597	67,243	63,605
	Project as per EIS	60,008	61,348		74,249	75,995	
Average network speed (km/h)	Amended Project	53	53	53	46	47	50
	Project as per EIS	39	39		36	37	

² The project as per the EIS did not have two options. As a result, the 2026 and 2036 'with project' scenarios for the project as per EIS do not distinguish between option 1 and option 2

Network measure	Amended project or project as per EIS	2026 ‘do minimum’	2026 ‘with project’ ²		2036 ‘do minimum’	2036 ‘with project’	
			Option 1	Option 2		Option 1	Option 2
Total vehicles entering the network	Amended Project	248,430	245,297	247,762	295,510	292,703	297,408
	Project as per EIS	268,058	269,648		305,541	307,046	
Unreleased traffic							
Total unreleased trips	Amended Project	241	3287	888	7484	9567	5432
	Project as per EIS	10,383	10,207		37,133	39,182	
% of demand unreleased	Amended Project	0%	1%	<1%	3%	3%	2%
	Project as per EIS	4%	4%		11%	12%	

Table 6-23 'With amended project network performance statistics – evening peak

Network measure	Amended project or project as per EIS	2026 'do minimum'	2026 'with project' ³		2036 'do minimum'	2036 'with project'	
			Option 1	Option 2		Option 1	Option 2
Network statistics for all vehicles							
Total traffic demand (vehicles)	Amended Project	291,873	292,328	292,328	355,643	355,951	355,951
	Project as per EIS	345,296	338,126		455,336	449,659	
Total vehicle kilometres travelled through network	Amended Project	2,461,544	2,537,780	2,537,565	2,888,246	3,093,034	3,110,187
	Project as per EIS	2,802,008	2,875,652		3,185,503	3,411,466	
Total vehicle travel time through the network (hours)	Amended Project	50,655	48,702	48,158	77,562	71,620	71,661
	Project as per EIS	78,157	70,063		96,743	95,691	
Average network speed (km/h)	Amended Project	52	54	54	46	48	49
	Project as per EIS	36	41		33	36	

³ The project as per the EIS did not have two options. As a result, the 2026 and 2036 'with project' scenarios for the project as per EIS do not distinguish between option 1 and option 2

Network measure	Amended project or project as per EIS	2026 'do minimum'	2026 'with project' ³		2036 'do minimum'	2036 'with project'	
			Option 1	Option 2		Option 1	Option 2
Total vehicles entering the network	Amended Project	285,957	286,975	286,853	333,605	339,224	340,394
	Project as per EIS	332,230	328,467		376,363	378,351	
Unreleased traffic							
Total unreleased trips	Amended Project	3236	1,588	1,679	14,293	10,568	9,588
	Project as per EIS	23,351	21,866		80,179	81,972	
% of demand unreleased	Amended Project	1%	<1%	<1%	4%	3%	3%
	Project as per EIS	7%	6%		18%	18%	

When compared to the project described in the EIS, the 'with amended project' intersection performance for the amended project shows an improvement at all intersections with the exception of The Northern Road / M12 Motorway intersection, where less traffic uses Elizabeth Drive and more traffic uses the project under option 2 (with Elizabeth Drive connections).

The improvement in performance at other intersections reflects the change to the demand growth in SMPM version 1.1 that has resulted in forecast traffic volumes being lower and amended designs for intersections to be upgraded.

A summary of 'with amended project' intersection performance compared to the project as described in the EIS is presented in **Table 6-24** and **Table 6-25**

Changes to general traffic travel times – with the project

Analysis of general traffic travel times 'with amended project' shows the following:

- Travel times on the M7 Motorway would generally increase with the amended project in the morning and evening peaks.
 - These increases in travel time are a result of increased traffic volumes on the M7 Motorway, leading to additional merging of traffic where the amended project interfaces with the M7 Motorway. This merging would generate additional delay in both directions. However, most of these delays would be reduced following the assumed widening of the M7 Motorway by 2036, which would reduce the conflict between merging traffic and traffic in through lanes. Comparing travel times between option 1 and option 2, option 2 (with Elizabeth Drive connections) would generally result in increased travel times as result of more traffic using the M7 Motorway.
- Travel times on The Northern Road between Bringelly Road and Elizabeth Drive in both directions, and between Elizabeth Drive and the M4 Motorway in the northbound direction, would increase with the amended project in 2026 and 2036 due to the changes in access to Western Sydney International Airport.
 - Without the amended project, some traffic from Western Sydney International Airport would travel south via Western Road and Devonshire Road and north via Luddenham Road. These routes are more direct and generally free-flowing, while The Northern Road would have several signalised intersections along its length once the various upgrade stages are complete. With the amended project, access to The Northern Road via the M12 Motorway would make The Northern Road a more attractive alternative to Western Road, Devonshire Road and Luddenham Road. Comparing travel times between option 1 and option 2, option 1 (without Elizabeth Drive connections) would generally result in increased travel times as result of more traffic accessing Elizabeth Drive via The Northern Road
- Travel times on Elizabeth Drive between The Northern Road and the M7 Motorway would decrease with the amended project, except for option 1 in the eastbound direction in the 2026 morning peak.
 - The minor increase in travel times along Elizabeth Drive in the 2026 morning peak is due to delays at the Elizabeth Drive / Mamre Road intersection. Comparing travel times between option 1 and option 2, option 1 (without Elizabeth Drive connections) would generally result in increased travel times as result of more traffic using Elizabeth Drive

Table 6-24 Intersection performance – 2026 and 2036 ‘with amended project’ scenarios – morning peak

Intersection	2026 ‘do minimum’		2026 ‘with project’ as per EIS		2026 ‘with amended project’ – option 1		2026 ‘with amended project’ – option 2		2036 ‘do minimum’		2036 ‘with project’ as per EIS		2036 ‘with amended project’ – option 1		2036 ‘with amended project’ – option 2	
	Av.delay (secs)	LoS	Av.delay (secs)	LoS	Av.delay (secs)	LoS	Av.delay (secs)	LoS	Av.delay (secs)	LoS	Av.delay (secs)	LoS	Av.delay (secs)	LoS	Av.delay (secs)	LoS
Elizabeth Drive / The Northern Road	43	D	59	E	32	C	31	C	55	D	75	F	42	C	39	C
Elizabeth Drive / Luddenham Road	46	D	176	F	44	D	56	D	66	E	52	D	44	D	45	D
Elizabeth Drive / Business Park East	36	C	37	C	33	C	33	C	32	C	30	C	30	C	27	B
Elizabeth Drive / Business Park West	30	C	21	B	22	B	25	B	66	E	19	B	24	B	27	B

Intersection	2026 'do minimum'		2026 'with project' as per EIS		2026 'with amended project' – option 1		2026 'with amended project' – option 2		2036 'do minimum'		2036 'with project' as per EIS		2036 'with amended project' – option 1		2036 'with amended project' – option 2	
	Av.delay (secs)	LoS	Av.delay (secs)	LoS	Av.delay (secs)	LoS	Av.delay (secs)	LoS	Av.delay (secs)	LoS	Av.delay (secs)	LoS	Av.delay (secs)	LoS	Av.delay (secs)	LoS
Elizabeth Drive / Martin Road	47	D	39	C	25	B	21	B	155	F	34	C	35	C	29	C
Elizabeth Drive / Western Road	38	C	35	C	33	C	31	C	171	F	42	C	31	C	25	B
Elizabeth Drive / Devonshire Road	35	C	170	F	38	C	36	C	60	E	73	F	45	D	41	C
Elizabeth Drive / Mamre Road	75	F	324	F	74	F	35	C	33	C	38	C	32	C	30	C
Elizabeth Drive / Duff Road	18	B	16	B	10	A	11	A	18	B	24	B	20	B	18	B

Intersection	2026 'do minimum'		2026 'with project' as per EIS		2026 'with amended project' – option 1		2026 'with amended project' – option 2		2036 'do minimum'		2036 'with project' as per EIS		2036 'with amended project' – option 1		2036 'with amended project' – option 2	
	Av.delay (secs)	LoS	Av.delay (secs)	LoS	Av.delay (secs)	LoS	Av.delay (secs)	LoS	Av.delay (secs)	LoS	Av.delay (secs)	LoS	Av.delay (secs)	LoS	Av.delay (secs)	LoS
Elizabeth Drive / Wallgrove Road	32	C	84	F	43	C	35	C	98	F	49	D	50	D	29	C
Elizabeth Drive / M7 Motorway	257	F	264	F	26	B	24	B	339	F	271	F	31	C	28	B
The Northern Road / M12 Motorway	N/A	N/A	44	D	28	B	31	C	N/A	N/A	27	B	28	B	31	C

Orange shading = LoS E or worse for the amended project,

Yellow shading = LoS E or worse for the project as per EIS

Table 6-25 Intersection performance – 2026 and 2036 ‘with amended project’ scenarios – evening peak

Intersection	2026 ‘do minimum’		2026 ‘with project’ as per EIS		2026 ‘with amended project’ – option 1		2026 ‘with amended project’ – option 2		2036 ‘do minimum’		2036 ‘with project’ as per EIS		2036 ‘with amended project’ – option 1		2036 ‘with amended project’ – option 2	
	Av.delay (secs)	LoS	Av.delay (secs)	LoS	Av.delay (secs)	LoS	Av.delay (secs)	LoS	Av.delay (secs)	LoS	Av.delay (secs)	LoS	Av.delay (secs)	LoS	Av.delay (secs)	LoS
Elizabeth Drive / The Northern Road	41	C	65	E	40	C	42	C	31	C	71	F	42	C	41	C
Elizabeth Drive / Luddenham Road	44	D	63	E	47	D	45	D	55	D	49	D	53	D	39	C
Elizabeth Drive / Business Park East	30	C	36	C	29	B	30	C	28	B	39	C	28	B	24	B
Elizabeth Drive / Business Park West	26	B	22	B	25	B	26	B	33	C	19	B	23	B	22	B

Intersection	2026 'do minimum'		2026 'with project' as per EIS		2026 'with amended project' – option 1		2026 'with amended project' – option 2		2036 'do minimum'		2036 'with project' as per EIS		2036 'with amended project' – option 1		2036 'with amended project' – option 2	
	Av.delay (secs)	LoS	Av.delay (secs)	LoS	Av.delay (secs)	LoS	Av.delay (secs)	LoS	Av.delay (secs)	LoS	Av.delay (secs)	LoS	Av.delay (secs)	LoS	Av.delay (secs)	LoS
Elizabeth Drive / Martin Road	32	C	37	C	28	B	29	B	40	C	44	D	36	C	35	C
Elizabeth Drive / Western Road	32	C	32	C	28	B	29	C	36	C	45	D	28	B	22	B
Elizabeth Drive / Devonshire Road	27	B	26	B	23	B	20	B	59	E	88	F	45	D	40	C
Elizabeth Drive / Mamre Road	36	C	109	F	54	D	33	C	35	C	43	C	40	C	29	B
Elizabeth Drive / Duff Road	14	A	49	D	11	A	10	A	20	B	26	B	20	B	17	B

Intersection	2026 'do minimum'		2026 'with project' as per EIS		2026 'with amended project' – option 1		2026 'with amended project' – option 2		2036 'do minimum'		2036 'with project' as per EIS		2036 'with amended project' – option 1		2036 'with amended project' – option 2	
	Av.delay (secs)	LoS	Av.delay (secs)	LoS	Av.delay (secs)	LoS	Av.delay (secs)	LoS	Av.delay (secs)	LoS	Av.delay (secs)	LoS	Av.delay (secs)	LoS	Av.delay (secs)	LoS
Elizabeth Drive / Wallgrove Road	58	E	66	E	31	C	36	C	71	F	73	F	40	C	38	C
Elizabeth Drive / M7 Motorway	294	F	278	F	35	C	34	C	283	F	97	F	43	C	42	C
The Northern Road / M12 Motorway	N/A	N/A	46	D	39	C	36	C	N/A	N/A	34	C	41	C	46	D

Orange shading = LoS E or worse for the amended project,

Yellow shading = LoS E or worse for the project as per EIS

- Travel times on the amended project would increase between 2026 and 2036, reflecting the forecast growth in traffic volumes associated with Western Sydney International Airport.
 - Although travel times on the amended project would increase over time as traffic demand grows, the change is small (less than five minutes along the length of the M12 Motorway) and demonstrates that the amended project has sufficient capacity to perform acceptably with forecast 2036 traffic volumes. Comparing travel times between option 1 and option 2, option 2 (with Elizabeth Drive connections) would generally result in increased travel times as result of more traffic using the amended project.

The majority of 'with amended project' general traffic travel times are similar or lower when compared to the project described in the EIS. This reflects the change to the demand growth in SMPM version 1.1 that has resulted in forecast traffic volumes being lower.

'With amended project' general traffic travel times, including 2026 and 2036 'do minimum', option 1 and option 2 are shown and compared to the project as described in the EIS in **Figure 6-14** to **Figure 6-21**.

Changes to freight transport – with the project

The amended project would reduce travel time and improve reliability and speed for trucks travelling between The Northern Road and the M7 Motorway. Trucks currently use Elizabeth Drive, which has a single lane in each direction and is capacity-constrained at its intersections with the M7 Motorway. The amended project would provide a safe and reliable route between The Northern Road and the M7 Motorway and Western Sydney International Airport. This would improve the reliability of freight shipments transferring between air and road modes.

With the upgrade of The Northern Road to a primary north-south freight route from the emerging South West Growth Area and other growth areas within the Western Parkland City, freight traffic travelling between The Northern Road and the M7 Motorway is expected to increase.

Analysis of forecast 'with amended project' daily heavy vehicle volumes compared to existing conditions shows the following:

- Increase of up to 35 per cent on The Northern Road north of Elizabeth Drive in both directions by 2036
- Overall volumes on Elizabeth Drive would remain unchanged by 2036. However, there would be localised increases and decreases at the following locations:
 - Elizabeth Drive west of Adams Road (increase of 54 per cent in the westbound direction)
 - Elizabeth Drive west of Devonshire Road (decrease of 15 per cent in the westbound direction)
 - Elizabeth Drive east of Mamre Road (increase of 14 per cent in the westbound direction. However, this is from a relatively low base)
- Increase of 27 per cent on Mamre Road in the northbound direction by 2036
- Volume changes on other roads would be 10 per cent or less by 2036.

As discussed previously, substantial growth in forecast daily heavy vehicle volumes for the amended project on The Northern Road, Elizabeth Drive and Wallgrove Road is largely attributed to the Western Sydney International Airport itself as well as adjacent employment areas.

Improvements to general traffic travel times and travel time reliability would also benefit freight traffic that would be travelling to and from Western Sydney International Airport. Additional traffic capacity and motorway-standard access to Western Sydney International Airport would minimise travel times and reduce wear and tear on trucks.

M7 Motorway

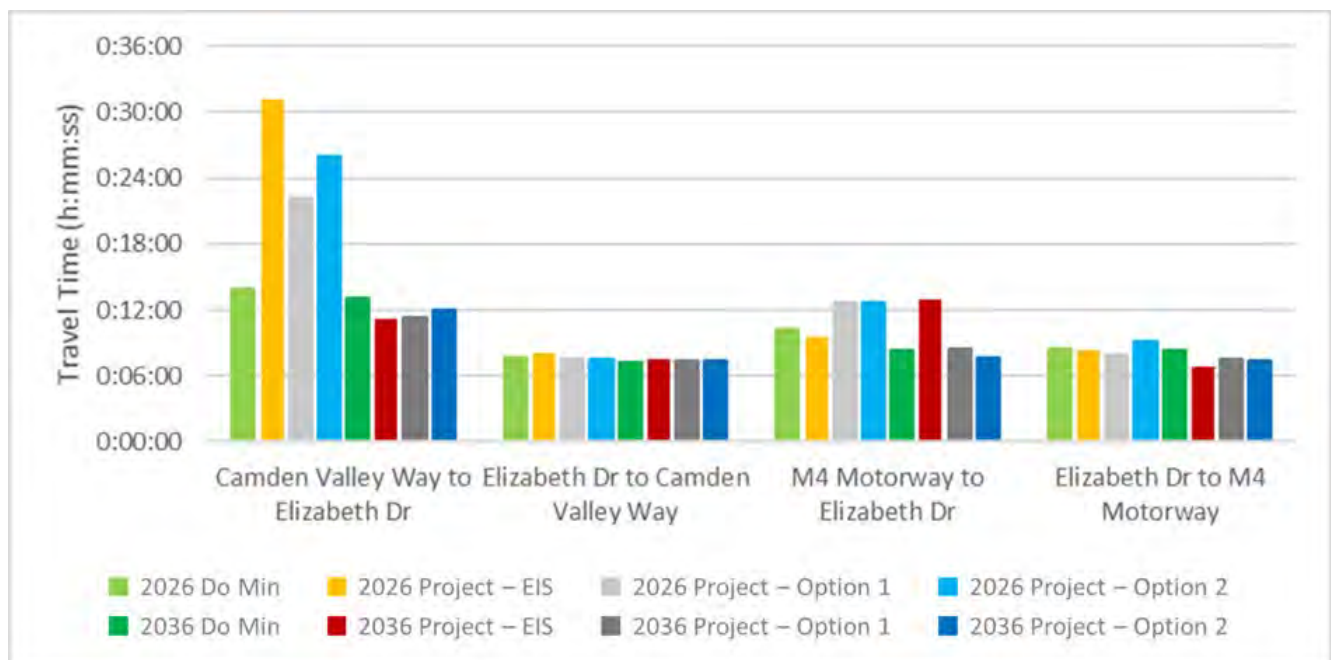


Figure 6-14 M7 Motorway morning peak travel time (8am to 9am)

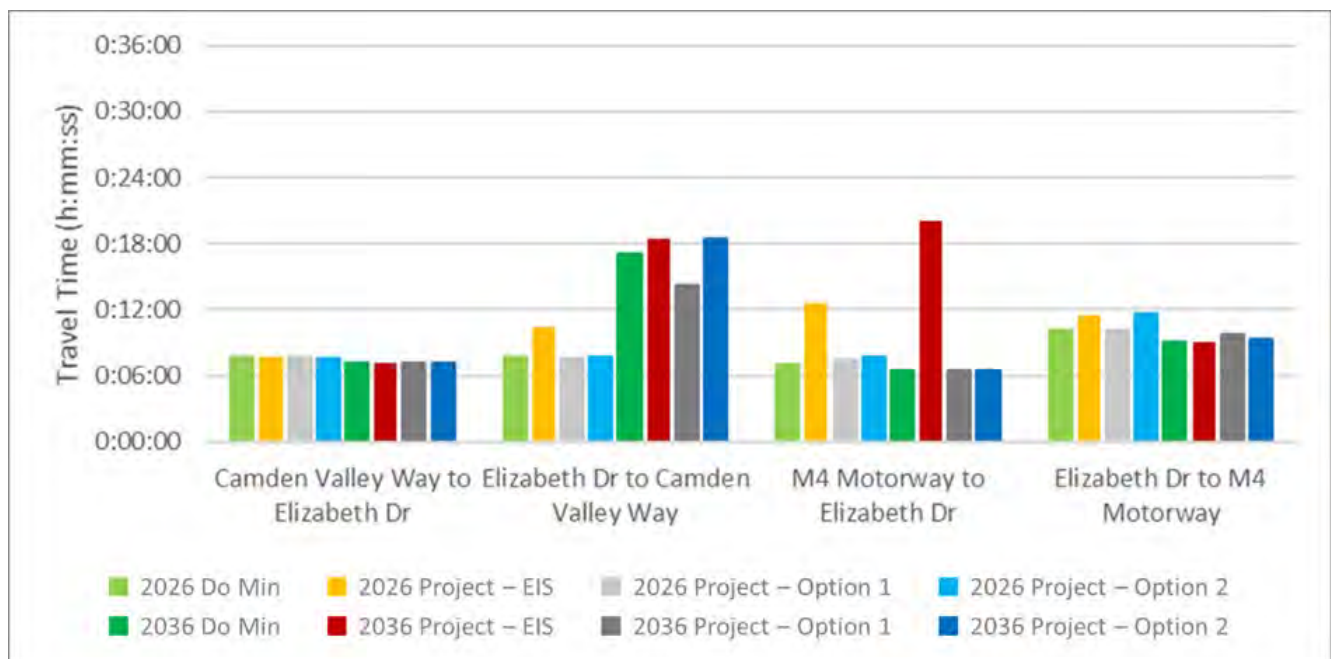


Figure 6-15 M7 Motorway evening peak travel time (5pm to 6pm)

The Northern Road

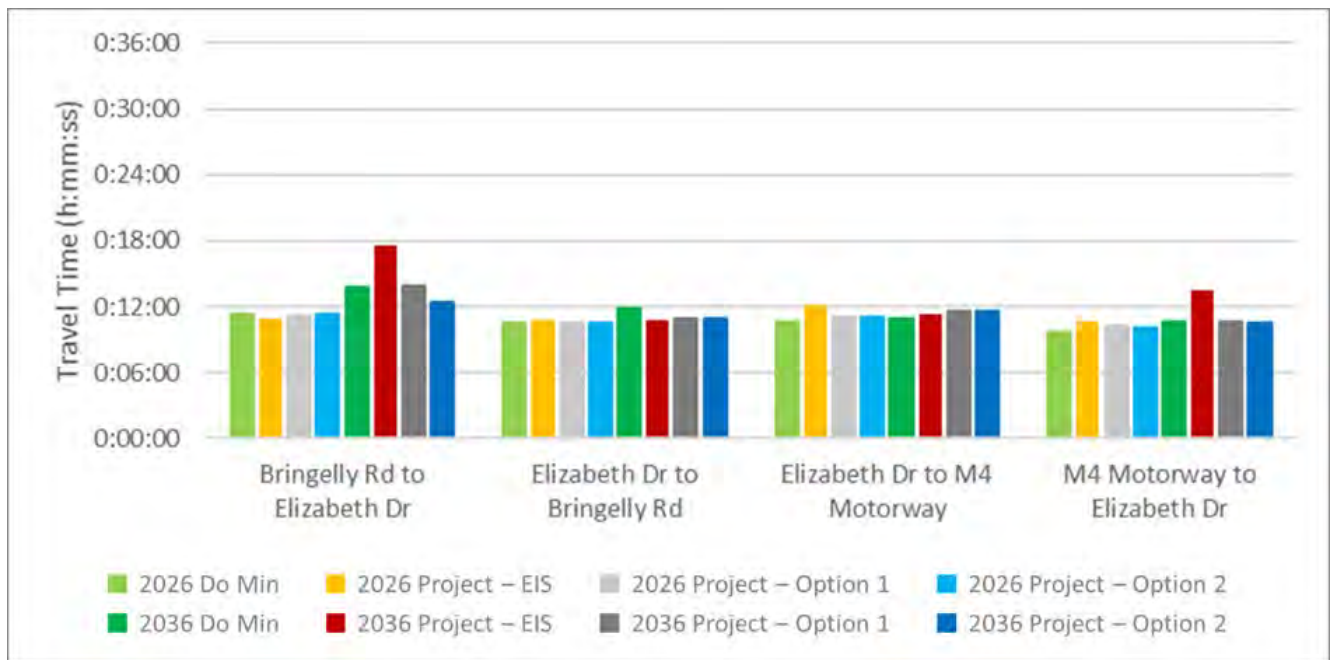


Figure 6-16 The Northern Road morning peak travel time (8am to 9am)

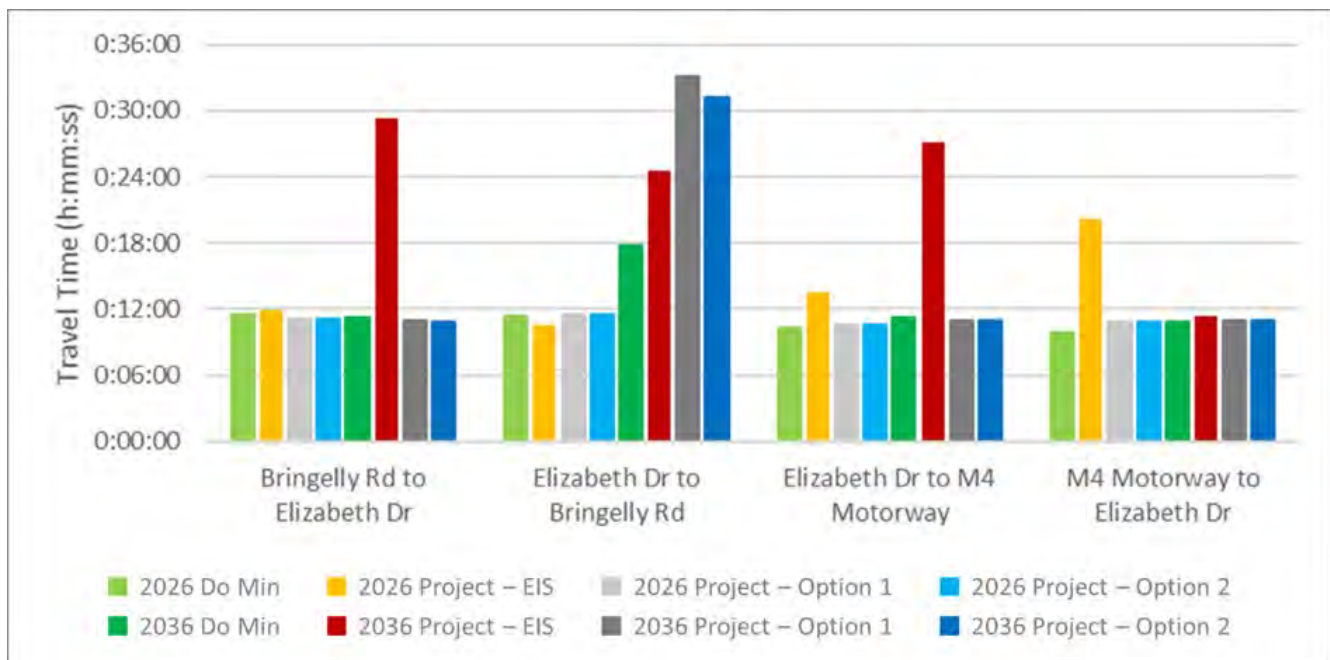


Figure 6-17 The Northern Road evening peak travel time (5pm to 6pm)

Elizabeth Drive

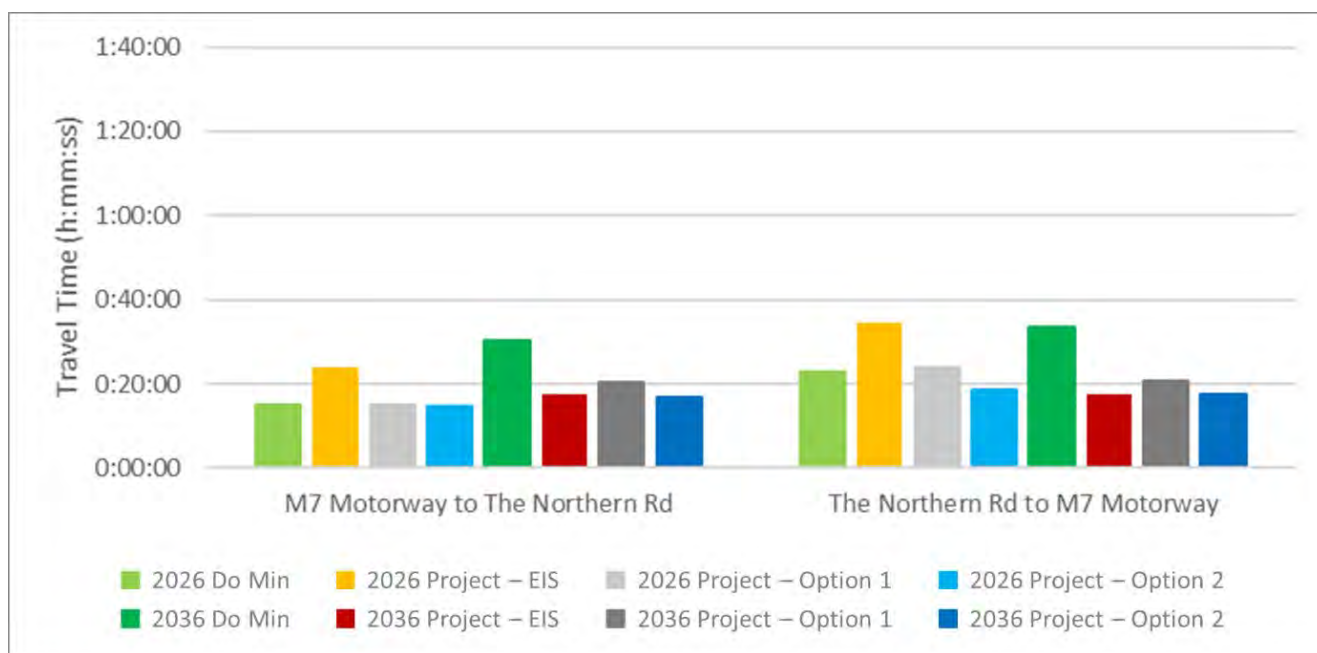


Figure 6-18 Elizabeth Drive morning peak travel time (8am to 9am)

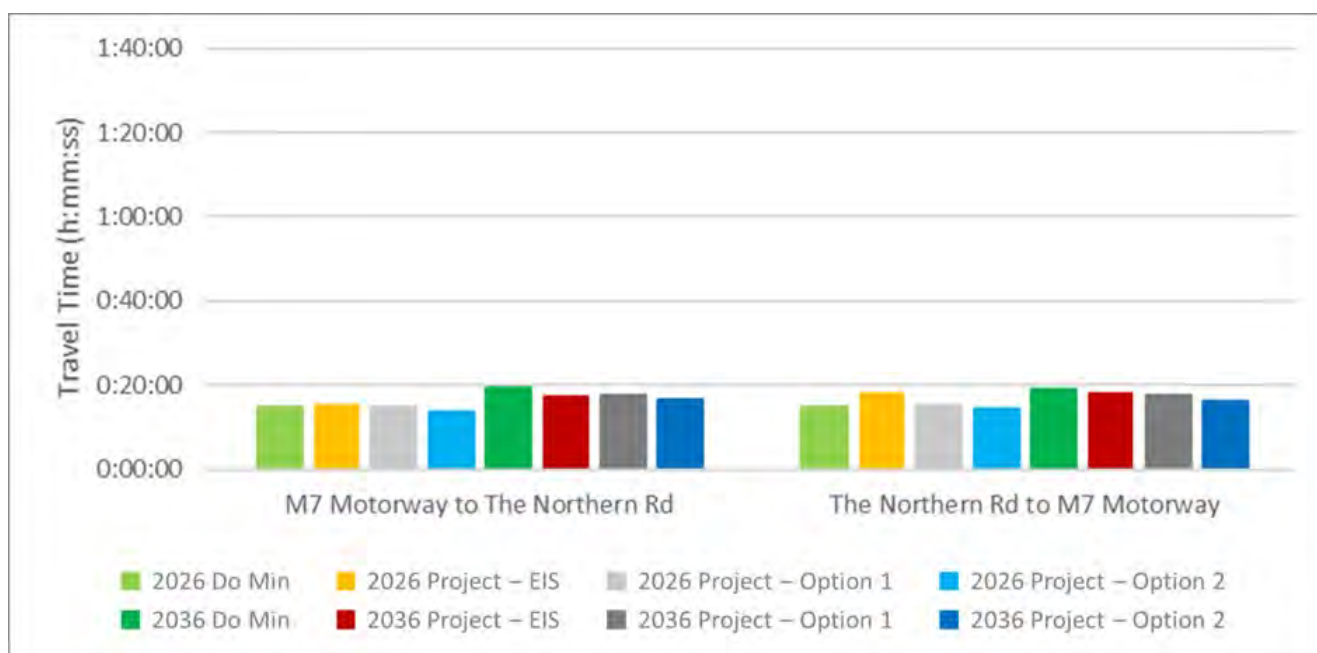


Figure 6-19 Elizabeth Drive evening peak travel time (5pm to 6pm)

M12 Motorway

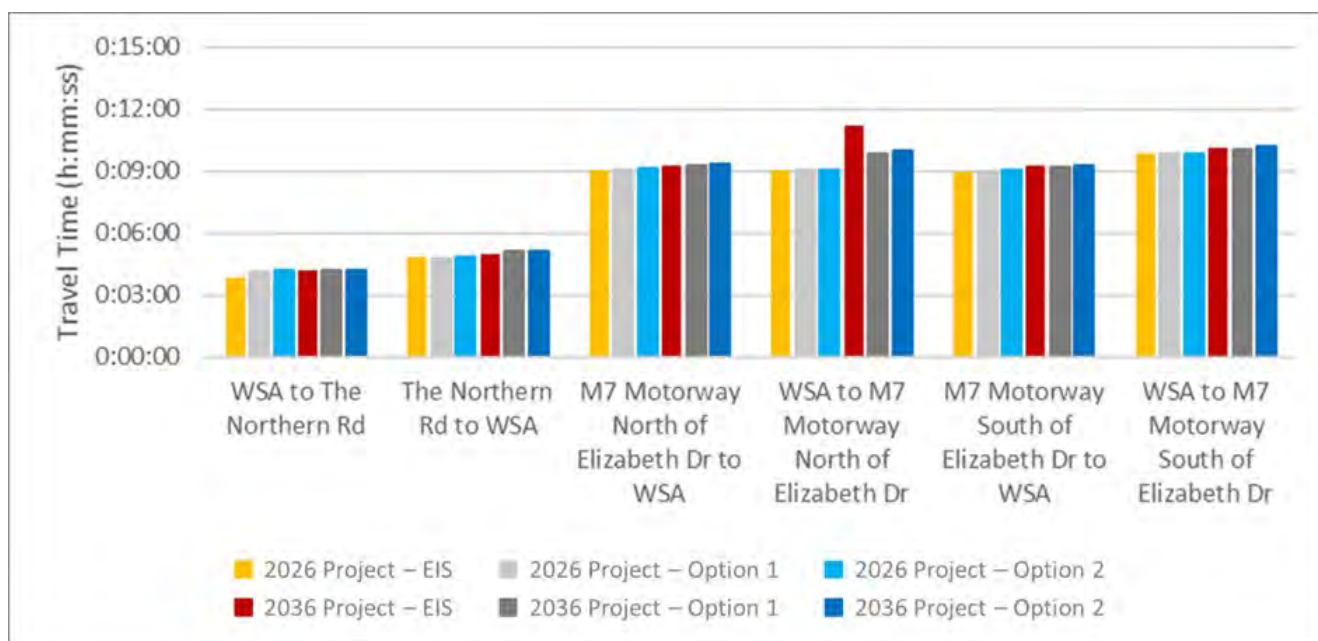


Figure 6-20 M12 Motorway morning peak travel times (8am to 9am)

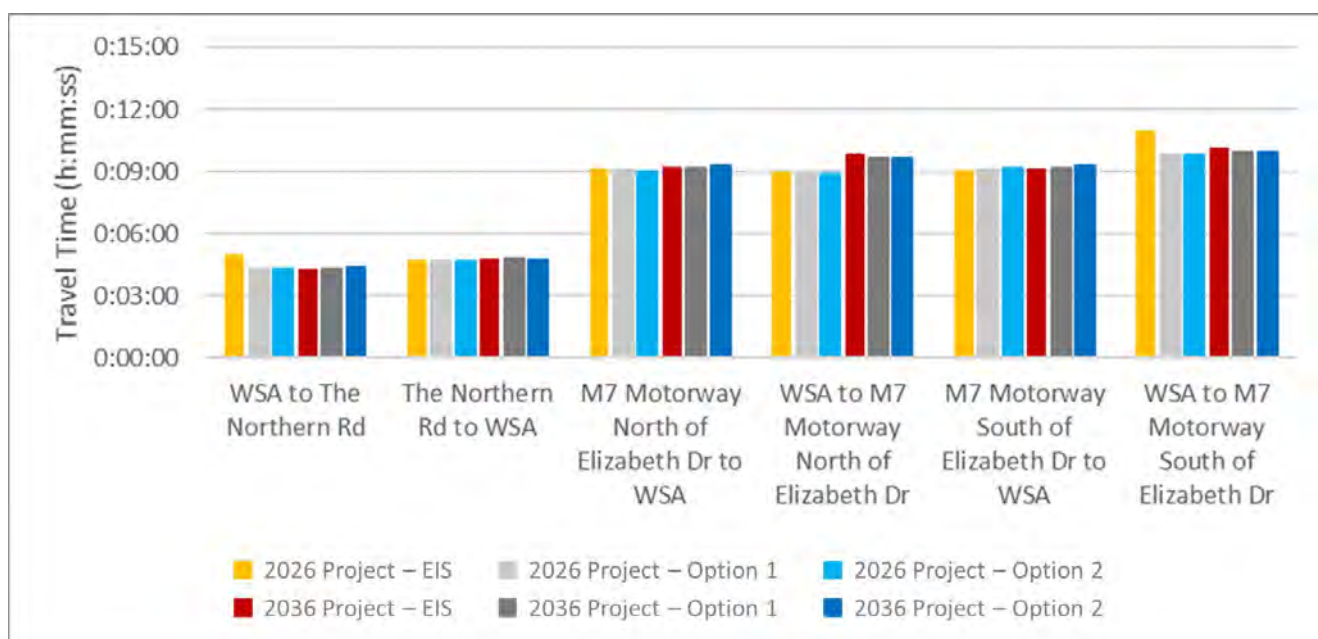


Figure 6-21 M12 Motorway evening peak travel times (5pm to 6pm)

When compared to the project described in the EIS, the forecast 'with amended project' daily heavy vehicle volumes for the amended project shows the following differences:

- Overall volumes on The Northern Road would be 167 per cent higher in 2026 and 251 per cent higher in 2036
- Overall volumes on Elizabeth Drive would be 20 per cent lower in 2026 and 28 per cent lower in 2036
- Volumes on Mamre Road would be 64 per cent lower in 2026 and 74 per cent lower in 2036
- Volumes on Wallgrove Road would be six per cent lower in 2026 and four per cent lower in 2036
- Volumes on the M12 Motorway Western Sydney International Airport Access Road would be 172 per cent higher in 2026 and 482 per cent higher in 2036
- Overall volumes on the M12 Motorway would be 23 per cent lower in 2026 and nine per cent lower in 2036.

The changes in daily heavy vehicle volumes reflect the update of the freight movement model as part of SMPM version 1.1.

A summary of forecast daily heavy vehicle volumes on key roads in the study area for the 2026 and 2036 'with amended project' scenarios is presented in **Table 6-26** and **Table 6-27**.

Table 6-26 Forecast 'with amended project' 2026 daily heavy vehicle volumes on key roads in the study area

Road location	Direction	2026 'do minimum'	2026 'with project' as per EIS	2026 'with amended project'	% change from 2026 'do minimum'	% change from '2026 do minimum' to 'with project' as per EIS
The Northern Road north of Elizabeth Drive	Northbound	2560	880	2740	7%	-38%
	Southbound	3340	1400	3880	16%	-13%
The Northern Road south of Elizabeth Drive	Northbound	2130	650	2130	0%	-42%
	Southbound	2730	1360	2690	-1%	-13%
Elizabeth Drive west of Adams Road	Eastbound	700	120	590	-16%	-8%
	Westbound	670	320	400	-40%	-26%
Elizabeth Drive west of Devonshire Road	Eastbound	1190	670	830	-30%	10%
	Westbound	720	1160	320	-56%	5%
Elizabeth Drive east of Mamre Road	Eastbound	1620	1410	1340	-17%	9%
	Westbound	1350	1730	1060	-21%	7%

Road location	Direction	2026 'do minimum'	2026 'with project' as per EIS	2026 'with amended project'	% change from 2026 'do minimum'	% change from '2026 do minimum' to 'with project' as per EIS
Elizabeth Drive east of Wallgrove Road	Eastbound	1870	1840	1780	-5%	12%
	Westbound	1020	2040	1110	9%	6%
Mamre Road north of Wallgrove Road	Northbound	310	990	330	6%	-8%
	Southbound	460	1210	460	0%	-5%
Wallgrove Road north of Elizabeth Drive	Northbound	2070	1280	2030	-2%	22%
	Southbound	650	1530	600	-8%	2%
M12 Motorway Western Sydney International Airport Access Road	Northbound	N/A	180	490	N/A	N/A
	Southbound	N/A	110	300	N/A	N/A
M12 Motorway west of Western Sydney International Airport	Eastbound	N/A	1340	720	N/A	N/A
	Westbound	N/A	1690	1340	N/A	N/A
M12 Motorway east of Western Sydney International Airport	Eastbound	N/A	1520	1200	N/A	N/A
	Westbound	N/A	1790	1630	N/A	N/A

¹ EIS data from Table 6-26 of Appendix F of the EIS

Table 6-27 Forecast 'with amended project' 2036 daily heavy vehicle volumes on key roads in the study area

Road location	Direction	2026 'do minimum'	2026 'with project' as per EIS	2026 'with amended project'	% change from 2026 'do minimum'	% change from '2026 do minimum' to 'with project' as per EIS
The Northern Road north of Elizabeth Drive	Northbound	2940	1400	3850	31%	2%
	Southbound	3240	750	4380	35%	23%
The Northern Road south of Elizabeth Drive	Northbound	2520	1150	2550	1%	-11%
	Southbound	2910	610	2930	1%	9%
Elizabeth Drive west of Adams Road	Eastbound	390	360	430	10%	-43%
	Westbound	630	440	970	54%	-27%
Elizabeth Drive west of Devonshire Road	Eastbound	990	1310	1030	4%	-15%
	Westbound	1020	1270	870	-15%	-12%
Elizabeth Drive east of Mamre Road	Eastbound	1870	2590	1770	-5%	8%
	Westbound	1500	2000	1290	-14%	-17%
Elizabeth Drive east of Wallgrove Road	Eastbound	2260	3240	2350	4%	17%
	Westbound	1120	2420	1160	4%	-13%
Mamre Road north of Wallgrove Road	Northbound	150	1660	190	27%	-20%
	Southbound	700	1890	730	4%	10%
Wallgrove Road north of Elizabeth Drive	Northbound	1940	1240	2010	4%	53%
	Southbound	450	1360	480	7%	7%
M12 Motorway Western Sydney International Airport Access Road	Northbound	N/A	60	370	N/A	N/A
	Southbound	N/A	50	270	N/A	N/A
M12 Motorway west of Western Sydney International Airport	Eastbound	N/A	2310	1900	N/A	N/A
	Westbound	N/A	2360	2090	N/A	N/A
M12 Motorway east of Western Sydney International Airport	Eastbound	N/A	2360	2260	N/A	N/A
	Westbound	N/A	2410	2350	N/A	N/A

6.2.4 Cumulative impact

The EIS identified that the project would have a minor cumulative transport and traffic impacts associated with the construction of other transport projects in south-western Sydney, where the construction schedules of those projects overlaps with that of the project. There are still substantial but difficult to quantify cumulative transport and traffic impacts associated with construction traffic generation, changes to road network conditions and driver construction fatigue, especially where the construction schedules of those projects overlaps with that of the project.

The cumulative transport and traffic impacts associated with the amended project would be likely to remain consistent with the assessment carried out as per Section 7.2.7 of the EIS.

6.2.5 Environmental management measures

The amended project shows improved levels of performance compared to the project as described in the EIS. This is mostly due to the reduction in overall network demands as result of updating to using SMPM Version 1.1. As a result, the environmental management measures identified for the project as described in the EIS (see Section 7.2.8 of the EIS) are therefore considered appropriate to manage the transport and traffic impacts associated with the amended project. These measures are consistent between the two options.

6.3 Urban design, landscape character and visual amenity

The urban design, landscape character and visual impact assessment supplementary technical memorandum is provided in **Appendix C**, and a summary is provided below. This section should be read in conjunction with Section 7.3 of the EIS and the urban design, landscape character and visual amenity assessment report provided in Appendix G of the EIS.

The urban design concept for the project as described in the EIS is still relevant and applicable to the amended project. This includes urban design principles and objectives, connection to country design, urban design elements and concept plan. This is detailed in Section 7.3.4 of the EIS and has not been discussed further in this section.

6.3.1 Assessment methodology

The assessment has been completed in accordance with the Environmental Impact Assessment Practice Note: Landscape Character and Visual Assessment EIA-NO4 (RMS, 2018).

The assessment methodology involved the following:

- Review of the Landscape Character Zones (LCZs) identified in the EIS and identification of LCZs where proposed changes occur
- Assessment of whether there are changes on the magnitude of the impact for each LCZ because of the proposed changes
- Review of viewpoints identified in the EIS and identification of those where proposed changes would be visible
- Identification of additional viewpoints potentially impacted by the proposed change. A site inspection was carried out in January 2020 to inform six new viewpoint locations for the amended project
- For those where proposed changes are visible, the magnitude of change and overall visual impact were revised.

6.3.2 Existing environment

The existing environment has not changed since the preparation of the EIS. The environment described in Section 7.3.3 of the EIS is still applicable to the amended project.

6.3.3 Assessment of potential impacts

6.3.3.1 *Landscape character assessment*

Landscape character zones

Eight LCZs were identified within the EIS study area. These were based on the surrounding land use, built form, vegetation cover and topography (see Table 7-62 and Figure 7-49 of the EIS). The eight LCZs are still applicable to the amended project (see **Figure 6-22**).

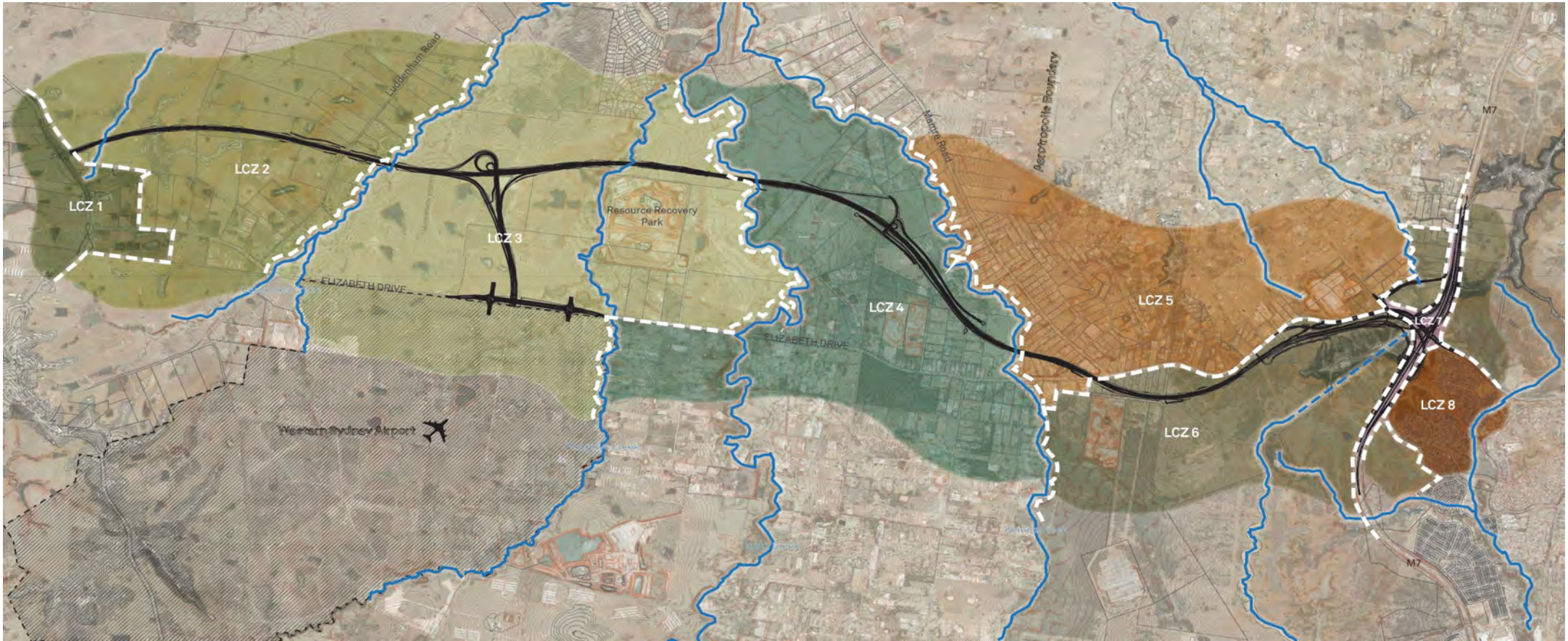


Figure 6-22 Landscape character zones for the amended project

Landscape character impacts during construction

The amended project involves changes to the construction footprint as described in the EIS and the provision of additional ancillary facilities, however the construction activities within each LCZ are largely the same as described in the EIS. Therefore, the impacts to the landscape character during construction of the amended project remains unchanged from the EIS.

Landscape character impacts during operation

The following four LCZs were reassessed following a review of the amended project and where the proposed changes occur across the amended project:

- LCZ 3: Rural Plains
- LCZ 6: Ridgetop Woodlands
- LCZ 7: M7 Motorway
- LCZ 8: Cecil Hills residential.

The amended project in each LCZ is similar in nature to the project as described in the EIS, particularly base infrastructure including road elements, bridges and landscaping. Impacts to landscape character associated with the operation of the amended project would therefore be consistent with those identified in the EIS.

6.3.3.2 Visual impact assessment

Visibility of the project

The visual catchment is the extent of the landscape that can be viewed from the amended visual impact study area and, likewise, the extent of locations from which the site can be seen. The visual catchment of the project is shown in Figure 7-50 of the EIS. The visual catchment has been updated to reflect the amended project as shown in **Figure 6-23**.

Viewpoint locations

Potential visual impacts of project elements on the existing visual environment were assessed from 30 viewpoints within the visual catchment (see **Figure 6-23**).

Based on a review of the amended design, the following viewpoints from the EIS were reassessed for operational impacts associated with the amended project:

- Viewpoint 7 - View east along Elizabeth Drive
- Viewpoint 22 - View south from Duff Road
- Viewpoint 24 - View south from Cecil Road
- Viewpoint 25 - View north-west toward M7 Motorway - M12 Motorway Interchange
- Viewpoint 26 - View north along the M7 Motorway
- Viewpoint 28 - View west from Jaquetta Close
- Viewpoint 29 - View west along Elizabeth Drive.
- Viewpoint 30 - View south along shared user path and M7 Motorway.

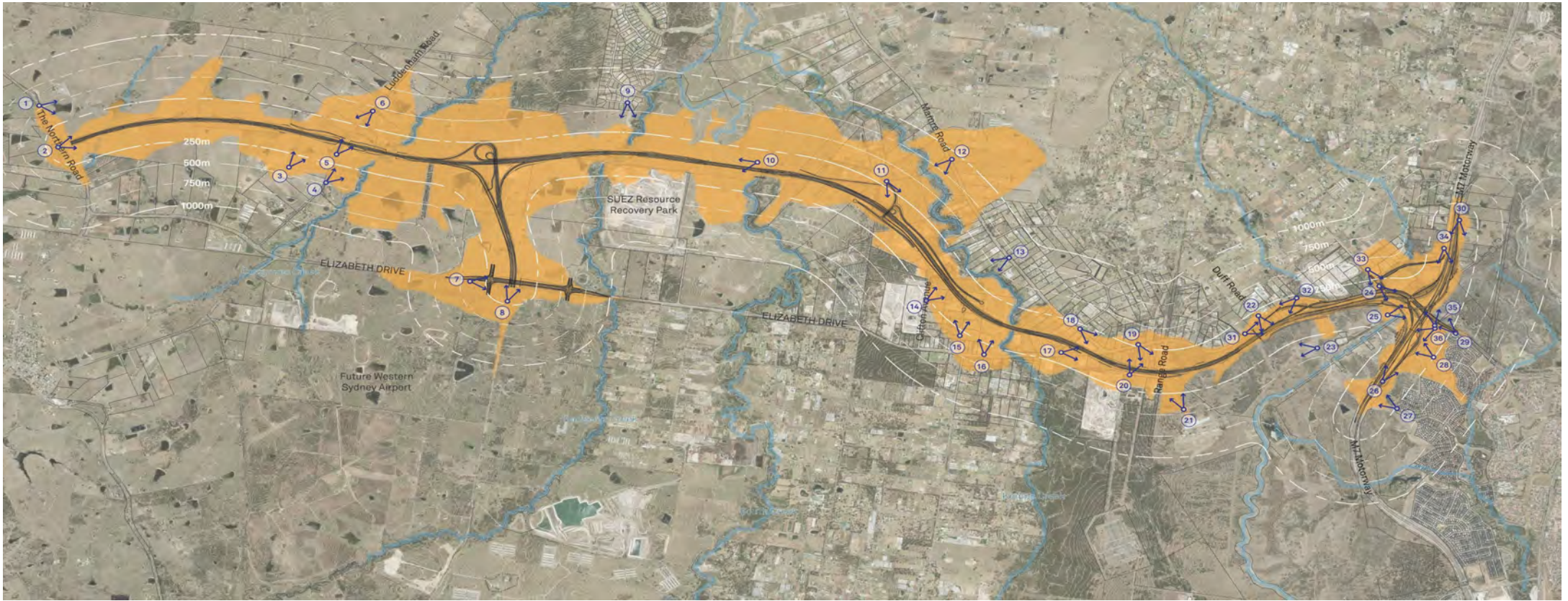


Figure 6-23 Revised visual catchment and viewpoints for the amended project

Six new viewpoints (see **Figure 6-23**) have also been identified, which have the potential to be impacted by the amended project during operation as a result of the proposed changes:

- Viewpoint 31: View south from Elizabeth Drive, west of Duff Road
- Viewpoint 32: View south-east from Elizabeth Drive, east of Duff Road
- Viewpoint 33: View south from Cecil Road, north of Elizabeth Drive
- Viewpoint 34: View south from Wallgrove Road
- Viewpoint 35: View north from Isabel Street
- Viewpoint 36: View west from Isabel Street.

Visual impacts during construction

While the amended project includes changes to the construction footprint as described in the EIS and the provision of additional ancillary facilities, the visual impacts at viewpoints are similar in nature during construction, and would be consistent with those described in the EIS.

Visual impacts during operation

The assessment identified that out of the eight existing viewpoints that were reassessed, one viewpoint (Viewpoint 22) would experience a lower overall impact assessment rating when compared to the EIS, reducing from Moderate, to Moderate-Low. The remaining seven viewpoints would experience the same overall impact assessment ratings as identified in the EIS. This is due to the amended design being of similar nature to the design described in the EIS at each of these locations. In addition, the amended project would have the following impacts at the six additional viewpoints:

- Viewpoint 31: Moderate-Low
- Viewpoint 32: Moderate
- Viewpoint 33: High
- Viewpoint 34: Moderate-Low
- Viewpoint 35: High-Moderate
- Viewpoint 36: High.

The impact assessment ratings for each viewpoint are provided in **Table 6-28**. Visualisations of the operational visual impact at each of the updated and additional viewpoints is provided in **Table 6-29**.

Overall, the amended project would have the following visual impacts during operation on all viewpoints (existing and additional):




- Six viewpoints would experience a High impact – two additional viewpoints compared with EIS
- Ten viewpoints would experience a High-Moderate impact – one additional viewpoint compared with EIS
- Six viewpoints would experience a Moderate impact – one additional viewpoint compared with EIS
- Six viewpoints would experience a Moderate-Low impact – two additional viewpoints compared with EIS
- Three viewpoints would experience a Low impact – same number of viewpoints compared with EIS
- Five viewpoints would experience a Negligible impact – same number of viewpoints compared with EIS.


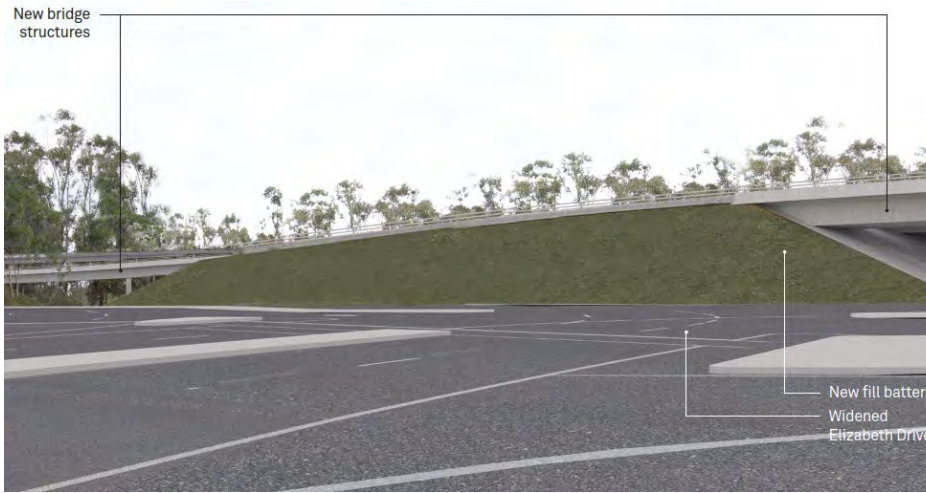


Table 6-28 Summary of visual impacts during operation of the amended project at updated and additional viewpoints

Viewpoint		Project as per EIS			Amended project			Notes
		Sensitivity	Magnitude	Impact	Sensitivity	Magnitude	Impact	
22	<u>Existing viewpoint</u> View south from Duff Road	Moderate	Moderate	Moderate	Moderate	Low	Moderate-Low	Given the design changes in this location are likely to not be visible when compared to the design as described in the EIS, the overall assessment impact is reduced from Moderate to Moderate-Low.
31	New viewpoint View south from Elizabeth Drive, west of Duff Road	N/A	N/A	N/A	Moderate	Moderate	Moderate	There would be limited views from nearby residents, against the rural-residential backdrop. The project would introduce new built elements that are of a similar scale and proportion existing elements in this view. Overall assessment impact is Moderate.
32	New viewpoint View south-east from Elizabeth Drive, east of Duff Road	N/A	N/A	N/A	Moderate	Moderate	Moderate	There would be limited views from nearby residents, against the rural-residential backdrop. The project would introduce new built elements that although are similar in nature, are of a much larger scale and proportion existing elements in this view. Overall assessment impact is Moderate.
33	New viewpoint View south from Cecil Road, north of Elizabeth Drive	N/A	N/A	N/A	High	High	High	The streetscape in this view has a rural-residential character with a backdrop of the Western Sydney Parklands. The project would introduce new built elements that are considerably larger in scale and proportion to existing elements in this view, and would also require clearing of existing woodland. Overall assessment impact is High.

Viewpoint		Project as per EIS			Amended project			Notes
		Sensitivity	Magnitude	Impact	Sensitivity	Magnitude	Impact	
34	New viewpoint View south from Wallgrove Road	N/A	N/A	N/A	Low	Moderate	Moderate-Low	The project would introduce additional infrastructure to the existing corridor already in this view as part of the motorway-to-motorway interchange and updated Elizabeth Drive connections. Overall assessment impact is Moderate-Low.
35	New viewpoint View north from Isabel Street	N/A	N/A	N/A	High	Moderate	High-Moderate	The project would introduce new fill embankments into this view with vehicles and road furniture possibly visible at this distance. Vehicles and road furniture are currently visible at this distance. Existing vegetation provides some ability to screen the infrastructure from residents. View would improve over time as new plantings are established. Overall assessment impact is High-Moderate.
36	New viewpoint View west from Isabel Street	N/A	N/A	N/A	High	High	High	The project would introduce new fill embankments into this view with vehicles and road furniture possibly visible at this distance. Vehicles and road furniture are currently visible at this distance. Existing vegetation provides some ability to screen the infrastructure from residents. View would improve over time as new plantings are established. Overall assessment impact is High.

Table 6-29 Operational visual impacts of the amended project at updated and additional viewpoints

Existing viewpoint	Viewpoint during operation of amended project
<u>Existing viewpoint</u> – Viewpoint 7: View east along Elizabeth Drive	
 <p>A photograph showing a two-lane asphalt road stretching into the distance under a cloudy sky. The road is bordered by grass and some trees on the left, and a concrete curb with a grassy area on the right.</p>	 <p>A photograph of the same road from Viewpoint 7, but showing the proposed project features. Labels with leader lines point to: 'New airport access roads' (top right), 'New Elizabeth Drive overbridge' (middle right), and 'New stub access road' (middle left).</p>
<u>Existing viewpoint</u> – Viewpoint 22: View south from Duff Road	
 <p>A photograph showing a road intersection or junction. On the left, there is a black fence and a sign. The road curves to the right, lined with trees and a utility pole. The sky is overcast.</p>	<p>The alignment has shifted so view would be similar to existing.</p>

Existing viewpoint	Viewpoint during operation of amended project
Existing viewpoint – Viewpoint 24: View south from Cecil Road	
	 <p>New bridge structures</p> <p>New fill batters Widened Elizabeth Drive</p>
Existing viewpoint – Viewpoint 25: View north-west toward M7 Motorway - M12 Motorway Interchange	
	 <p>New interchange bridges and road alignments</p>

Existing viewpoint	Viewpoint during operation of amended project
<u>Existing viewpoint</u> – Viewpoint 26: View north along the M7 Motorway	
	 <p>New interchange bridges, embankments and widened cuttings</p> <p>New on ramp</p>
<u>Existing viewpoint</u> – Viewpoint 28: View west from Jaquetta Close	
	 <p>New fill batter</p> <p>Road barrier</p>

Existing viewpoint	Viewpoint during operation of amended project
Existing viewpoint – Viewpoint 29: View west along Elizabeth Drive	
	
Existing viewpoint – Viewpoint 30: View south along shared user path and M7 Motorway	
	

Existing viewpoint	Viewpoint during operation of amended project
New viewpoint – Viewpoint 31: View south from Elizabeth Drive, west of Duff Road	
	
New viewpoint – Viewpoint 32: View south-east from Elizabeth Drive, east of Duff Road	
	

Existing viewpoint	Viewpoint during operation of amended project
New viewpoint – Viewpoint 33: View south from Cecil Road, north of Elizabeth Drive	
	
New viewpoint – Viewpoint 34: View south from Wallgrove Road	
	

Existing viewpoint	Viewpoint during operation of amended project
New viewpoint – Viewpoint 35: View north from Isabel Street	
	 <p>New interchange bridges</p> <p>New fill batter</p>
New viewpoint – Viewpoint 36: View west from Isabel Street	
	 <p>New fill batter</p>

6.3.4 Cumulative impact

The EIS identified that the project would have a moderate to high contribution to cumulative landscape character and visual impacts in the area. The cumulative landscape character and visual impacts associated with the amended project would be likely to remain unchanged from the assessment carried out as per Section 7.3.7 of the EIS.

6.3.5 Environmental management measures

The landscape character and visual impacts associated with the amended project are generally consistent with the impacts described in the EIS. The environmental management measures identified in Section 7.3.8 of the EIS are therefore considered appropriate to manage the landscape character and visual amenity impacts associated with the amended project. No additional or amended environmental management measures are required for the amended project.

6.4 Socio-economic, land use and property

The socio-economic, land use and property supplementary technical memorandum is provided as **Appendix D** of this report, and a summary is provided below. This section should be read in conjunction with Section 7.4 of the EIS and the socio-economic, land use and property assessment report provided in Appendix H of the EIS.

6.4.1 Assessment methodology

The methodology for the socio-economic, land use and property assessment is consistent with the methodology outlined in Section 7.4.2 of the EIS.

The primary and secondary study areas for the assessment remain unchanged to those presented in the EIS (see Figure 7-51 of EIS).

6.4.2 Existing environment

Section 7.4.3 of the EIS provides a detailed description of the existing environment within which the project is located. This includes existing and planned future land use; population, demography and housing characteristics, local business and industry; social infrastructure; community values; and transport and access.

While the existing environment has not changed since the preparation of the EIS, there have been some changes in planned future land use, with the release of the Draft Western Sydney Aerotropolis Planning Package. The Draft Western Sydney Aerotropolis Planning Package identifies precincts based on likely future character and connectivity and outlines future land use proposed for the Western Sydney Aerotropolis. Precincts as described in the Draft Western Sydney Aerotropolis Planning Package that would be impacted by the amended project include the following:

- Northern Gateway
- North Luddenham
- Wianamatta – South Creek
- Badgerys Creek
- Kemps Creek.

The amended construction and operational footprints have moved further north at Cecil Park to account for the realignment of Wallgrove Road. As such, the amended project now sits within the south-eastern boundary of the Horsley Park and Cecil Park Urban Investigation Area (UIA).

Fairfield City Council is progressing planning for its section of the UIA in consultation with the Greater Sydney Commission and other government agencies including TfNSW. The UIA and associated structure plan are still in the planning phase and are yet to be endorsed by the Greater Sydney Commission. As such, the UIA has not been considered further in the assessment for the amended project. However, it is worth noting that proposed changes as part of the amended project would improve access from the UIA to Elizabeth Drive, the M12 Motorway and the Western Sydney International Airport.

6.4.3 Assessment of potential impacts

The potential socio-economic, land use and property impacts associated with the amended project are described below for construction and operation. Only impacts that are additional or different from those documented in the EIS have been outlined. Overall, the proposed design and construction changes would likely result in localised changes to socio-economic impacts and are considered to have minimal variation from the impacts described in the EIS.

6.4.3.1 Property impacts

Section 7.4.4 of the EIS identified the following types of property impacts:

- Directly affected properties
- Impacts of property acquisition
- Other property impacts.

There would be changes to impacts to all of the above as a result of the amended project, in comparison the project as described in the EIS. These potential impacts are discussed in detail in the following sections.

Directly affected properties

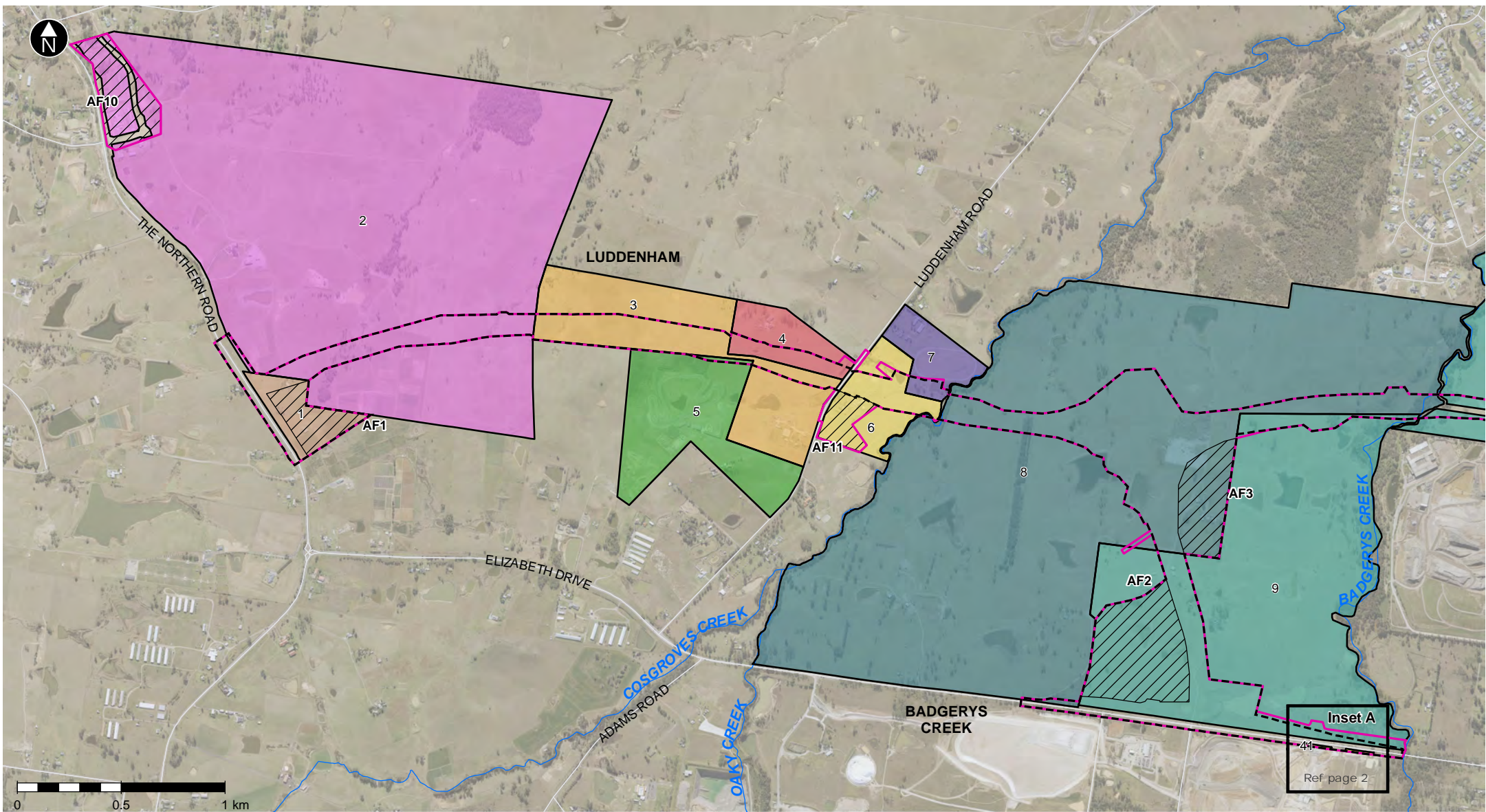
The project as described in the EIS would directly affect 41 properties by either property acquisition or temporary lease. The proposed amended project would require the additional partial acquisition of five properties and three temporary leases. This brings the total number of directly affected properties to 49 for the amended project. Properties within the amended project construction footprint are shown on **Figure 6-24** and properties within the amended project operational footprint are shown on **Figure 6-25**.

Seventeen properties identified in the EIS for acquisition or temporary lease would also be subject to increased acquisition or temporary lease requirements. This would include privately owned rural residential land and publicly owned recreation land, specifically, the Western Sydney Parklands, which is managed by the Western Sydney Parklands Trust.

A summary of properties directly affected by the amended project is provided in **Table 6-30**. No changes are proposed to the other properties identified in the EIS for acquisition or temporary lease.

The types of impacts on the land use associated with the amended project would be consistent with those described in Section 7.4.4 of the EIS. In addition, access to properties subject to temporary lease would remain consistent with the access discussed in the EIS. .

Acquisition of additional land required for the amended project would be undertaken in accordance with the provisions of the NSW Land Acquisition (Just Terms Compensation) Act 1991 and the Land Acquisition Reform 2016 process (<https://www.propertyacquisition.nsw.gov.au/>). Where properties are only partly affected by the project, TfNSW would generally undertake a partial acquisition of the directly affected portion in consultation with the landowner.



- The project construction footprint as per the EIS
 - The amended project construction footprint
 - Affected properties
 - The amended project ancillary facilities
 - ~~~~~ Waterways
- Note: Different colours have been used for each affected property for ease of identification**

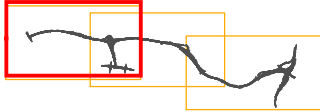
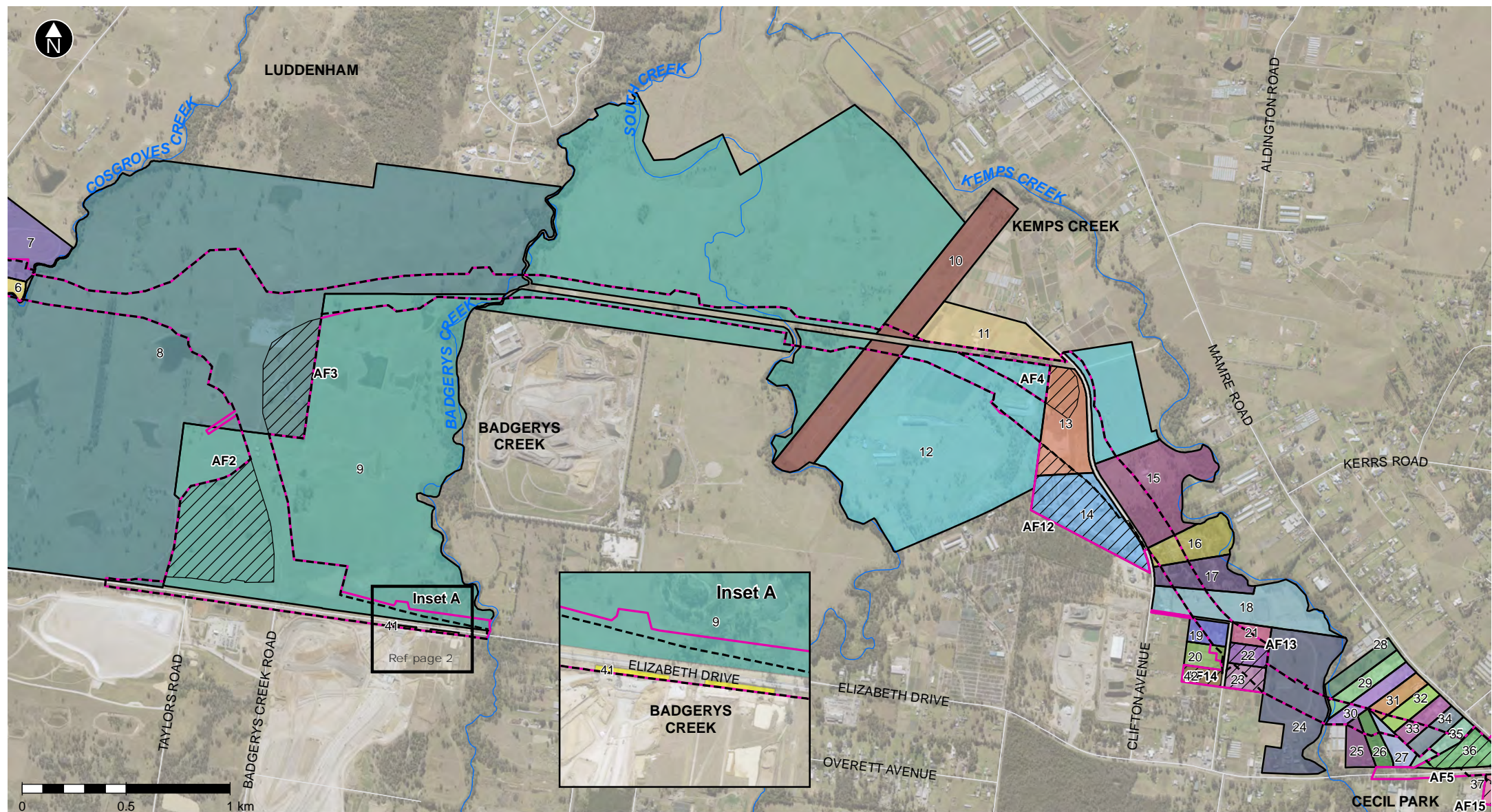


Figure 6-24 Properties within amended project construction footprint



- The project construction footprint as per the EIS
- The amended project construction footprint
- The amended project ancillary facilities
- ~ Waterways
- Affected properties

Note: Different colours have been used for each affected property for ease of identification

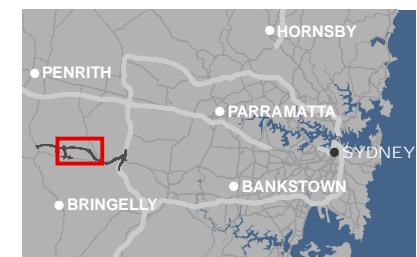
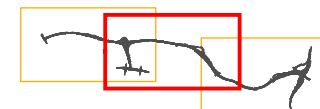
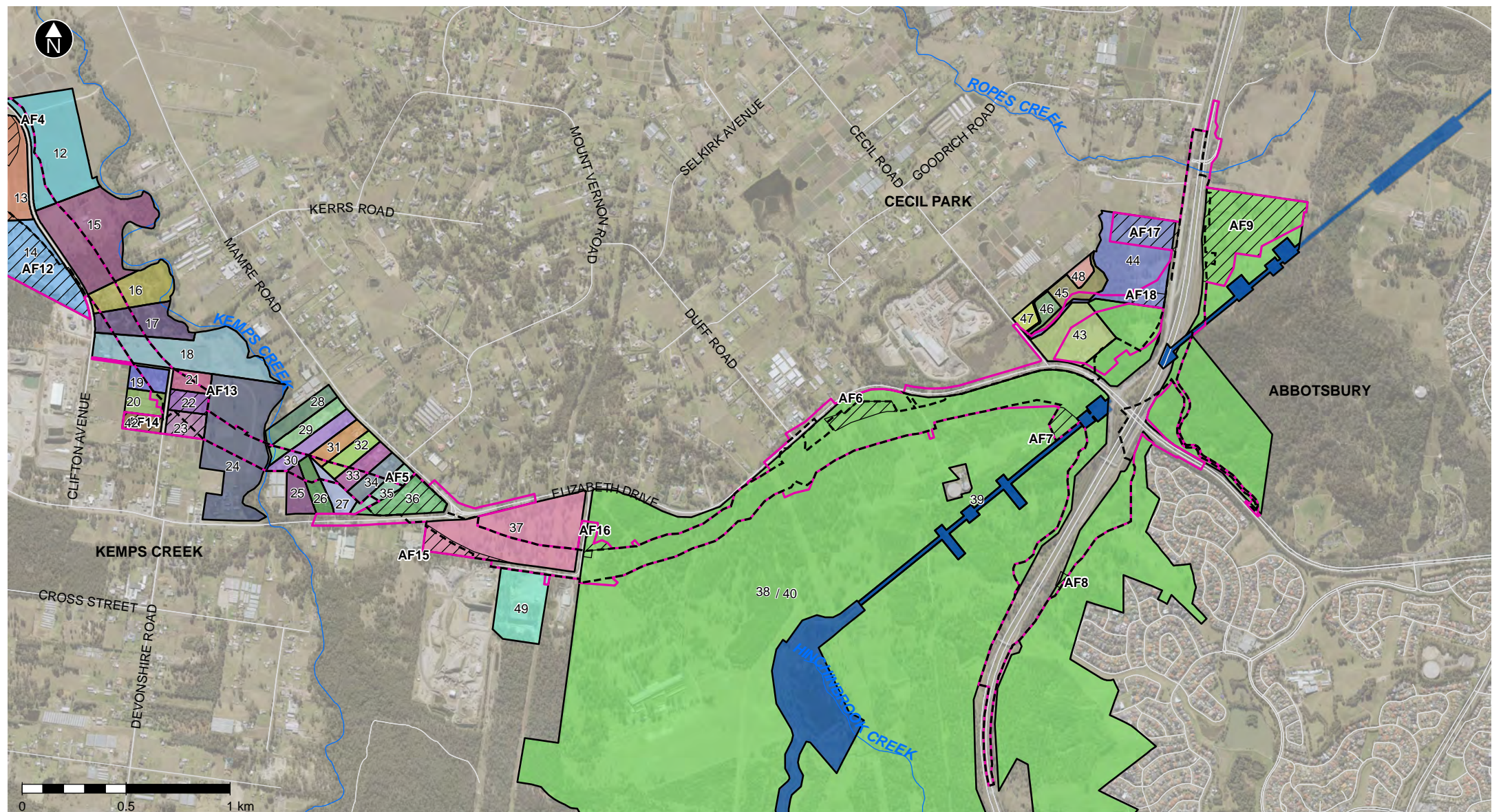


Figure 6-24 Properties within amended project construction footprint



- The project construction footprint as per the EIS
- The amended project construction footprint
- The amended project ancillary facilities
- ~ Waterways
- Affected properties

Note: Different colours have been used for each affected property for ease of identification

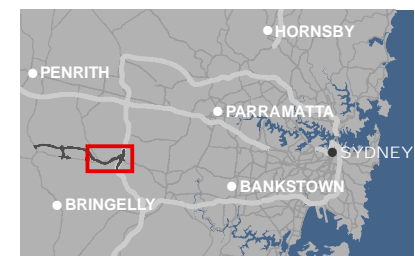
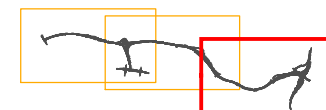
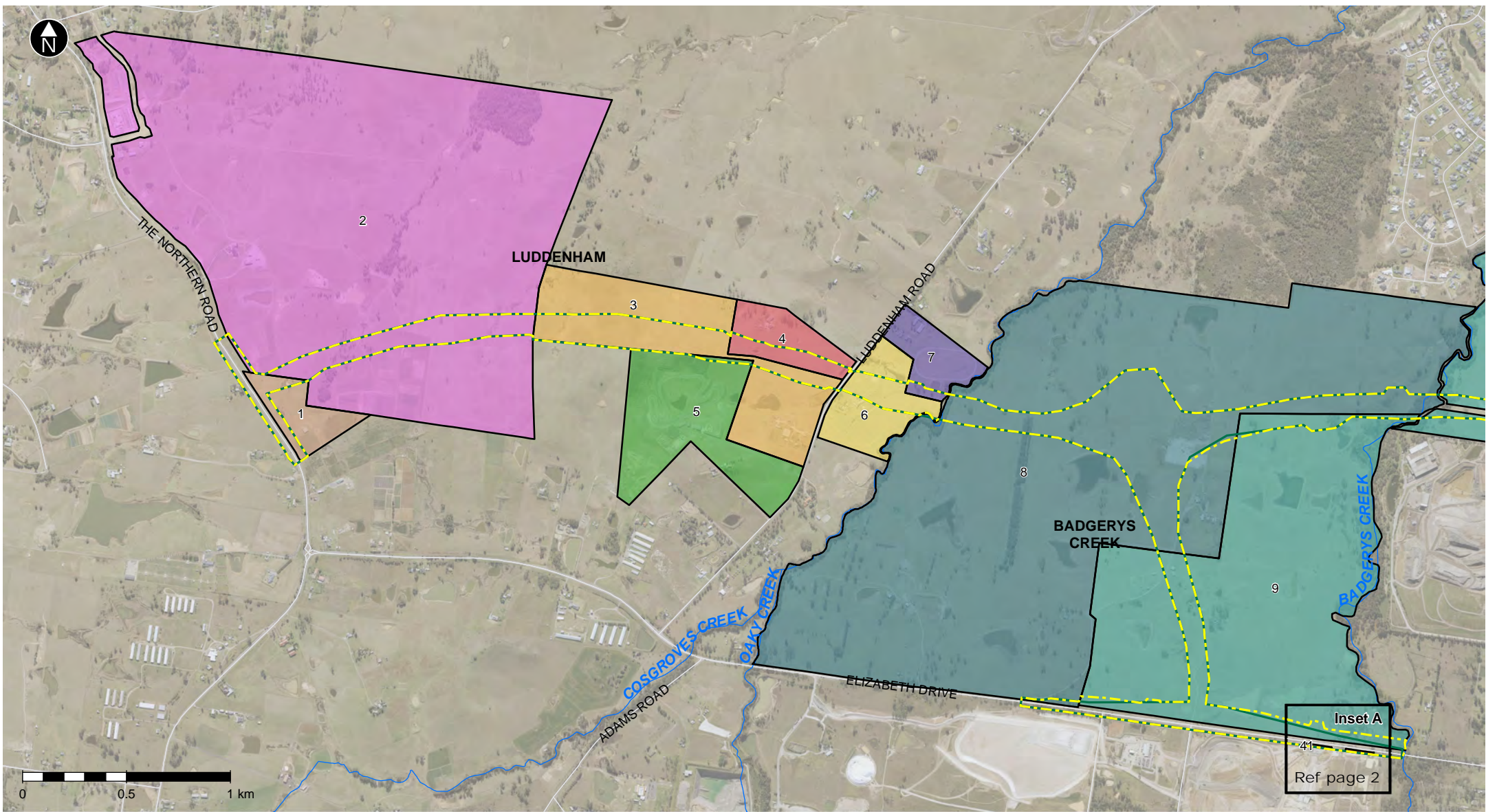


Figure 6-24 Properties within amended project construction footprint

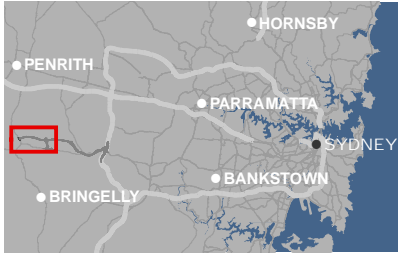
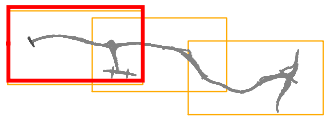


The project operational footprint as per EIS
 Affected properties

The amended project operational footprint

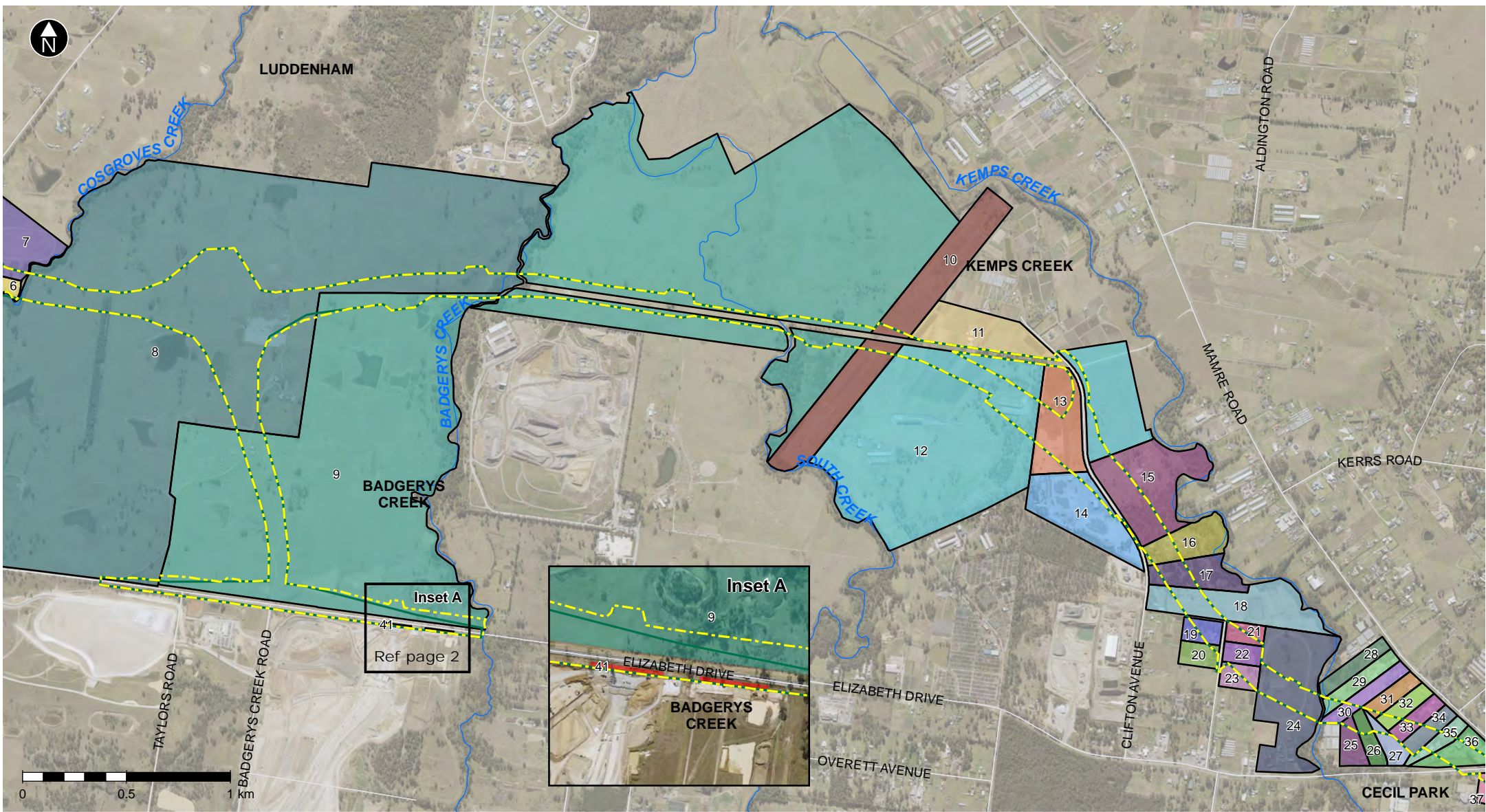
~~~~~ Waterways

**Note: Different colours have been used for each affected property for ease of identification**

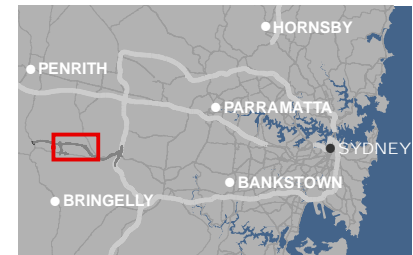


**Figure 6-25** Properties within amended project operational footprint

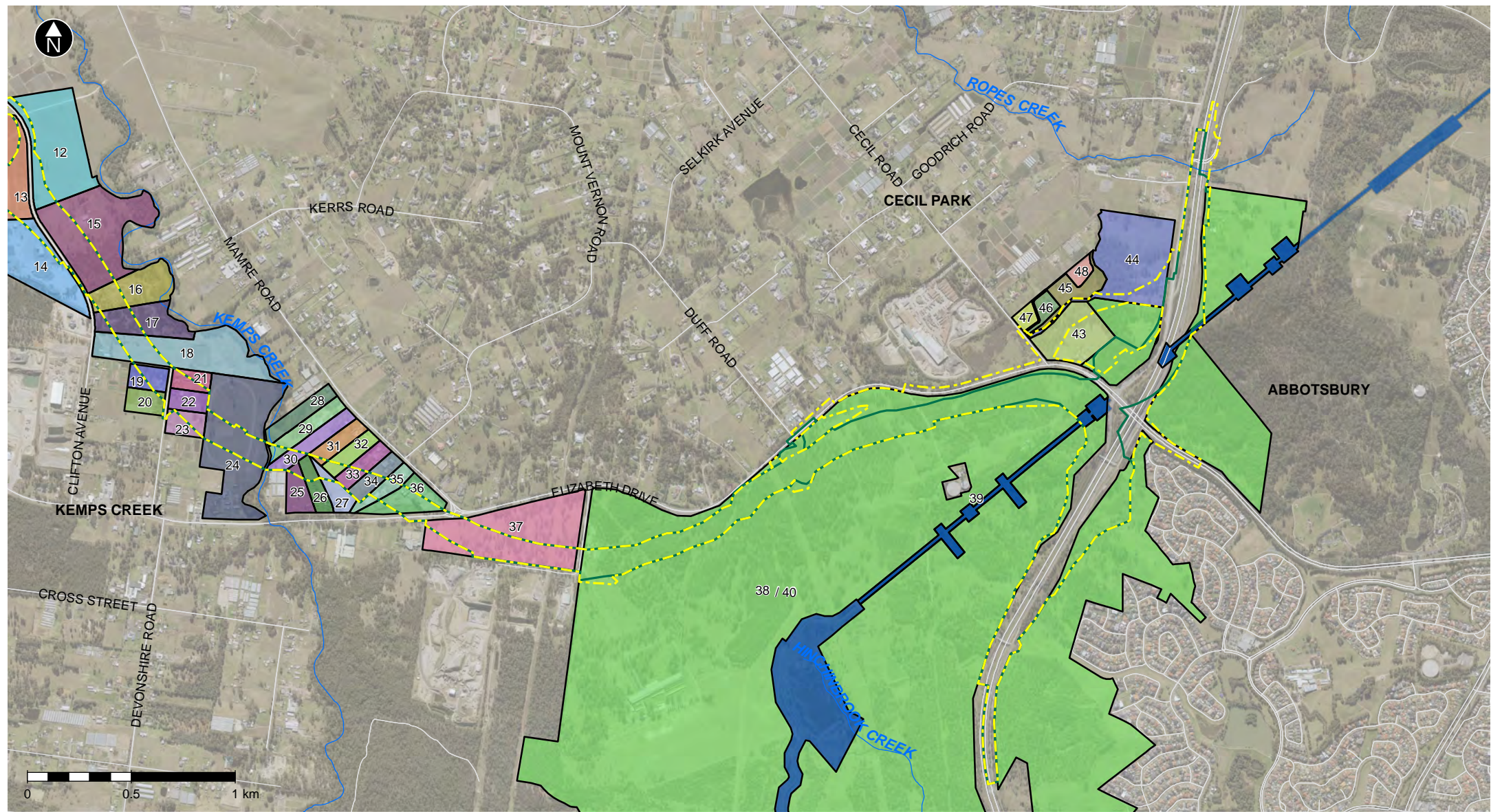




**Figure 6-25** Properties within amended project operational footprint





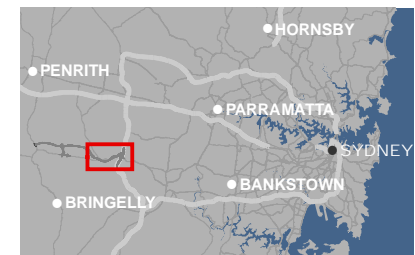
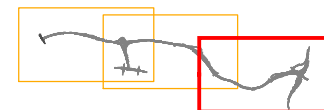


The project operational footprint as per EIS Affected properties

The amended project operational footprint

Waterways

**Note: Different colours have been used for each affected property for ease of identification**



**Figure 6-25** Properties within amended project operational footprint



Table 6-30 Summary of properties directly affected by the amended project

| ID             | Lot (lot or section/ DP) | Ownership         | Existing land use                                                                                     | Total property area (hectares) | Area of land within amended operational footprint (hectares) (proportion of property in brackets) | Area of land subject to temporary lease (hectares) (proportion of property in brackets) | Property improvements affected (eg dwellings, sheds, farm dams, shade houses) | Change from EIS                                                                                                                                                                                     |
|----------------|--------------------------|-------------------|-------------------------------------------------------------------------------------------------------|--------------------------------|---------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 <sup>4</sup> | 1/DP200435               | Private           | Agriculture (The Honey Shed), home based business (transport company), utilities (mobile phone tower) | 8.7                            | 1.5 (17.2%)                                                                                       | 7.2 (82.8%)                                                                             | Dwelling(s), internal roads/ tracks                                           | No change                                                                                                                                                                                           |
| 2              | 1/DP1240402              | Private (company) | Rural                                                                                                 | 315.2                          | 13.5 (4.3%)                                                                                       | 9.3 (3.0%)                                                                              | -                                                                             | Increase in property area affected by construction with the temporary lease of the area currently used for The Northern Road upgrade (Stage 5 and 6) construction ancillary facility (9.3 hectares) |

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<sup>4</sup> Since the M12 Motorway EIS, Lot 1/DP200435 has been subdivided into two separate lots – Lot 4/DP1238606 and Lot 1/DP1238606. Lot 4/DP1238606 (comprising 1.7 hectares) will form part of The Northern Road Stage 5 and 6 and has been excluded from the calculations for Property ID1



| ID | Lot (lot or section/ DP) | Ownership                    | Existing land use                                                   | Total property area (hectares) | Area of land within amended operational footprint (hectares) (proportion of property in brackets) | Area of land subject to temporary lease (hectares) (proportion of property in brackets) | Property improvements affected (eg dwellings, sheds, farm dams, shade houses)                         | Change from EIS                                                                                                                                                               |
|----|--------------------------|------------------------------|---------------------------------------------------------------------|--------------------------------|---------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3  | 26/DP604586, 1/DP228498  | Private                      | Agriculture – grazing                                               | 48.3                           | 16.1 (33.3%)                                                                                      | -                                                                                       | -                                                                                                     | No change                                                                                                                                                                     |
| 4  | 25/DP604586              | Private                      | Agriculture – grazing                                               | 12.8                           | 4.7 (36.4%)                                                                                       | 0.2 (1.6%)                                                                              | Farm dams (two)                                                                                       | Increase in the property area affected by construction with the temporary lease of 0.2 hectares to fully incorporate a farm dam that would be impacted by the amended project |
| 5  | 2/DP529885               | Private (company)            | Commercial (Luddenham Raceway)                                      | 37.8                           | 0.5 (1.4%)                                                                                        | -                                                                                       | Olive trees                                                                                           | No change                                                                                                                                                                     |
| 6  | 1/DP235124               | Private (now owned by TfNSW) | Commercial (former Karingal Training Stables – no longer operating) | 17.6                           | 5.2 (29.8%)                                                                                       | 5.4 (30.7%)                                                                             | Sheds, horse paddocks/ stables, farm dams, training facilities, training track, internal roads/tracks | Increase in the property area affected by construction (by 5.0 hectares) for a construction ancillary facility (AF 11) following acquisition of the property by TfNSW         |

| ID | Lot (lot or section/ DP) | Ownership         | Existing land use                                                                        | Total property area (hectares) | Area of land within amended operational footprint (hectares) (proportion of property in brackets) | Area of land subject to temporary lease (hectares) (proportion of property in brackets) | Property improvements affected (eg dwellings, sheds, farm dams, shade houses) | Change from EIS                                                                                                                                                                                                                                                                                   |
|----|--------------------------|-------------------|------------------------------------------------------------------------------------------|--------------------------------|---------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7  | 35/DP211842              | Private           | Agriculture – intensive animal husbandry (horses)                                        | 11.3                           | 1.0 (8.7%)                                                                                        | 0.7 (6.2%)                                                                              | Farm dams                                                                     | Change to the property area affected by temporary lease (from 0.6 hectares to 0.7 hectares) to fully incorporate the farm dams that would be impacted by the amended project                                                                                                                      |
| 8  | 101/DP848215             | Private (company) | Agriculture – grazing, commercial (quarrying, waste management and/or resource recovery) | 343.4                          | 47.7 (13.8%)                                                                                      | 13.1 (3.8%)                                                                             | Farm dams, quarry, farm dams (two), internal roads/tracks                     | Minor adjustment in operational footprint to accommodate amended design of airport interchange (47.2 hectares to 47.5 hectares). Reduction in the property area subject to temporary lease (from 13.4 hectares to 13.1 hectares), which is partly due to adjustments in the operational footprint |

| ID | Lot (lot or section/ DP)                                                  | Ownership         | Existing land use                                               | Total property area (hectares) | Area of land within amended operational footprint (hectares) (proportion of property in brackets) | Area of land subject to temporary lease (hectares) (proportion of property in brackets) | Property improvements affected (eg dwellings, sheds, farm dams, shade houses) | Change from EIS                                                                                                                                                                                                                                                                                                                                                                                      |
|----|---------------------------------------------------------------------------|-------------------|-----------------------------------------------------------------|--------------------------------|---------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 9  | 63/DP1087838, 62/DP1087838, 3/DP164242, 1/DP74574, 21/DP258414, 1/DP88836 | Private           | Rural land – The University of Sydney farms                     | 343.9                          | 34.0 (9.9%)                                                                                       | 23.2 (6.7%)                                                                             | Farm dams                                                                     | Change to the operational footprint (from 30.9 hectares to 33.6 hectares) at Elizabeth Drive to incorporate intersections into the Western Sydney International Airport and connection to future development to the north of Elizabeth Drive. Reduction in the area subject to temporary lease (from 27.9 hectares to 23.2 hectares), which is mainly due to the change in the operational footprint |
| 10 | 2/DP88836                                                                 | Private (company) | Model aircraft airstrip/ rural land, commercial (radio testing) | 25.3                           | 1.6 (6.2%)                                                                                        | -                                                                                       | -                                                                             | No change                                                                                                                                                                                                                                                                                                                                                                                            |
| 11 | 55/DP734584                                                               | Private           | Agriculture – horticulture                                      | 10.1                           | 0.04 (0.4%)                                                                                       | -                                                                                       |                                                                               | No change                                                                                                                                                                                                                                                                                                                                                                                            |



| ID | Lot (lot or section/ DP)           | Ownership         | Existing land use                                                             | Total property area (hectares) | Area of land within amended operational footprint (hectares) (proportion of property in brackets) | Area of land subject to temporary lease (hectares) (proportion of property in brackets) | Property improvements affected (eg dwellings, sheds, farm dams, shade houses) | Change from EIS                                                                                                                                                                       |
|----|------------------------------------|-------------------|-------------------------------------------------------------------------------|--------------------------------|---------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 12 | 1/DP587135, 2/DP587135, 7/DP812284 | Private (company) | Agriculture – horticulture, grazing (identified for future urban development) | 88.1                           | 10.8 (12.2%)                                                                                      | 0.1 (0.1%)                                                                              | Horticultural gardens, internal roads                                         | Minor increase in the property area affected by construction with the temporary lease of 0.1 hectares to fully incorporate a shed impacted by the amended project                     |
| 13 | 47/DP734584                        | Private (company) | Rural land                                                                    | 10.7                           | 6.1 (56.8%)                                                                                       | 4.6 (43.0%)                                                                             | -                                                                             | Change to the property area subject to temporary lease (from 3.0 hectares to 4.6 hectares), to incorporate residual land within the construction ancillary facility (AF 12)           |
| 14 | 3/DP812284                         | Private (company) | Recycling facility, commercial (TreeServe)                                    | 12.8                           | 0.8 (6.3%)                                                                                        | 12.0 (93.8%)                                                                            | -                                                                             | Increase in the property area affected by construction with the temporary lease of 12.0 hectares for an ancillary facility (AF 12), in response to approach from owner offering lease |
| 15 | 6/DP812284                         | Private           | Agriculture – grazing                                                         | 16.3                           | 6.4 (39.1%)                                                                                       | -                                                                                       | Sheds, internal roads/tracks                                                  | No change                                                                                                                                                                             |

| ID | Lot (lot or section/ DP) | Ownership | Existing land use          | Total property area (hectares) | Area of land within amended operational footprint (hectares) (proportion of property in brackets) | Area of land subject to temporary lease (hectares) (proportion of property in brackets) | Property improvements affected (eg dwellings, sheds, farm dams, shade houses) | Change from EIS                                                                                                                                                                                     |
|----|--------------------------|-----------|----------------------------|--------------------------------|---------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 16 | 5/DP812284               | Private   | Wrecked car yard           | 6.1                            | 1.7 (27.5%)                                                                                       | -                                                                                       | -                                                                             | No change                                                                                                                                                                                           |
| 17 | 4/DP812284               | Private   | Rural land                 | 5.7                            | 1.8 (30.9%)                                                                                       | -                                                                                       | -                                                                             | No change                                                                                                                                                                                           |
| 18 | 41/DP734584              | Private   | Agriculture – horticulture | 13.1                           | 2.2 (17.1%)                                                                                       | -                                                                                       | Horticultural gardens, shed                                                   | No change                                                                                                                                                                                           |
| 19 | 1/DP981721               | Private   | Rural residential          | 2.1                            | 1.3 (60.6%)                                                                                       | -                                                                                       | Dwelling, sheds                                                               | No change                                                                                                                                                                                           |
| 20 | 1/DP981720               | Private   | Agriculture – horticulture | 2.1                            | 0.2 (9.0%)                                                                                        | 0.2 (10.0%)                                                                             | Shade houses, farm dam                                                        | Increase in the property area affected by construction with the temporary lease of 0.2 hectares to fully incorporate a farm dam and a small number of additional shade houses (up to five in total) |

| ID | Lot (lot or section/ DP) | Ownership | Existing land use                                 | Total property area (hectares) | Area of land within amended operational footprint (hectares) (proportion of property in brackets) | Area of land subject to temporary lease (hectares) (proportion of property in brackets) | Property improvements affected (eg dwellings, sheds, farm dams, shade houses) | Change from EIS                                                                                                                                                             |
|----|--------------------------|-----------|---------------------------------------------------|--------------------------------|---------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 21 | 1/DP736951               | Private   | Commercial (horse training)                       | 1.9                            | 1.05 (56.8%)                                                                                      | 0.03 (1.6%)                                                                             | Dwellings (two), sheds/ stables, horse paddocks                               | Change to the construction footprint to fully incorporate a shed impacted by the amended project, increasing the property area affected from 1.05 hectares to 1.08 hectares |
| 22 | 2/DP736951               | Private   | Rural residential                                 | 1.9                            | 1.9 (100.0%)                                                                                      | -                                                                                       | Dwelling, sheds, horse paddocks                                               | No change                                                                                                                                                                   |
| 23 | B/DP416720, 39/A/DP2566  | Private   | Commercial (horse training facility – Bara Lodge) | 2.2                            | 1.0 (45.4%)                                                                                       | 1.2 (54.5%)                                                                             | Horse paddocks, shed, internal roads/tracks                                   | Increase in the property area affected by construction with the temporary lease of 1.2 hectares to include additional area for a construction ancillary facility (AF 13)    |
| 24 | B/DP102214               | Private   | Commercial (horse training facility – Bara Lodge) | 18.8                           | 4.0 (21.5%)                                                                                       | -                                                                                       | Training track, farm dam, internal roads/tracks                               | No change                                                                                                                                                                   |



| ID | Lot (lot or section/ DP) | Ownership         | Existing land use                | Total property area (hectares) | Area of land within amended operational footprint (hectares) (proportion of property in brackets) | Area of land subject to temporary lease (hectares) (proportion of property in brackets) | Property improvements affected (eg dwellings, sheds, farm dams, shade houses) | Change from EIS |
|----|--------------------------|-------------------|----------------------------------|--------------------------------|---------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|-----------------|
| 25 | 29/DP30265               | Private (company) | Commercial (Vac Group Australia) | 2.4                            | 0.3 (12.4%)                                                                                       | -                                                                                       | -                                                                             | No change       |
| 26 | 8/DP737052               | Private           | Residential                      | 2.1                            | 0.8 (35.9%)                                                                                       | -                                                                                       | -                                                                             | No change       |
| 27 | 7/DP737052               | Private (company) | Commercial                       | 2.1                            | 0.5 (22.7%)                                                                                       | -                                                                                       | -                                                                             | No change       |
| 28 | 17/DP30265               | Private           | Rural residential                | 2.9                            | 0.02 (0.6%)                                                                                       | -                                                                                       | -                                                                             | No change       |
| 29 | 18/DP30265               | Private           | Rural residential                | 3.1                            | 0.5 (15.0%)                                                                                       | -                                                                                       | -                                                                             | No change       |
| 30 | 19/DP30265               | Private           | Rural residential                | 3.2                            | 1.0 (31.7%)                                                                                       | -                                                                                       | -                                                                             | No change       |
| 31 | 20/DP30265               | Private (company) | Rural residential                | 2.3                            | 0.2 (7.6%)                                                                                        | -                                                                                       | -                                                                             | No change       |
| 32 | 21/DP30265               | Private           | Rural residential                | 2.3                            | 0.6 (23.9%)                                                                                       | -                                                                                       | -                                                                             | No change       |

| ID | Lot (lot or section/ DP)                                                                                            | Ownership         | Existing land use                         | Total property area (hectares) | Area of land within amended operational footprint (hectares) (proportion of property in brackets) | Area of land subject to temporary lease (hectares) (proportion of property in brackets) | Property improvements affected (eg dwellings, sheds, farm dams, shade houses) | Change from EIS                                                                                                                                                                              |
|----|---------------------------------------------------------------------------------------------------------------------|-------------------|-------------------------------------------|--------------------------------|---------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 33 | 22/DP30265                                                                                                          | Private (company) | Commercial                                | 2.3                            | 0.9 (40.6%)                                                                                       | -                                                                                       | Hardstand                                                                     | No change                                                                                                                                                                                    |
| 34 | 23/DP30265                                                                                                          | Private (company) | Commercial – Western Safety Fences        | 2.3                            | 1.3 (55.2%)                                                                                       | -                                                                                       | -                                                                             | No change                                                                                                                                                                                    |
| 35 | 24/DP30265                                                                                                          | Private           | Rural residential                         | 2.0                            | 0.8 (39.9%)                                                                                       | -                                                                                       | Shed                                                                          | No change                                                                                                                                                                                    |
| 36 | 26/DP30265, 25/DP30265                                                                                              | Private           | Commercial (Hi-Quality Group Head Office) | 4.2                            | 2.2 (51.6%)                                                                                       | 2.0 (47.6%)                                                                             | Shed, office, hardstand                                                       | Increase in the property area affected by construction by 2.0 hectares to incorporate the whole of this property                                                                             |
| 37 | 9/DP1054778, 8/DP1054778, 7/DP1054778, 6/DP1054778, 5/DP1054778, 4/DP1054778, 3/DP1054778, 2/DP1054778, 1/DP1054778 | Private           | Agriculture – grazing                     | 18.9                           | 8.3 (43.7%)                                                                                       | 1.7 (9.0%)                                                                              | -                                                                             | Increase in the property area affected by construction with the temporary lease of 1.7 hectares to incorporate land south of the M12 Motorway into a construction ancillary facility (AF 15) |

| ID                      | Lot (lot or section/ DP)                                                                                                                                                                                                                                                                 | Ownership                                           | Existing land use              | Total property area (hectares) | Area of land within amended operational footprint (hectares) (proportion of property in brackets) | Area of land subject to temporary lease (hectares) (proportion of property in brackets) | Property improvements affected (eg dwellings, sheds, farm dams, shade houses)                                                                                                                              | Change from EIS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|-------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------|--------------------------------|--------------------------------|---------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 38 <sup>5</sup> /<br>40 | 3/DP1087825,<br>1/DP875790,<br>2/DP922940,<br>28/DP654786,<br>1/DP308358,<br>6/DP629798,<br>5/DP629798,<br>1/DP1041390,<br>2/DP1041390,<br>10/DP1021940,<br>11/DP1021940,<br>12/DP1021940,<br>14/DP1021940,<br>1/DP724970,<br>11/DP860893 <sup>6</sup> ,<br>13/DP1021940,<br>1/DP522269, | Public<br>(Western<br>Sydney<br>Parklands<br>Trust) | Western<br>Sydney<br>Parklands | 801.3                          | 53.5<br>(6.7%)                                                                                    | 20.4<br>2.5%)                                                                           | Wylde Mountain<br>Bike Trail and<br>other recreation<br>uses,<br>International<br>Shooting<br>Centre, car<br>parking area,<br>vegetated<br>areas, orchard<br>trees, dwelling,<br>sheds, farm<br>dams (two) | Increase in the property area affected by construction with the temporary lease of an additional 13.9 hectares of land to incorporate the existing Wylde Mountain Bike Trail car park area (which would be relocated) into construction ancillary facility (AF 16), land east of the M7 Motorway (AF 9), and other minor adjustments.<br><br>Increase in the property area affected by the operational footprint from 46.1 hectares to 53.5 hectares, to accommodate the amended project at Elizabeth Drive |

<sup>5</sup> Property ID38 now includes land within the Western Sydney Parklands identified separately in the EIS as Property ID40. Rural residential land owned by the Western Sydney Parklands Trust has also been removed from Property ID38 and is shown separately as Property ID44

<sup>6</sup> This property was previously affected by an access track for the project as described in the EIS, but was not included in the list of affected properties



| ID     | Lot (lot or section/ DP)                        | Ownership           | Existing land use            | Total property area (hectares) | Area of land within amended operational footprint (hectares) (proportion of property in brackets) | Area of land subject to temporary lease (hectares) (proportion of property in brackets) | Property improvements affected (eg dwellings, sheds, farm dams, shade houses) | Change from EIS                                                                                                                            |
|--------|-------------------------------------------------|---------------------|------------------------------|--------------------------------|---------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|
| 39     | 21/DP1109551, 26/DP1109551, 22/DP1109551        | Public              | WaterNSW                     | 9.5                            | 2.1 (22.6%)                                                                                       | -                                                                                       | -                                                                             | Minor change to the operational footprint east of the M7 Motorway, increasing the property area affected from 2.0 hectares to 2.1 hectares |
| 41     | 2/DP1230172, 1/DP129674, 2/DP996420, 1/DP996420 | Public <sup>7</sup> | Elizabeth Drive road reserve | 0.3                            | 0.3 (99.7%)                                                                                       | -                                                                                       | -                                                                             | No change                                                                                                                                  |
| 42 New | 33/A/DP2566                                     | Private             | Rural residential            | 1.5                            | -                                                                                                 | 1.5 (100%)                                                                              | -                                                                             | Property to be used for construction ancillary facility (AF 14)                                                                            |
| 43     | 2/4/DP2954                                      | Private             | Rural residential            | 7.4                            | 3.3 (45.4%)                                                                                       | -                                                                                       | Vegetated area, farm dam                                                      | Change to the operational footprint for the realignment of Wallgrove Road                                                                  |

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<sup>7</sup> Transfer of Commonwealth land to TfNSW currently ongoing

| ID     | Lot (lot or section/ DP)                                                       | Ownership                               | Existing land use           | Total property area (hectares) | Area of land within amended operational footprint (hectares) (proportion of property in brackets) | Area of land subject to temporary lease (hectares) (proportion of property in brackets) | Property improvements affected (eg dwellings, sheds, farm dams, shade houses) | Change from EIS                                                                                                                                                                    |
|--------|--------------------------------------------------------------------------------|-----------------------------------------|-----------------------------|--------------------------------|---------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 44     | 7/DP629798, 1/DP1222339, 26B/DP387529, 26A/DP387529, 25/4/DP2954, 24/DP1152887 | Public (Western Sydney Parklands Trust) | Rural and rural residential | 14.9                           | 2.9 (19.6%)                                                                                       | 4.3 (28.9%)                                                                             | Dwelling, sheds, vegetated area                                               | Change to the operational footprint for the connection to Wallgrove Road and temporary lease of 4.3 hectares for an additional construction ancillary facilities (AF 17 and AF 18) |
| 45 New | 302/DP1122172<br>303/DP1122172<br>304/DP1122172                                | Private                                 | Residential                 | 4.3                            | 0.02 (0.5%)                                                                                       | 0.02 (0.5%)                                                                             | -                                                                             | Minor adjustment to driveway access at Cecil Road<br><br>Temporary lease of 0.02 hectares of land to incorporate whole of dam                                                      |
| 46 New | 301/DP1122172                                                                  | Private                                 | Residential                 | 1.3                            | 0.02 (1.6%)                                                                                       | -                                                                                       | -                                                                             | Minor adjustment to driveway access at Cecil Road                                                                                                                                  |
| 47 New | 300/DP1122172                                                                  | Private                                 | Residential                 | 1.0                            | 0.01 (1.3%)                                                                                       | -                                                                                       | -                                                                             | Minor adjustment to driveway access at Cecil Road                                                                                                                                  |
| 48 New | 303/DP1122172                                                                  | Private                                 | Residential                 | 1.2                            | 0.004 (0.4%)                                                                                      | -                                                                                       | -                                                                             | Minor adjustment to driveway access at Cecil Road                                                                                                                                  |
| 49 New | 91/DP1101411                                                                   | Private                                 | Commercial (quarry)         | 7.7                            | -                                                                                                 | 0.1 (1.3%)                                                                              | -                                                                             | Minor adjustment to driveway access at Range Road                                                                                                                                  |

## Impact of property acquisition

The project as described in the EIS would require the demolition of nine dwellings located on rural and rural-residential properties to be acquired for the project. The proposed changes would require the demolition of one additional dwelling located on a rural residential property at Cecil Park. This increases the total number of dwellings to be demolished for the project to 10 dwellings.

Potential impacts associated with property acquisition would generally be consistent with those described in the EIS and would mainly relate to disruption of social networks and community relationships, loss of family heritage and potential stress and anxiety for residents associated with the changes.

## Other property impacts

In addition to local road changes already described in the EIS, the proposed amended project includes the realignment of Wallgrove Road to connect to Elizabeth Drive via Cecil Road. This would change access routes for properties at Wallgrove Road, potentially increasing travel distances to individual properties, by about 550 metres. Other property impacts that would result from the amended project would generally be consistent with the EIS.

TfNSW will continue to consult with property owners affected by partial acquisition and temporary lease arrangements about property access and property adjustments as the project progresses.

### 6.4.3.2 Construction impacts

Section 7.4.4 of the EIS identified the following socio-economic and land use impacts during construction:

- Land use impacts
- Water use impacts
- Population and demography
- Employment impacts
- Business and industry impacts
- Social infrastructure
- Community values
- Access and connectivity.

These were assessed in relation to the amended project. Where the amended project has changed the impacts to the list above, these are discussed in the sections below. Where the assessment has concluded that the amended project would be consistent with the construction impacts of the project as described in the EIS, these sections have not been repeated.

## Land use impacts

The amended construction footprint would directly impact about 441 hectares. This is an additional 87 hectares of land compared to the construction footprint as described in the EIS. **Table 6-31** summarises the construction impacts of the amended project on land use, and how it would change from the project as described in the EIS.



As described in **Table 6-31** urban land uses, urban land uses comprise the largest area of the additional land impacted by the construction of the amended project (about 39.2 hectares). This additional land use mainly comprises:

- Land used for resource and waste facilities at Clifton Avenue and Kemps Creek
- Land used for recreation at Luddenham Road, Luddenham and within the Western Sydney Parklands at Cecil Park.

The amended project would result in additional utility impacts, including electricity transmission lines, communications infrastructure, and water and gas pipelines. These services would be modified, protected or relocated during construction to minimise any service disruptions, in consultation with the relevant service provider to minimise any service disruptions. A summary of proposed utility modifications required for the amended project is provided in **Section 3.3.4**. TfNSW would continue to engage with utility providers to refine potential utility modifications and protection measures through the detailed design.

Potential impacts of the amended project on future growth and development for the Western Sydney Aerotropolis and Western Sydney Growth Area would be consistent with those described in the EIS.

Table 6-31 Summary of construction impacts on land use

| Land use                            | Construction footprint as per EIS (hectares) | Amended construction footprint (hectares) | Difference (hectares) |
|-------------------------------------|----------------------------------------------|-------------------------------------------|-----------------------|
| <b>Rural and agricultural uses</b>  | <b>223.9</b>                                 | <b>253.2</b>                              | <b>29.3</b>           |
| Grazing                             | 168.1                                        | 184.5                                     | 16.4                  |
| Intensive agriculture               | 15.0                                         | 15.0                                      | 0.0                   |
| Rural                               | 25.8                                         | 26.2                                      | 0.4                   |
| Rural residential                   | 15.0                                         | 27.5                                      | 12.5                  |
| <b>Environmental areas</b>          | <b>3.0</b>                                   | <b>3.1</b>                                | <b>0.1</b>            |
| Watercourse or water infrastructure | 3.0                                          | 3.1                                       | 0.1                   |
| <b>Urban</b>                        | <b>72.8</b>                                  | <b>112.0</b>                              | <b>39.2</b>           |
| Commercial/ industrial              | 11.8                                         | 17.2                                      | 5.4                   |
| Resource and waste facility         | 9.9                                          | 23.6                                      | 13.7                  |
| Recreation use                      | 51.1                                         | 71.2                                      | 20.1                  |
| <b>Infrastructure</b>               | <b>54.6</b>                                  | <b>72.8</b>                               | <b>18.2</b>           |
| Roads and transport                 | 54.6                                         | 72.8                                      | 18.2                  |
| <b>Total land affected</b>          | <b>354.3</b>                                 | <b>441.1</b>                              | <b>86.8</b>           |

## Water use impacts

Consistent with the project as described in the EIS, a combination of potable mains supply and recycled water would be required during construction of the amended project. The estimated total water use during construction would be 822 megalitres (ML). This is an increase of about 22 per cent from the 676 ML required for the project as described in the EIS. As indicated in the EIS, strategies would be implemented to reduce reliance on potable water and identify opportunities for using recycled water where feasible.

## Population and demography

It was determined that the proposed construction updates for the amended project would not result in a substantial change to the nature of the population and demography impacts identified in the EIS. As a result, potential impacts on population and demography during construction of the amended project would be consistent with those described in the EIS.

## Employment impacts

It was determined that the proposed construction updates for the amended project would not result in a substantial change to the nature of the employment impacts identified in the EIS. As a result, potential impacts on employment during construction of the amended project would be consistent with those described in the EIS.

## Business and industry impacts

No additional businesses would be directly affected by the amended project. Three businesses, however, would incur additional impacts:

- B18; TreeServe:
  - About 0.8 hectares of the property would be permanently acquired by the project as described in the EIS.
  - The amended project would use the total land accommodating this business as a construction ancillary facility (AF 12), which could result in a potential temporary relocation of the business to an alternate site. As a result, about 12.0 hectares of the property would be impacted by the construction of the amended project.
  - It is noted that this business approached TfNSW about utilising the site as an ancillary facility and that TfNSW would continue to consult and negotiate with the property owner about arrangements for an ancillary facility on this property.
- B20; Farm (Salisbury Avenue)
  - The amended project would impact an additional 0.2 hectares as a temporary lease during construction, resulting in a total of 0.4 hectares (25 per cent of site) being impacted. This change during construction would result in the dam on-site being in-filled and removal of additional two shade house structures from that described in the EIS (up to five in total).
- B28; Bara Lodge (Horse training facility)
  - The property accommodating this business would be totally acquired by TfNSW for the operational footprint and establishment of a construction ancillary facility (AF 13). As a result, about 2.2 hectares of the property would be impacted by the construction of the amended project. This is an increase from the 1.0 hectares that would be impacted by the project as described in the EIS. This would also potentially result in temporary disruptions to business operations, including re-establishment costs.

The potential impacts on the other businesses directly affected by the amended project would be consistent with the EIS.

The expansion of the construction ancillary facility within the Western Sydney Parklands at Cecil Park (AF 9) has the potential to disrupt amenity for users of Calmsley Hill City Farm, which is located about 270 metres east of AF 9. Calmsley Hill City Farm is an interactive farm that offers visitors the opportunity to interact with a range of native and farm yard animals. Increased noise and dust from construction activities has potential to impact on the farm's business operations, by reducing its attractiveness for such things as private functions and location filming.

The proposed changes would require the temporary lease of additional agricultural land for the construction of the amended project. Additional impact on agricultural land would mainly be associated with:

- Refinements to the construction footprint to fully incorporate farm dams and structures such as sheds and shade houses, that were previously identified as being partly impacted by the project as described in the EIS
- Establishment of additional construction ancillary facilities.

The amended project would require the temporary lease of two properties that are currently used for agricultural or rural uses that were not previously impacted by the project as described in the EIS. This includes land used for the agistment of horses at Salisbury Avenue and rural land within the Western Sydney Parklands.

The establishment of additional construction ancillary facilities would directly impact on farm infrastructure such as fencing, dams, sheds and other structures. In particular:

- Two rural properties within the Western Sydney Parklands have dams within the amended construction footprint, that were not affected by the project as described in the EIS. A total of nine properties that have farm dams would be impacted by the amended project.
- About three properties have sheds impacted by the amended construction footprint that were not affected by the project as described in the EIS. A total of 11 properties with sheds would be impacted by the amended project.
- The amended construction footprint would impact additional horticultural gardens, shade houses and orchard trees not affected by the project as described in the EIS on two properties. A total of five properties with horticultural gardens, shade houses and orchard trees would be impacted by the amended project.

## Social infrastructure

### Directly affected social infrastructure

No additional social infrastructure would be directly affected by the amended project. The proposed changes, however, would result in additional impacts on land within the Western Sydney Parklands associated with:

- The establishment of construction ancillary facilities, including on the existing car park area at the Wylde Mountain Bike Trail and rural land at Cecil Park and Horsely Park / Abbotsbury
- The Elizabeth Drive connections and local road changes across the proposed M12 Motorway operational footprint connecting Range Road to Elizabeth Drive, at Cecil Hills. This would result in the permanent loss of a small area of additional land adjacent to the amended operational footprint, although this is not expected to have any additional impacts to those of the project as described in the EIS.

As indicated in the EIS, redesign and relocation of the Wylde Mountain Bike Trail would take place before the start of construction. This would allow access to the trails and other facilities to be maintained during construction and help reduce disruptions to users.



The use of the existing Wylde Mountain Bike Trail car park for construction would not impact on the use of the trail during construction.

Non-recreational land (for example rural and rural residential uses) owned by the Western Sydney Parklands Trust would also be directly affected by local road changes at Wallgrove Road and Cecil Road for the amended project.

The total area of land managed by the Western Sydney Parklands Trust impacted by the amended project would be 81.1 hectares, of which 24.7 hectares is for the construction phase only. This comprises land used for both recreational and non-recreational purposes (eg rural residential and agriculture) and represents a total increase from the EIS of 28.5 hectares (13.9 hectares of which is for the construction phase only). Land required for the construction phase only will be reinstated to its existing use following construction.

### **Social infrastructure in the primary study area**

As described in the EIS, some social infrastructure in the primary study area may experience impacts due to the proximity of these facilities to the project. During construction, potential impacts on social infrastructure in the primary study area from the amended project would be consistent with those identified in the EIS and would mainly relate to amenity impacts from increased noise, dust and construction traffic, and access changes.

The establishment of additional construction ancillary facilities near existing social infrastructure (see **Figure 6-26**) has potential to increase disruptions and amenity impacts for users of this infrastructure, specifically:

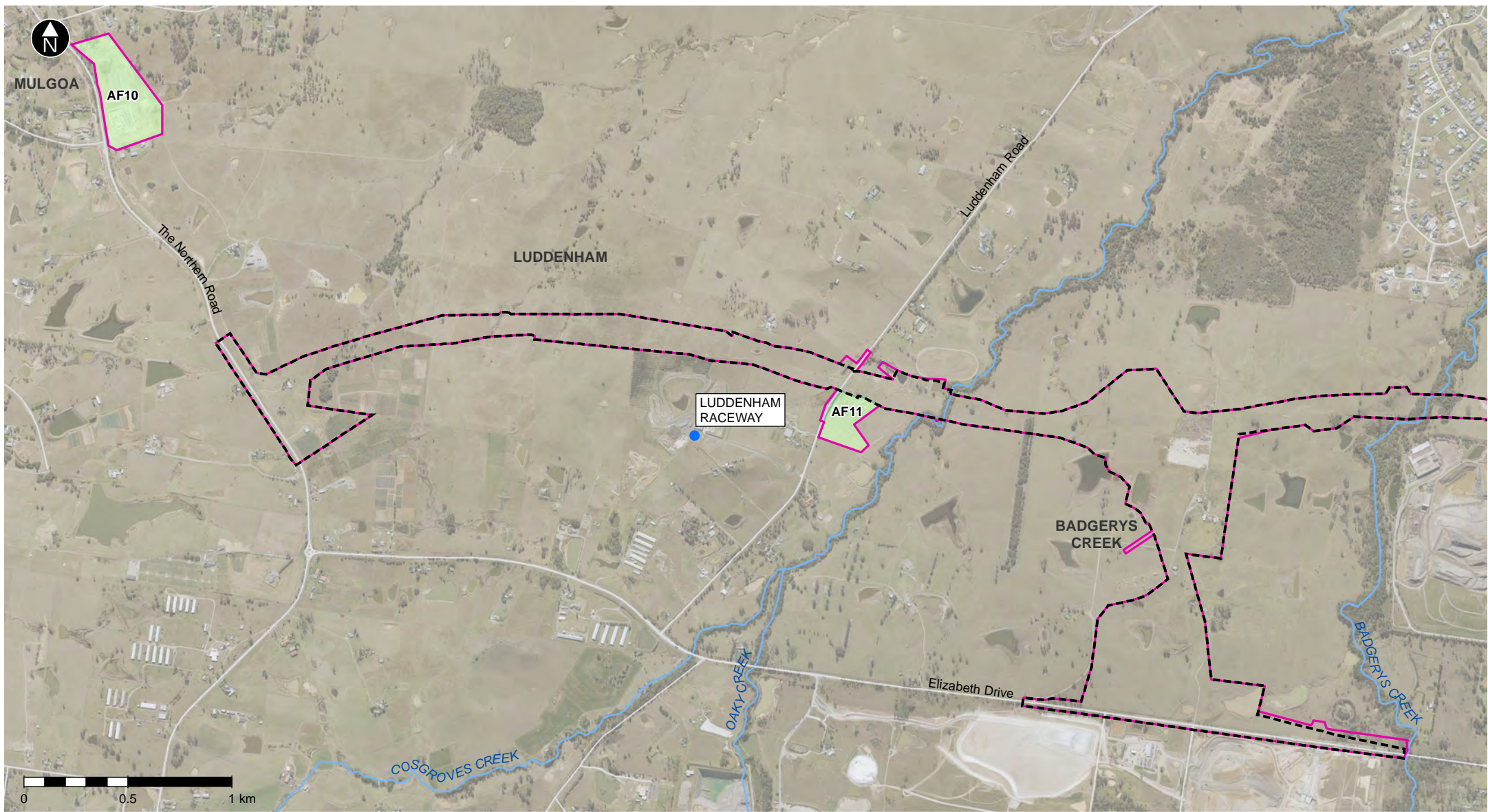
- Luddenham Raceway, approximately 450 metres from AF 11
- Muhammadi Welfare Association of Australia, which has a common fence with AF 12
- Kemps Creek Sporting and Bowling Club, which has a common fence with AF 15
- St Peter and Paul Assyrian Church approximately 170 metres from AF 17.

The establishment of a construction ancillary facility within the Western Sydney Parklands at Cecil Park (AF 9) has the potential to disrupt amenity for users of Calmsley Hill City Farm. The farm provides a range of formal and informal activities for visitors. Increased noise and dust from construction activities has the potential to reduce amenity of the farm, particularly within outdoor areas, impacting on the use and enjoyment of the farm for visitors and possibly deterring some people from visiting the farm. Environmental management measures would be implemented at the construction ancillary facility to assist in managing potential impacts on the farm operations and users of the facility.

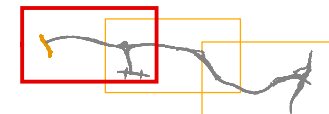
### **Community values**

The proposed changes, including local road changes and establishment of additional construction ancillary facilities, have the potential to increase impacts on local amenity and character for some communities, including:

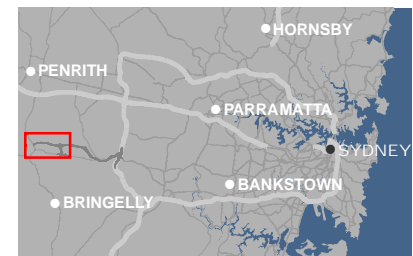
- Residents of rural residential uses at Cecil Park, during construction of local road changes at Wallgrove Road and Cecil Road
- Rural and rural residential uses at Kemp Creek near the AF 13
- Users of community uses within the Western Sydney Parklands and at Elizabeth Drive and Clifton Avenue at Kemps Creek associated with the establishment of construction ancillary facilities.



- The project construction footprint
- The amended project construction footprint
- Additional ancillary facilities
- ~ Waterways
- Motorway
- Existing roads
- Social infrastructure types**
- Sport, recreation and leisure facilities

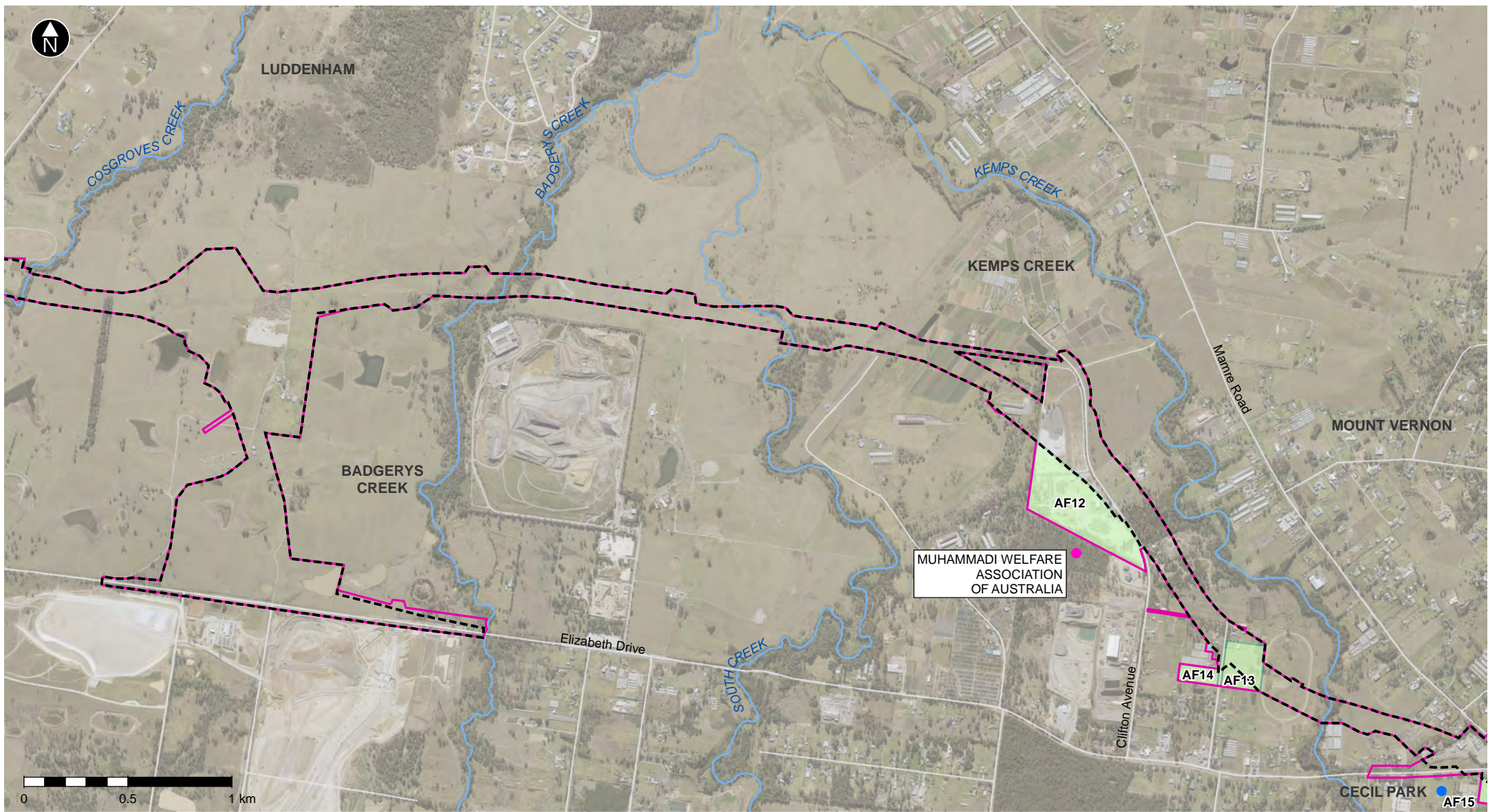


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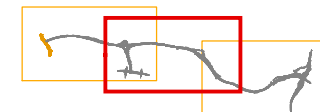


**Figure 6-26** Social infrastructure affected by increased construction impacts

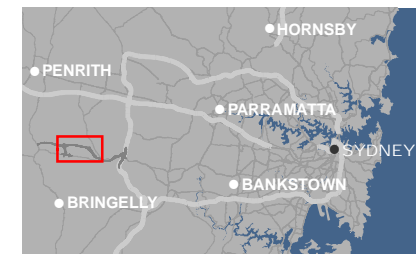




- |                                            |                |                                          |
|--------------------------------------------|----------------|------------------------------------------|
| The project construction footprint         | Waterways      | <b>Social infrastructure types</b>       |
| The amended project construction footprint | Motorway       | Sport, recreation and leisure facilities |
| Additional ancillary facilities            | Existing roads | Cultural facilities                      |

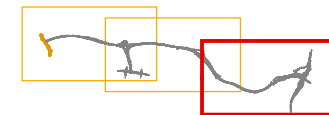
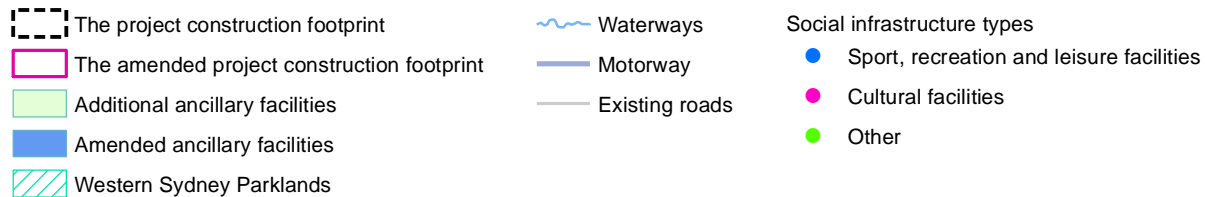
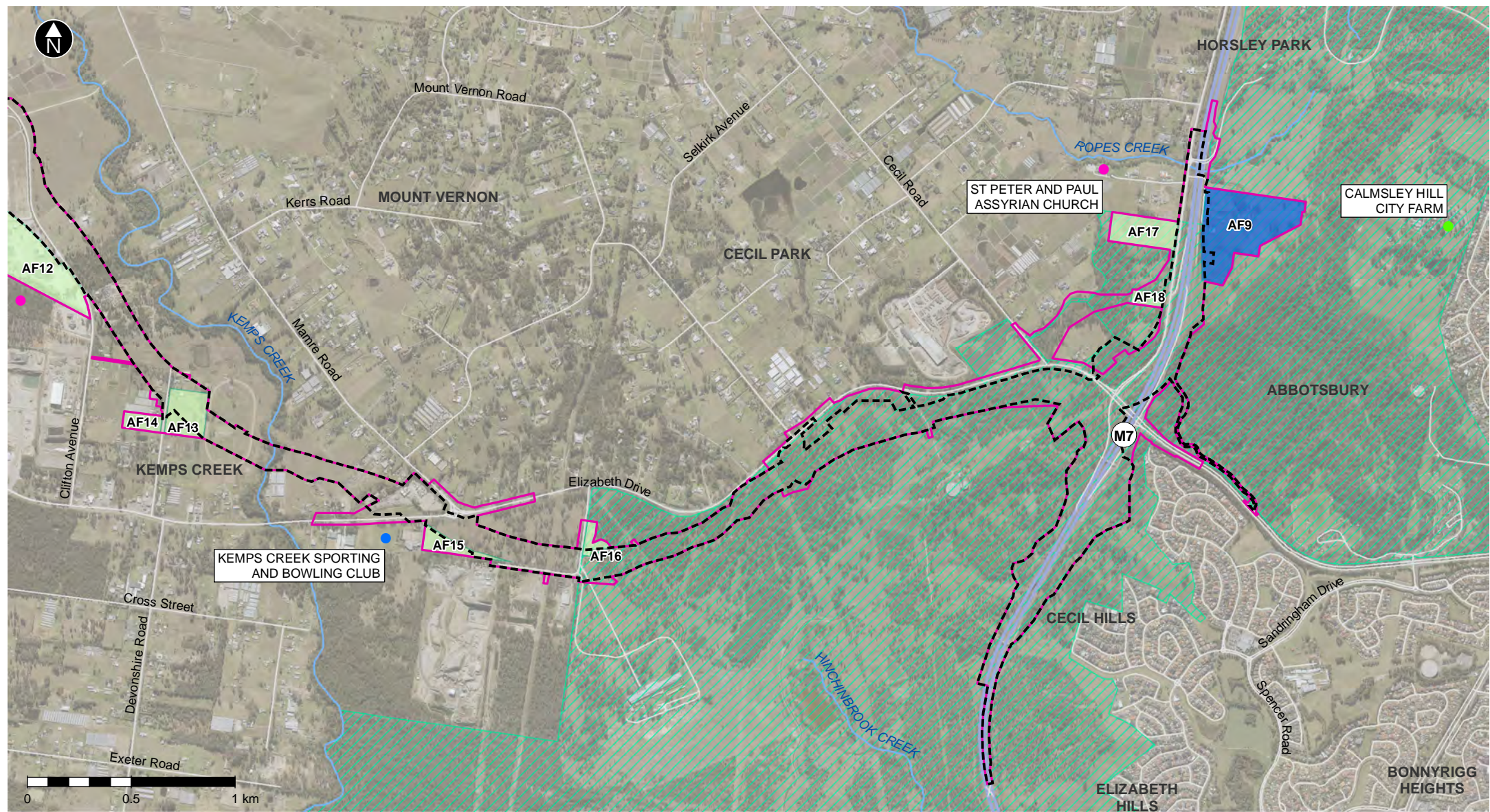


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**Figure 6-26** Social infrastructure affected by increased construction impacts





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**Figure 6-26** Social infrastructure affected by increased construction impacts



The construction ancillary facility on the Northern Road (AF 10), which is currently being used for The Northern Road upgrade, also has potential to impact on amenity for residents of nearby rural residential properties at The Northern Road and Gates Road. Cumulative impacts are discussed further in **Section 6.4.4**.

The proposed changes would also require the clearing of additional vegetation (see **Section 6.1**), particularly within the Western Sydney Parklands at Cecil Park for the construction of the realigned Wallgrove Road. An increase in the area of bushland and vegetation required to be cleared for the amended project is likely to be a concern for community members, impacting on community values relating to the natural environment.

### Access and connectivity

In addition to the bus stop changes as a result of the project as described in the EIS, existing bus stops at Cecil Road and Elizabeth Drive may be affected by construction activities at the Cecil Road and Elizabeth Drive intersection, possibly requiring their temporary relocation. Potential impacts of these changes on bus users are expected to be consistent with those described in the EIS.

#### 6.4.3.3 Operational impacts

Section 7.4.4 of the EIS identified the following types of socio-economic, property and land use impacts during operation:

- Land use impacts
- Water use impacts
- Population and demography
- Employment impacts
- Business and industry impacts
- Social infrastructure
- Community values
- Access and connectivity.

Where the amended project has changed the impacts to the list above, these are discussed in the sections below. Where the amended project is consistent with the operational impacts documented in the EIS, these sections have not been repeated.

### Land use impacts

About 290.53 hectares of land would be impacted during operation of the project as described in the EIS. The amended project would impact about 316.8 hectares, an additional 32 hectares of land from that described in the EIS. This would be mainly comprised of land owned used for roads and transport, rural and agricultural uses and recreational uses. A breakdown of impacted land use as a result of proposed changes is provided in **Table 6-32**.

Table 6-32 Summary of operational impacts on land use

| Land use                            | Operational footprint as per EIS (hectares) | Amended operational footprint (hectares) | Difference (hectares) |
|-------------------------------------|---------------------------------------------|------------------------------------------|-----------------------|
| <b>Rural and agricultural uses</b>  | <b>174.5</b>                                | <b>182.7</b>                             | <b>8.2</b>            |
| Grazing                             | 126.5                                       | 129.6                                    | 3.1                   |
| Intensive agriculture               | 7.8                                         | 7.8                                      | 0                     |
| Rural                               | 25.2                                        | 25.2                                     | 0                     |
| Rural residential                   | 15.0                                        | 20.1                                     | 5.1                   |
| <b>Environmental areas</b>          | <b>2.8</b>                                  | <b>2.9</b>                               | <b>0.1</b>            |
| Watercourse or water infrastructure | 2.8                                         | 2.9                                      | 0.1                   |
| <b>Urban</b>                        | <b>60.2</b>                                 | <b>66.9</b>                              | <b>6.7</b>            |
| Commercial/ industrial              | 9.5                                         | 9.5                                      | 0                     |
| Resource and waste facility         | 6.9                                         | 6.9                                      | 0                     |
| Recreation use                      | 43.8                                        | 50.5                                     | 6.7                   |
| <b>Infrastructure</b>               | <b>53.2</b>                                 | <b>64.4</b>                              | <b>11.2</b>           |
| Roads and transport                 | 53.2                                        | 64.4                                     | 11.2                  |
| <b>Total</b>                        | <b>290.7</b>                                | <b>316.9</b>                             | <b>26.2</b>           |

### Water use impacts

It was determined that the proposed changes for the amended project would not result in a substantial change to the nature of the operational water use impacts identified in the EIS. Potential water use impacts associated with the operation of the amended project would be consistent with those described in the EIS.

### Population and demography

It was determined that the proposed changes for the amended project would not result in a substantial change to the nature of the population and demography impacts identified in the EIS. As a result, potential impacts on population and demography during operation of the amended project would be consistent with those described in the EIS.

### Employment impacts

The acquisition or temporary lease of additional commercial land for the amended project has the potential to result in further impacts on local employment. This would be associated with the additional two businesses (B18 Tree Serve and B28 Bara Lodge) that may be required to temporarily or permanently relocate from their current location. Potential impacts on employees would be similar to those for the project as described in the EIS.



## Business and industry impacts

The amended project may require the temporary lease of whole site of one business (BR18, Tree Serve) that was previously identified in the EIS for partial acquisition. The temporary lease of whole site would result in operations temporarily ceasing at this location. It is noted that this business approached TfNSW about utilising the site as an ancillary facility and that TfNSW will continue to consult and negotiate with the property owner about arrangements for an ancillary facility on this property. Impacts on other directly affected businesses from the operation of the amended project would be consistent with those for the project as described in the EIS.

Local road changes at Wallgrove Road and Cecil Road are not expected to result in any substantial changes to access for businesses at Wallgrove Road.

## Community values

Potential impacts of the operation of the amended project on community values relating to local amenity and character, community cohesion and community health and well-being, and the natural environment are generally expected to be consistent with those for the project as described in the EIS.

Changes to impacts on community values as a result of the operation of the amended project would mainly be associated with local road changes at Wallgrove Road and Cecil Road. The realignment of Wallgrove Road and changes to the intersection with Cecil Road would result in the operational footprint being located closer to rural residential properties at Cecil Road, potentially impacting on the amenity for residents of these houses.

The amended project would also result in existing rural residential properties at Cecil Park to be isolated between the M7 Motorway and Wallgrove Road. This would potentially reduce amenity for residents of these properties. Some land in this area is proposed to be developed for higher-density residential uses. TfNSW is currently consulting with the developer of this property about potential implications and management measures.

For many locations in the primary study area, amenity impacts due to road traffic noise from the amended project would be similar to those described in the EIS, although reduced amenity would occur at some residential uses that were not previously identified as being affected by road traffic noise in the EIS. Residential receivers most likely to be affected by reductions in amenity from the amended project are located near the realigned section of Wallgrove Road and Duff Road at Cecil Park, and near Salisbury Avenue at Kemps Creek. Noise mitigation options, including noise barriers, will be determined during detailed design as described in **Appendix G**. The amended project is not expected to result in any substantial change in local or regional air quality from what was determined for the project as described in the EIS. Further information on operational air quality is **Appendix L**.

The amended project is not expected to result in any substantial change in local or regional air quality from what was determined for the project as described in the EIS.

## Access and connectivity

The realignment of Wallgrove Road to connect to Elizabeth Drive via Cecil Road would change access routes for properties at Wallgrove Road. This would increase travel distance for some motorists by up to about 550 metres. This is not expected to increase travel times, but may be an inconvenience for some motorists.

The amended project would provide improved access to the Western Sydney Aerotropolis through the provision of two intersections at Elizabeth Drive. The intersections would also support improved access to future developments north of Elizabeth Drive.

TfNSW has participated in regular consultation with the Western Sydney Planning Partnership to discuss district plans. This included how best to integrate the development of transport projects with the Western Sydney Planning Partnership's strategic planning for the Western Parkland City. TfNSW would continue to work with the Western Sydney Planning Partnership and the strategic planning divisions within DPIE to integrate the M12 Motorway and the arterial roads with the future local road network. TfNSW is committed to ongoing consultation with the Western Sydney Planning Partnership during the detailed design phase of the project.

#### 6.4.4 Cumulative impact

The main change to cumulative impacts of the amended project from that described in the EIS (see Section 7.4.5 of the EIS) would relate to the use of the construction ancillary facility on The Northern Road at Luddenham (AF 10) that is currently being used for construction of The Northern Road upgrade.

The use of this site for the amended project would prolong the duration of construction activities in this location by about four years extending possible disruptions for residents of nearby rural residential properties at Gates Road and The Northern Road associated with construction noise, dust and traffic. This has potential to result in construction fatigue for some community members and possibly impact on the health and well-being of some residents. As indicated in the EIS (see Section 7.4 of the EIS), construction fatigue would be managed in accordance with the Construction Fatigue Protocol to be prepared for the project as part of the Community Communication Strategy.

Elsewhere, cumulative socio-economic impacts are generally consistent with those described in the EIS.

#### 6.4.5 Environmental management measures

The environmental management measures identified in Section 7.4.6 of the EIS are therefore considered appropriate to manage the socio-economic, land use and property impacts associated with the amended project. The proposed changes would not require any additional or amended environmental management measures.

## 6.5 Aboriginal heritage

The Aboriginal heritage supplementary technical memorandum is provided in **Appendix E** and a summary is provided below. This section should be read in conjunction with Section 7.5 of the EIS and the Aboriginal cultural heritage assessment report provided in Appendix I of the EIS.

### 6.5.1 Assessment methodology

The assessment involved the following:

- Desktop assessment – comparative analysis of the additional areas within the amended construction footprint (ie the areas that are outside of the construction footprint as described in the EIS), against known or potential areas of Aboriginal heritage sensitivity
- Site investigation – carried out in January 2020 in any areas of Aboriginal heritage sensitivity within the additional areas within the amended construction footprint, in order to confirm either the presence of Aboriginal heritage objects, to document vegetation cover or to identify ground exposures and substantial ground disturbance. The site visit was accompanied by a representative from the Deerubbin LALC
- Refinement of boundaries of Aboriginal sites identified in the EIS – to exclude areas that are unlikely to contain archaeological deposits, such as areas occupied by dams, roads and buildings. This process was carried out in consultation with the Deerubbin LALC and TfNSW in accordance with the Procedure for Aboriginal Cultural Heritage Consultation and Investigation (PACHCI) Stage 2 (Roads and Maritime 2011) process
- Preparation of significance assessments – prepared for Aboriginal sites identified within the additional areas of amended construction footprint assessed in this supplementary assessment in accordance with the Australian International Council on Monuments and Sites (ICOMOS) Burra Charter described in Section 7.5.2 of the EIS
- Assessment of potential Aboriginal heritage impacts that may result due to the construction and operation of the amended project and, if required, identification of additional environmental management measures, or updates to existing measures proposed in the EIS.

The assessment focussed on the changes in potential impacts to Aboriginal cultural heritage associated with the changes in construction footprint as a result of the amended project, as ground disturbance would occur during construction.

### 6.5.2 Existing environment

The existing environment has not changed since the preparation of the EIS. The environment described in Section 7.5.3 of the EIS is still applicable to the amended project.

The 19 Aboriginal sites were identified within the construction footprint as described in the EIS and an additional seven Aboriginal sites within the detailed investigation area (located outside of the construction footprint as described in the EIS). The EIS also identified five 'site complexes' associated with particular creek systems or ridgetop complexes. The overall significance of these Aboriginal sites and site complexes are provided in Table 7-85 of the EIS.

A desktop review carried out for the amended project confirmed that two of the seven sites previously outside the EIS construction footprint (PAD-OS-7 and KC/ED2) would now be located within the amended construction footprint.



### 6.5.2.1 Revision of site boundaries

The Aboriginal site boundaries presented in Section 7.5.3 of the EIS were refined to exclude areas that are unlikely to contain archaeological deposits, such as areas occupied by dams, roads and buildings. This process was carried out in consultation with the Deerubbin LALC and TfNSW in accordance with the Procedure for Aboriginal Cultural Heritage Consultation and Investigation (PACHCI) Stage 2 (Roads and Maritime 2011) process.

In addition, the location and boundaries of two Aboriginal sites (PAD-OS-7 and KC/ED2) now located within the amended construction footprint were reassessed based on the original site card and site investigations. These are discussed in the following sections.

#### PAD-OS-7

PAD-OS-7 is located north-east of the project near Ropes Creek adjacent to the M7 Motorway, Villiers Road and Wallgrove Road (see **Figure 6-27** and **Figure 6-28**). It is associated with the previously registered AHIMS site 45-5-2721.

During the site inspection, it was identified that the landform that was subject to test excavation carried out as part of the EIS was observed to extend further south than the original site recording documented. As a result, the boundaries for PAD-OS-7 as shown in the EIS (see Figure 7-69 of the EIS) have been extended in consultation with Deerubbin LALC and TfNSW, The amended boundary is shown in **Figure 6-29**.



**Figure 6-27** Facing south from Ropes Creek toward terrace defined as an area of PAD-OS-7



**Figure 6-28** Photo facing south showing ground surface visibility at PAD-OS-7

FIGURE REDACTED

**Figure 6-29** Updated PAD-OS-7 boundary

## KC/ED2

KC/ED2 is located adjacent to the Western Sydney Parklands Wylde Mountain Bike trail, along Elizabeth Drive (see **Figure 6-30** and **Figure 6-31**). It is registered as AHIMS site 45-5-2310.

From a desktop review, it was found that the amended construction footprint would partially intersect the southern portion of the site KC/ED2. This amendment to the construction footprint is required to enable utility relocations along Elizabeth Drive.

However, further investigation identified no observed artefacts within the areas in the amended construction footprint within the boundary of this site, and the area was found to be highly disturbed. The boundary of KC/ED2 has therefore been refined and is now located 30 metres east of the mapped location in the EIS, and outside of the amended construction footprint (see **Figure 6-9**). The amended project is therefore not expected to impact on this site.



**Figure 6-30** Photo facing east from KC/ED2



**Figure 6-31** Photo facing west toward Elizabeth Drive from KC/ED2

Based on the above findings, a total of 20 Aboriginal sites are located within the amended construction footprint and six Aboriginal sites are located within the detailed investigation area (outside of the construction footprint). The location of the revised Aboriginal site and site complexes within the amended construction footprint is shown in **Figure 6-32**.



FIGURE REDACTED

**Figure 6-32** Revised boundary of KC/ED2

## 6.5.3 Assessment of potential impacts

### 6.5.3.1 Construction impacts

All 19 Aboriginal sites within the construction footprint as described in the EIS would be subject to direct harm as a result of the amended project (see Section 7.5.4 of the EIS). Further information on the terminology use (ie type and degree of harm) is provided in Section 7.5.2 of the EIS.

Based on the amended construction footprint, the amended project has the potential to impact two additional Aboriginal sites (PAD OS-7 and KC/ED2). These are discussed in detail in the following sections. No other Aboriginal archaeological material was identified at any other properties associated with the proposed changes.

#### PAD-OS-7

The construction footprint as described in the EIS was amended in the area near PAD-OS-7 due to changes at ancillary facility site 9 (AF 9). This amended ancillary facility is required to support the delivery of the M7 Motorway interchange and associated enabling works along Elizabeth Drive. As a result, PAD-OS-7 is now within the amended construction footprint.

Overall, PAD-OS-7 is of low significance at a local level as it provides limited evidence of the use of the area by Aboriginal people. The site has low-moderate scientific significance as the integrity and structure of the site is low-moderate due to disturbance as a result by agricultural activities. The site has low representativeness/rarity due to the presence of stone artefacts in a deep alluvial profile. The site has low-moderate research and educational potential pertaining to the manner in which Aboriginal populations lived in the area. Further information on the significance assessment carried out is provided in Table 3-1 of **Appendix E**.

The PAD-OS-7 site will be avoided by the amended construction footprint by the erection of an exclusion zone and appropriate barrier / fencing which will be provided along the portion of the site that extends closest to, and extending into the amended construction footprint, with visible signage notifying construction personnel to avoid ground impacts. The Aboriginal site impact assessment for PAD-OS-7 is provided in **Table 6-33**, focusing on the change in impact when compared to the assessment presented in the EIS.

Table 6-33 Aboriginal site impact assessment

| Site name                                      | Registered AHIMS sites | Assessed significance of site | Type of harm | Degree of harm | Consequence of harm                                                                              |
|------------------------------------------------|------------------------|-------------------------------|--------------|----------------|--------------------------------------------------------------------------------------------------|
| Project as per EIS (See Table 7-86 of the EIS) |                        |                               |              |                |                                                                                                  |
| PAD-OS-7                                       | 45-5-2721              | (not assessed)                | No harm      | None           | No loss of value as this site is about 130 metres from the construction footprint as per the EIS |
| Amended project                                |                        |                               |              |                |                                                                                                  |
| PAD-OS-7                                       | 45-5-2721              | Low                           | No harm      | None           | No loss of value as this site will be contained within an exclusion zone                         |

Overall, KC/ED2 is of low significance at a local level as it provides limited evidence of the use of the area by Aboriginal people. The site has low scientific significance as the integrity and structure of the site is low due to disturbance as a result of infrastructure and road building activities. The site has low representativeness/rarity due to the presence of surface artefacts in a disturbed context. The site has low research and educational potential pertaining to the manner in which Aboriginal populations lived in the area. Further information on the significance assessment carried out is provided in Table 3-2 of **Appendix E**.

In summary, a total of 20 Aboriginal sites are located within the amended construction footprint, however the number of sites subject to direct harm (19) would be consistent with the project as described in the EIS with the implementation of an exclusion zone around PAD-OS-7. In addition, the 19 Aboriginal sites identified within the construction footprint as presented in the EIS are not likely to experience any additional impacts as a result of the amended construction project.

The revised Aboriginal site and site complexes within the amended construction footprint is shown in **Figure 6-33**.

### Aboriginal cultural heritage values

There would be no additional impact to Aboriginal cultural heritage values as a result of the amended project when compared to the EIS given the general similarity in construction footprints, construction activities and implementation of management measures.

#### 6.5.3.2 Operation impacts

Aboriginal heritage impacts (either direct or indirect) associated with the operation of the amended project are not anticipated, as impacts are related to construction activities and associated ground disturbance. This is consistent with the EIS assessment (see Section 7.5.4 of the EIS).

### 6.5.4 Cumulative impact

The cumulative Aboriginal heritage impacts associated with the amended project would be consistent with those as described in the EIS (see Section 7.5.5 of the EIS). Overall, there is likely to be moderate cumulative Aboriginal cultural heritage impacts associated with the amended project and the other ongoing and planned developments in the area.



### 6.5.5 Environmental management measures

Aboriginal heritage impacts associated with the amended project are generally consistent with impacts described in the EIS and would therefore be managed through the implementation of the proposed management measures described in Section 7.5.6 of the EIS.

However, two new additions have been proposed to manage impacts associated with the amended project, shown in **bold** text in **Table 6-34**. In summary, active protection in the form of an exclusion zone will now be required on the boundary of PAD-OS-7 (AHIMS site 45-5-2721). The intent is to avoid impacts to the portion of the site inside the amended construction footprint.

Table 6-34 Revised environmental management measures (Aboriginal heritage) (bold text shows change from EIS)

| Impact                                  | Reference   | Environmental management measures                                                                                                                                                                                                                                                                                                        | Responsibility            | Timing                                               |
|-----------------------------------------|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|------------------------------------------------------|
| Impacts on identified cultural deposits | <b>AH08</b> | <b>Exclusion zones will be set up in the form of an appropriate barrier / fencing along the portion of AHIMS site 45-5-2721 (PAD-OS-7) that extends into the amended construction footprint, with visible signage notifying construction personnel to avoid ground impacts</b>                                                           | <b>Contractor / TfNSW</b> | <b>Prior to construction and during construction</b> |
|                                         | <b>AH09</b> | <b>Archaeological test excavation will be carried out at PAD-OS-7 in the instance that construction restrictions result in impacts to that site. Test excavations would be conducted in accordance with Requirement 16a of the Code of Practice (DECCW 2010), Stage 2 PACHCI (Roads and Maritime 2011) and in consultation with RAPs</b> | <b>Contractor / TfNSW</b> | <b>Prior to construction</b>                         |

FIGURE REDACTED

**Figure 6-33** Revised Aboriginal site and site complexes within the amended construction footprint

FIGURE REDACTED

**Figure 6-33** Revised Aboriginal site and site complexes within the amended construction footprint



FIGURE REDACTED

**Figure 6-33** Revised Aboriginal site and site complexes within the amended construction footprint

## 6.6 Non-Aboriginal heritage

The non-Aboriginal heritage supplementary technical memorandum is provided in **Appendix F**, and a summary is provided below. This section should be read in conjunction with Section 7.6 of the EIS and the non-Aboriginal heritage assessment report provided in Appendix J of the EIS.

### 6.6.1 Assessment methodology

This assessment focuses on the changes in potential impacts associated with the amended project and involved:

- Desktop assessment carried out in January 2020 to identify known heritage items within the amended study area and to identify any newly listed heritage items within the EIS study area. This involved:
  - Searches of available registers and online databases
  - Review of previous heritage assessments and local heritage studies
  - Review of aerial imagery
- Impact assessment:
  - Level of impact – an assessment of the impact on each heritage item in the amended study area based on the scale, intensity, duration and frequency of the proposed works associated with the amended project
  - Statement of heritage impact – an assessment to identify what impact the amended project would have on specific heritage items prepared in accordance with the NSW Heritage Office (2002) Statements of Heritage Impact Guidelines.

No site investigations or assessments of significance were carried out, as no new non-Aboriginal heritage items were identified within the construction footprint.

The study area was updated for the assessment to accommodate the proposed changes. The amended non-Aboriginal heritage study area is shown on **Figure 6-34**.

### 6.6.2 Existing environment

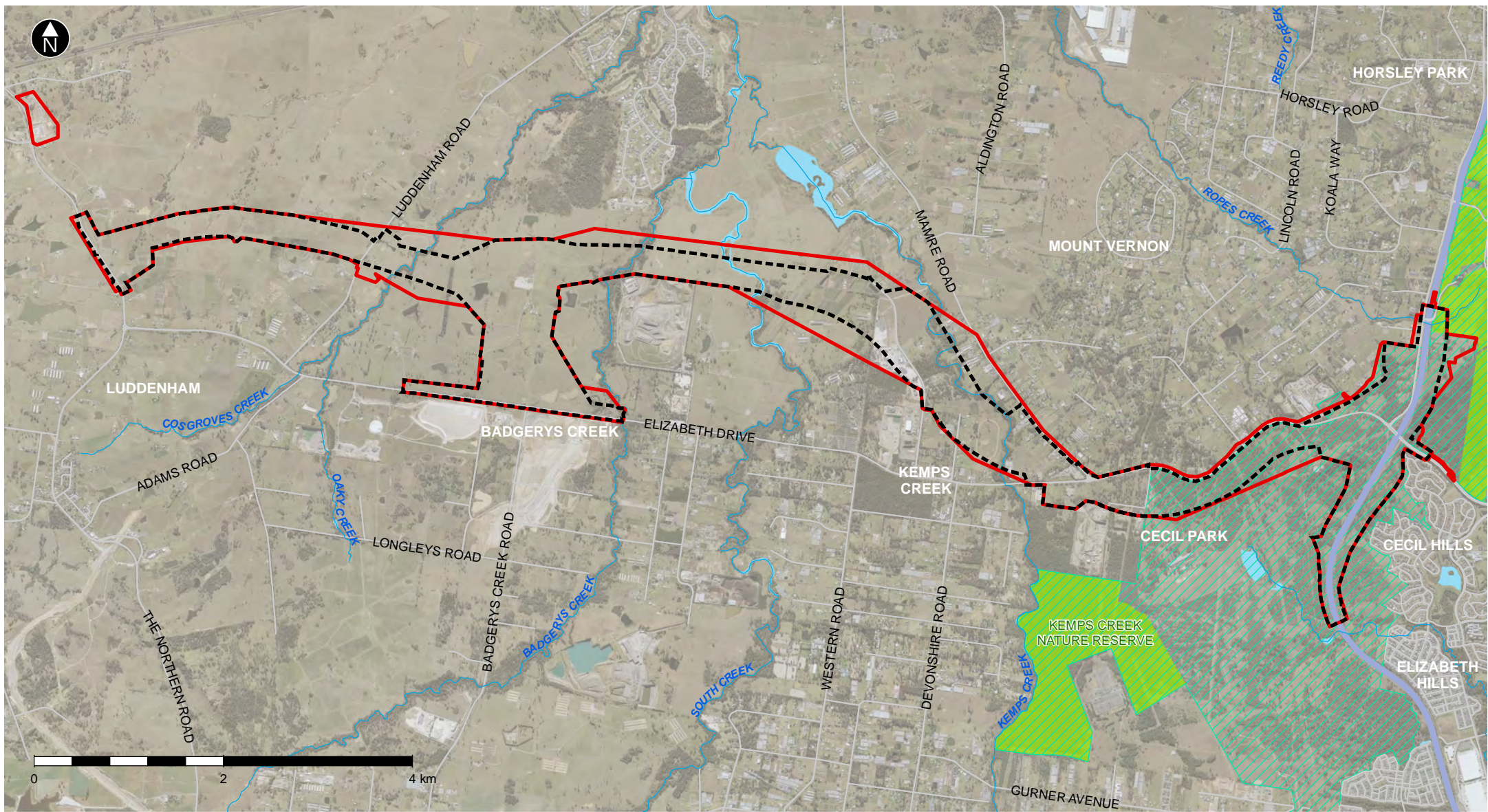
The existing environment is described in Section 7.6.3 of the EIS and is still applicable to the amended project.

The EIS identified nine heritage items of either local, State or potentially National heritage significance within or adjacent to the EIS study area (see **Figure 6-34**). The curtilage of two heritage items identified in the EIS extend further into the amended construction footprint, these are:

- Item 3: Luddenham Road Alignment, listed on the Penrith LEP (PLEP 843)
- Item 8: Cecil Park School, Post Office and School Church.

The desktop assessment and review of aerial imagery did not identify any additional areas of potential heritage items or areas of archaeological sensitivity within the amended study area.





- Study area as per the EIS
- Amended project study area
- ~~~~~ Waterways
- Motorway
- Main roads
- Western Sydney Parklands
- NPWS estate / reserves



**Figure 6-34** Amended non-Aboriginal heritage study area



## 6.6.3 Assessment of potential impacts

### 6.6.3.1 Construction impacts

As discussed in **Section 6.6.2**, nine heritage items of either local, State or potentially National heritage significance were identified within or adjacent to the EIS non-Aboriginal heritage study area (see Section 7.6.4 of the EIS). The amended project is not anticipated to have a greater impact on seven of these items. However, the desktop assessment identified that the curtilage of two of the nine heritage items (Item 3 and Item 8) also extend into the amended construction footprint.

An assessment of potential impacts on each of these items has therefore been carried out and is presented in **Table 6-35**. The assessment found that the amended project would not result in a greater impact overall on these items when compared to the project presented in the EIS. A full description and assessment of significance is included in **Appendix F**.

### 6.6.3.2 Operational impacts

Non-Aboriginal heritage impacts (either direct or indirect) associated with the operation of the amended project are not anticipated, as impacts are related to construction activities and associated ground disturbance. This is consistent with the EIS assessment (see Section 7.6.4 of the EIS).

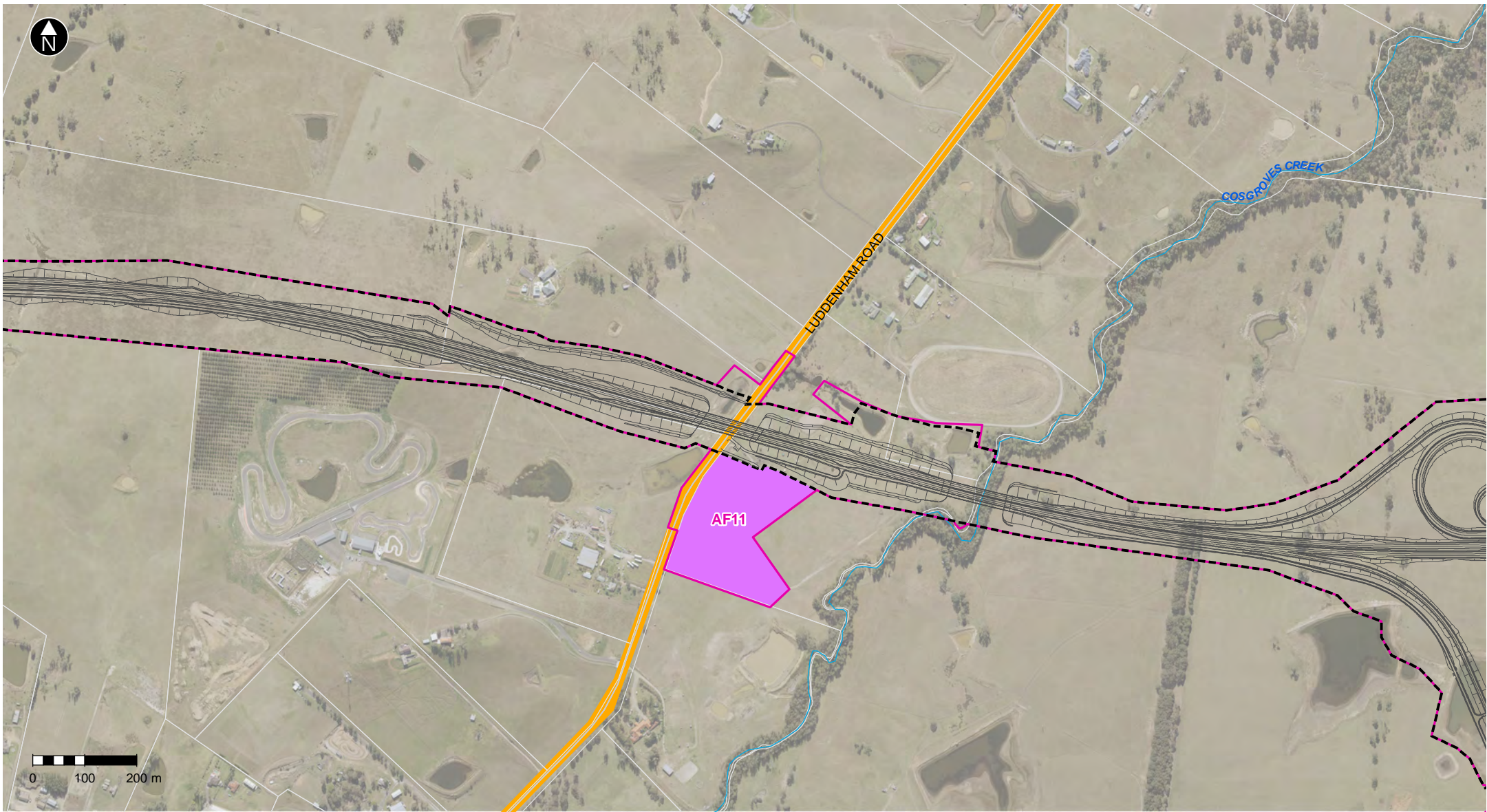
## 6.6.4 Cumulative impact

The cumulative non-Aboriginal heritage impacts would be likely to remain unchanged from the assessment carried out as part of the EIS and discussed in Section 7.6.5 of the EIS. The contribution of the project to cumulative impacts on non-Aboriginal heritage in the area is minor, considering the heritage impacts would be addressed and managed through the implementation of a range of environmental mitigation measures.

Table 6-35 Summary of potential impacts on heritage items associated with proposed changes

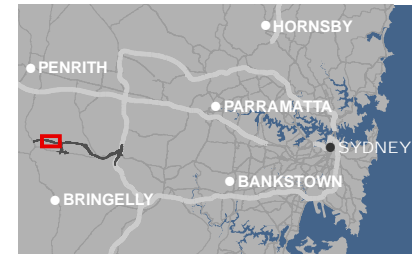
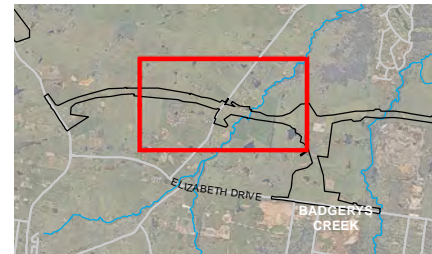
| Heritage item                                               | Assessment                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Revised impact                                                                               |
|-------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|
| Item 3:<br>Luddenham Road<br>Alignment<br>(Penrith LEP 843) | <p>The proposed changes as part of the amended project that would potentially impact this heritage item include:</p> <ul style="list-style-type: none"><li>• Construction of dual carriageway motorway with two lanes in each direction on a bridge over Luddenham Road</li><li>• Provision of a construction ancillary facility adjacent to Luddenham Road</li><li>• Relocation of existing overhead powerlines underground along Luddenham Road</li><li>• New property access and potential drainage culverts to cater for this access.</li></ul> <p>The amended project includes a new construction ancillary facility adjacent to Luddenham Road, which extends around 65 metres further south into this heritage item, see <b>Figure 6-35</b>. Direct physical impacts on the heritage item relate to the installation of underground utilities, new property access points and culverts within the cadastral reserve.</p> <p>The overlap of an additional 65 metres of Luddenham Road as a result of the amended non-Aboriginal study area would not impact on the significance of the heritage item which relates to the road's historical significance as a late nineteenth century road.</p> | <p>Project as per EIS:<br/>negligible</p> <p>Amended project:<br/>negligible (no change)</p> |

| Heritage item                                            | Assessment                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Revised impact                                                                           |
|----------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|
| Item 8: Cecil Park School, Post Office and School Church | <p>The amended construction footprint has been extended around 58 metres further north resulting in around 18 metres of the amended construction footprint overlapping with the southern curtilage of the heritage item (see <b>Figure 6-36</b>).</p> <p>The widening of Elizabeth Drive under the M7 Motorway and approaches and the amendment of the exit ramps from the M7 Motorway to the M12 Motorway overlap with the former Cecil Park School, Post Office and School Church (historical complex). The works outlined in the EIS would have a direct impact on archaeological deposits of the Cecil Park Post Office and the former Church of St Paul. However with the amended construction footprint extending further to the north, the archaeological deposits of the Cecil Park School would now be completely impacted, rather than partially impacted.</p> <p>The proposed works within the Cecil Park School, Park Post Office and School Church historical complex would still be of medium-large scale and moderate-high intensity, with the changes being permanent and irreversible.</p> <p>While permanent and irreversible impacts would occur through the destruction of the area of archaeological potential, undertaking archaeological salvage investigations would provide opportunity to obtain information about the archaeology and history of the site not available from other sources. An Archaeological Research Design (ARD) for archaeological salvage of Item 8: Cecil Park School, Post Office and School Church has been prepared and is presented in Attachment A of <b>Appendix F</b>.</p> | <p>Project as per EIS: major impact</p> <p>Amended project: major impact (no change)</p> |

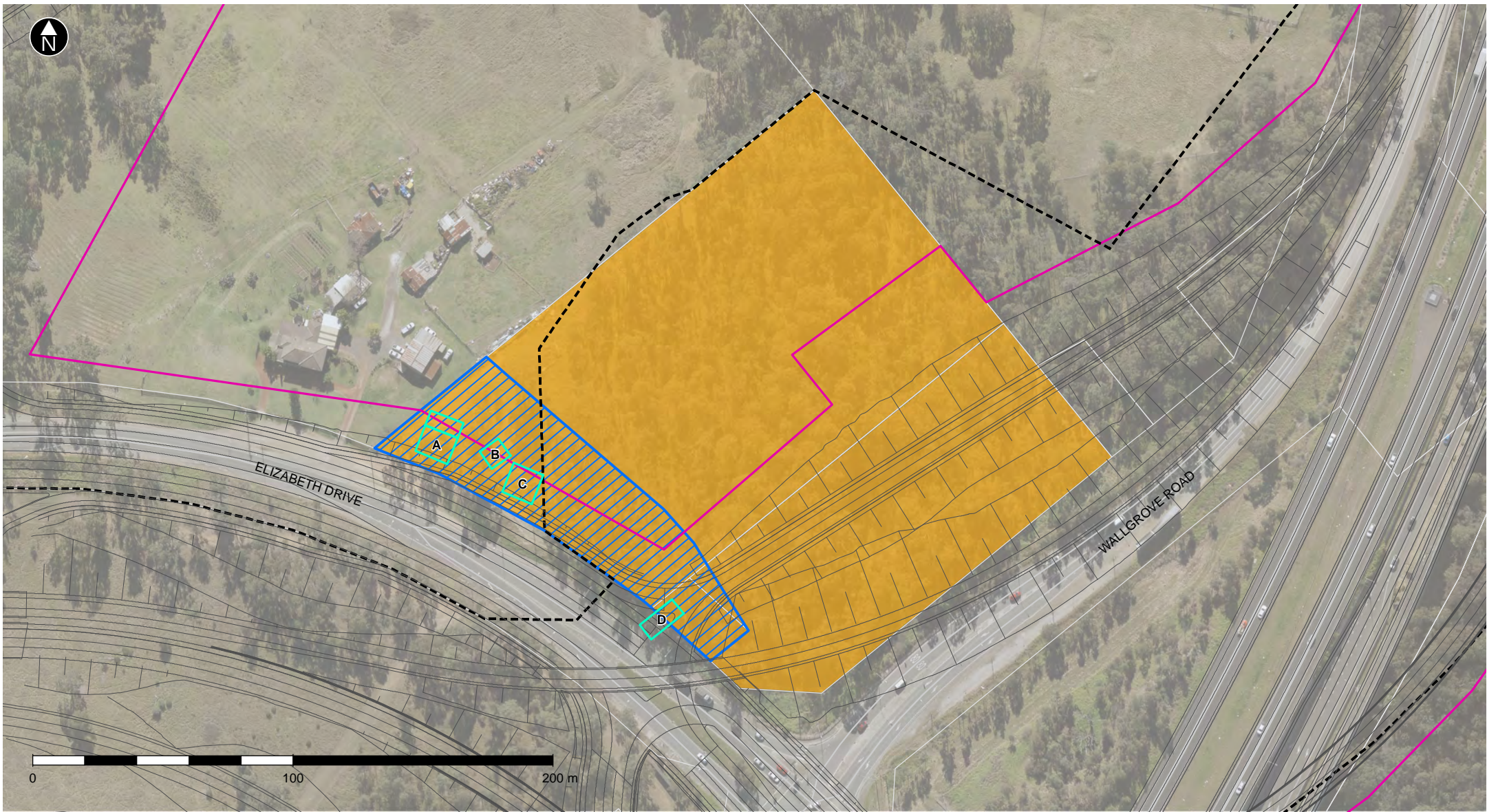


- The amended project
- The project construction footprint as per the EIS
- AF11 The amended project construction footprint
- Amended project ancillary facilities
- Luddenham Road Alignment
- Waterways

**Figure 6-35** Luddenham Road Alignment (Penrith LEP 843) (Item 3) in relation to the amended project







- The project construction footprint as per the EIS
- The amended project construction footprint
- Archaeological potential
- Subject site boundary
- Cecil Park former building locations
- A Cecil Park School
- B Teacher's Residence
- C Cecil Park Post Office
- D School Church of St Paul

**Figure 6-36** Cecil Park School, Post Office and Church (Item 8) in relation to the amended project





## 6.6.5 Environmental management measures

The environmental management measures identified in Section 7.6.6 of the EIS are considered appropriate to manage the non-Aboriginal heritage impacts associated with the amended project. However environmental management measure NAH09 has been revised, as shown in **Table 6-36**, to acknowledge the preparation of the archaeological research design and methodology for Item 8: Cecil Park School, Post Office and School Church (see Attachment A of **Appendix F**). Additional text is shown in **bold** and text that has been removed is shown in strikethrough text (~~example~~).

Table 6-36 Revised environmental management measures (non-Aboriginal heritage) (bold and strikethrough text shows change from EIS)

| Impact                                                  | Reference | Environmental management measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Responsibility     | Timing          |
|---------------------------------------------------------|-----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|-----------------|
| Cecil Park School, Post Office and Church Site (Item 8) | NAH09     | <ul style="list-style-type: none"> <li>TfNSW will liaise with local museums and/or historical societies to arrange a long-term secure artefact repository for the artefact assemblage. Once that arrangement has been made, DPC (Heritage) will be notified for their records. In the short term, TfNSW will provide secure short-term secure storage for the assemblage.</li> <li><b>Archaeological salvage excavations will be carried out for the Cecil Park School, Post Office and Church Site (Item 8) in accordance with the research design and methodology outlined in the <i>M12 Motorway: Former Cecil Park Historical Complex Historical Archaeological Salvage Research Design and Methodology</i> (Jacobs, 2020).</b></li> <li><del>An Archaeological Research Design (ARD) for archaeological salvage of the former historical complex will be prepared and implemented prior to construction commencing by a suitably qualified historical archaeologist who fulfils the Heritage Council's Excavation Director Criteria to conduct open area excavation of a locally significant archaeological site. The ARD will include a revised impact assessment, revised research questions and a methodology to ensure archaeological relics within the project construction footprint are adequately investigated in accordance with standard NSW archaeological practice.</del></li> </ul> | Contractor / TfNSW | Detailed design |

## 6.7 Noise and vibration

The noise and vibration updated technical report is provided in **Appendix G** and a summary is provided below. This section should be read in conjunction with Section 7.7 of the EIS and the noise and vibration assessment report provided in Appendix K of the EIS.

### 6.7.1 Assessment methodology

The assessment methodology involved the following:

- A review of the existing noise and vibration environment and potential noise and vibration receivers
- Assessment of potential construction and operational noise and vibration impacts based on option 1 and option 2 for the amended project
- A comparison of impacts between the project as described in the EIS and the amended project
- Assessment of cumulative and consecutive noise and vibration impacts as a result of the amended project
- Identification of additional environmental management measures required to address noise and vibration impacts for the amended project.

No additional ambient noise surveys were carried out for the amended project, as the amended construction and operational footprints are largely consistent with the project as described in the EIS. Monitoring locations and ambient noise survey results are detailed in Section 7.7.5 of the EIS.

#### 6.7.1.1 Construction noise and vibration assessment methodology

##### Construction scenarios

Representative scenarios have been developed to assess the likely impacts of the main construction phases of the amended project. Construction scenarios for the amended project are largely consistent with those described in the EIS. Changes to the construction scenarios as described in the EIS due to the amended project are shown in **bold text** in **Table 4-1**. A full list of construction scenarios is provided in **Appendix G**.

Table 6-37 Amendments to construction scenario descriptions as described in the EIS (bold text shows change from EIS)

| ID | Scenario                                                           | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|----|--------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1a | Ancillary facility establishment/ decommissioning – Peak impact    | Before construction commences, the ancillary facilities would need to be prepared to allow construction work to occur. The work would vary depending on location and the existing conditions but could include: <ul style="list-style-type: none"><li>• Minor clearing</li><li>• Minor earthwork</li></ul>                                                                                                                                                                                                                                        |
| 1b | Ancillary facility establishment/ decommissioning – Typical impact | <ul style="list-style-type: none"><li>• Installation of office accommodation</li><li>• Utilities</li><li>• Amenities</li><li>• Secure perimeter fencing, including visual screening of construction ancillary facilities where necessary</li></ul> High noise impact work would be required at certain times and would include the use of excavators and frontend loaders.<br><b>As described in Section 4.1.2, nine additional ancillary facility sites are proposed for the amended project to those described in the EIS (see Figure 4-1).</b> |



| ID | Scenario                                   | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|----|--------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2a | Ancillary facilities – Operation           | <p>The ancillary facilities would generally comprise:</p> <ul style="list-style-type: none"> <li>Temporary buildings (generally prefabricated) including offices and meeting rooms, amenities and first aid facilities (the size and number of office facilities at the main ancillary facilities would be greater than at the secondary ancillary facilities)</li> <li>Hardstand parking areas with sufficient space to accommodate the numbers of construction workers expected at any site</li> <li>Materials laydown, storage and handling areas, including purpose-built temporary structures as required</li> <li>Batching plants are currently proposed to be located at AF 2, AF 3, <b>AF 4 and AF 10</b>. The location of the batching plant has been assumed to be all of AF 10 and in the centre of AF 2 and AF 3.</li> <li><b>Crushing, grinding and screening operations are currently proposed to be located at AF 1, AF 2 and AF 10.</b></li> </ul> |
| 2b | Ancillary facilities – Stockpiling         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 2c | Ancillary facilities – Batching plant      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 2d | Ancillary facilities – Crushing activities | <p>The site layout of all ancillary facilities is considered indicative and would be confirmed as the project progresses.</p> <ul style="list-style-type: none"> <li>Bridge construction support areas</li> <li>Workshops with appropriate safety and environmental controls for servicing plant and equipment.</li> </ul> <p>The operation of all ancillary sites has been assessed for 24/7 operation. It should be noted that the assessment does not include any source mitigation or localised screening which would be investigated following confirmation of the site layout.</p> <p><b>Nine additional ancillary facility sites are proposed for the amended project to those described in the EIS (see Figure 4-1)</b></p>                                                                                                                                                                                                                                |

### Working hours and work schedule

The proposed construction working hours are described in **Section 4.2.5**. Extended construction hours are proposed for the amended project, consistent with the working hours described in Section 7.7.3 of the EIS.

Activities that are required to be completed out-of-hours for the amended project are consistent with those described in Section 7.7.3 of the EIS. In addition, the amended project would also include the following out-of-hours work activities:

- Stockpiling of soil within ancillary facilities
- Deliveries of concrete to the ancillary facilities
- Deliveries of large prefabricated material (eg bridge girders).

Night-time construction activities would be supported by out-of-hours operation of temporary ancillary facilities. The exact timing of out-of-hours work would depend on construction activities, construction techniques and working with the affected communities or authorities such as utility authorities or North West Roads (M7 Motorway).

The proposed work schedule for the amended project is described in **Section 4.2.8** and **Figure 4-5**.

### Construction noise modelling

The noise model of the study area prepared for the EIS has been updated for the amended project, where required, and used to predict noise levels from the construction work to all surrounding receivers. Modelling methodologies for the amended project are consistent with those described in Section 7.7.3 of the EIS.

## Construction road traffic

Construction traffic volumes during the peak construction period (around 2024) have been compared to the forecast traffic volumes during the same period (see **Section 6.1.6**).

Construction haulage for the amended project is described in **Section 4.2.6**.

### 6.7.1.2 Operation noise and vibration assessment methodology

The operational noise and vibration assessment methodology for the amended project is largely consistent with the methodology as described in Section 7.7.4 of the EIS.

The study area for the operational noise assessment extends to a distance of 600 metres on each side of the project roads (measured from the centreline of the outermost traffic lanes). This is consistent with the project as described in the EIS, and in accordance with the Road Noise Policy (RNP) (NSW EPA, 2011) and Noise Criteria Guideline (NCG) ((Roads and Maritime, 2015). However, as the amended project now includes work on Elizabeth Drive and Wallgrove Road, the operational study area for the amended project has been extended. This amended study area is shown on **Figure 6-37**. The change in operational footprint is primarily within noise catchment area (NCA) 03 (NCA03) and NCA04 and includes additional receivers to the north of the amended project.

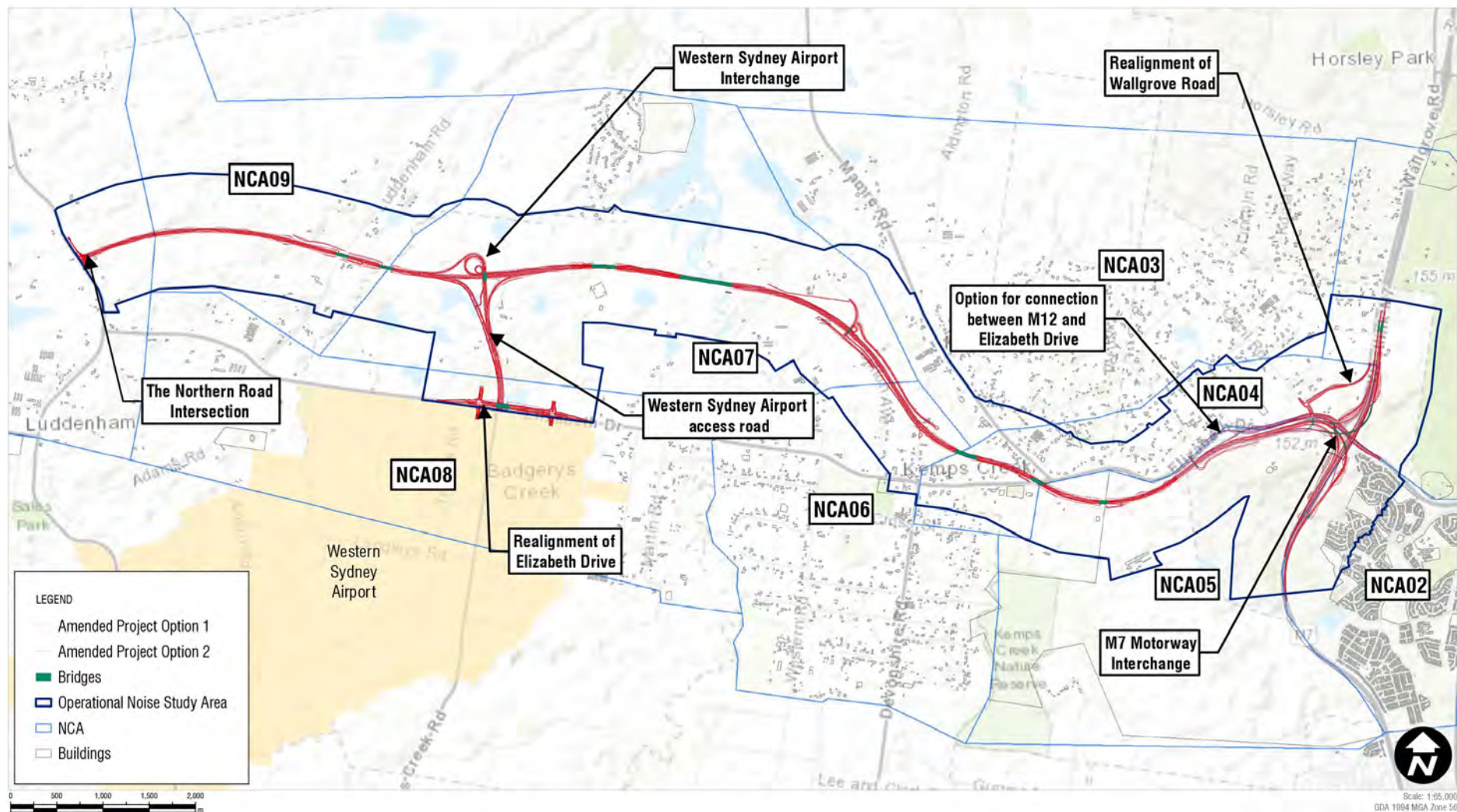
Operational traffic data for at-opening year (2026) and future design year (2036) has been updated and informed by the data provided in **Section 6.1.6** and **Appendix B**. In summary, the land use and demographics scenario has been updated from LU14 version 4 (developed in 2014 and adjusted for specific developments) to a more recent LU16 (developed in 2016). The modelling package used for the amendment report changed to an updated model as the traffic forecasts for western Sydney from this model are considered to be more robust than the model that was used for the EIS analysis. The changes in forecast land use and improvements in modelling processes have resulted in a major reduction in future trips to the South West Growth Area in western Sydney. Forecast traffic volumes using the amended project and the surrounding network have reduced as a result.

- Forecast operational traffic data has been updated for the following scenarios: No Build (ie without the amended project) – this scenario represents the existing road network in the operational study area in the absence of the amended project
- Build (ie with the amended project) – this scenario assumes that the amended project goes ahead and data provided for both option 1 and option 2.

## 6.7.2 Existing environment

The existing noise environment, including noise catchment areas and noise and vibration sensitive receivers, has not changed since the preparation of the EIS. The noise environment described in Section 7.7.5 of the EIS is still applicable to the amended project.

Receivers potentially sensitive to construction noise and vibration for the amended project are generally the same as those described in Section 7.7.5 of the EIS, with the exception of additional receivers in NCA10. These additional receivers are located around AF 10 which is now included in the amended study area. The location of sensitive receivers for the amended project is shown in Annexure B of **Appendix G**.



**Figure 6-37** Amended noise and vibration study area and sensitive receivers



## 6.7.3 Construction impacts

### 6.7.3.1 Construction airborne noise

#### Predicted worst-case noise impacts

The construction noise impact assessment is based on the predicted noise impacts at the most affected receivers in each NCA and is representative of the worst-case scenario where construction equipment is at the closest point to each receiver.

A summary of the predicted construction noise impacts in each NCA for residential receivers during the extended construction hours (morning shoulder, standard daytime, and evening shoulder) is shown in **Table 6-38** to **Table 6-42**.

For option 1, the assessment for residential receivers shows the following differences from the project as described in the EIS:

- The amended project would result in additional impacts to receivers situated in NCA02, due to work being carried out on Elizabeth Drive, south of the intersection with the M7 Motorway. NCA01 no longer has predicted high impacts, as reported in the EIS, as the closest receivers to the work now lie within the expanded ancillary facility AF 9 and, as such, will not be occupied during construction work.
- The amended project would have a higher impact on receivers in NCA02 which are adjacent to work on Elizabeth Drive. During the standard daytime period, 'high' impacts are predicted in NCA02, NCA06 and NCA07. These are typically limited to receivers immediately adjacent to the works areas, with 'moderate' impacts extending a row or two of properties further away. A relatively small number of receivers are predicted to have 'moderate' impacts in the remaining areas where receivers are in close proximity to the construction footprint, such as east of the M7 Motorway and south of Elizabeth Drive in NCA02.
- During the night-time, construction work is predicted to have 'high' impacts at some receivers near areas where out-of-hours work would be required. The receivers with 'high' or 'moderate' impacts are generally consistent with the EIS, with the exception of a few discrete areas around the Wallgrove Road realignment in NCA04, the Elizabeth Drive work to the east of the M7 Motorway in NCA02 and adjacent to the ancillary facility AF 10 in NCA10. Receivers in these areas typically have 'high' impacts at the first row or two of receivers, with 'moderate' impacts extending a few rows further away.
- Additional batching plants (within AF 4 and AF 10) have been assessed for the amended project. Noise levels from AF 10 are predicted to result in 'moderate' impacts at the nearest residential receivers during the daytime and evening periods, and 'high' impacts during the night-time period. Noise levels from AF 4 are predicted to result in 'moderate' impacts at the nearest receivers during the daytime, evening and night-time periods, primarily at the receivers to the north of the site, and the closest receiver to the south. The site arrangements of the batching plants are considered indicative and would be further assessed as part of detailed design.
- Crushing, grinding and screening activities were not included for the project as described in the EIS. Since the EIS exhibition, additional information has been received from current construction projects indicating these activities may be necessary. These have been assessed for the amended project at AF 1, AF 2 and AF 10. Noise levels from AF 1 and AF 10 are predicted to result in 'moderate' impacts at the nearest residential receivers during the daytime and evening periods, and 'high' impacts during the night-time period. Noise levels from AF 2 are predicted to result in 'moderate' impacts at the nearest residential receivers during the daytime period, and

'high' impacts during the evening and night-time periods. During the night-time period at all three facilities 'moderate' impacts are predicted at receivers up to around one kilometre from the ancillary facilities, depending on the surrounding topography.

- Stockpiling activities are predicted to have higher impacts than the batching plants, as the assessment assumes the work may occur across the entire ancillary facility and therefore maybe closer to the nearest receivers. This is consistent with the project as described in the EIS for AF 1 to AF 8, however, the amended project has expanded the size of AF 9 and added AF 10 to AF 18.
- The assessment identified the following additional worst-case scenarios for the amended project:
  - Scenario 1a, Ancillary facility establishment – peak impact due to the proximity of some of the new ancillary facilities to receivers, particularly AF 10 and AF 14
  - Scenario 2d, Ancillary facility operations – crushing activities due to the high noise level of this work paired with the potential of out-of-hours operation.
- Given the location of the nearest receivers to the amended project, it is likely that there are several areas of the amended project where construction can occur with little or no impact to residential receivers due to the separation distances between the work and receiver.

For option 2 (with Elizabeth Drive connections), the assessment for residential receivers shows the following differences when compared to the project as described in the EIS:

- The design changes between the amended project option 1 and option 2 are limited to the area adjacent to Elizabeth Drive between Wallgrove Road and Duff Road, in NCA04. Therefore, construction airborne noise impacts in all other NCAs for the option 2 would be consistent with the impacts for option 1 detailed in **Table 6-38** to **Table 6-42**.
- Due to the Elizabeth Drive connection extending the required work further north towards NCA04, there are some minor increases to the predicted noise impacts for the immediately surrounding area.
- The closest residential receivers to the additional work for option 2 (with Elizabeth Drive connections) are predicted to have 'moderate impacts' for option 2, where 'minor impacts' are predicted for option 1 during all periods for the 'tie in work' scenario of the road work. A maximum increase of five dB is predicted at these most affected receivers for option 2 compared to option 1.
- An additional three receivers adjacent to this work on Elizabeth Drive are predicted to be potential highly noise affected during the worst-case impacts from the option 2 (with Elizabeth Drive connections) construction.
- The closest school (Irfan College), located in NCA04, is predicted to have 'high impacts' during the worst-case scenarios when noise intensive equipment is being used for option 2, where 'moderate impacts' were predicted for option 1.

Table 6-38 Predicted construction noise exceedances morning shoulder – residential receivers

| Period                                                                                                                                                              | ID | Scenario                          | Activity             | Project as described in the EIS |       |       |       |       |       |       |       |       |       | Amended project |       |       |       |       |       |       |       |       |       |   |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|-----------------------------------|----------------------|---------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-----------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|---|
|                                                                                                                                                                     |    |                                   |                      | NCA01                           | NCA02 | NCA03 | NCA04 | NCA05 | NCA06 | NCA07 | NCA08 | NCA09 | NCA10 | NCA01           | NCA02 | NCA03 | NCA04 | NCA05 | NCA06 | NCA07 | NCA08 | NCA09 | NCA10 |   |
| Morning shoulder                                                                                                                                                    | 1a | Ancillary facility establishment  | Peak impact          | 🟡                               | 🟢     | 🟢     | 🟢     | ⬜     | 🟢     | 🔴     | ⬜     | ⬜     | 🟡     | 🟡               | 🟢     | 🟢     | 🟢     | ⬜     | 🔴     | 🔴     | 🟡     | 🟡     | 🔴     |   |
|                                                                                                                                                                     | 1b |                                   | Typical impact       | 🟢                               | 🟢     | ⬜     | 🟢     | ⬜     | ⬜     | 🔴     | ⬜     | ⬜     | 🟢     | 🟢               | 🟢     | ⬜     | 🟢     | ⬜     | 🔴     | 🔴     | 🟢     | 🟢     | 🟡     |   |
|                                                                                                                                                                     | 2a | Ancillary facility operations     | Operation            | 🟢                               | ⬜     | ⬜     | ⬜     | ⬜     | ⬜     | 🔴     | ⬜     | ⬜     | 🟢     | 🟢               | ⬜     | ⬜     | ⬜     | ⬜     | 🔴     | 🔴     | ⬜     | 🟢     | 🟢     |   |
|                                                                                                                                                                     | 2b |                                   | Stockpiling          | 🟢                               | 🟢     | ⬜     | 🟢     | ⬜     | ⬜     | 🔴     | ⬜     | ⬜     | 🟢     | 🟢               | 🟢     | 🟢     | 🟢     | ⬜     | 🔴     | 🔴     | 🟢     | 🟢     | 🟡     |   |
|                                                                                                                                                                     | 2c |                                   | Batching plant       | ⬜                               | ⬜     | ⬜     | ⬜     | ⬜     | ⬜     | 🟡     | ⬜     | ⬜     | ⬜     | ⬜               | ⬜     | 🟢     | ⬜     | ⬜     | ⬜     | 🟡     | 🟢     | ⬜     | 🟡     |   |
|                                                                                                                                                                     | 2d |                                   | Crushing             | n/a                             | n/a   | n/a   | n/a   | n/a   | n/a   | n/a   | n/a   | n/a   | n/a   | ⬜               | ⬜     | ⬜     | ⬜     | ⬜     | ⬜     | 🔴     | 🟡     | 🟢     | 🟡     |   |
|                                                                                                                                                                     | 3a | Utilities and drainage            | Peak impact          | 🔴                               | 🟡     | 🟡     | 🟡     | ⬜     | 🔴     | 🔴     | 🟡     | 🔴     | 🟡     | 🔴               | 🔴     | 🟡     | 🔴     | ⬜     | 🔴     | 🔴     | 🔴     | 🔴     | 🟡     |   |
|                                                                                                                                                                     | 3b |                                   | Typical impact       | 🟡                               | 🟢     | ⬜     | 🟢     | ⬜     | 🔴     | 🔴     | 🟢     | 🟢     | 🟢     | 🟢               | 🟡     | ⬜     | 🟢     | ⬜     | 🔴     | 🔴     | 🟢     | 🟢     | 🟢     |   |
|                                                                                                                                                                     | 4a | Demolition                        | Peak impact          | ⬜                               | ⬜     | 🟡     | 🟡     | ⬜     | 🔴     | 🔴     | 🟢     | 🟢     | 🟡     | 🟢               | 🟢     | 🟡     | 🟡     | ⬜     | 🔴     | 🔴     | 🟢     | 🟢     | 🟡     |   |
|                                                                                                                                                                     | 4b |                                   | Typical impact       | ⬜                               | ⬜     | ⬜     | 🟢     | ⬜     | 🟡     | 🔴     | ⬜     | ⬜     | 🟢     | ⬜               | ⬜     | ⬜     | 🟢     | ⬜     | 🟡     | 🔴     | ⬜     | ⬜     | 🟢     |   |
|                                                                                                                                                                     | 5a | Clearing                          | Peak impact          | 🔴                               | 🟡     | 🟡     | 🟡     | ⬜     | 🔴     | 🔴     | 🟡     | 🟡     | 🟡     | 🟡               | 🟡     | 🔴     | 🟡     | 🔴     | ⬜     | 🔴     | 🔴     | 🔴     | 🟡     | 🟡 |
|                                                                                                                                                                     | 5b |                                   | Typical impact       | 🟡                               | 🟢     | ⬜     | 🟢     | ⬜     | 🔴     | 🔴     | 🟢     | 🟢     | 🟢     | 🟢               | 🟡     | ⬜     | 🟢     | ⬜     | 🔴     | 🔴     | 🟢     | 🟢     | 🟢     |   |
|                                                                                                                                                                     | 6a | Earthwork                         | Peak impact          | 🔴                               | 🟡     | 🟡     | 🟡     | ⬜     | 🔴     | 🔴     | 🟡     | 🟡     | 🟡     | 🟡               | 🔴     | 🟡     | 🔴     | ⬜     | 🔴     | 🔴     | 🟡     | 🟡     | 🟡     |   |
|                                                                                                                                                                     | 6b |                                   | Typical impact       | 🟡                               | 🟢     | ⬜     | 🟢     | ⬜     | 🔴     | 🔴     | 🟢     | 🟢     | 🟢     | 🟢               | 🟡     | ⬜     | 🟢     | ⬜     | 🔴     | 🔴     | 🟢     | 🟢     | 🟢     |   |
|                                                                                                                                                                     | 6c |                                   | Onsite truck haulage | ⬜                               | ⬜     | ⬜     | ⬜     | ⬜     | ⬜     | 🟢     | ⬜     | ⬜     | ⬜     | ⬜               | ⬜     | 🟢     | ⬜     | ⬜     | ⬜     | ⬜     | 🟢     | ⬜     | ⬜     | ⬜ |
|                                                                                                                                                                     | 7a | Bridge work                       | Peak impact          | ⬜                               | 🟢     | 🟢     | 🟢     | ⬜     | 🟢     | 🟡     | ⬜     | 🟢     | ⬜     | 🟢               | 🟢     | 🟢     | 🟢     | ⬜     | 🟢     | 🟡     | ⬜     | 🟢     | ⬜     |   |
|                                                                                                                                                                     | 7b |                                   | Typical impact       | ⬜                               | 🟢     | ⬜     | ⬜     | ⬜     | ⬜     | 🟢     | ⬜     | ⬜     | ⬜     | ⬜               | ⬜     | ⬜     | ⬜     | ⬜     | ⬜     | 🟢     | ⬜     | ⬜     | ⬜     |   |
|                                                                                                                                                                     | 7c |                                   | Concrete work        | ⬜                               | 🟢     | ⬜     | ⬜     | ⬜     | 🟢     | 🟢     | ⬜     | 🟢     | ⬜     | 🟢               | 🟢     | ⬜     | ⬜     | ⬜     | ⬜     | 🟢     | 🟢     | ⬜     | 🟢     | ⬜ |
|                                                                                                                                                                     | 7d |                                   | Girder lifts         | ⬜                               | 🟢     | ⬜     | ⬜     | ⬜     | ⬜     | ⬜     | ⬜     | ⬜     | ⬜     | ⬜               | 🟢     | 🟢     | ⬜     | ⬜     | ⬜     | ⬜     | ⬜     | 🟢     | ⬜     | ⬜ |
|                                                                                                                                                                     | 8a | Road work                         | Concrete work        | 🟡                               | 🟢     | ⬜     | 🟢     | ⬜     | 🔴     | 🔴     | ⬜     | 🟢     | 🟢     | 🟢               | 🟢     | ⬜     | 🟢     | ⬜     | 🔴     | 🔴     | 🟢     | 🟢     | 🟢     |   |
|                                                                                                                                                                     | 8b |                                   | Typical work         | 🟡                               | 🟢     | ⬜     | ⬜     | ⬜     | 🔴     | 🔴     | ⬜     | 🟢     | 🟢     | ⬜               | 🟢     | ⬜     | ⬜     | ⬜     | 🔴     | 🔴     | 🟢     | 🟢     | 🟢     |   |
|                                                                                                                                                                     | 8c |                                   | Tie-in work          | 🔴                               | 🟡     | 🟢     | 🟡     | ⬜     | 🟢     | 🟡     | 🟡     | 🟡     | ⬜     | 🟡               | 🔴     | 🟢     | 🔴     | ⬜     | 🔴     | 🔴     | 🟡     | ⬜     | ⬜     |   |
|                                                                                                                                                                     | 9a | Signage, lighting and landscaping |                      | 🟡                               | 🟢     | 🟢     | 🟢     | ⬜     | 🔴     | 🔴     | 🟢     | 🟡     | 🟢     | 🟢               | 🟡     | 🟢     | 🟡     | ⬜     | 🔴     | 🔴     | 🟡     | 🟡     | 🟢     |   |
| Key to impacts: <span>⬜</span> No exceedance <span>🟢</span> Marginal to minor (1 dB to 10 dB) <span>🟡</span> Moderate (11 dB to 20 dB) <span>🔴</span> High (>20 dB) |    |                                   |                      |                                 |       |       |       |       |       |       |       |       |       |                 |       |       |       |       |       |       |       |       |       |   |



Table 6-39 Predicted construction noise exceedances standard daytime – residential receivers

| Period                                                                                                          | ID | Scenario                          | Activity             | Project as described in the EIS |       |       |       |       |       |       |       |       |       | Amended project |       |       |       |       |       |       |       |       |       |
|-----------------------------------------------------------------------------------------------------------------|----|-----------------------------------|----------------------|---------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-----------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
|                                                                                                                 |    |                                   |                      | NCA01                           | NCA02 | NCA03 | NCA04 | NCA05 | NCA06 | NCA07 | NCA08 | NCA09 | NCA10 | NCA01           | NCA02 | NCA03 | NCA04 | NCA05 | NCA06 | NCA07 | NCA08 | NCA09 | NCA10 |
| Standard Daytime                                                                                                | 1a | Ancillary facility establishment  | Peak impact          | ●                               | ●     | ●     | ●     | •     | •     | ■     | •     | •     | ●     | ◆               | ●     | ●     | ●     | •     | ■     | ■     | ●     | ◆     | ◆     |
|                                                                                                                 | 1b |                                   | Typical impact       | ●                               | •     | •     | •     | •     | •     | ■     | •     | •     | ●     | ●               | •     | •     | •     | •     | ■     | ■     | •     | ●     | ●     |
|                                                                                                                 | 2a | Ancillary facility operations     | Operation            | •                               | •     | •     | •     | •     | •     | ◆     | •     | •     | •     | •               | •     | •     | •     | •     | ◆     | ◆     | •     | •     | ●     |
|                                                                                                                 | 2b |                                   | Stockpiling          | ●                               | •     | •     | •     | •     | •     | ■     | •     | •     | ●     | ●               | •     | •     | •     | •     | ■     | ■     | •     | ●     | ●     |
|                                                                                                                 | 2c |                                   | Batching plant       | •                               | •     | •     | •     | •     | •     | ◆     | •     | •     | •     | •               | •     | ●     | •     | •     | •     | ◆     | ●     | •     | ●     |
|                                                                                                                 | 2d |                                   | Crushing             | n/a                             | n/a   | n/a   | n/a   | n/a   | n/a   | n/a   | n/a   | n/a   | n/a   | •               | •     | •     | •     | •     | •     | ◆     | ●     | •     | ◆     |
|                                                                                                                 | 3a | Utilities and drainage            | Peak impact          | ■                               | ◆     | ●     | ◆     | •     | ■     | ■     | ◆     | ◆     | ◆     | ◆               | ■     | ●     | ◆     | •     | ■     | ■     | ◆     | ◆     | ◆     |
|                                                                                                                 | 3b |                                   | Typical impact       | ●                               | •     | •     | •     | •     | ◆     | ■     | •     | ●     | •     | ●               | ●     | •     | ●     | •     | ◆     | ■     | ●     | ●     | •     |
|                                                                                                                 | 4a | Demolition                        | Peak impact          | •                               | •     | ●     | ●     | •     | ■     | ■     | •     | •     | ◆     | ●               | •     | ●     | ●     | •     | ■     | ■     | ●     | •     | ◆     |
|                                                                                                                 | 4b |                                   | Typical impact       | •                               | •     | •     | •     | •     | ●     | ◆     | •     | •     | •     | •               | •     | •     | •     | •     | ●     | ◆     | •     | •     | •     |
|                                                                                                                 | 5a | Clearing                          | Peak impact          | ■                               | ◆     | ●     | ◆     | •     | ■     | ■     | ●     | ◆     | ●     | ◆               | ■     | ●     | ◆     | •     | ■     | ■     | ◆     | ◆     | ●     |
|                                                                                                                 | 5b |                                   | Typical impact       | ●                               | •     | •     | •     | •     | ◆     | ■     | •     | ●     | •     | ●               | ●     | •     | ●     | •     | ◆     | ■     | ●     | ●     | •     |
|                                                                                                                 | 6a | Earthwork                         | Peak impact          | ◆                               | ◆     | ●     | ●     | •     | ■     | ■     | ●     | ◆     | ●     | ◆               | ■     | ●     | ◆     | •     | ■     | ■     | ◆     | ◆     | ●     |
|                                                                                                                 | 6b |                                   | Typical impact       | ●                               | •     | •     | •     | •     | ◆     | ■     | •     | ●     | •     | ●               | ●     | •     | ●     | •     | ◆     | ■     | ●     | ●     | •     |
|                                                                                                                 | 6c |                                   | Onsite truck haulage | •                               | •     | •     | •     | •     | •     | •     | •     | •     | •     | •               | •     | •     | •     | •     | •     | •     | •     | •     | •     |
|                                                                                                                 | 7a | Bridge work                       | Peak impact          | •                               | ●     | •     | •     | •     | ●     | ●     | •     | ●     | •     | ●               | ●     | •     | •     | •     | ●     | ●     | •     | ●     | •     |
|                                                                                                                 | 7b |                                   | Typical impact       | •                               | •     | •     | •     | •     | •     | •     | •     | •     | •     | •               | •     | •     | •     | •     | •     | •     | •     | •     | •     |
|                                                                                                                 | 7c |                                   | Concrete work        | •                               | •     | •     | •     | •     | •     | •     | •     | •     | •     | •               | •     | •     | •     | •     | •     | •     | •     | •     | •     |
|                                                                                                                 | 7d |                                   | Girder lifts         | •                               | •     | •     | •     | •     | •     | •     | •     | •     | •     | •               | •     | •     | •     | •     | •     | •     | •     | •     | •     |
|                                                                                                                 | 8a | Road work                         | Concrete work        | ●                               | ●     | •     | •     | •     | ◆     | ■     | •     | ●     | •     | •               | •     | •     | •     | •     | ◆     | ■     | ●     | ●     | •     |
|                                                                                                                 | 8b |                                   | Typical work         | ●                               | ●     | •     | •     | •     | ◆     | ■     | •     | ●     | •     | •               | •     | •     | •     | •     | ◆     | ■     | •     | ●     | •     |
|                                                                                                                 | 8c |                                   | Tie-in work          | ◆                               | ●     | ●     | ◆     | •     | •     | ●     | ●     | ●     | •     | ◆               | ■     | ●     | ◆     | •     | ■     | ◆     | ◆     | •     | •     |
|                                                                                                                 | 9a | Signage, lighting and landscaping |                      | ◆                               | ●     | •     | ●     | •     | ◆     | ■     | •     | ●     | •     | ●               | ◆     | •     | ●     | •     | ◆     | ■     | ●     | ●     | •     |
| Key to impacts: ■ No exceedance ● Marginal to minor (1 dB to 10 dB) ◆ Moderate (11 dB to 20 dB) ■ High (>20 dB) |    |                                   |                      |                                 |       |       |       |       |       |       |       |       |       |                 |       |       |       |       |       |       |       |       |       |

Table 6-40 Predicted construction noise exceedances evening shoulder – residential receivers

| Period                                                                                                          | ID | Scenario                          | Activity             | Project as described in the EIS |       |       |       |       |       |       |       |       |       | Amended project |       |       |       |       |       |       |       |       |       |
|-----------------------------------------------------------------------------------------------------------------|----|-----------------------------------|----------------------|---------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-----------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
|                                                                                                                 |    |                                   |                      | NCA01                           | NCA02 | NCA03 | NCA04 | NCA05 | NCA06 | NCA07 | NCA08 | NCA09 | NCA10 | NCA01           | NCA02 | NCA03 | NCA04 | NCA05 | NCA06 | NCA07 | NCA08 | NCA09 | NCA10 |
| Evening shoulder                                                                                                | 1a | Ancillary facility establishment  | Peak impact          | ♦                               | ♦     | ●     | ♦     | •     | ●     | ■     | ●     | ●     | ♦     | ♦               | ♦     | ●     | ♦     | •     | ■     | ■     | ♦     | ■     | ♦     |
|                                                                                                                 | 1b |                                   | Typical impact       | ●                               | ●     | •     | ●     | •     | •     | ■     | •     | •     | ●     | ●               | ●     | •     | ●     | •     | ■     | ■     | ●     | ♦     | ●     |
|                                                                                                                 | 2a | Ancillary facility operations     | Operation            | ●                               | •     | •     | ●     | •     | •     | ■     | •     | •     | ●     | ●               | •     | •     | ●     | •     | ♦     | ♦     | ●     | ●     | ●     |
|                                                                                                                 | 2b |                                   | Stockpiling          | ●                               | ●     | •     | ●     | •     | •     | ■     | •     | •     | ●     | ●               | ●     | •     | ●     | •     | ■     | ■     | ●     | ♦     | ♦     |
|                                                                                                                 | 2c |                                   | Batching plant       | •                               | •     | •     | •     | •     | •     | ♦     | •     | •     | •     | •               | •     | ●     | •     | •     | •     | ♦     | ●     | •     | ●     |
|                                                                                                                 | 2d |                                   | Crushing             | n/a                             | n/a   | n/a   | n/a   | n/a   | n/a   | n/a   | n/a   | n/a   | n/a   | •               | •     | •     | •     | •     | •     | ■     | ♦     | ●     | ♦     |
|                                                                                                                 | 3a | Utilities and drainage            | Peak impact          | ■                               | ■     | ♦     | ■     | •     | ■     | ■     | ♦     | ■     | ♦     | ■               | ■     | ♦     | ■     | •     | ■     | ■     | ■     | ■     | ♦     |
|                                                                                                                 | 3b |                                   | Typical impact       | ♦                               | ●     | •     | ●     | •     | ■     | ■     | ●     | ♦     | ●     | ●               | ♦     | •     | ♦     | •     | ♦     | ■     | ♦     | ♦     | •     |
|                                                                                                                 | 4a | Demolition                        | Peak impact          | •                               | •     | ♦     | ♦     | •     | ■     | ■     | ●     | ●     | ♦     | ●               | ●     | ●     | ♦     | •     | ■     | ■     | ♦     | ●     | ♦     |
|                                                                                                                 | 4b |                                   | Typical impact       | •                               | •     | •     | ●     | •     | ♦     | ■     | •     | •     | ●     | •               | •     | •     | ●     | •     | ♦     | ■     | •     | •     | •     |
|                                                                                                                 | 5a | Clearing                          | Peak impact          | ■                               | ♦     | ♦     | ■     | •     | ■     | ■     | ♦     | ■     | ♦     | ♦               | ■     | ●     | ■     | •     | ■     | ■     | ■     | ■     | ●     |
|                                                                                                                 | 5b |                                   | Typical impact       | ♦                               | ●     | •     | ●     | •     | ■     | ■     | ●     | ♦     | ●     | ●               | ♦     | •     | ♦     | •     | ♦     | ■     | ♦     | ♦     | •     |
|                                                                                                                 | 6a | Earthwork                         | Peak impact          | ■                               | ♦     | ♦     | ■     | •     | ■     | ■     | ♦     | ■     | ♦     | ♦               | ■     | ●     | ■     | •     | ■     | ■     | ■     | ■     | ●     |
|                                                                                                                 | 6b |                                   | Typical impact       | ♦                               | ●     | •     | ●     | •     | ■     | ■     | ●     | ♦     | ●     | ●               | ♦     | •     | ♦     | •     | ♦     | ■     | ♦     | ♦     | •     |
|                                                                                                                 | 6c |                                   | Onsite truck haulage | ●                               | •     | •     | •     | •     | •     | ●     | •     | •     | •     | •               | ●     | •     | ●     | •     | •     | ●     | •     | •     | •     |
|                                                                                                                 | 7a | Bridge work                       | Peak impact          | •                               | ♦     | ●     | ●     | •     | ●     | ♦     | •     | ♦     | •     | ●               | ●     | ●     | ●     | •     | ●     | ●     | •     | ♦     | •     |
|                                                                                                                 | 7b |                                   | Typical impact       | •                               | ●     | •     | •     | •     | •     | ●     | •     | ●     | •     | ●               | ●     | •     | •     | •     | •     | ●     | •     | ●     | •     |
|                                                                                                                 | 7c |                                   | Concrete work        | •                               | ●     | •     | ●     | •     | ●     | ●     | •     | ●     | •     | ●               | ●     | •     | ●     | •     | •     | ●     | •     | ●     | •     |
|                                                                                                                 | 7d |                                   | Girder lifts         | •                               | ●     | •     | •     | •     | •     | •     | •     | ●     | •     | ●               | ●     | •     | •     | •     | •     | •     | ●     | ●     | •     |
|                                                                                                                 | 8a | Road work                         | Concrete work        | ♦                               | ●     | •     | ●     | •     | ■     | ■     | ●     | ♦     | ●     | ●               | ●     | •     | ●     | •     | ♦     | ■     | ●     | ♦     | •     |
|                                                                                                                 | 8b |                                   | Typical work         | ♦                               | ●     | •     | ●     | •     | ■     | ■     | •     | ♦     | ●     | •               | ●     | •     | •     | •     | ■     | ■     | ●     | ●     | ●     |
|                                                                                                                 | 8c |                                   | Tie-in work          | ■                               | ♦     | ●     | ■     | •     | ●     | ♦     | ♦     | ♦     | •     | ♦               | ■     | ●     | ■     | •     | ■     | ■     | ♦     | •     | •     |
|                                                                                                                 | 9a | Signage, lighting and landscaping |                      | ♦                               | ♦     | ♦     | ●     | ♦     | •     | ■     | ■     | ●     | ♦     | ●               | ♦     | ●     | ♦     | •     | ■     | ■     | ♦     | ♦     | ●     |
| Key to impacts: ■ No exceedance ■ Marginal to minor (1 dB to 10 dB) ♦ Moderate (11 dB to 20 dB) ■ High (>20 dB) |    |                                   |                      |                                 |       |       |       |       |       |       |       |       |       |                 |       |       |       |       |       |       |       |       |       |

Table 6-41 Predicted construction noise exceedances evening – residential receivers

| Period  | ID | Scenario                          | Activity             | Project as described in the EIS |       |       |       |       |       |       |       |       |       | Amended project |       |       |       |       |       |       |       |       |       |
|---------|----|-----------------------------------|----------------------|---------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-----------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
|         |    |                                   |                      | NCA01                           | NCA02 | NCA03 | NCA04 | NCA05 | NCA06 | NCA07 | NCA08 | NCA09 | NCA10 | NCA01           | NCA02 | NCA03 | NCA04 | NCA05 | NCA06 | NCA07 | NCA08 | NCA09 | NCA10 |
| Evening | 1a | Ancillary facility establishment  | Peak impact          | .                               | .     | .     | .     | .     | .     | .     | .     | .     | .     | .               | .     | .     | .     | .     | .     | .     | .     | .     | .     |
|         | 1b |                                   | Typical impact       | ●                               | ●     | .     | ●     | .     | .     | ■     | .     | .     | ●     | ●               | ●     | .     | ●     | .     | ■     | ■     | ●     | ◆     | ●     |
|         | 2a | Ancillary facility operations     | Operation            | ●                               | .     | .     | ●     | .     | .     | ■     | .     | .     | ●     | ●               | .     | .     | ●     | .     | ◆     | ◆     | ●     | ●     | ●     |
|         | 2b |                                   | Stockpiling          | ●                               | ●     | .     | ●     | .     | .     | ■     | .     | .     | ●     | ●               | ●     | .     | ●     | .     | ■     | ■     | ●     | ◆     | ◆     |
|         | 2c |                                   | Batching plant       | .                               | .     | .     | .     | .     | .     | ◆     | .     | .     | .     | .               | .     | .     | ●     | .     | .     | .     | ◆     | ●     | ●     |
|         | 2d |                                   | Crushing             | n/a                             | n/a   | n/a   | n/a   | n/a   | n/a   | n/a   | n/a   | n/a   | n/a   | .               | .     | .     | .     | .     | .     | ■     | ◆     | ●     | ◆     |
|         | 3a | Utilities and drainage            | Peak impact          | .                               | .     | .     | .     | .     | .     | .     | .     | .     | .     | .               | .     | .     | .     | .     | .     | .     | .     | .     | .     |
|         | 3b |                                   | Typical impact       | .                               | .     | .     | .     | .     | .     | .     | .     | .     | .     | .               | .     | .     | .     | .     | .     | .     | .     | .     | .     |
|         | 4a | Demolition                        | Peak impact          | .                               | .     | .     | .     | .     | .     | .     | .     | .     | .     | .               | .     | .     | .     | .     | .     | .     | .     | .     | .     |
|         | 4b |                                   | Typical impact       | .                               | .     | .     | .     | .     | .     | .     | .     | .     | .     | .               | .     | .     | .     | .     | .     | .     | .     | .     | .     |
|         | 5a | Clearing                          | Peak impact          | .                               | .     | .     | .     | .     | .     | .     | .     | .     | .     | .               | .     | .     | .     | .     | .     | .     | .     | .     | .     |
|         | 5b |                                   | Typical impact       | .                               | .     | .     | .     | .     | .     | .     | .     | .     | .     | .               | .     | .     | .     | .     | .     | .     | .     | .     | .     |
|         | 6a | Earthwork                         | Peak impact          | .                               | .     | .     | .     | .     | .     | .     | .     | .     | .     | .               | .     | .     | .     | .     | .     | .     | .     | .     | .     |
|         | 6b |                                   | Typical impact       | .                               | .     | .     | .     | .     | .     | .     | .     | .     | .     | .               | .     | .     | .     | .     | .     | .     | .     | .     | .     |
|         | 6c |                                   | Onsite truck haulage | .                               | .     | .     | .     | .     | .     | .     | .     | .     | .     | .               | .     | .     | .     | .     | .     | .     | .     | .     | .     |
|         | 7a | Bridge work                       | Peak impact          | .                               | ◆     | ●     | ●     | .     | ●     | ◆     | .     | ◆     | .     | ●               | ●     | ●     | ●     | .     | ●     | ●     | .     | ◆     | .     |
|         | 7b |                                   | Typical impact       | .                               | ●     | .     | .     | .     | .     | ●     | .     | ●     | .     | ●               | ●     | .     | .     | .     | .     | ●     | .     | ●     | .     |
|         | 7c |                                   | Concrete work        | .                               | ●     | .     | ●     | .     | ●     | ●     | .     | ●     | .     | ●               | ●     | .     | ●     | .     | .     | ●     | .     | ●     | .     |
|         | 7d |                                   | Girder lifts         | .                               | ●     | .     | .     | .     | .     | .     | .     | ●     | .     | ●               | ●     | .     | .     | .     | .     | .     | ●     | ●     | .     |
|         | 8a | Road work                         | Concrete work        | ◆                               | ●     | .     | ●     | .     | ■     | ■     | ●     | ◆     | ●     | ●               | ●     | .     | ●     | .     | ◆     | ■     | ●     | ◆     | .     |
|         | 8b |                                   | Typical work         | .                               | .     | .     | .     | .     | .     | .     | .     | .     | .     | .               | ●     | ●     | .     | .     | .     | .     | .     | .     | .     |
|         | 8c |                                   | Tie-in work          | ■                               | ◆     | ●     | ■     | .     | ●     | ◆     | ◆     | ◆     | .     | ◆               | ■     | ●     | ◆     | .     | ■     | ◆     | ◆     | .     | .     |
|         | 9a | Signage, lighting and landscaping |                      | .                               | .     | .     | .     | .     | .     | .     | .     | .     | .     | .               | .     | .     | .     | .     | .     | .     | .     | .     | .     |

Key to impacts:   No exceedance   Marginal to minor (1 dB to 10 dB)   Moderate (11 dB to 20 dB)   High (>20 dB)



Table 6-42 Predicted construction noise exceedances night-time – residential receivers

| Period     | ID | Scenario                          | Activity             | Project as described in the EIS |       |       |       |       |       |       |       |       |       | Amended project |       |       |       |       |       |       |       |       |       |
|------------|----|-----------------------------------|----------------------|---------------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-----------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
|            |    |                                   |                      | NCA01                           | NCA02 | NCA03 | NCA04 | NCA05 | NCA06 | NCA07 | NCA08 | NCA09 | NCA10 | NCA01           | NCA02 | NCA03 | NCA04 | NCA05 | NCA06 | NCA07 | NCA08 | NCA09 | NCA10 |
| Night-time | 1a | Ancillary facility establishment  | Peak impact          | .                               | .     | .     | .     | .     | .     | .     | .     | .     | .     | .               | .     | .     | .     | .     | .     | .     | .     | .     | .     |
|            | 1b |                                   | Typical impact       | ■                               | ■     | ■     | ■     | .     | .     | ■     | .     | .     | ■     | ■               | ■     | ■     | ■     | .     | ■     | ■     | ■     | ■     | ■     |
|            | 2a | Ancillary facility operations     | Operation            | ■                               | ■     | .     | ■     | .     | .     | ■     | .     | .     | ■     | ■               | ■     | .     | ■     | .     | ■     | ■     | ■     | ■     | ■     |
|            | 2b |                                   | Stockpiling          | ■                               | ■     | ■     | ■     | .     | .     | ■     | .     | .     | ■     | ■               | ■     | ■     | ■     | .     | ■     | ■     | ■     | ■     | ■     |
|            | 2c |                                   | Batching plant       | .                               | .     | .     | .     | .     | .     | ■     | ■     | ■     | .     | .               | .     | ■     | .     | .     | ■     | ■     | ■     | ■     | ■     |
|            | 2d |                                   | Crushing             | n/a                             | n/a   | n/a   | n/a   | n/a   | n/a   | n/a   | n/a   | n/a   | .     | .               | .     | .     | .     | .     | ■     | ■     | ■     | ■     | ■     |
|            | 3a | Utilities and drainage            | Peak impact          | .                               | .     | .     | .     | .     | .     | .     | .     | .     | .     | .               | .     | .     | .     | .     | .     | .     | .     | .     | .     |
|            | 3b |                                   | Typical impact       | .                               | .     | .     | .     | .     | .     | .     | .     | .     | .     | .               | .     | .     | .     | .     | .     | .     | .     | .     | .     |
|            | 4a | Demolition                        | Peak impact          | .                               | .     | .     | .     | .     | .     | .     | .     | .     | .     | .               | .     | .     | .     | .     | .     | .     | .     | .     | .     |
|            | 4b |                                   | Typical impact       | .                               | .     | .     | .     | .     | .     | .     | .     | .     | .     | .               | .     | .     | .     | .     | .     | .     | .     | .     | .     |
|            | 5a | Clearing                          | Peak impact          | .                               | .     | .     | .     | .     | .     | .     | .     | .     | .     | .               | .     | .     | .     | .     | .     | .     | .     | .     | .     |
|            | 5b |                                   | Typical impact       | .                               | .     | .     | .     | .     | .     | .     | .     | .     | .     | .               | .     | .     | .     | .     | .     | .     | .     | .     | .     |
|            | 6a | Earthwork                         | Peak impact          | .                               | .     | .     | .     | .     | .     | .     | .     | .     | .     | .               | .     | .     | .     | .     | .     | .     | .     | .     | .     |
|            | 6b |                                   | Typical impact       | .                               | .     | .     | .     | .     | .     | .     | .     | .     | .     | .               | .     | .     | .     | .     | .     | .     | .     | .     | .     |
|            | 6c |                                   | Onsite truck haulage | ■                               | .     | .     | ■     | .     | ■     | ■     | .     | .     | .     | .               | .     | .     | .     | .     | .     | .     | .     | .     | .     |
|            | 7a | Bridge work                       | Peak impact          | .                               | ■     | ■     | ■     | .     | ■     | ■     | ■     | ■     | .     | ■               | ■     | ■     | ■     | .     | ■     | ■     | .     | ■     | .     |
|            | 7b |                                   | Typical impact       | .                               | ■     | .     | ■     | .     | ■     | ■     | .     | ■     | .     | ■               | ■     | .     | ■     | .     | ■     | ■     | .     | ■     | .     |
|            | 7c |                                   | Concrete work        | .                               | ■     | ■     | ■     | .     | ■     | ■     | .     | ■     | .     | ■               | ■     | ■     | ■     | .     | ■     | ■     | .     | ■     | .     |
|            | 7d |                                   | Girder lifts         | .                               | ■     | .     | ■     | .     | .     | ■     | .     | ■     | .     | ■               | ■     | .     | ■     | .     | .     | ■     | ■     | ■     | .     |
|            | 8a | Road work                         | Concrete work        | ■                               | ■     | ■     | ■     | .     | ■     | ■     | ■     | ■     | ■     | ■               | ■     | ■     | ■     | .     | ■     | ■     | ■     | ■     | ■     |
|            | 8b |                                   | Typical work         | .                               | .     | .     | .     | .     | .     | .     | .     | .     | .     | .               | .     | .     | .     | .     | .     | .     | .     | .     | .     |
|            | 8c |                                   | Tie-in work          | ■                               | ■     | ■     | ■     | .     | ■     | ■     | ■     | ■     | .     | ■               | ■     | ■     | ■     | .     | ■     | ■     | ■     | .     | .     |
|            | 9a | Signage, lighting and landscaping |                      | .                               | .     | .     | .     | .     | .     | .     | .     | .     | .     | .               | .     | .     | .     | .     | .     | .     | .     | .     | .     |

Key to impacts: ■ No exceedance ■ Marginal to minor (1 dB to 10 dB) ■ Moderate (11 dB to 20 dB) ■ High (>20 dB)

## Predicted impacts

Receivers can be highly noise affected when noise intensive equipment is being used close to residents. The following scenarios were assessed for the amended project as they resulted in the highest number of receivers being affected or are representative of work with the longest duration:

- Utilities and drainage, which is the scenario with the predicted worst-case impacts during standard daytime hours (ie the highest predicted NML exceedances and the greatest number of receivers affected)
- Road work – Tie in work, which is the scenario with the predicted worst-case impacts during the night-time period (ie the highest predicted NML exceedances and the greatest number of receivers affected)
- Earthwork and ancillary facility operations (stockpiling), which are the two longest duration scenarios.

The impacts described below are based on all equipment working in each assessed scenario. There would frequently be periods when construction noise levels are much lower than worst-case and there would be times when no equipment is in use and there are no impacts.

### Utilities and drainage

For both option 1 and option 2, the assessment for this scenario identified the following differences from the project as described in the EIS:

- The assessment identified an increase in impact for receivers to the south of Elizabeth Drive in NCA02, where 'high' worst-case impacts are predicted at seven receivers (previously 'moderate' impact) and more distant receivers having 'moderate' and 'minor' impacts. These receivers are experiencing a greater impact due to the proximity of works on Elizabeth Drive as a result of the amended project
- Slight reduction in receivers experiencing a 'high' impact in NCA06, around Salisbury Avenue (decrease from two to one receiver). This change is due to one receiver now being within the footprint of the expanded construction footprint including AF 13 and AF 14 in this NCA, and as such, will not be occupied during construction work.

### Road work – Tie in work

For option 1, the assessment for this scenario identified the following differences from the project as described in the EIS:

- Eleven receivers to the north of Elizabeth Drive, around the M7 Motorway and Wallgrove Road in NCA01 and NCA04, are predicted to have 'high' worst-case impacts, due to tie in work along Elizabeth Drive (east of Duff Rd), on Cecil Rd, on Wallgrove Road and on the M7 Motorway. Two additional receivers are predicted to have 'high' impacts when compared to the project as described in the EIS, which identified nine receivers. This change is due to the expanded construction footprint around the realigned Wallgrove Road.
- Twenty-six receivers to the south of Elizabeth Drive in NCA02, adjacent to work on Elizabeth Drive, are predicted to have 'high' worst-case impacts due to the tie in work on Elizabeth Drive. In the EIS, no receivers were identified in this area to experience 'high' impacts.
- A further 185 receivers have 'moderate' impacts, due to the tie in work on Elizabeth Drive and the M7 Motorway southbound on ramps. This is an increase of 90 from the 68 'moderate' receivers for the project as described in the EIS due to additional work on Elizabeth Drive associated with the amended project.

- Four receivers to the north of the amended construction footprint adjacent to the utility access road in NCA04 are predicted to have 'high' worst-case impacts with more distant receivers having 'moderate' and 'minor' impacts depending on the distance from the tie-in work. Two additional receivers are affected when compared to the project as described in the EIS due to the adjustment of the work location to accommodate the expanded work on Elizabeth Drive.
- Four receivers to the south of the amended construction footprint, adjacent to the relocated Salisbury Avenue cul-de-sac in NCA06, and five receivers to the north of the construction footprint, adjacent to the realignment of Clifton Avenue in NCA07, are predicted to have 'high' worst-case impacts with more distant receivers having 'moderate' and 'minor' impacts (including around the Mamre Road intersection with Elizabeth Drive). These impacts are generally additional to what was described for the project as described in the EIS due to the more extensive tie in work associated with the establishment of the additional ancillary facilities in this area.

For option 2 (with Elizabeth Drive connections), the impacts described above are mostly consistent. In NCA04 adjacent to the road tie in work at Elizabeth Drive, however, the closest residential receivers to the additional work are predicted to have 'moderate impacts'. A maximum increase of five dB is predicted at these most affected receivers for option 2 when compared to option 1.

### **Earthwork**

For option 1 and option 2, the assessment for this scenario identified the following differences from the project as described in the EIS:

- To the south of Elizabeth Drive in NCA02, where receivers are densely clustered 'high' worst-case impacts are predicted at three receivers, with several more having 'moderate' impacts. These impacts are additional to those described in the EIS due to work on Elizabeth Drive to the east of the M7 Motorway associated with the amended project.
- To the south of the construction footprint in NCA06, around Salisbury Avenue and between the amended project and Elizabeth Drive, where one receiver is predicted to have 'high' impacts and several more having 'moderate' impacts. This is a minor decrease (one receiver) of receivers predicted to have 'high' impacts when compared to the project as described in the EIS as the closest receiver to the work now lies within the expanded ancillary facility AF 13, and, as such, will not be occupied during construction work.

### **Ancillary facility operations (stockpiling)**

For option 1 and option 2, the assessment for this scenario concluded a general increase in impacts when compared to the project as described in the EIS due to the additional ancillary facilities impacting a greater number of receivers. 24-hour operation of a number of the ancillary facilities is anticipated to occur for the duration of the amended project. Consistent with the project as described in the EIS, 24-hour operations have conservatively been modelled at all ancillary facilities.

The assessment identified the following:

- Near AF 7, AF 9, AF 17 and AF 18 in NCA01 and NCA04, four receivers are predicted to have 'moderate' impacts with receivers further from the ancillary facilities having 'minor' impacts
- Near AF 8 in NCA02, the nearby receivers are predicted to have 'minor' impacts
- Near AF 6 in NCA04, five receivers are predicted to have 'moderate' impacts with receivers further from the ancillary facility having 'minor' impacts
- Near AF 5, AF 15 and AF 16 in NCA04, eight receivers are predicted to have 'moderate' impacts with receivers further from the ancillary facilities (including in NCA03) having 'minor' impacts



- Near AF 13 and AF 14 in NCA06 two receivers are predicted to have 'high' impacts with a further seven receivers with 'moderate' impacts; receivers further from the ancillary facilities (including in NCA03 and NCA04) generally have 'minor' impacts
- Near AF 4 and AF 12 in NCA07, five receivers are predicted to have 'moderate' impacts with receivers further from the ancillary facilities having 'minor' impacts
- Near AF 2 and AF 3 in NCA07, three receivers are predicted to have 'moderate' impacts with receivers further from the ancillary facilities (north of the amended project) having 'minor' impacts
- Near AF 11 in NCA09, three receivers are predicted to have 'moderate' impacts with receivers further from the ancillary facility (including in NCA08) having 'minor' impacts
- Near AF 1 in NCA10, three receivers are predicted to have 'moderate' impacts with receivers further from the ancillary facility having 'minor' impacts
- Near AF 10 in NCA10, one receiver is predicted to have 'high' impacts with a further nine receivers with 'moderate' impacts; receivers further from the ancillary facility generally have 'minor' impacts.

### Work in one location

The assessment identified that when highly noise intensive work is occurring in a single location, the impacts are limited to receivers within 800 metres of the work. Receivers in the rest of the study area are predicted to be compliant with the noise management levels.

### Highly noise affected residential receivers

Residential receivers that are subject to noise levels of 75 dBA or greater are considered highly noise affected. Highly noise affected impacts may occur during work associated with the 'Utilities and drainage', 'Clearing', 'Earthwork' and 'Road work' scenarios.

Eleven receivers in total (an increase of four from seven receivers for the project as described in the EIS) may be subject to construction noise levels above the highly noise affected threshold due to the amended project. This increase occurs primarily in NCA02 due to the amended project work on Elizabeth Drive. It is noted that two receivers in NCA01 are no longer highly noise affected as the closest receivers to the work now lie within the expanded ancillary facility AF 9, and as such, will not be occupied during construction work. The location of highly affected receivers are shown in

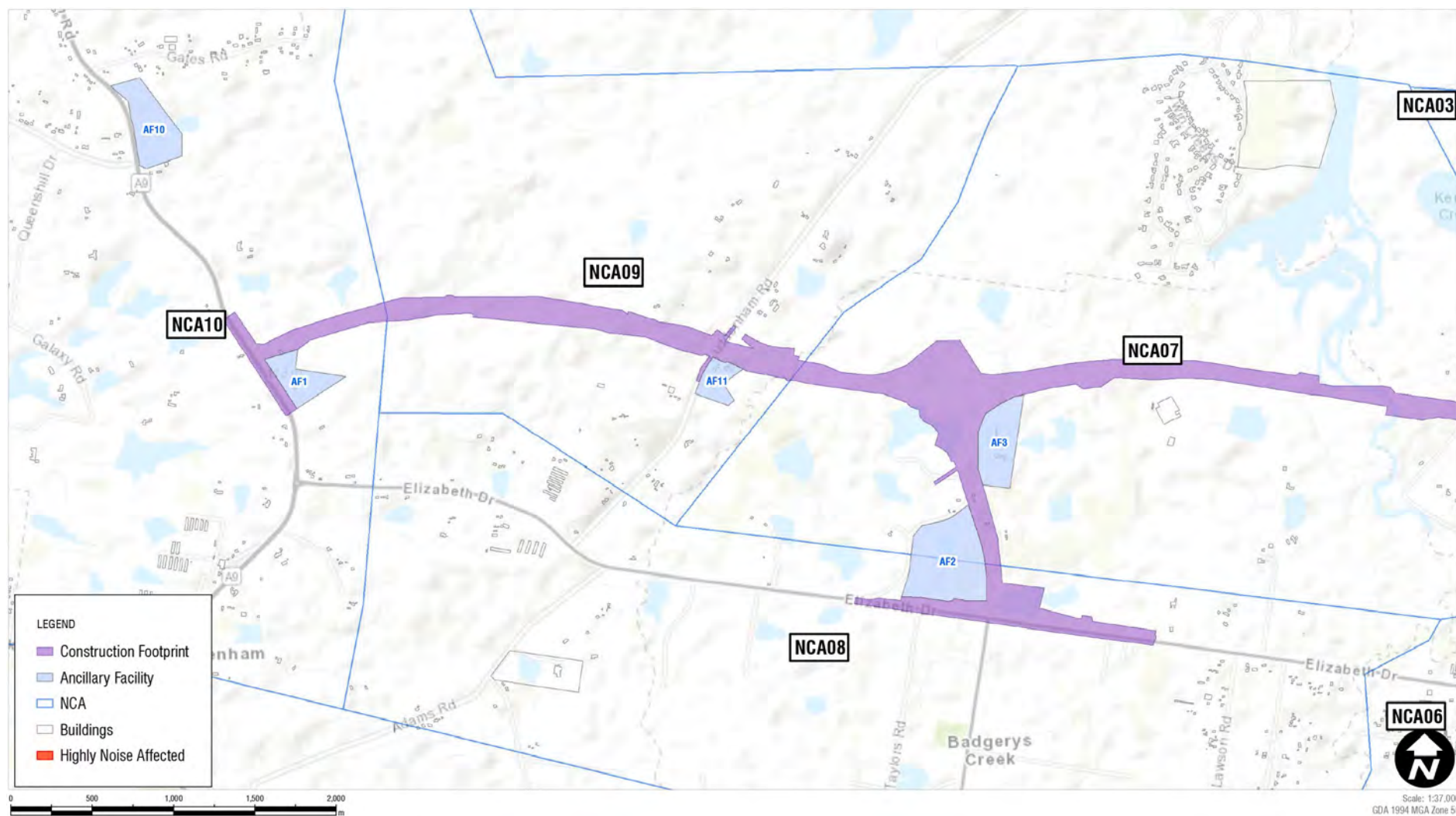
**Figure 6-38.**

Highly noise affected receivers are mostly consistent between option 1 and option 2. An additional three receivers on in NCA04 adjacent to the additional work on Elizabeth Drive for option 2 (with Elizabeth Drive connections) are predicted to potentially be highly noise affected during the worst-case impacts from the option 2 construction.

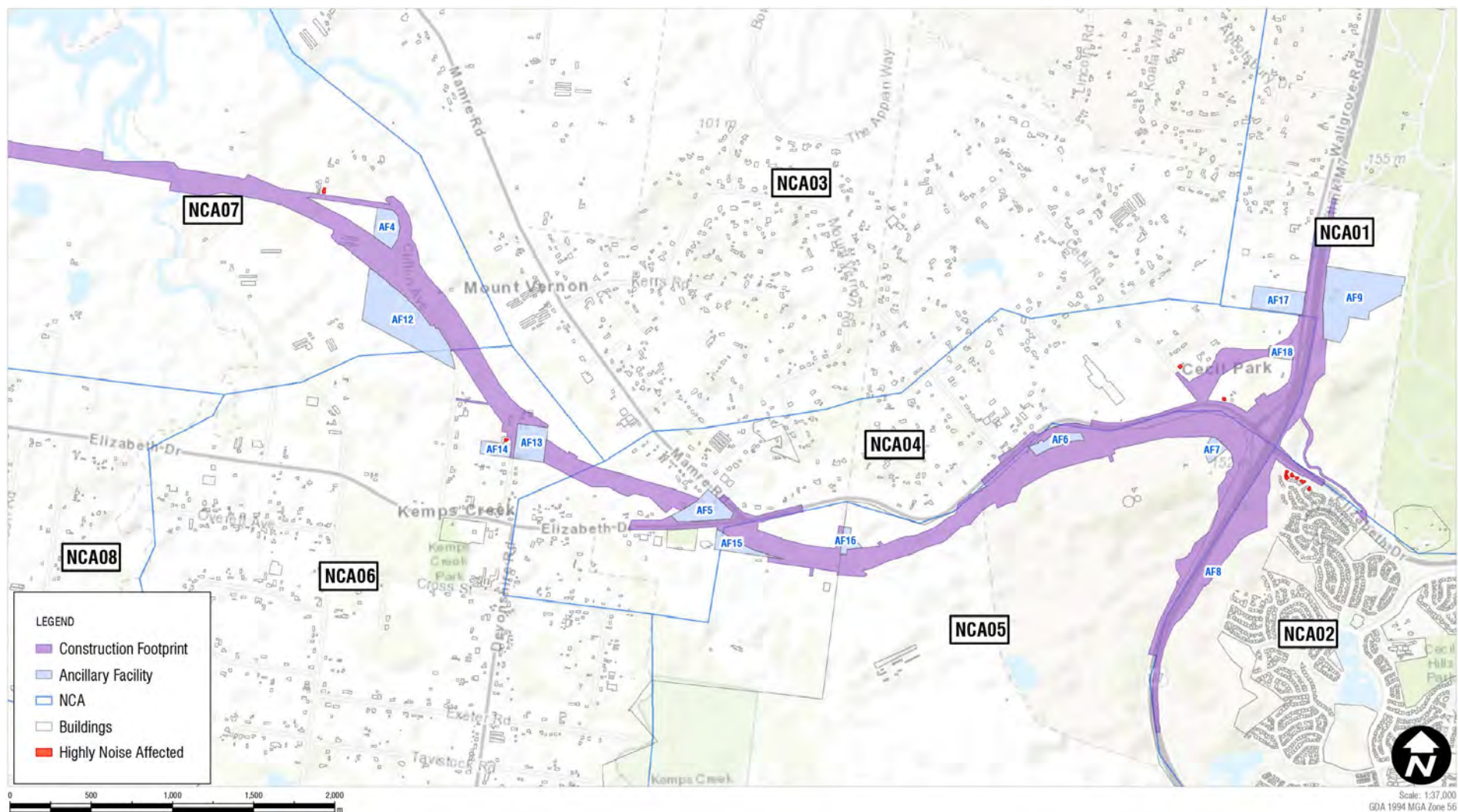
### 'Other' sensitive receivers

There are several categories of 'other' sensitive receivers in the study area, including educational facilities, places of worship and outdoor areas.

In general, impacts on 'other' sensitive receivers for the amended project are generally consistent with the impacts as described in the EIS. However for option 1, the assessment for this scenario identified minor exceedances of up to seven dB (an increase of one dB from six dB as described in the EIS) are predicted at two outdoor sensitive receiver areas (Kemps Creek Sporting and Bowling Club and Western Sydney Parklands) adjacent to the amended project in NCA04 and NCA05. Minor increases are due to expansion of the construction footprint for the amended project including the new ancillary facilities.



**Figure 6-38** Highly noise affected residential receivers during construction of the amended project



**Figure 6-39** Highly noise affected residential receivers during construction of the amended project



For option 2 (with Elizabeth Drive connections), the assessment is mostly consistent for option 1 and 2 however, the closest school (Irfan College), located in NCA04, is predicted to have 'high impacts' during the worst-case scenarios when noise intensive equipment is being used for option 2, where 'moderate impacts' were predicted for option 1. This is due to the additional work on Elizabeth Drive associated with option 2. Other sensitive receivers, such as schools, would be consulted prior to and throughout the construction of the amended project to appropriately manage predicted impacts.

### Commercial receivers

In general, impacts on commercial receivers for the amended project are generally consistent with the impacts of the project as described in the EIS, with the exception of additional minor impacts in NCA04 due to the addition of ancillary facility AF 15 adjacent to commercial receivers. This is consistent between option 1 and option 2 of the amended project.

#### 6.7.3.2 Sleep disturbance

A sleep disturbance screening assessment has been carried out for the construction work and a summary is provided in the assessment tables in **Appendix G** (Annexure C). Review of the predictions shows that the sleep disturbance screening criterion is likely to be exceeded when night-time work are occurring near to residential receivers. This is consistent for both option 1 and option 2.

The need for night-time work on consecutive nights is not fully understood at this stage of the project. The requirements for night-time work would be determined as the amended project progresses and the likelihood of sleep disturbance impacts would be reviewed during detailed design.

Where night-time work is located close to residential receivers, a detailed assessment of the potential noise impacts would be carried out prior to the work commencing and site-specific environmental management measures to control the impacts would be developed and implemented.

#### 6.7.3.3 Construction vibration

The main sources of vibration from construction work within the study area are vibratory rollers and rock-breakers are consistent with those described in the EIS. The assessment assumes that a vibratory roller is required across the study area and the assessment is summarised in **Figure 6-40**.

### Cosmetic damage

Based on the amended construction footprint, there has been a change in the number of structures located within the recommended minimum working distance when compared to the project as described in the EIS.

In total, about 21 structures (an increase from 19 structures as described in the EIS) are now located within the recommended minimum working distance spread across NCA02, NCA04, NCA05, NCA06, NCA07 and NCA10 where receivers are located close to the work.

In some locations additional structures are now located within the recommended minimum working distance and in other locations are no longer included due to changes in the amended construction footprint. Additional structures located within the minimum working distance when compared to the project as described in the EIS are detailed below:

- Three additional structures in NCA02 adjacent to the work on Elizabeth Drive
- Six additional structures in NCA04 adjacent to the expanded construction footprint associated with work on Elizabeth Drive around AF 6 and Cecil Road

- Two additional structures in NCA04 and NCA05 adjacent to the expanded construction footprint around AF 5 and AF 15
- One additional structure in NCA06 adjacent to the expanded construction footprint around AF 13 and AF 14.

However, there are also a few structures that are now either inside the amended project construction footprint (and therefore no longer receivers to be impacted by the project), or are outside the cosmetic damage minimum working distance due to a change in the construction footprint. These comprise:

- One in NCA01 (now inside AF9)
- Six in NCA04
  - Four now inside construction footprint
  - Two now outside the cosmetic damage minimum working distance
- Three in NCA06 and NCA07
  - Two now inside construction footprint
  - One now outside the cosmetic damage minimum working distance.

Where work is within the minimum working distances, construction work would not proceed unless:

- A different construction method with lower source vibration levels is used, where feasible
- Attended vibration measurements are carried out at the start of the work to determine the risk of exceeding of the vibration objectives.

Where buildings are potentially affected by vibration, building condition surveys would be completed before and after work.

### Human comfort vibration

Certain receivers which are near the construction footprint are within the human comfort minimum working distance and occupants of affected buildings may be able to perceive vibration impacts at times when vibration generating equipment is in use. Where impacts would be perceptible, they would likely only be apparent for relatively short durations when equipment such as rock-breakers or vibratory rollers are in use nearby.

The requirement for vibration intensive work and associated potential for impacts on human comfort would be reviewed during detailed design once finalised details of the work are available.

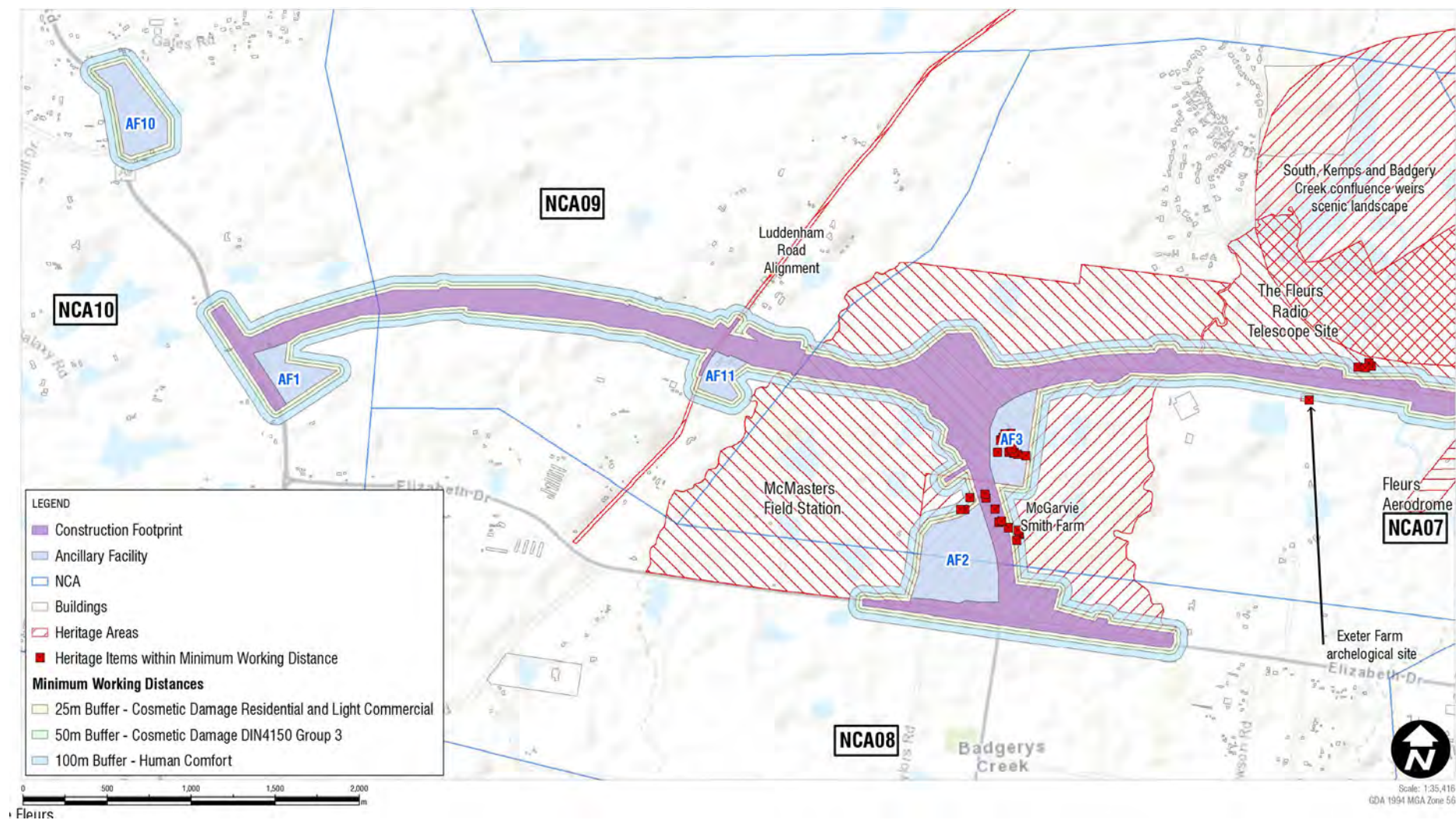
### Heritage structures

The location of heritage structures is shown in **Figure 6-40**. Heritage buildings are to be considered on a case by case basis and further investigation would be carried out during detailed design for all potentially affected structures. Where buildings or structures are considered sensitive to vibration, appropriate vibration criteria would be determined after detailed inspections have been completed.

Potential vibration impacts to heritage structures for the amended project are consistent with those described in the EIS.

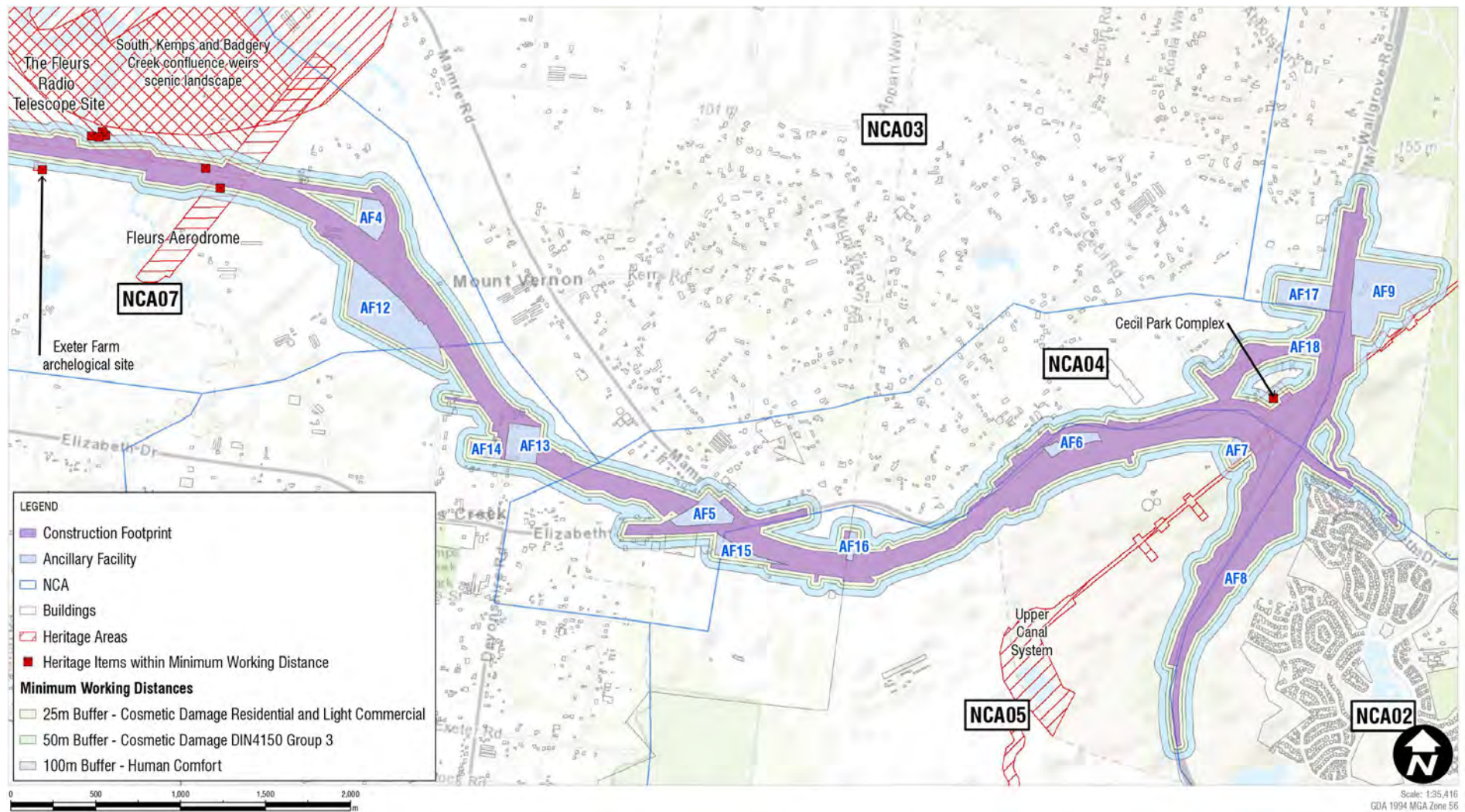
#### 6.7.3.4 Construction ground-borne noise

The majority of receivers are sufficiently distant from the work for ground-borne noise impacts to be minimal. Where residential receivers are located near to construction work, airborne noise levels would typically be dominant over the ground-borne component.



**Figure 6-40** Construction vibration assessment for the amended project





**Figure 6-41** Construction vibration assessment for the amended project

### **6.7.3.5 Construction traffic noise**

A comparison of the proposed construction traffic volumes to the forecast traffic volumes during the construction period has been used to determine where noticeable increases in road traffic noise (ie a greater than two decibel increase over the existing noise level) may be likely to occur.

The assessment identified that construction traffic is unlikely to result in a noticeable increase in noise levels where vehicles use major roads. This is because of the high volumes of traffic that already use these routes.

Based on the proposed construction traffic routes and the forecast redistribution of traffic during construction, no noticeable increases in road traffic noise are predicted. The results are generally consistent with the findings for the project as described in the EIS.

Where local roads are used to access compounds, an assessment will be required once detailed vehicle movements are confirmed. In the event that an increase greater than two dB is predicted, existing road traffic noise levels will be further evaluated to determine if the receiver is also above the relevant RNP base criteria. If the receiver is above the RNP base criteria and predicted to experience an increase in noise greater than two dB from construction traffic, mitigation options will be required to be further investigated. Mitigation may include the earlier installation of operational treatments to provide a noise benefit during the construction phase of the amended project.

### **6.7.3.6 Cumulative and consecutive construction noise impacts**

The amended construction footprint has not substantially changed in the vicinity of recently completed, ongoing and proposed projects. As a result, the cumulative and consecutive construction noise impacts associated with the amended project would likely remain consistent with the assessment described in Section 7.7.8 and Section 7.7.9 of the EIS.

These would be investigated further as the project progresses when detailed construction planning is developed. Specific additional management measures would then be designed in consultation with the community to address potential cumulative and consecutive impacts to minimise impacts as far as practicable.

## **6.7.4 Operational impacts**

### **6.7.4.1 Operational road noise predictions**

Forecast traffic volume data for the amended project has been provided for the at-opening year (2026) and future design year (2036). As part of the transport and traffic updated technical report (see **Appendix B**) land use and demographics scenario has been updated to a more recent model (developed in 2016). The modelling package used for the amendment report changed to an updated model as the traffic forecasts for western Sydney from this model are considered to be more robust than the model that was used for the EIS analysis.

The changes in forecast land use and improvements in modelling processes have resulted in a major reduction in future trips to the South West Growth Area in western Sydney. Forecast traffic volumes using the amended project and the surrounding network have reduced as a result.

Operational noise impacts in the operational study area were predicted 'without mitigation' and compared to the NCG criteria (Roads and Maritime, 2015). The 'without mitigation' noise predictions are used to identify receivers which qualify for consideration of additional noise mitigation using guidance from the Noise Mitigation Guideline (NMG) (Roads and Maritime 2015a), noting that receivers which are above the NCG criteria do not necessarily qualify for additional noise mitigation.

## Option 1

For option 1 the assessment identified that increases in road traffic noise levels are predicted at receivers within most NCAs across the operational study area, which is consistent with the project as described in the EIS. At certain locations within the NCAs, there would be an increase in traffic noise levels with the amended project due to:

- The alignment of the amended project being relatively close to receivers resulting in impacts to facades of houses which were previously not affected by road traffic noise for NCA01, NCA03, NCA04 and NCA06
- The amended project would be constructed in an area which has low existing road traffic noise levels and affects receivers which were previously not affected for NCA07 and NCA09
- The amended project would be constructed in an area where receivers are in close proximity to existing roads for NCA10.

When compared to the project as described in the EIS, the amended project does not have receivers within NCA02 which qualify for consideration of mitigation. This is primarily due to a reduction in night-time noise levels (generally around one dB to two dB) across the NCA. The EIS identified two buildings which qualified for consideration of mitigation, with both buildings being marginally over the night-time NCG criteria. With the predicted reduction in night-time noise levels for the amended design, these receivers do not trigger consideration of mitigation as part of the amended project.

Overall, the amended project option 1 generally results in a reduction in the predicted night-time noise levels (between three and four decibels) when compared to the corresponding period in the EIS, however there are pockets where the realignment or changes to localised traffic volumes (Wallgrove Road, Salisbury Avenue and Duff Road) result in increased road noise levels. Daytime noise levels are consistent (within 0 dB to 0.5 dB) with the EIS predictions for option 1, with the exception of receivers in NCA04 where an increase is predicted.

The predicted operational road noise levels at residential receivers under option 1 are summarised in **Table 6-43** for the 2026 at-opening and 2036 future design scenarios.

The time period in which the project is predicted to have the highest number of impacted receivers is the 2036 day-time scenario. This is different to the project as described in the EIS where 2036 night-time scenario has the highest number of impacted receivers. The maps in **Figure 6-42** and **Figure 6-43** present the impacts for the controlling 2036 day-time scenario, while maps for the other time periods are included in **Appendix G**.



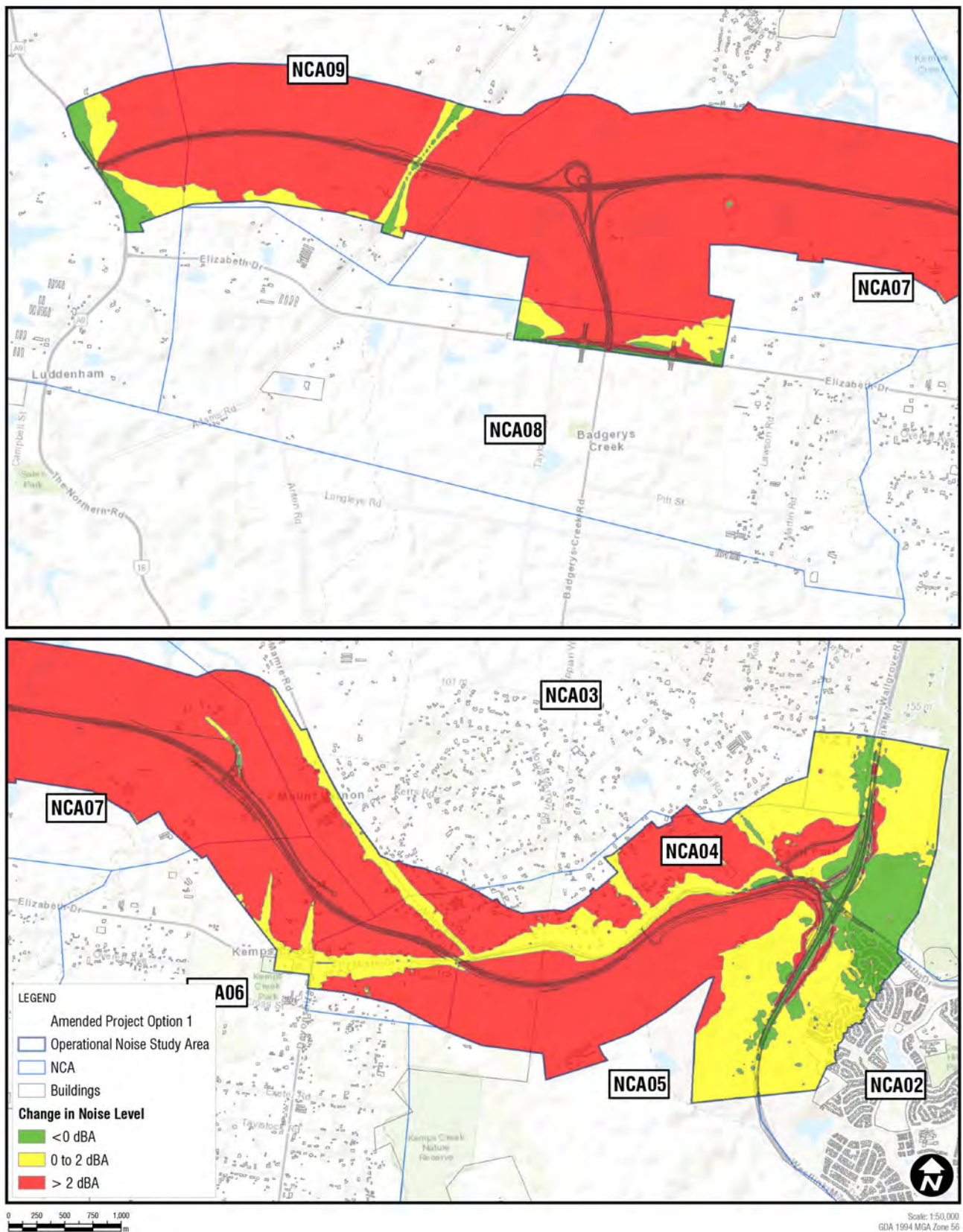
Table 6-43 Predicted worst-case change in road traffic noise level in each NCA without mitigation – option 1 (triggered residential receivers only)

| NCA   | Project as per EIS                       |       |                      |       |                            |       |                            |       |                                           |       | Amended project – option 1               |       |                      |       |                            |       |                            |       |                                           |       |
|-------|------------------------------------------|-------|----------------------|-------|----------------------------|-------|----------------------------|-------|-------------------------------------------|-------|------------------------------------------|-------|----------------------|-------|----------------------------|-------|----------------------------|-------|-------------------------------------------|-------|
|       | Predicted noise level (dBA) <sup>1</sup> |       |                      |       |                            |       |                            |       | Change in noise levels (dBA) <sup>2</sup> |       | Predicted noise level (dBA) <sup>1</sup> |       |                      |       |                            |       |                            |       | Change in noise levels (dBA) <sup>2</sup> |       |
|       | At-Opening 2026                          |       |                      |       | Future Design 2036         |       |                            |       |                                           |       | At-Opening 2026                          |       |                      |       | Future Design 2036         |       |                            |       |                                           |       |
|       | No Build (without project)               |       | Build (with project) |       | No Build (without project) |       | No Build (without project) |       |                                           |       | No Build (without project)               |       | Build (with project) |       | No Build (without project) |       | No Build (without project) |       |                                           |       |
|       | Day                                      | Night | Day                  | Night | Day                        | Night | Day                        | Night | Day                                       | Night | Day                                      | Night | Day                  | Night | Day                        | Night | Day                        | Night | Day                                       | Night |
| NCA01 | 62                                       | 58    | 67                   | 63    | 63                         | 59    | 69                         | 64    | 5                                         | 5     | 61                                       | 56    | 64                   | 59    | 62                         | 57    | 66                         | 60    | 4                                         | 3     |
| NCA02 | 52                                       | 47    | 53                   | 50    | 53                         | 49    | 55                         | 52    | 2                                         | 2     | -3                                       | -3    | -3                   | -3    | -3                         | -3    | -3                         | -3    | -3                                        | -3    |
| NCA03 | 49                                       | 44    | 59                   | 55    | 49                         | 45    | 60                         | 56    | 11                                        | 11    | 49                                       | 39    | 59                   | 51    | 48                         | 37    | 60                         | 50    | 12                                        | 13    |
| NCA04 | 54                                       | 53    | 66                   | 65    | 53                         | 51    | 66                         | 64    | 12                                        | 12    | 52                                       | 42    | 65                   | 58    | 52                         | 42    | 68                         | 60    | 16                                        | 17    |
| NCA05 | -                                        | -     | -                    | -     | -                          | -     | -                          | -     | -                                         | -     | -                                        | -     | -                    | -     | -                          | -     | -                          | -     | -                                         | -     |
| NCA06 | 51                                       | 47    | 67                   | 63    | 53                         | 49    | 67                         | 63    | 16                                        | 16    | 52                                       | 42    | 66                   | 60    | 52                         | 43    | 66                         | 58    | 15                                        | 18    |
| NCA07 | 33                                       | 28    | 53                   | 48    | 36                         | 31    | 55                         | 51    | 20                                        | 20    | 45                                       | 37    | 63                   | 57    | 46                         | 35    | 66                         | 58    | 20                                        | 23    |
| NCA08 | -                                        | -     | -                    | -     | -                          | -     | -                          | -     | -                                         | -     | -                                        | -     | -                    | -     | -                          | -     | -                          | -     | -                                         | -     |
| NCA09 | 44                                       | 40    | 57                   | 53    | 45                         | 41    | 59                         | 55    | 14                                        | 15    | 43                                       | 42    | 58                   | 57    | 44                         | 37    | 59                         | 55    | 15                                        | 17    |
| NCA10 | 53                                       | 49    | 55                   | 51    | 54                         | 50    | 57                         | 53    | 3                                         | 3     | 54                                       | 49    | 56                   | 51    | 56                         | 49    | 57                         | 51    | 2                                         | 2     |

Note 1: Daytime and night-time are LAeq(15hour) and LAeq(9hour) noise levels, respectively.

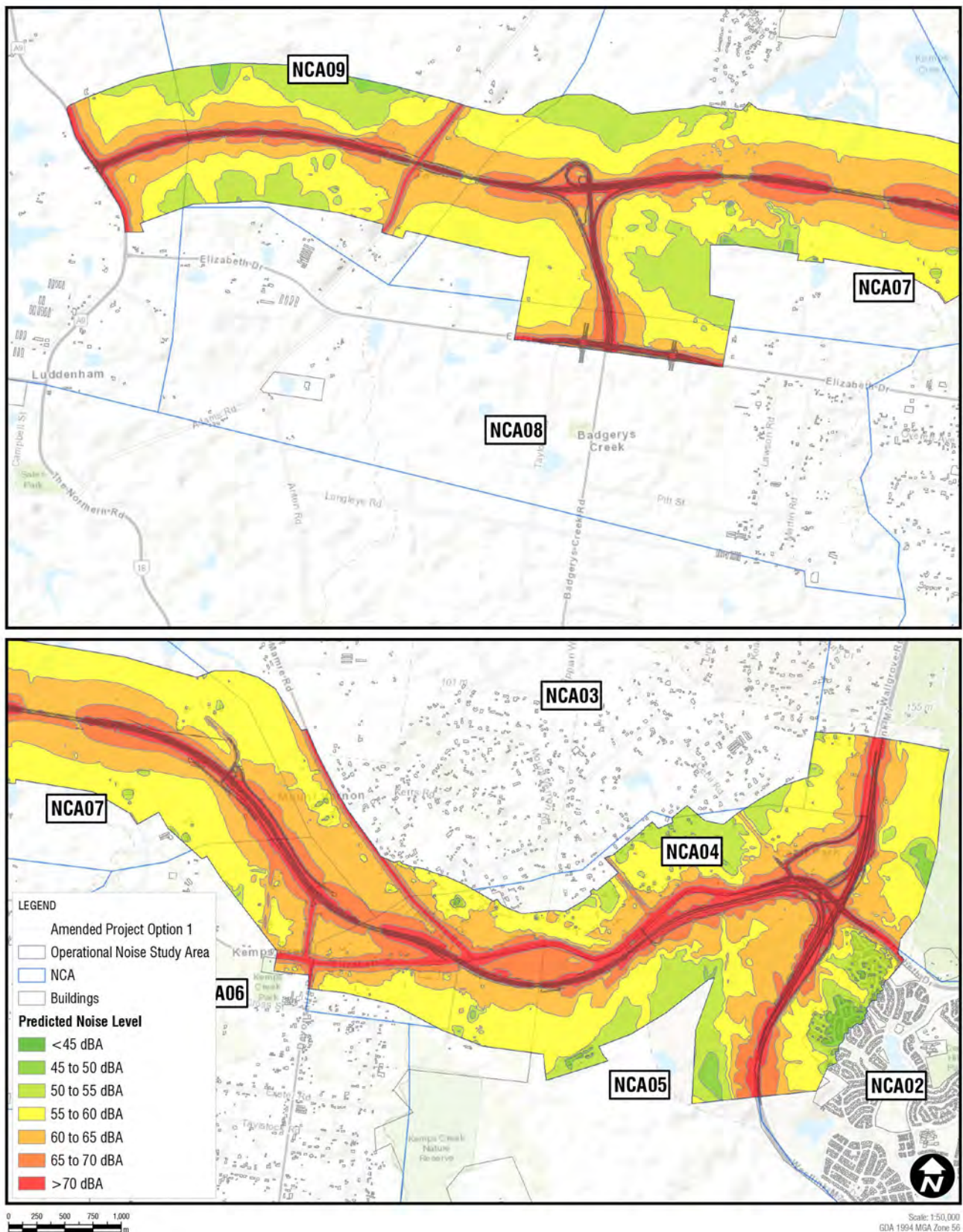
Note 2: The change in noise level is based on the worst-case noise level

Note 3: No triggered receivers within NCA02 in the amended project



**Figure 6-42** Predicted change in operational noise without mitigation – 2036 Daytime – option 1





**Figure 6-43** Predicted Build operational noise levels without mitigation – LAeq(15hour) – 2036 Daytime – option 1



## Option 2

The predicted 'without mitigation' operational road noise levels at residential receivers for the amended project option 2 (with Elizabeth Drive connections) are summarised in **Table 6-44** for the 2026 at-opening and 2036 future design scenarios. Like for option 1, **Table 6-44** summarises the worst-case change in noise levels in each NCA, which typically affect receivers which are nearest to the amended project.

For option 2, these results show that, consistent with the project as described in the EIS and option 1, increases in road traffic noise levels are predicted at receivers within most NCAs across the operational study area for the amended project option 2. The reasons for the increases in the different NCAs are mostly consistent with the project as described in the EIS and option 1 above.

Similar to option 1, option 2 does not have impacted receivers within NCA02 which qualify for consideration of mitigation. This is primarily due to a reduction in night-time noise levels (generally around 1 dB to 2 dB) across the NCA. The EIS identified two buildings which qualified for consideration of mitigation, with both buildings being marginally over the night-time NCG criteria. With the predicted reduction in night-time noise levels for the amended design, these receivers do not trigger consideration of mitigation as part of the amended project.

Overall, the amended project option 2 generally results in a reduction in the predicted night-time noise levels (between three and four decibels) when compared to the corresponding period in the EIS. This is due to the night-time vehicle volumes across the amended option 2 design decreasing along with a change in the percentage of heavy vehicles when compared to the EIS (see **Chapter 4**). Daytime noise levels for option 1 are consistent (within 0 to 0.5 dB) with the EIS predictions, apart from receivers in NCA04 where an increase is predicted. **Figure 6-44** and **Figure 6-45** illustrate the predicted change in noise levels (ie the Build minus No Build) and the predicted Build noise levels for the 2036 daytime timeframe for the amended project option 1.

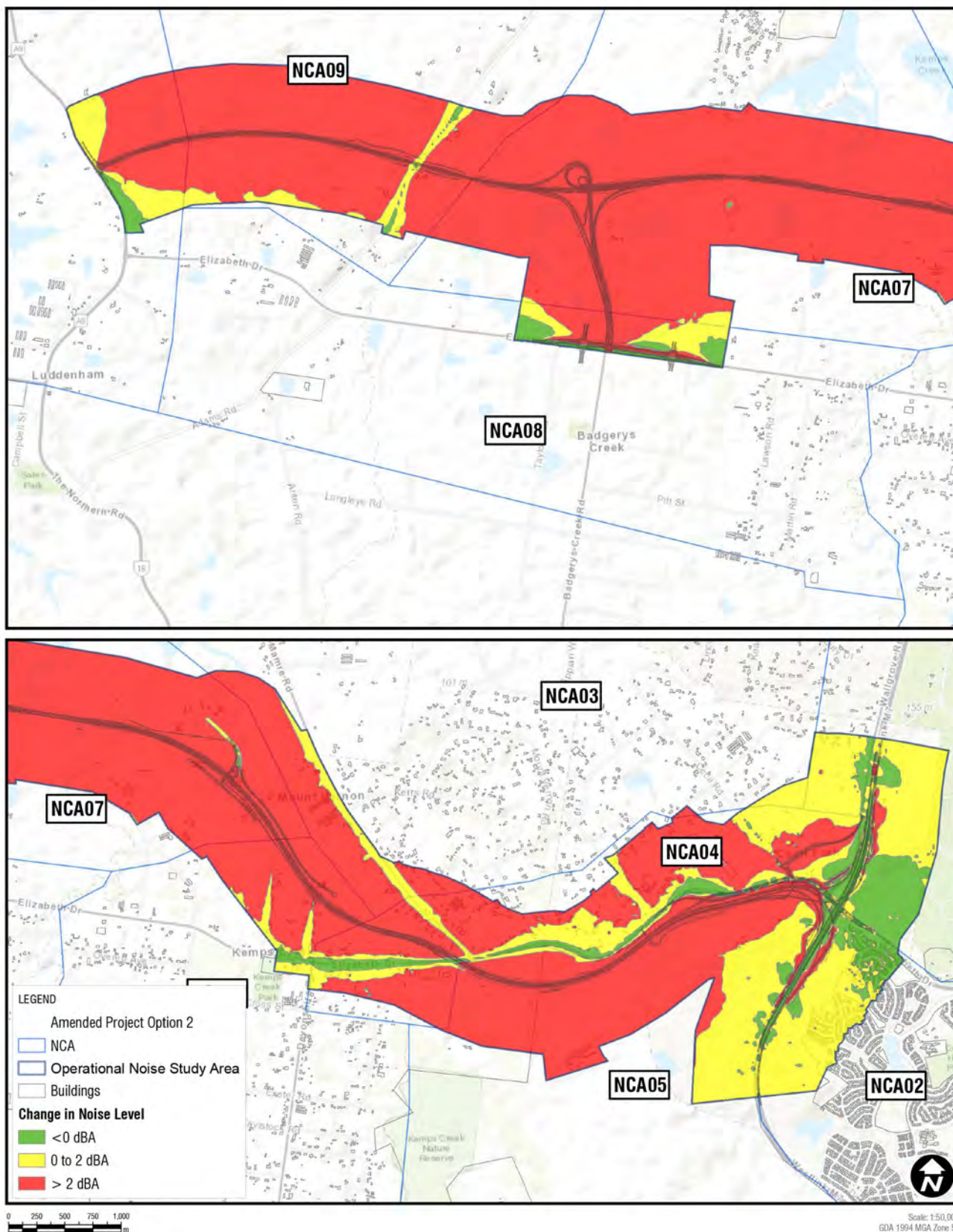
Table 6-44 Predicted worst-case change in road traffic noise level in each NCA without mitigation – option 2

| NCA   | Project as described in EIS              |       |                      |       |                            |       |                            |       |                                           |    | Amended project – option 2               |       |                      |       |                            |       |                            |       |                                           |    |
|-------|------------------------------------------|-------|----------------------|-------|----------------------------|-------|----------------------------|-------|-------------------------------------------|----|------------------------------------------|-------|----------------------|-------|----------------------------|-------|----------------------------|-------|-------------------------------------------|----|
|       | Predicted noise level (dBA) <sup>1</sup> |       |                      |       |                            |       |                            |       | Change in noise levels (dBA) <sup>2</sup> |    | Predicted noise level (dBA) <sup>1</sup> |       |                      |       |                            |       |                            |       | Change in noise levels (dBA) <sup>2</sup> |    |
|       | At-Opening 2026                          |       |                      |       | Future Design 2036         |       |                            |       |                                           |    | At-Opening 2026                          |       |                      |       | Future Design 2036         |       |                            |       |                                           |    |
|       | No Build (without project)               |       | Build (with project) |       | No Build (without project) |       | No Build (without project) |       |                                           |    | No Build (without project)               |       | Build (with project) |       | No Build (without project) |       | No Build (without project) |       |                                           |    |
|       | Day                                      | Night | Day                  | Night | Day                        | Night | Day                        | Night |                                           |    | Day                                      | Night | Day                  | Night | Day                        | Night | Day                        | Night |                                           |    |
| NCA01 | 62                                       | 58    | 67                   | 63    | 63                         | 59    | 69                         | 64    | 5                                         | 5  | 61                                       | 56    | 64                   | 59    | 62                         | 57    | 66                         | 60    | 4                                         | 3  |
| NCA02 | 52                                       | 47    | 53                   | 50    | 53                         | 49    | 55                         | 52    | 2                                         | 2  | -3                                       | -3    | -3                   | -3    | -3                         | -3    | -3                         | -3    | -3                                        | -3 |
| NCA03 | 49                                       | 44    | 59                   | 55    | 49                         | 45    | 60                         | 56    | 11                                        | 11 | 49                                       | 39    | 60                   | 51    | 48                         | 37    | 61                         | 50    | 12                                        | 13 |
| NCA04 | 54                                       | 53    | 66                   | 65    | 53                         | 51    | 66                         | 64    | 12                                        | 12 | 52                                       | 42    | 66                   | 58    | 52                         | 42    | 68                         | 60    | 17                                        | 18 |
| NCA05 | -                                        | -     | -                    | -     | -                          | -     | -                          | -     | -                                         | -  | -                                        | -     | -                    | -     | -                          | -     | -                          | -     | -                                         | -  |
| NCA06 | 51                                       | 47    | 67                   | 63    | 53                         | 49    | 67                         | 63    | 16                                        | 16 | 52                                       | 42    | 68                   | 60    | 52                         | 43    | 67                         | 59    | 16                                        | 19 |
| NCA07 | 33                                       | 28    | 53                   | 48    | 36                         | 31    | 55                         | 51    | 20                                        | 20 | 45                                       | 32    | 65                   | 52    | 46                         | 35    | 67                         | 59    | 21                                        | 23 |
| NCA08 | -                                        | -     | -                    | -     | -                          | -     | -                          | -     | -                                         | -  | -                                        | -     | -                    | -     | -                          | -     | -                          | -     | -                                         | -  |
| NCA09 | 44                                       | 40    | 57                   | 53    | 45                         | 41    | 59                         | 55    | 14                                        | 15 | 43                                       | 42    | 58                   | 58    | 44                         | 37    | 59                         | 55    | 15                                        | 17 |
| NCA10 | 53                                       | 49    | 55                   | 51    | 54                         | 50    | 57                         | 53    | 3                                         | 3  | 54                                       | 49    | 56                   | 51    | 56                         | 49    | 57                         | 52    | 2                                         | 3  |

Note 1: Daytime and night-time are LAeq(15hour) and LAeq(9hour) noise levels, respectively.

Note 2: The change in noise level is based on the worst-case noise level

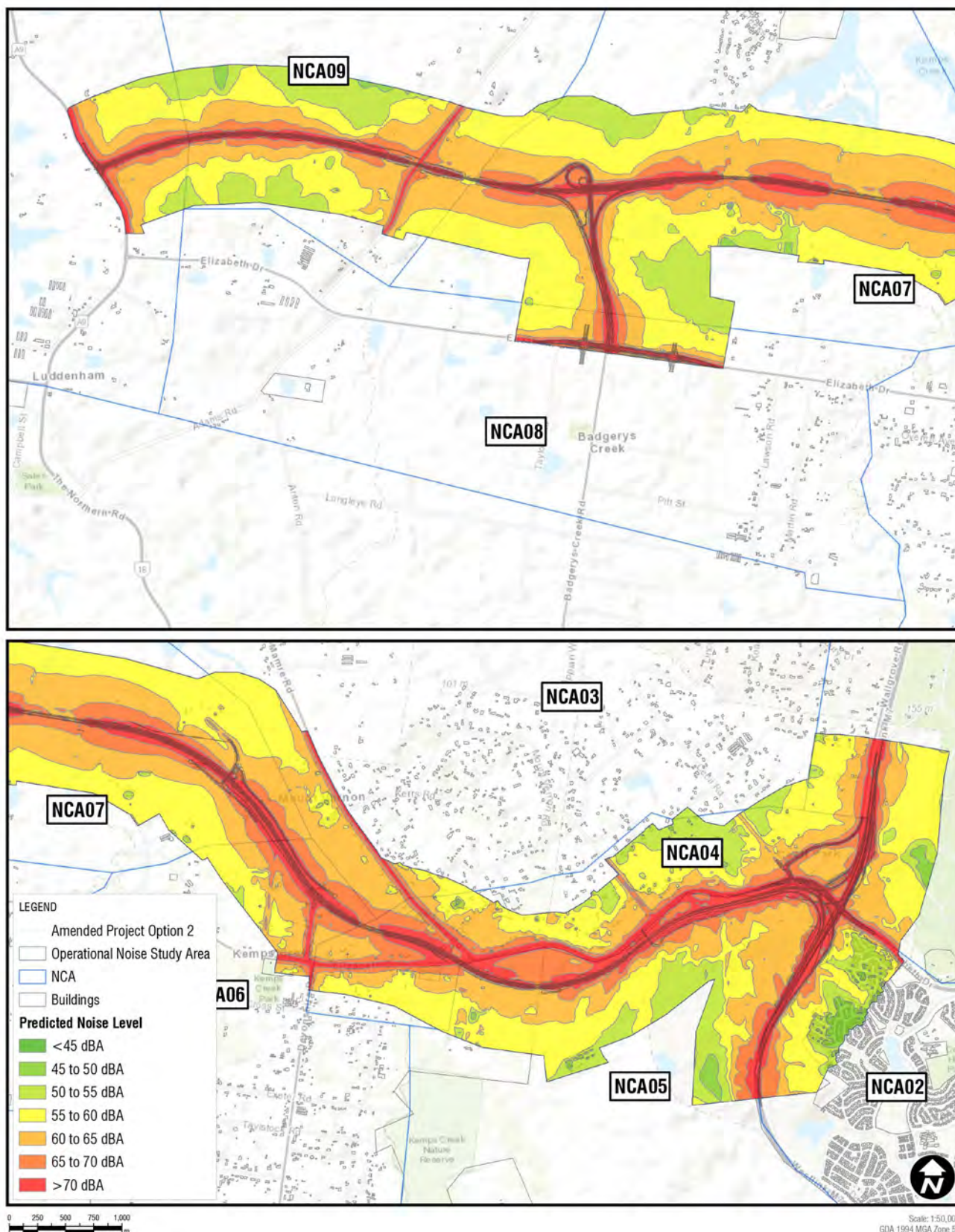
Note 3: No triggered receivers within NCA02 in the amended project



Note 1: Predicted change in noise levels (Build minus No Build) are for 2036 daytime scenario at a height of 1.5 metres above local ground (ground floor level).

**Figure 6-44** Predicted change in operational noise without mitigation – 2036 Daytime – option 2





Note 1: Predicted free field noise levels are for Build 2036 daytime scenario at a height of 1.5 metres above local ground (ground floor level).

**Figure 6-45** Predicted Build operational noise levels without mitigation –  $L_{Aeq}(15\text{hour})$  – 2036 Daytime – option 2

### 6.7.4.2 Receivers considered for additional noise mitigation

Under both option 1 and option 2, additional receivers have been identified as eligible for consideration of additional noise mitigation using guidance from the NMG (Roads and Maritime 2015a), when compared to the project as described in the EIS (see **Table 6-45**).

For option 1 (without Elizabeth Drive connections), there are a total of 310 floors (212 individual buildings) eligible for consideration of additional noise mitigation. This is an increase of 48 floors (29 individual buildings) from the project as described in the EIS. The increase in the number of qualifying receivers is largely controlled by the increase to the operational assessment boundary in NCA04.

For option 2 (with Elizabeth Drive connections), there are a total of 320 floors (220 individual buildings) eligible for consideration of additional noise mitigation. This is an increase of 58 floors (37 individual buildings) from the project as described in the EIS, and an increase from option 1 by 10 floors (eight individual buildings). The increase in the number of qualifying receivers is largely controlled by the increase to the operational assessment study area in NCA04.

The receivers which were identified as eligible for consideration of additional noise mitigation for option 1 and option 2 are shown in **Figure 6-46** and **Figure 6-47** respectively.

Operational noise mitigation measures are discussed in **Section 6.7.5**.

Table 6-45 Trigger receiver exceedance categories

| Trigger category                          | Project as described in EIS |            | Amended project – option 1 |            | Amended project – option 2 |            |
|-------------------------------------------|-----------------------------|------------|----------------------------|------------|----------------------------|------------|
|                                           | Number of triggers          |            | Number of triggers         |            | Number of triggers         |            |
|                                           | Floors                      | Building   | Floors                     | Building   | Floors                     | Building   |
| Trigger 1<br>(greater than 2 dB increase) | 218                         | 151        | 306                        | 210        | 312                        | 215        |
| Trigger 2<br>(exceeds cumulative limit)   | 228                         | 162        | 218                        | 147        | 239                        | 164        |
| Trigger 3<br>(acute)                      | 50                          | 36         | 47                         | 34         | 69                         | 47         |
| <b>TOTAL</b>                              | <b>262</b>                  | <b>183</b> | <b>310</b>                 | <b>212</b> | <b>320</b>                 | <b>220</b> |

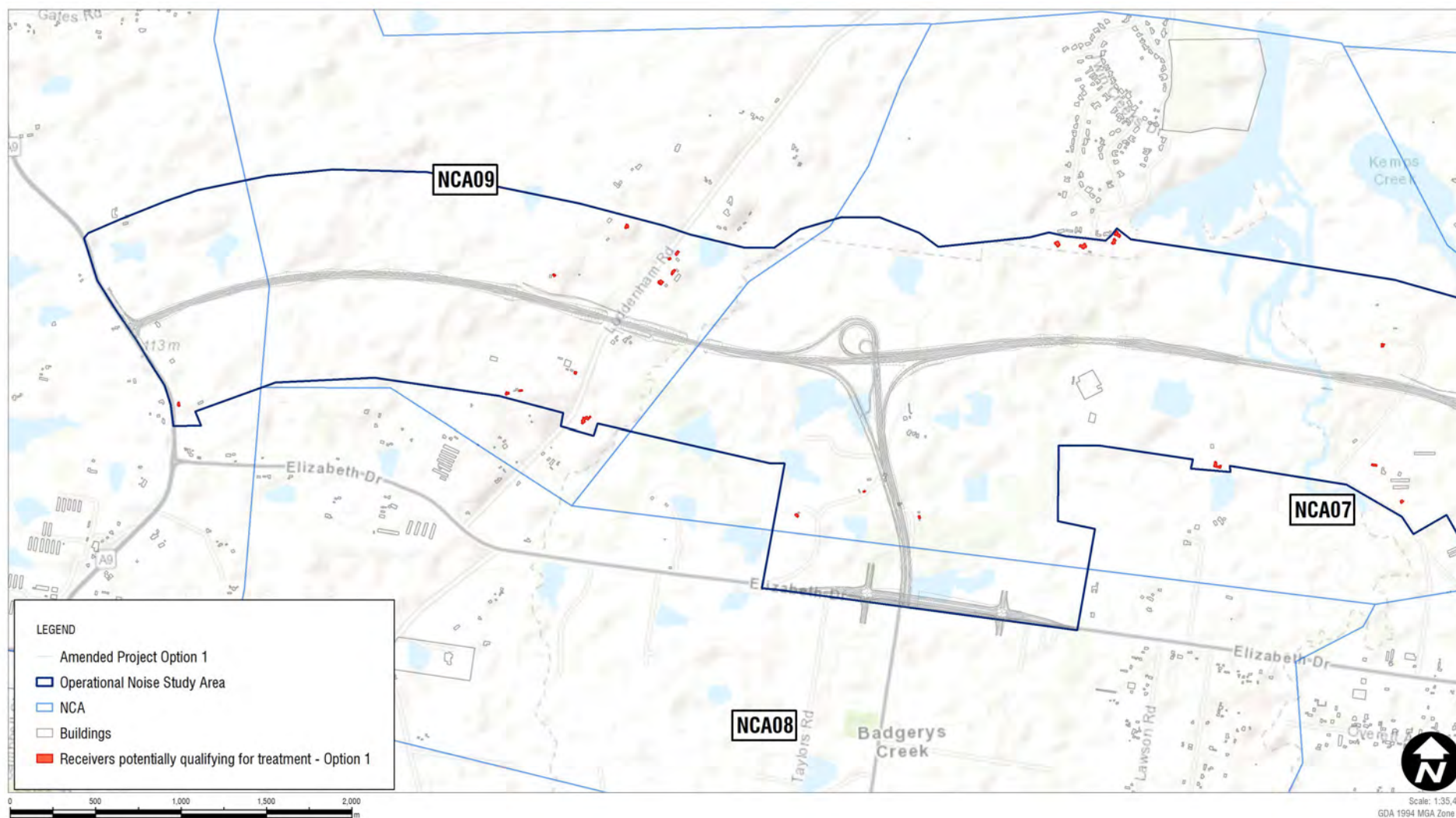
Note 1: The Relative Increase Criteria is included in the assessment of Trigger 1 and Trigger 2 as it adjusts the RNP base criteria for each receiver where existing road traffic noise levels are more than 12 dB below the RNP criteria.

Note 2: The total number of triggers may be lower than the sum of each type of trigger as individual receivers can trigger multiple types.

### Sensitivity analysis

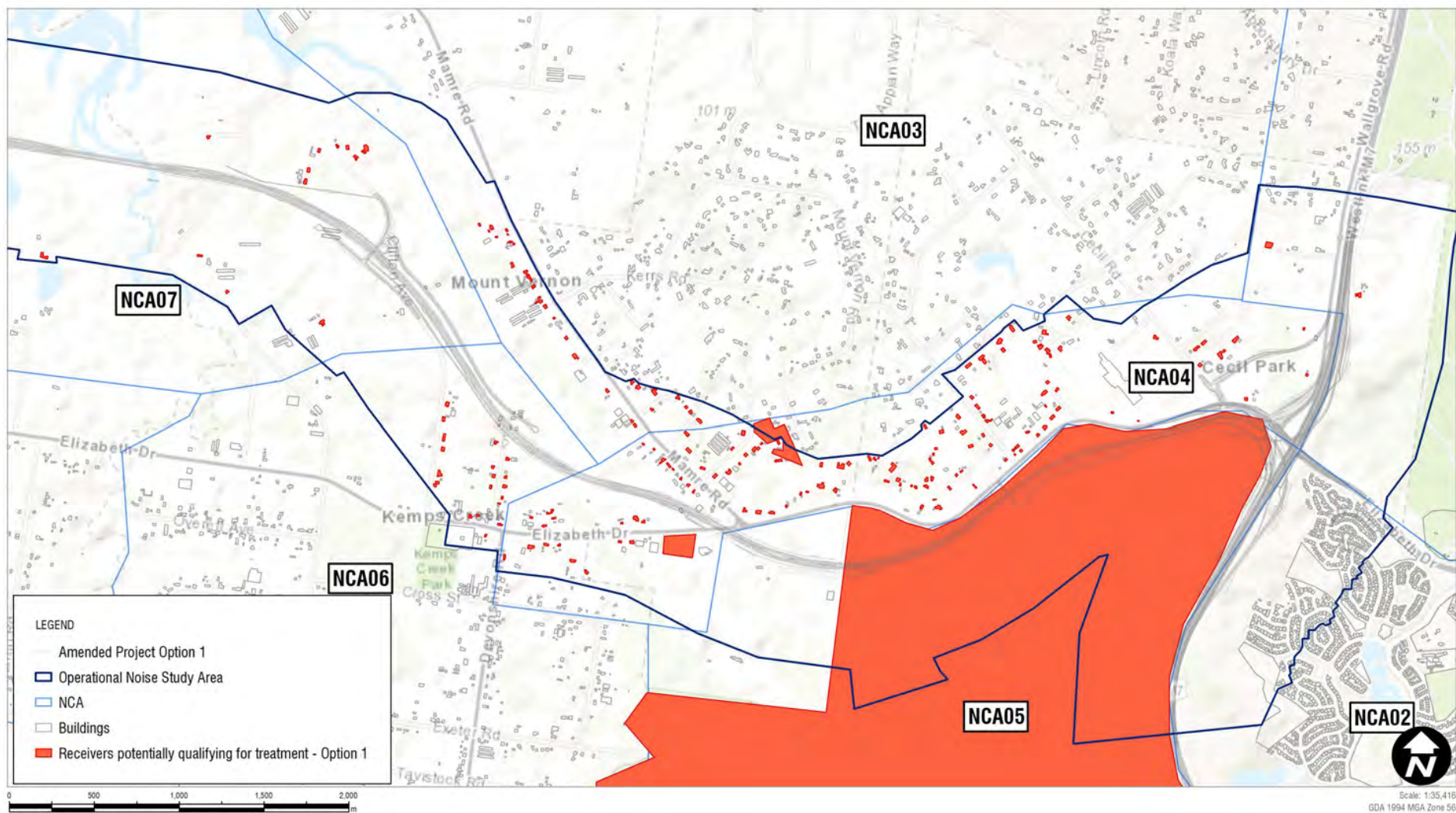
Modelling indicated that an additional 12 receivers for option 1 and 10 receivers for option 2 (decrease from 15 receivers described in the EIS) would be eligible for consideration of property treatment if a +1 dBA correction were to be added to the noise model predictions. Under both option 1 and option 2, a reduction of nine receivers (decrease from 19 receivers described in the EIS) would be apparent if 1 dBA was subtracted from the noise model predictions.



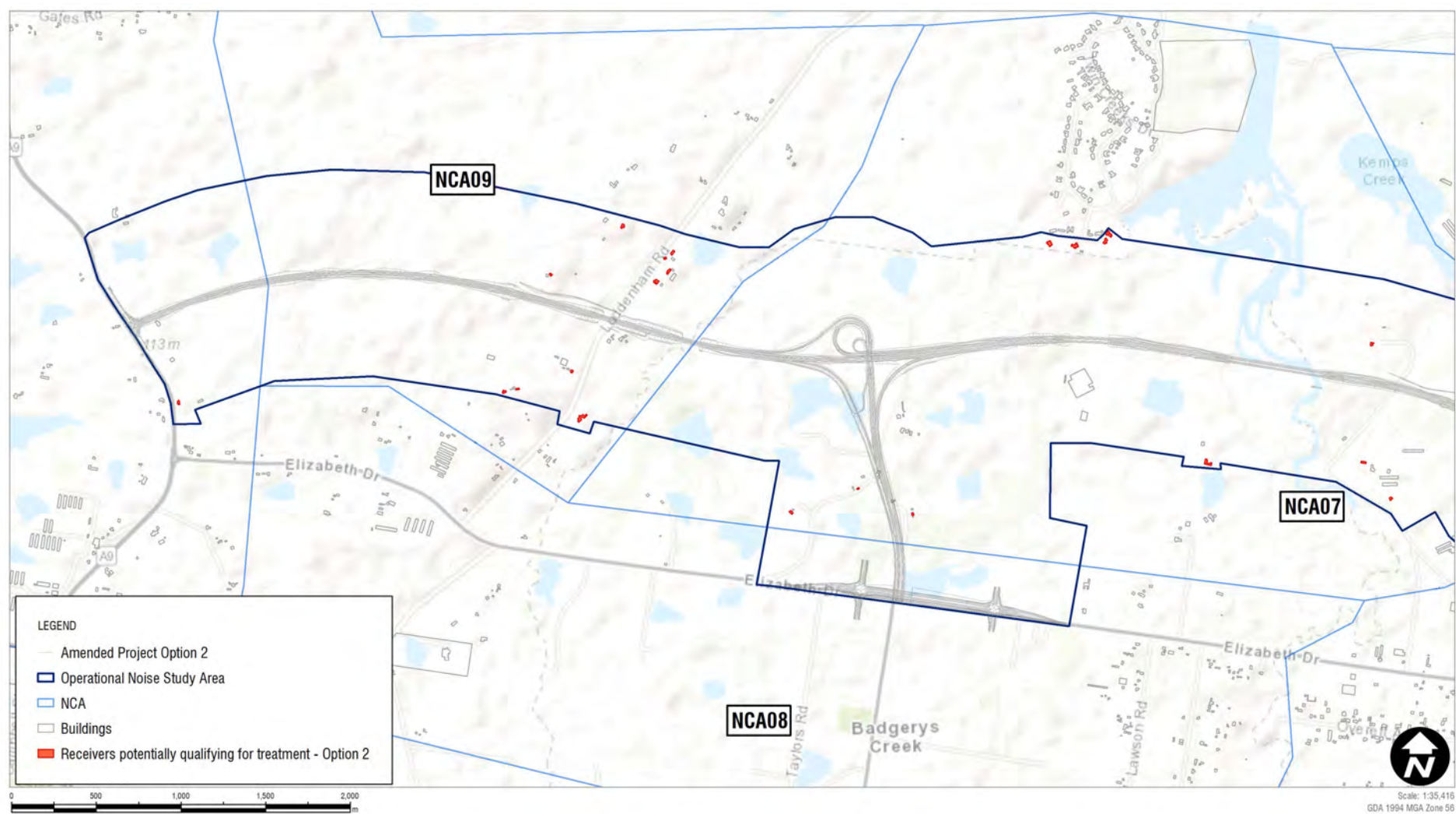


**Figure 6-46** Receivers identified as eligible for consideration of additional mitigation – option 1



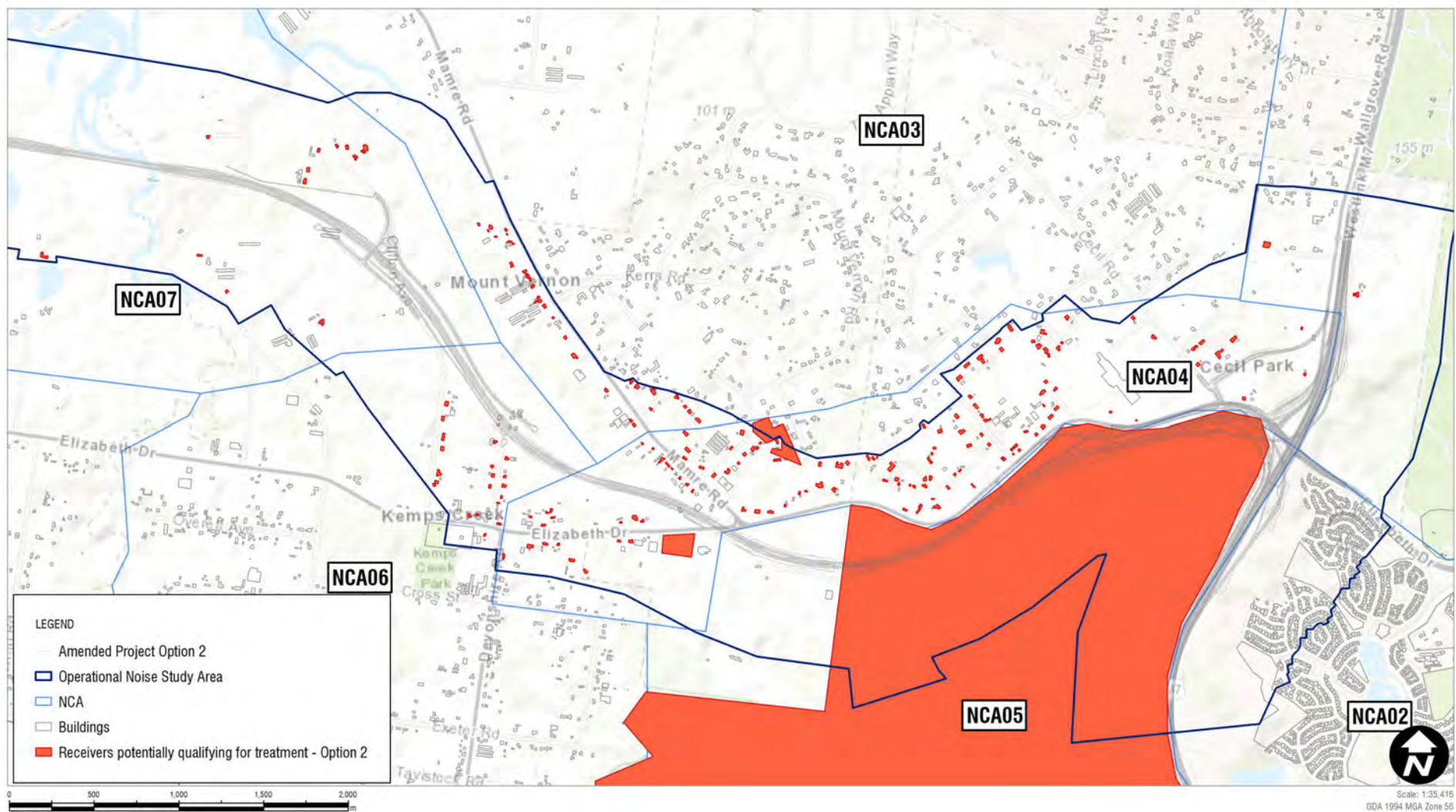


**Figure 6-46** Receivers identified as eligible for consideration of additional mitigation – option 1



**Figure 6-47** Receivers identified as eligible for consideration of additional mitigation – option 2





**Figure 6-47** Receivers identified as eligible for consideration of additional mitigation – option 2



#### **6.7.4.3 Maximum noise level assessment**

Maximum noise levels resulting from amended project would be generally consistent with those described in Section 7.7.7 of the EIS.

However, maximum noise levels are predicted to increase by up to 15 dB at dwellings adjacent to the realigned Wallgrove Road in NCA04, compared to up to eight dB at these receivers in the EIS. This is due to the realigned Wallgrove Road moving closer to the dwellings in the amended project than the project as described in the EIS.

Some of the receivers identified in the assessment may be eligible for consideration of additional noise mitigation based on the predicted  $L_{Aeq}$  road traffic noise levels. While receivers are not triggered for consideration of additional noise mitigation by maximum noise levels alone, selection of feasible and reasonable mitigation measures during the detailed design stage would take the change in maximum noise levels into consideration where a receiver qualifies for consideration of additional mitigation

A full breakdown of the highest predicted change in maximum noise level for option 1 and option 2 is described in Table 6-5 of **Appendix G**.

#### **6.7.4.4 Cumulative and consecutive impacts**

The amended operational footprint has not substantially changed in the vicinity of recently completed, ongoing and proposed projects. As a result, the cumulative and consecutive construction noise impacts associated with the amended project would be likely to remain unchanged from the assessment carried out as per Section 7.7.8 and Section 7.7.9 of the EIS.

### **6.7.5 Environmental management measures**

Noise and vibration impacts associated with the amended project are generally consistent with impacts described in the EIS and would therefore be managed through the implementation of the proposed management measures described in Section 7.7.9 of the EIS. Where management measures differ from those listed in the EIS, these are described in the sections below.

#### **6.7.5.1 Operational noise mitigation management measures**

Road traffic noise levels would be reduced to meet the NCG noise criteria through the use of feasible and reasonable mitigation. An assessment of operational mitigation measures in **Appendix G** forms a preliminary feasible and reasonable assessment to inform the detailed design stage of the project. A summary of the preliminary assessment for pavement selection, noise barriers and architectural treatment is provided below.

A preferred noise mitigation option (low noise pavement, noise barriers, architectural treatments, or a combination of these) will be determined during detailed design taking into account whole-of-life engineering considerations and the overall social, economic and environmental benefits. The preference will be given to noise mitigation measures that reduce outdoor noise levels and the overall number of at-property treatments.

## At-source mitigation – Pavement

To investigate the potential benefit that quieter road surfaces could provide to the amended project the following scenarios have been assessed:

- Dense graded asphalt (DGA) on the main carriageway and bridges/ramps (with a +0 dB surface correction)
- Open graded asphalt (OGA) on the main carriageway (with a -2 dB surface correction) and DGA on the bridges/ramps.

Quieter pavements are predicted to reduce the number of triggered buildings:

- For option 1 (without Elizabeth Drive connections), DGA results in a total of 203 triggered buildings (a decrease of nine buildings from the project as described in the EIS) and OGA results in a total of 188 triggered buildings (decrease of 24 buildings from the project as described in the EIS)
- For option 2 (with Elizabeth Drive connections), DGA results in a total of 212 triggered buildings (decrease of eight buildings from the project as described in the EIS) and OGA results in a total of 201 triggered buildings (decrease of 19 buildings from the project as described in the EIS).

The assessment noted that if diamond ground concrete surface were used for pavement, the reduction in triggered receivers would be comparable to the performance of DGA.

Overall, quieter noise pavements are predicted to provide a minor benefit to triggered receivers and would be considered in conjunction with other mitigation options during detailed design, subject to feasible and reasonable considerations.

## In-corridor mitigation – noise barriers

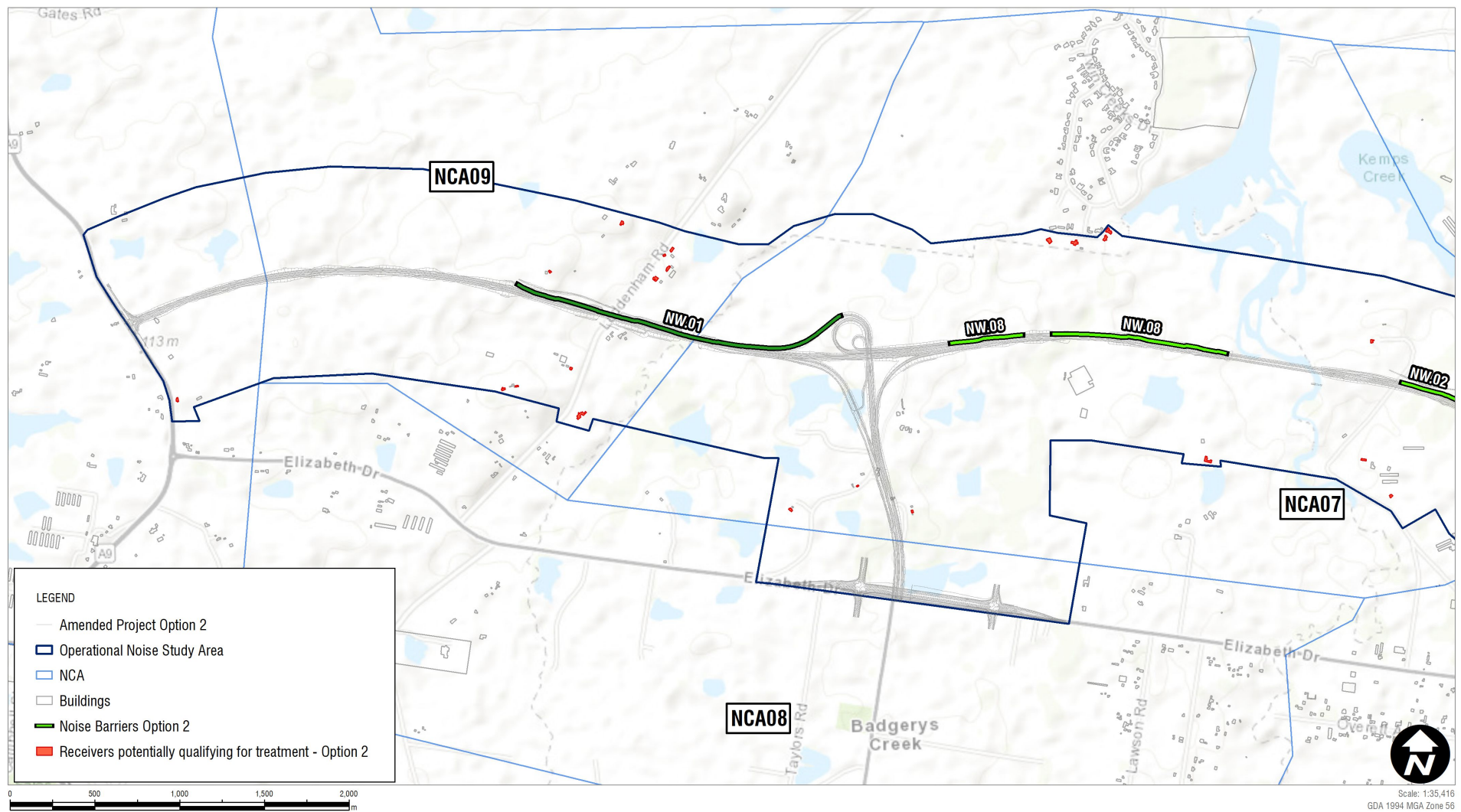
The process for considering the use of noise barriers is described in the NMG (Roads and Maritime 2015a) and would be considered where there are four or more closely spaced triggered receivers. As a guide, noise barriers are considered to be a reasonable noise mitigation option where they are capable of providing a noise attenuation benefit (referred to as an insertion loss) of:

- Five dBA at representative receivers for barrier heights of up to five metres
- Ten dBA at representative receivers for barrier heights above five metres high and up to eight metres high.

In certain situations, the requirements for the barrier cannot always be met. In this case, further feasible and reasonable assessment is undertaken to identify alternative noise mitigation options.

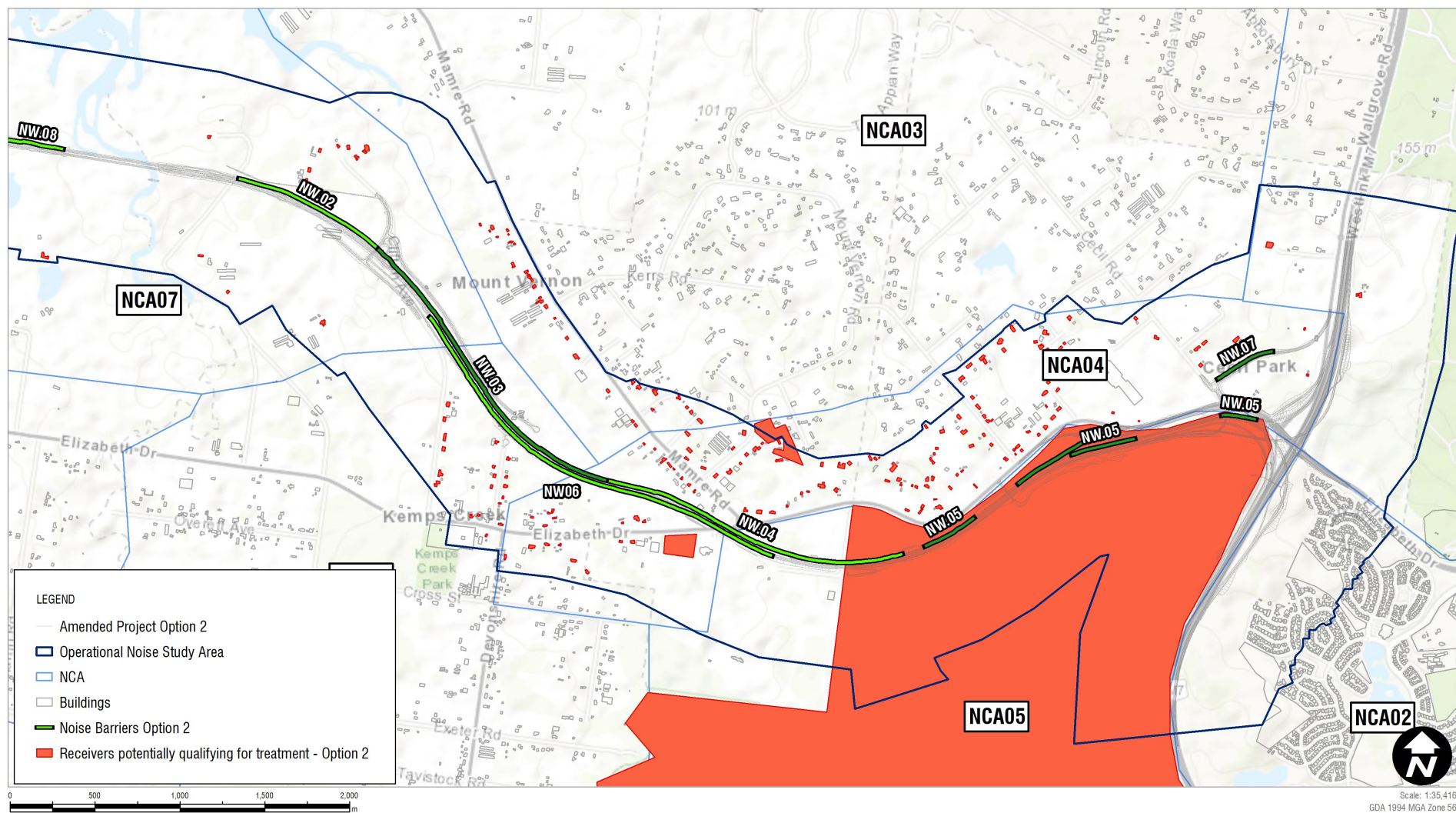
At this early stage in the amended project, the barrier analysis has used the predicted noise levels from the concrete road surface scenario, as this results in the highest road traffic noise levels and represents a worst-case assessment.

During the assessment of the EIS, several barrier arrangements were investigated throughout the alignment. Two additional barriers (NW.07 and NW.08) which were not investigated as part of the EIS that have been included in the amended design assessment due to either additional triggered receivers being identified as part of the amended assessment or, design changes as part the amended assessment which allows barriers in new locations to be considered. The assessment concluded that three noise barrier locations (NW.02, NW.03, NW.04) would be considered further in detailed design based on the predicted noise benefit. These are described in **Table 6-46** and the indicative locations for option 2 (with Elizabeth Drive connections) are shown in **Figure 6-48** as this is the worst case scenario.



**Figure 6-48** Potential noise barrier locations – option 2





**Figure 6-48** Potential noise barrier locations – option 2

Other design factors such as cost to benefit ratio, constructability, and overhead power line clearance may result in these barriers being considered unfeasible and/or unreasonable. The noise barriers identified as potentially reasonable will be considered in conjunction with other mitigation measures for their feasibility and reasonability during the detailed design stage of the amended project.

Table 6-46 Noise barrier arrangement in the EIS and amended project design

| EIS Barrier ID | Length (m) | Findings as per EIS                            | Corresponding amended project barrier (length m) |              | Location                                                                                                                          | Amended project findings                                                                                                                                       |
|----------------|------------|------------------------------------------------|--------------------------------------------------|--------------|-----------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                |            |                                                | Option 1                                         | Option 2     |                                                                                                                                   |                                                                                                                                                                |
| NW.01          | 2019       | Not found to be reasonable                     | NW.01 (2018)                                     | NW.01 (2018) | Along the northern boundary of the amended project west of Luddenham Road to the Western Sydney International Airport interchange | Not found to be reasonable as it does not achieve the principles of the NMG                                                                                    |
| NW.02          | 923        | Referred to detailed design at a height of 5 m | NW.02 (914)                                      | NW.02 (914)  | Along the northern boundary of the amended project, east of South Creek to Clifton Avenue overbridge                              | Referred to detailed design for further reasonable and feasible assessment at a height of 5 m (option 1) and 5.5 m (option 2)                                  |
| NW.03          | 1978       | Referred to detailed design at a height of 5 m | NW.03 (1978)                                     | NW.03 (1978) | Along the northern boundary of the amended project, from Clifton Avenue overbridge to Kemps Creek                                 | Referred to detailed design for further reasonable and feasible assessment at a height of 5 m (option 1) and 6 m (option 2)                                    |
| NW.04          | 1907       | Referred to detailed design at a height of 7 m | NW.04 (2170)                                     | NW.04 (2170) | Along the northern boundary of the amended project, from Kemps Creek to Western Sydney Parklands                                  | Referred to detailed design for further feasible and reasonable assessment at a height of 8 m (both options). Consideration would be given for a lower height. |
| NW.05          | 809        | Not found to be reasonable                     | NW.05 (961)                                      | NW.05 (1331) | Along the northern boundary of the amended project, within the Western Sydney Parklands                                           | Not found to be reasonable as it does not achieve the principles of the NMG.                                                                                   |

| EIS Barrier ID | Length (m) | Findings as per EIS                            | Corresponding amended project barrier (length m) |              | Location                                                                                                                         | Amended project findings                                                     |
|----------------|------------|------------------------------------------------|--------------------------------------------------|--------------|----------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------|
|                |            |                                                | Option 1                                         | Option 2     |                                                                                                                                  |                                                                              |
| NW.06          | 2552       | Referred to detailed design at a height of 5 m | NW.06 (2552)                                     | NW.06 (2552) | Along the southern boundary of the amended project, between Clifton Avenue overbridge and Elizabeth Drive                        | Not found to be reasonable as it does not achieve the principles of the NMG. |
| -              |            |                                                | NW.07 (365)                                      | NW.07 (365)  | Along the northern boundary of the realigned Wallgrove Road, extending 360 m from Cecil Road                                     | Not found to be reasonable as it does not achieve the principles of the NMG. |
|                |            |                                                | NW.08 (1466)                                     | NW.08 (1466) | Along the northern boundary of the amended project, east of the interchange with the future Western Sydney International Airport | Not found to be reasonable as it does not achieve the principles of the NMG. |

Where a barrier has been identified as being referred to detailed design for further reasonable and feasible assessment, this will be done in accordance with the NMG. A barrier's feasibility can include engineering considerations, such as road corridor site constraints, maintenance access requirements, and wind loading and ground conditions. The consideration of what is considered reasonable in the NMG typically means looking at cost and equity considerations. There is no set monetary limit for noise mitigation but the NMG provides guiding principles to gauge whether costs are reasonable and equitable.

In addition, the community perspective and opinion must be considered.

The key areas which would be further evaluated for each barrier identified as requiring further consideration are as follows:

- Barrier NW.02 – The noise barrier removes triggered receivers at various heights and provides a five dB insertion loss to at least one receiver.
  - Lowering barrier height to 3.5 metres
    - Would still provide a five dB insertion loss to at least one receiver and provides a two dB insertion loss at the majority of receivers
    - Would still require between eight (option 1) and 11 (option 2) of the 12 triggered receivers to be considered for at property treatments
    - Would still provide an external amenity benefit



- Shortening barrier length
  - Would provide at least five dB insertion loss to the receivers located within 100 metres of the barrier and a two dB benefit to the second cluster of receivers situated approximately 400 metres from the barrier
- Other factors which may influence the barrier design, such as future development and interconnectivity with other projects.
- Barrier NW.03 –The noise barrier removes triggered receivers at various heights and provides a five dB insertion loss to at least one receiver
  - Lowering barrier height
    - A five metre noise barrier would still require between 27 (option 1) and 31 (option 2) of the 36 triggered receivers to be considered for at property treatments
  - Other factors which may influence the barrier design such as future development and interconnectivity with other projects would also be further evaluated during detailed design.
- Barrier NW.04 –The noise barrier only removes one triggered receiver at a height of eight metres
  - Lowering barrier height
    - A barrier at lower height of four metres would still provide a five dB insertion loss to at least one receiver and provides a two dB insertion loss at the majority of receivers
    - Whilst the barrier would provide the required insertion loss for a barrier which is greater than five metres in height, the wider noise reduction provided to the community for each incremental height after four metres becomes less; as such, a lower height barrier would still provide an acceptable noise reduction (benefit) to the wider community
  - Constructability of the proposed noise barrier, including clearance to transmission powerlines, must be considered when evaluating the feasibility of the noise barriers length.

#### At-property – architectural treatment

As described in **Section 6.7.4.2**, receivers have been identified as eligible for consideration of additional noise mitigation using guidance from the NMG (Roads and Maritime, 2015a). Architectural treatments provided by TfNSW, where feasible and reasonable, are typically limited to:

- Fresh air ventilation systems that meet the Building Code of Australia requirements with the windows and doors shut
- Upgraded windows and glazing and solid core doors on the exposed facades of the substantial structures only (eg masonry or insulated weather board cladding with sealed underfloor)
- Upgrading window or door seals and appropriately treating sub-floor ventilation
- The sealing of wall vents
- The sealing of the underfloor below the bearers and appropriately treating sub-floors ventilation
- Roof insulation
- The sealing of eaves.

## 6.8 Flooding

The flooding supplementary technical memorandum is provided in **Appendix H** and a summary is provided below. This section should be read in conjunction with Section 7.8 of the EIS and the flooding assessment report provided in Appendix L of the EIS.

### 6.8.1 Assessment methodology

The methodology for the supplementary flooding assessment is described in this section and involved the following:

- Review of flooding assessment carried out on the project as described in the EIS against the amended project
  - Confirm qualitatively the likely impact to the flooding conditions from the geometric design changes
- TUFLOW flood modelling of the amended project
  - With project conditions under 5 year, 20 year, 50 year and 100 year average recurrence interval (ARI) events and probable maximum flood (PMF) for the study area where change of impact is likely to occur (refer to first dot point above)
  - Modelling is described in detail in **Section 6.8.1.1**, below
- Update of flood immunity and hydraulic impact predictions for the amended project
- Identification of changes to the impacts documented in the EIS
- Identification of any updates to existing management measures presented in the EIS, or additional management measures required to address impacts resulting from the amended project.

#### 6.8.1.1 Modelling

The project as described in the EIS was assessed using both hydrological and hydraulic modelling. The hydrological characteristics of the catchments surrounding the project were described in Section 7.8 of the EIS. These would not change as a result of the amended project. As such, the supplementary assessment focused on the hydraulic analysis for the amended project using the TUFLOW modelling developed for the EIS. The approach as described in Section 7.8.2 of the EIS was adopted to undertake the hydraulic supplementary assessment.

The outputs from the EIS flood model and the amended project flood model were compared to identify any additional impacts. The comparison of hydraulic assessment outputs included flood levels, flood depth, flood velocities and afflux. This review identified one area where the amended project would result in a noticeable change to the flooding results for the project as described in the EIS.

The change would occur at Badgerys Creek in the area of Elizabeth Drive to the north of the Western Sydney International Airport. The other changes were found to be minimal and/or contained within the amended project construction and operational footprints.

Other flooding impacts anticipated to result from the amended project are considered to be consistent with those described in the EIS and have therefore not been discussed further.

### 6.8.1.2 Study area

The study area as described in Section 7.8.2 of the EIS covered five key areas where the project would influence, or be influenced by, flooding including:

- Cosgroves Creek
- Badgerys Creek
  - The EIS flood model only included the area where the main M12 Motorway carriageway would intersect the creek
  - The area where Elizabeth Drive crosses Badgerys Creek was not included in the EIS flood model
- South Creek
- Kemps Creek
- The minor waterway next to Luddenham Road that would be bridged by the project.

The amended project would extend further into the Badgerys Creek floodplain than the project as described in the EIS. The study area has therefore been extended east into the Badgerys Creek floodplain in the vicinity of Elizabeth Drive to assess any potential flood impact as a result of the amended project (see **Figure 6-49**).

## 6.8.2 Existing flooding conditions

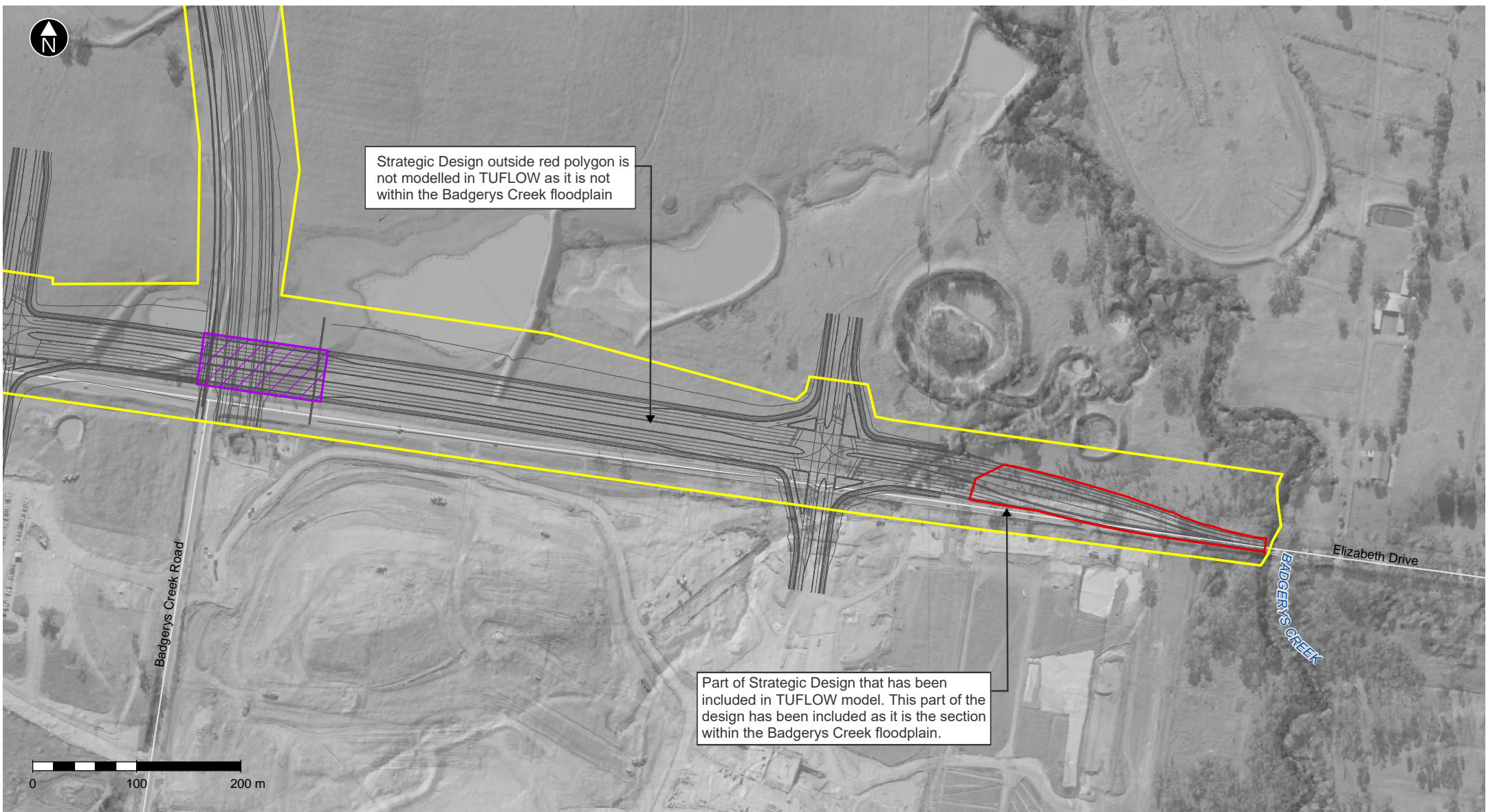
Section 7.8.3 of the EIS provides a detailed description of the existing flooding conditions of the EIS study area, which are shown in Attachment A of **Appendix H**.

The supplementary assessment has focused on the existing environment of the additional project area at Badgerys Creek in the vicinity of Elizabeth Drive, to the north of the Western Sydney International Airport. At this location, Elizabeth Drive currently bridges over Badgerys Creek. The creek flows south-to-north under Elizabeth Drive and then pass under the main M12 Motorway carriageway at the proposed bridge (Bridge 05) as shown in **Figure 3-2** further north before joining South Creek. West of the Elizabeth Drive bridge over Badgerys Creek, there is a tributary to Badgerys Creek that crosses Elizabeth Drive via a box culvert.

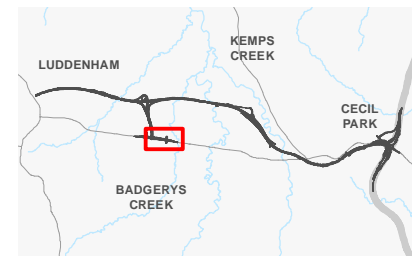
Upstream of Elizabeth Drive (south of the road) the combined Badgerys Creek and tributary floodplains flow overland towards Elizabeth Drive. Under existing conditions, Elizabeth Drive is shown to be inundated in events smaller than the 20 year ARI flood event. The floodwaters in the floodplain of the tributary and Badgerys Creek overtop an existing low point in the road.

The draft for public exhibition Floodplain Risk Management Study and Plan for South Creek (Penrith City Council, September 2019), also indicates overtopping of the road in the 20 year ARI flood event (five per cent annual exceedance probability (AEP) flood).





- The amended project
- The amended project operational footprint
- ▨ Bridge
- ▭ Extent of the amended project modelled in TUFLOW



**Figure 6-49** Amended study area (TUFLOW Modelling Area)

## 6.8.3 Assessment of potential impacts

### 6.8.3.1 Construction impacts

Section 7.8.4 of the EIS identified a number of flooding impacts that may occur during construction. This section focuses on the additional impacts that are likely to occur as a result of the amended project when compared to the project described in the EIS. These impacts include:

- Earthworks
- Stockpile and ancillary facilities.

These impacts are discussed in the following sections.

The EIS also identifies impacts associated with temporary creek crossings. Temporary creek crossings would not change, however, from those described in the EIS. As a result, no change to flood conditions is anticipated as a result of temporary creek crossings.

#### Earthworks

The fill associated with the construction of the amended project would be 3,322,000 cubic metres. This is a decrease of 267,000 cubic metres from the 3,589,000 cubic metres that would be required for the project as described in the EIS. Flow constriction and loss of storage would be similar to the effects described in the EIS.

#### Stockpile and ancillary facilities

To support the construction of the amended project, nine additional construction ancillary facilities (AF 10 to AF 18) and an expanded AF 9 would be required. Six of the additional proposed ancillary facilities (AF 11 to AF 16) would be located outside of the major floodplains to avoid or minimise impacts from the project earthworks on flow behaviour in the floodplains. Three of the additional proposed ancillary facilities (AF 10, AF 17 and AF 18) and expanded AF 9 would be located near The Northern Road catchment in the west and Ropes Creek Catchment in the east.

Potential flood impacts of these ancillary facilities are as follows:

- A small portion of expanded AF 9 would be located within the medium risk flood precinct which is below the 100 year flood level but is not subject to a high hydraulic hazard as per the Ropes Creek Flood Planning Map (Fairfield City Council, 2014). The impact from the expanded AF 9 on the 100 year flood conditions is likely to be minimal.
- AF 17 and AF 18 would be located within the low flood risk precinct which is within the PMF extent but above the 100 year flood level as per Fairfield City Council (2014). This would not be impacted by a 100 year flood.
- AF 10 is located about 1500 metres from Blaxland Creek, the closest significant waterway. As a result, negligible impact on the main creek floodplains is expected.

These construction impacts would be managed through the implementation of the environmental management measures outlined in Section 7.8.6 of the EIS.

### 6.8.3.2 Operational impacts

Section 7.8.4 of the EIS identified a number of flooding impacts during operation. This section focuses on the additional impacts that are likely to occur as a result of the amended project when compared to the project as described in the EIS.

Operational impacts would not change as a result of the amended project, with the exception of the area of Badgerys Creek at Elizabeth Drive north of the Western Sydney International Airport. The potential impacts in this area would include:

- Increases in flood affectation
- Changes to peak stormwater flows, downstream velocity and scour potential
- Flood hazards
- Climate change.

These impacts are discussed in the following sections.

A number of other impacts would be consistent with the EIS. These include:

- Land use impact
- Impacts on buildings and inundation durations
- Changes in surrounding catchments
- Farm dams
- Hydraulic functions of flow conveyance
- Adverse effects to beneficial floodplain inundation
- Emergency management, evacuation and access
- Social and economic costs.

These impacts are consistent as the amended project is not anticipated to have any design features that would result in increased flooding impacts associated with these issues. These impacts have therefore not been discussed further.

### Increases in flood affectation

Elizabeth Drive would be raised from the existing road surface level and the road widened as part of the amended project. Floodwaters would build up upstream of the road (to the south) before the road is overtopped. This would cause an increase in flood levels on the upstream side of the road of about 50 millimetres in the Badgerys Creek floodplain area in the 100 year ARI event.

The maximum predicted flood level in Badgerys Creek channel upstream of the existing bridge would increase by about 75 millimetres due to the amended project. Downstream of Elizabeth Drive (to the north) a decrease in flood levels of up to 25 millimetres is predicted due to the reduced overtopping of the road.

The area in the vicinity of the Badgerys Creek floodplain at Elizabeth Drive is currently agricultural land use. A 250 millimetre threshold was adopted in the EIS as a flood impact objective for this land use type. The predicted afflux from the assessment of the amended project is within the flood impact objective in the 100 year ARI flood event. The increases in flood affectation for the amended project, as compared to the existing conditions, are shown in **Table 6-47**.



Table 6-47 Elizabeth Drive increases in flood affectation and flood immunity

| Flood affectation                                                                                             | Existing conditions                                                                            | Amended Project                                                                                                                                         |
|---------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
| Flood level upstream of existing bridge (100 year ARI)                                                        | 46.55 m AHD                                                                                    | 46.63 m AHD                                                                                                                                             |
| Flood level in floodplain (100 year ARI)                                                                      | 46.82 m AHD                                                                                    | 46.87 m AHD                                                                                                                                             |
| Afflux – Badgerys Creek (100 year ARI)                                                                        | N/A                                                                                            | + 75 mm                                                                                                                                                 |
| Afflux – Badgerys Creek floodplain (100 year ARI)                                                             | N/A                                                                                            | + 50 mm                                                                                                                                                 |
| Afflux – downstream of Elizabeth Drive (100 year ARI)                                                         | N/A                                                                                            | - 25 mm                                                                                                                                                 |
| Flood immunity at area of Badgerys Creek at Elizabeth Drive north of the Western Sydney International Airport | 5 year ARI flood immunity Overtopped in the 20 year ARI event by about 295 mm over road crown. | 5 year ARI flood immunity Overtopped in the 20 year ARI event by about 160 mm over road crown and depths of up to 350 mm on the west-bound carriageway. |

### Changes to peak stormwater flows, downstream velocity and scour potential

Under the amended project, velocities in the creek channel would remain in the order of 1.5 metres per second to 2.3 metres per second and increase by a maximum of 0.1 metres per second in the 100 year ARI flood event compared to the existing conditions. In the floodplain, velocities would remain in the order of 0.1 to 0.8 metres per second and increase by a maximum of 0.1 metres per second in the 100 year ARI flood event. The changes to velocity for the amended project, as compared to existing conditions are shown in **Table 6-48**.

Given the change in peak flows and velocity is negligible, there would no expected increase in scour potential.

Table 6-48 Elizabeth Drive changes to velocity

| Flood affectation                                                            | Existing conditions (metres per second) | Amended Project (metres per second) |
|------------------------------------------------------------------------------|-----------------------------------------|-------------------------------------|
| Velocity at existing bridge (100 year ARI)                                   | 2.2                                     | 2.3                                 |
| Velocity in upstream floodplain (adjacent to road embankment) (100 year ARI) | 0.7                                     | 0.8                                 |

## Flood hazards

The existing Elizabeth Drive at Badgerys Creek north of the Western Sydney International Airport has a flood immunity up to and including the 5 year ARI flood event. It is overtopped on the 20 year ARI event under the existing scenario with 295 millimetres of flood depth above the crown of the road.

During operation of the amended project, Elizabeth Drive would have a flood immunity up to and including the 5 year ARI flood event. It would be overtopped in the 20 year ARI event with a flood depth of about 160 millimetres above the crown of the road and depths of up to 350 millimetres on the west-bound carriageway.

There would be no substantial change to the flood immunity at Elizabeth Drive north of the Western Sydney International Airport as a result of the amended project.

## Climate change

The project as described in the EIS would be well above the 2000 year ARI (equivalent to 0.05 per cent AEP) flood levels and the impacts of climate change would have minimal impact on flooding due to the project. However, modelling of the amended project indicates that the section of the amended project along Elizabeth Drive around the Western Sydney International Airport, would be overtopped during both the 100 year ARI and the 2000 year ARI flood events. The depth of overtopping would increase by about 220 millimetres in a 2000 year ARI event compared to the 100 year ARI event. Elizabeth Drive would be overtopped both for existing conditions and, if the amended project is approved and constructed, in smaller floods than the 20 year ARI flood.

The impacts of climate change may result in an increased frequency of flooding events and the overtopping of Elizabeth Drive. As such, the road may become overtopped in smaller magnitude flood events or inundated for longer periods of time. However, the impact of climate change is not likely to substantially alter the traffic conditions of the road compared to the existing conditions when in flood, given the flood modelling undertaken for the amended project (see Annexure A of **Appendix H**).

### 6.8.3.3 Cumulative impacts

The cumulative flooding impacts would likely remain consistent with the qualitative assessment undertaken as part of the EIS and presented in Section 7.8.5 of the EIS.

For Badgerys Creek at Elizabeth Drive north of the Western Sydney International Airport an assumption has been made that the Western Sydney International Airport would have adequate on-site measures to mitigate any impacts outside the airport site boundary. As further details of Western Sydney Internal Airport's flood management and earthworks are developed, these will be incorporated into an updated M12 Motorway flood model for the detailed design phase of the project.

## 6.8.4 Environmental management measures

Flooding impacts associated with the amended project are generally consistent with impacts described in the EIS and can be managed through the implementation of the proposed management measures described in Section 7.8.6 of the EIS.

However, further flood investigations and hydrological and hydraulic modelling will be required during the detailed design stage to ensure the flood impact criteria for the amended project are met. This is already addressed in the existing environmental management measure F01. The refined modelling would be adopted to define the nature of Badgerys Creek mainstream flooding and

tributary flooding at the area where Elizabeth Drive crosses the Badgerys Creek floodplain. Two additional environmental management measures would also be required for the amended project as shown in **Table 6-49**.

Table 6-49 Revised environmental management measures (flooding)

| Impact                                          | Reference  | Environmental management measure                                                                                                                                                                                                                                                           | Responsibility            | Timing                                  |
|-------------------------------------------------|------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|-----------------------------------------|
| <b>Flooding impacts of bridges and culverts</b> | <b>F07</b> | <b>During the detailed design phase, TfNSW will seek to refine the design of the works at Elizabeth Drive near Badgerys Creek to minimise flood affectation. Mitigation measures may include adjustment of road levels and/or flood relief culverts through the road.</b>                  | <b>TfNSW / Contractor</b> | <b>Detailed design</b>                  |
| <b>Consultation regarding flooding impacts</b>  | <b>F10</b> | <b>Ongoing consultation will be carried out with Western Sydney International Airport and as further details of their flood management and earthworks are developed, these will be incorporated into an updated M12 Motorway flood model for the detailed design phase of the project.</b> | <b>TfNSW / Contractor</b> | <b>Prior to and during construction</b> |



## 6.9 Surface water quality and hydrology

The surface water quality and hydrology supplementary technical memorandum is provided in **Appendix I**, and a summary is provided below. This section should be read in conjunction with Section 7.9 of the EIS and the surface water quality and hydrology assessment report provided in Appendix M of the EIS.

### 6.9.1 Assessment methodology

This surface water quality and hydrology supplementary assessment focused on the changes in potential impacts associated with the proposed changes to the project, which include design changes and construction updates (see **Chapter 3** and **Chapter 4**).

The methodology included:

- A desktop review, including:
  - A review of the proposed changes associated with the amended project compared to the project as described in the EIS, as they relate to surface water quality, hydrology, geomorphology, environmental water availability and water quality objectives
  - A review of and confirmation of the sensitive receiving environments crossed by and adjacent to the amended project
  - A review of the environmental management measures and other treatment or monitoring measures proposed for the project as described in the EIS
- Assessment of the impact of construction and operation activities of the amended project on water quality and hydrology, including:
  - An assessment of changes to catchment characteristics
  - An update of the hydrological model in DRAINS that was used for the project as described in the EIS
  - Assessment of flows and identification of locations of potential adverse impacts
- Identification of appropriate measures to mitigate the potential impacts that would need to be updated or added, including water quality controls and monitoring requirements
  - Update of the MUSIC model used for the project as described in the EIS to determine amended proposed permanent operational quality basin sizes.

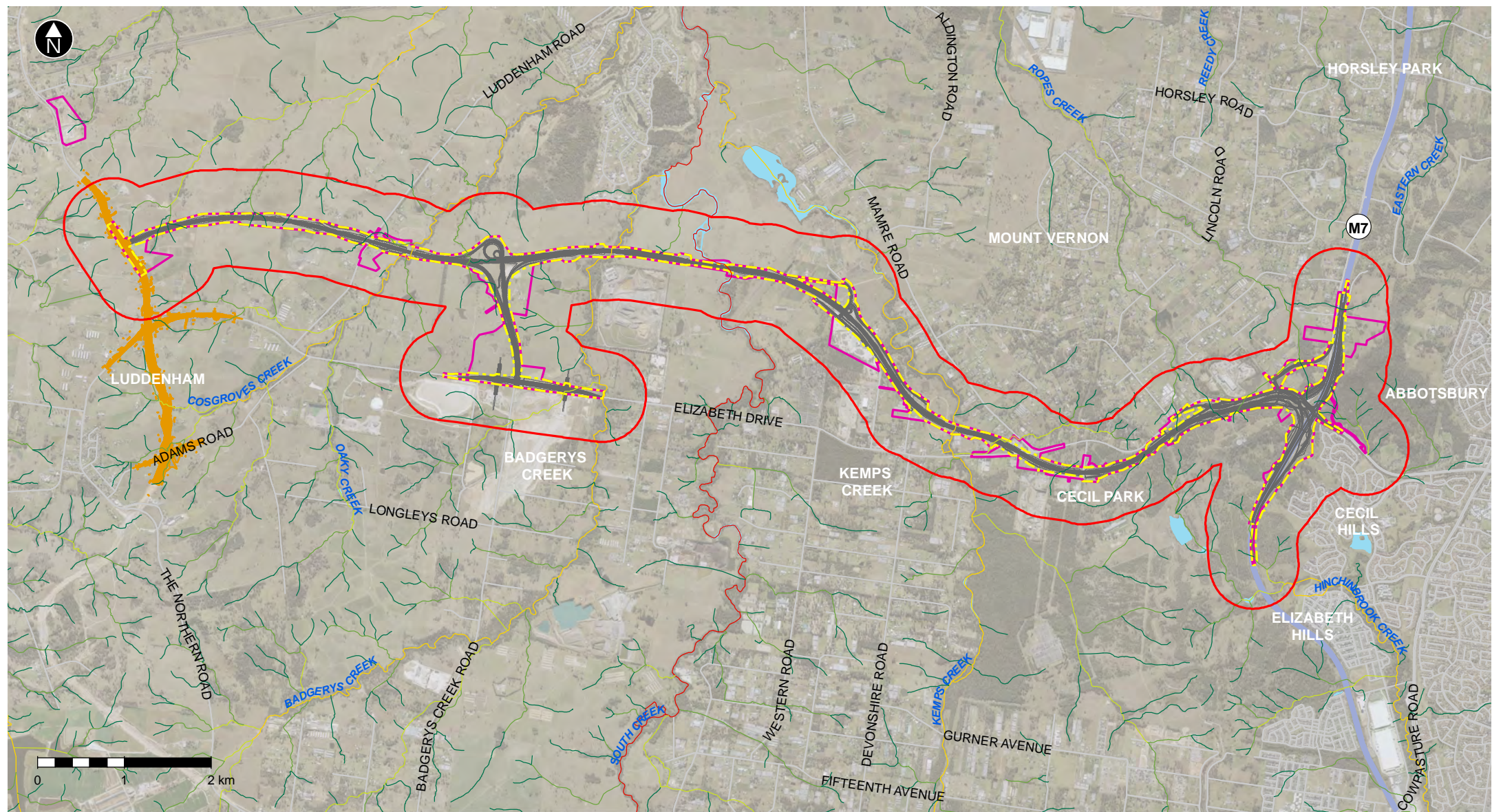
The study area was updated for the supplementary assessment to include the construction and operational footprints, and a 500 metre buffer surrounding the road alignment for the amended project (see **Figure 6-50**).

Water quality criteria used for the amended project is largely consistent with that used for the project as described in the EIS. An additional guideline was used for the supplementary assessment, however. The amended project was prepared in accordance with the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZG) (2018) guidelines. These have been updated from the ANZECC/ARMCANZ 2000 guidelines that were used in the assessment of the project as described in the EIS. Section 2 of **Appendix I** provides a summary of these guidelines.

### 6.9.2 Existing environment

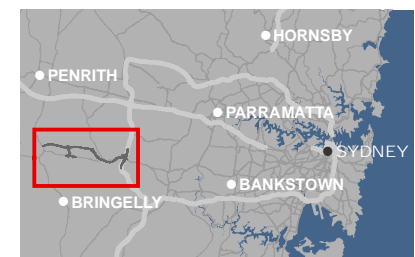
The existing environment described in Section 7.9.3 of the EIS is still applicable to the amended project. Additional surface water quality data has been collected, however, for all key watercourses, including Ropes Creek, since the preparation of the EIS. This new data is summarised below.





- The amended project
- Part of The Northern Road upgrade project
- The amended project construction footprint
- - - The amended project operational footprint
- Surface water and hydrology study area

- |            |                       |   |
|------------|-----------------------|---|
| Waterways  | Strahler Stream Order | 3 |
| Motorway   | 1                     | 4 |
| Main roads | 2                     | 6 |



**Figure 6-50** Study area for the supplementary surface water quality and hydrology assessment



As identified in the EIS, the key watercourses (and the tributaries) within the study area are Cosgrove Creek, Badgerys Creek, Kemps Creek, South Creek, Ropes Creek and Hinchinbrook Creek. Water quality data was available for all creeks during the assessment of the project as described in the EIS, with the exception of Ropes Creek.

Monitoring upstream and downstream of the named waterways has continued during the preparation and submission of the EIS. Monthly monitoring has occurred between April and September 2019 and will continue until construction commences. The resulting data confirms that the creeks continue to exhibit very poor water quality due to elevated nutrients and metals (particularly arsenic, copper and zinc) (GHD 2019). Additionally, pesticides have been detected infrequently at Badgerys Creek, South Creek and Kemps Creek, and, on a single occasion, at Ropes Creek and Hinchinbrook Creek.

Monthly water quality monitoring of Ropes Creek, both upstream and downstream of the project, was completed by GHD between April and September 2019. Monitoring data shows that water quality during this time was poor with frequent exceedances of the nominated guideline values. The water quality of Ropes Creek is reflective of a waterway with limited flow that drains into a catchment that has been significantly altered from its natural state. The catchment is a combination of agricultural and urban land uses with much of the vegetation removed. The creek is also currently traversed by the M7 Motorway at Cecil Hills, along with other road and rail assets (GHD, 2019).

## 6.9.3 Assessment of potential impacts

### 6.9.3.1 Construction

Section 7.9.3 of the EIS identified a number of surface water quality and hydrology impacts that may occur during construction of the project. This section focuses on the additional impacts that are likely to occur as a result of the amended project when compared to the project described in the EIS. These impacts include:

- Surface water quality
- Water balance.

A number of other impacts may occur that would be consistent with those assessed for the project as described in the EIS. These include:

- Impacts to SEPP Coastal Wetlands
- Construction discharges
- Erosion and sedimentation
- Hydrology and geomorphology
- Environmental water availability and flows
- Performance against NSW water quality objectives.

It was determined that the proposed construction updates for the amended project would not result in a substantial change to the nature of the impacts identified in the EIS. As a result, the assessments provided in Section 5.1 of the EIS still apply to these issues and they have therefore not been discussed further in this amendment report.

Impacts associated with surface water quality and water balance would be managed in accordance with the environmental management measures described in **Section 6.9.5** and **Chapter 7** and are discussed in the following sections.



## Surface water quality

The potential impacts to surface water quality associated with the amended project are presented in **Table 6-51**. **Table 6-51** only presents the impacts that are likely to change as a result of the amended project. A full list is provided in Table 5-1 of **Appendix I**. It is noted that the additional project bridges described in **Section 3.1** are not anticipated to result in potential surface water impacts, as these bridges do not extend over any waterways and would not require any creek adjustments or placement piles located in the vicinity of waterways.

## Water balance

A revised water balance for the amended project is summarised in **Table 6-50** and compared to the project as described in the EIS. All construction activities would result in an increase in both total and annual average water demand with the exception of potable water at main ancillary facilities. There is no change for this activity.

Table 6-50 Amended project water balance

| Construction activity                    | Total water demand (ML) |                 | Annual average water demand (ML) |                 |
|------------------------------------------|-------------------------|-----------------|----------------------------------|-----------------|
|                                          | Project as per EIS      | Amended project | Project as per EIS               | Amended project |
| Dust suppression                         | 270                     | 320             | 90                               | 106.67          |
| Earthworks compaction                    | 270                     | 320             | 90                               | 106.67          |
| Concrete pavements                       | 38                      | 46              | 12.6                             | 15.33           |
| Potable water at main ancillary facility | 10                      | 10              | 2.86                             | 2.86            |
| Potable water at (eight) outpost sites   | 16                      | 32              | 4.57                             | 9.14            |
| Concrete bridges                         | 63                      | 76              | 21                               | 25.33           |
| Wheel washing (nine sites)               | 9                       | 18              | 3                                | 6               |
| <b>Total</b>                             | <b>676</b>              | <b>822</b>      | <b>224</b>                       | <b>272</b>      |

The project as described in the EIS would have a maximum estimated annual groundwater inflow rate of 2.46 megalitres per year. For the amended project, due to two additional areas of potential groundwater inflow, the total estimated annual groundwater inflow rate is 7.96 megalitres per year. This would be 5.50 megalitres per year higher than the rate estimated for the project as described in the EIS.

A breakdown of the total modelled mean annual surface water runoff from the amended project is summarised in **Table 6-52**. While not documented in the EIS, the estimated surface water runoff for the amended project is considered to be very similar to that which would have occurred due to the EIS design.

Table 6-51 Potential construction impacts on surface water quality associated with the amended project

| Construction activity/source of pollutants                                                                                                                                                                                                                     | Pollutants of concern                                                            | Potential Impacts prior to the implementation of environmental management measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Receiving waterways                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>Earthworks, cuttings, stockpiling</b><br/>Erosion and exposure of sediments and contaminated soils from exposed areas open cuts and stockpiles due to wind and stormwater runoff leaving to sedimentation and contamination of downstream waterways.</p> | <p>Sediments, nutrients, hydrocarbons, metal contaminants, gross pollutants,</p> | <p>The amended project would potentially result in increased sedimentation due to more exposed areas at the new intersections connecting Elizabeth Drive with the Western Sydney International Airport, at the widened Ropes Creek bridge and at additional ancillary facilities. While the extent of impact is likely to increase, the nature of impacts would generally be consistent with those described in the EIS including:</p> <ul style="list-style-type: none"> <li>• Altered geomorphology of waterways which can smother and reduce biological productivity of aquatic systems through reduced light penetration, thereby decreasing available plant material for fish to feed on.</li> <li>• Increased nutrient levels in waterways which can lead to algal blooms. This reduces the environmental value of water by limiting its potential uses.</li> <li>• Greater turbidity levels which can reduce visual amenity.</li> </ul> | <p>As identified in the EIS, all waterways within the study area have the potential to be impacted by sedimentation. The following waterways, however, have an increased risk as a result of the amended project:</p> <ul style="list-style-type: none"> <li>• Badgerys Creek</li> <li>• Ropes Creek.</li> </ul> <p>Waterways within 50 metres downstream of an ancillary facility including unnamed first order tributaries of:</p> <ul style="list-style-type: none"> <li>• Badgerys Creek</li> <li>• Kemps Creek</li> <li>• Ropes Creek.</li> </ul> |

| Construction activity/source of pollutants                                                                                                                                                                                                                                                                                        | Pollutants of concern                                                                                                                     | Potential Impacts prior to the implementation of environmental management measures                                                                                                                                                                                                                                                                                                                                                                                                                                          | Receiving waterways                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Pollution – leakages and spills</b><br>Leakage or spills of petroleum, oils and other toxicants from construction machinery, plant equipment, refuelling and vehicles traveling to and from site. Spills and leakages could potentially be transported to downstream waterways                                                 | Hydrocarbons, oil and grease, hydraulic fluids, high pH, zinc and other hazardous chemicals.                                              | <p>Additional ancillary facilities and construction activities near waterways as part of the amended project would potentially increase the risk of leakages and spills. This would result in the following potential impacts:</p> <ul style="list-style-type: none"> <li>• Oily films on surface water reducing visual amenity</li> <li>• Decreased biodiversity, loss of habitat and fish kills from increased concentrations of toxicants</li> <li>• Increased alkalinity and pH impacting aquatic organisms.</li> </ul> | <p>All waterways within the study area have the potential to be impacted by leakages and spills. Waterways at a higher risk due to the amended project when compared with the EIS include:</p> <ul style="list-style-type: none"> <li>• Unnamed tributary of South Creek (and the South Creek downstream receiving environment)</li> <li>• Unnamed tributary of Kemps Creek (and the Kemps Creek downstream receiving environment)</li> <li>• Ropes Creek</li> <li>• Unnamed first order tributaries of Badgerys Creek and Ropes Creek.</li> </ul> |
| <b>Vegetation clearing and mulching</b><br>Soil and bank erosion and mobilisation of sediments to waterways via direct disturbance of waterway (due to installation of culverts, clearing of riparian vegetation etc) or via stormwater runoff and wind. Tannin leachate from clearing and mulching entering downstream waterways | Sediment, nutrients, heavy metals (bound to sediments or resuspended in instream works), high Biological Oxygen Demand (BOD) and tannins. | <p>The amended project would result in about 7 ha of additional native vegetation clearing across the amended project construction footprint including riparian vegetation near Ropes Creek. While the extent of clearing has increased, the nature of impacts would be consistent with the impacts described in the EIS (see Table 5-2 in Appendix M of the EIS).</p>                                                                                                                                                      | <p>All waterways within the study area have the potential to be impacted by vegetation clearing as identified in the EIS (see Table 5-2 in Appendix M of the EIS). However there would be an increased risk of impact at Ropes Creek as a result of the amended project.</p>                                                                                                                                                                                                                                                                       |



| Construction activity/source of pollutants                                                                                                                                                                                                                                                                            | Pollutants of concern                                                                        | Potential Impacts prior to the implementation of environmental management measures                                                                                                                                                                                                         | Receiving waterways                                                                                                                                                                                                          |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Cut and Fill</b><br>Sediment runoff from excavation and excess spoil storage to downstream waterways. Water pollution from dust generated from stockpiles or inappropriate storage, handling and disposal of spoils. Contaminants associated with previously land uses could be exposed and transported downstream | Sediment, hydrocarbons, metals, and nutrients.                                               | Due to changes in the vertical alignment the volume of cut for the amended project has increased when compared to the EIS, while the volume of fill has decreased. Overall, however, impacts would be consistent with those described in the EIS (see Table 5-2 in Appendix M of the EIS). | No change from the receiving waterways identified in the EIS (see Table 5-2 in Appendix M of the EIS).                                                                                                                       |
| <b>Drainage and surface road works</b><br>Soil and bank erosion and mobilisation of sediments into receiving waterway during the direct disturbance of waterway bed and/or banks as a result of the construction of instream structures and associated earthworks.                                                    | Sediments, nutrients and heavy metals stored in bed sediments.                               | As part of the amended project, an instream structure would be constructed at Ropes Creek to widen the existing M7 Motorway bridge. The nature of impacts expected in this location would be consistent with those described in the EIS (see Table 5-2 in Appendix M of the EIS).          | As identified in the EIS (see Table 5-2 in Appendix M of the EIS), all waterways are at risk of impacts from drainage and surface road works, however, Ropes Creek would be at an increased risk due to the amended project. |
| <b>Bridges</b><br>Elevated concentrations of sediments entering and polluting the waters from disturbance and erosion of bed and banks. Pollutants from construction machinery or concrete spills entering waterways.                                                                                                 | Sediments and nutrients, high pH, fuels, chemicals, oils, grease and petroleum hydrocarbons. | Bridge widening is proposed at Ropes Creek as part of the amended project. The nature of impacts expected due to this work would be consistent with those described in the EIS (see Table 5-2 in Appendix M of the EIS)                                                                    | In addition to the waterways identified in the EIS (see Table 5-2 in Appendix M of the EIS), Ropes Creek would also be at risk due to bridge work proposed as part of the amended project.                                   |

| Construction activity/source of pollutants                                                                                                                                                                              | Pollutants of concern                                                                 | Potential Impacts prior to the implementation of environmental management measures                                                                                                                                                                                                                    | Receiving waterways                                                                                                                                                                        |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Temporary watercourse crossings</b><br>Increased sediments to downstream water courses due to scour and disturbance of creek banks. Spills from construction machinery and vehicles hauling material over crossings. | Sediment, nutrients, chemicals, heavy metal, oil and grease and petroleum hydrocarbon | An additional temporary waterway crossing may be required at Ropes Creek to widen the existing M7 Motorway bridge. The nature of impacts expected at Ropes Creek would, however, be consistent with impacts described in the EIS (see Table 5-2 in Appendix M of the EIS).                            | In addition to waterways identified in the EIS (see Table 5-2 in Appendix M of the EIS), Ropes Creek would also be at risk due to bridge widening proposed as part of the amended project. |
| <b>Dewatering</b><br>Dewatering and infilling for farm dams. Discharges from sediment basins to downstream waterways.                                                                                                   | Sediments, nutrients.                                                                 | The amended project would impact one additional farm dam and would result in a number of dams being fully infilled instead of partially infilled. The nature of impacts due to these changes is expected to be consistent with impacts described in the EIS (see Table 5-2 in Appendix M of the EIS). | No change from the waterways identified in EIS (see Table 5-2 in Appendix M of the EIS).                                                                                                   |

Table 6-52 Summary breakdown of modelled mean annual surface water discharge from project

| Receiving environment                                | Mean annual surface water runoff (ML/year) |
|------------------------------------------------------|--------------------------------------------|
| Badgerys Creek                                       | 18                                         |
| Cosgrove Creek                                       | 7                                          |
| Kemps Creek                                          | 18                                         |
| South Creek                                          | 20                                         |
| Hinchinbrook Creek                                   | 27                                         |
| Remaining smaller catchments (including Ropes Creek) | 179                                        |
| <b>Total</b>                                         | <b>269</b>                                 |

### 6.9.3.2 Operational impact

Section 7.9.4 of the EIS identified the surface water quality and hydrology impacts that may occur during operation of the project. This section focuses on the additional impacts that are likely to occur as a result of the amended project when compared to the project described in the EIS. These impacts include:

- Surface water quality
  - Stormwater quality
  - Spills
- Hydrology and geomorphology
  - Major watercourses
  - Minor receiving drainage lines.

Impacts associated with the above would be managed in accordance with the environmental management measures described in **Section 6.9.5** and **Chapter 7** and are discussed in the following sections.

A number of other impacts may occur that would be consistent with those assessed for the project as described in the EIS. These include:

- Performance against NSW water quality objectives
- Hydrology and geomorphology
  - Creek adjustments
  - Culverts
- Impacts to SEPP Coastal Wetlands.

While all potential impacts were assessed, the proposed changes associated with the amended project (see **Chapter 3**) would not substantially alter these impacts, as the relevant changes are similar when compared to the design of the project as described in the EIS.



## Surface water quality

The potential impacts to surface water quality associated with the amended project are presented in **Table 6-53**. **Table 6-53** only shows the impacts that are likely to change as a result of the amended project. Refer to Section 5.1.1 of **Appendix I** for a full assessment.

Table 6-53 Potential operational impacts on surface water quality

| Operational element / source of pollutants                                                                                                            | Pollutants of concern                                                                                                         | Potential impacts prior to the implementation of environmental management measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Receiving waterways                                                                                                                                                                  |
|-------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Spill events</b><br><br>Discharge of spill directly into waterways (should spill event happen on a bridge) or via runoff into the drainage system. | Oil and grease, fuel and various hazardous chemicals transported by vehicles.                                                 | Widening the bridge at Ropes Creek would result in an increased risk of spills in this location. The nature of impacts would be consistent with the impacts described in the EIS (see Table 5-3 of Appendix M of the EIS).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | As identified in the EIS (see Table 5-3 of Appendix M of the EIS) all waterways would be at risk, however Ropes Creek has increased risk of spill events due to the amended project. |
| <b>Stormwater runoff</b><br><br>Untreated stormwater from impervious surfaces which are not conveyed to treatment systems.                            | Gross pollutants and litter, sediments, total suspended solids, nutrients, BOD, heavy metals and hydrocarbons, oil and grease | While the amended project would result in an increase in impervious surface area, the area is minimal and impacts are expected to be generally consistent with those described in the EIS (see Table 5-3 of Appendix M of the EIS).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | No change from the waterways identified in the EIS (see Table 5-3 of Appendix M of the EIS).                                                                                         |
| <b>Hydrology and scour protection</b><br><br>Permanent instream structures                                                                            | Elevated concentrations of sediments and nutrients                                                                            | <p>As described in the EIS bridges would be located over Cosgroves Creek, Badgerys Creek, South Creek and Kemps Creek. Proposed creek adjustments and placement of bridge piles out of the creeks has resulted in no permanent instream structures proposed at these locations.</p> <p>The existing M7 Motorway bridge at Ropes Creek is proposed to be widened as part of the amended project and would require a pile located within Ropes Creek to align with the existing bridge piles.</p> <p>As such, this permanent instream structure could change the characteristics of Ropes Creek due to changes in flow rates and flow paths leading to scour and deposition of sediments. As the new instream structure would be aligned with the existing bridge piles the risk of impact would be minimised.</p> | Ropes Creek                                                                                                                                                                          |

## Hydrology and geomorphology

### Major watercourses

The amended project would result in only a slight increase in percentage of impervious areas when compared to the project described in the EIS. It is anticipated that this minor increase in catchment imperviousness of the amended project would translate to negligible impact to the natural hydrological attributes including volumes and duration and would have negligible impact on the geomorphology of receiving major watercourses.

### Minor receiving drainage lines

Three of the proposed changes listed in **Chapter 3** would result in adjustments to the catchments and flows to minor drainage lines. The locations of the revised minor drainage channel catchments are shown in **Figure 6-51** and a summary of the impacts on minor drainage lines associated with the above proposed design changes is provided in **Table 6-54**. **Table 6-54** only shows the impacts that are likely to change as a result of the amended project. Refer to Section 5.2.2 of **Appendix I** for a full assessment.

Impacts to other minor drainages remain as documented in Section 5.2.3 of Appendix M of the EIS.

### 6.9.3.3 Cumulative impacts

The cumulative impact assessment for the project as described in the EIS concluded that the project was expected to have a minor contribution to cumulative surface water quality and hydrological impacts. As the project was not expected to generate significant water quality or hydrological impacts during construction or operation, outside of the potential for minor erosion and sedimentation, accidental spills and increased stormwater runoff, the M12 Motorway was anticipated to have a minor contribution to cumulative surface water quality and hydrological impacts associated with the project and other identified projects in the vicinity.

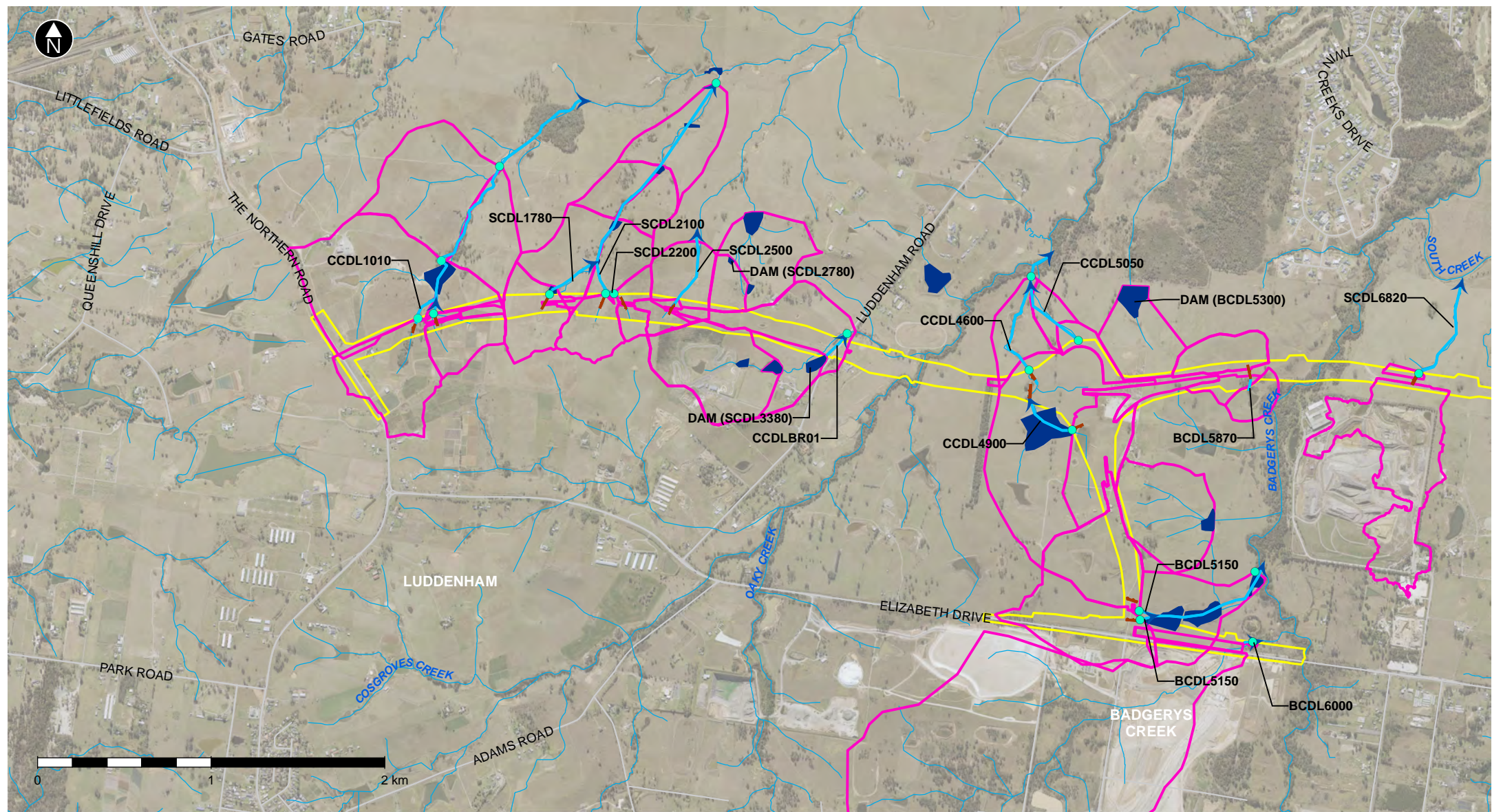
While the proposed changes associated with the amended project would result in some changes to the expected water quality and hydrological impacts described in the EIS, these are also expected to have a minor contribution when considering the contribution of other surrounding developments. The amended project is therefore not anticipated to have a substantial cumulative impact on surface water quality and hydrology and the cumulative surface water quality and hydrology impacts would be likely to remain consistent with those of the project as described in the EIS.

## 6.9.4 Amended water quality and hydrology controls

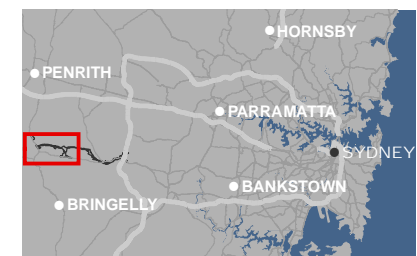
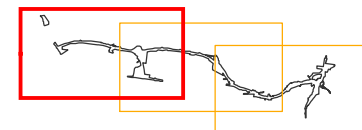
### 6.9.4.1 Construction phase

Construction erosion and sediment controls at the additional construction ancillary facilities would be consistent with the controls described in Chapter 6 of Appendix M of the EIS.



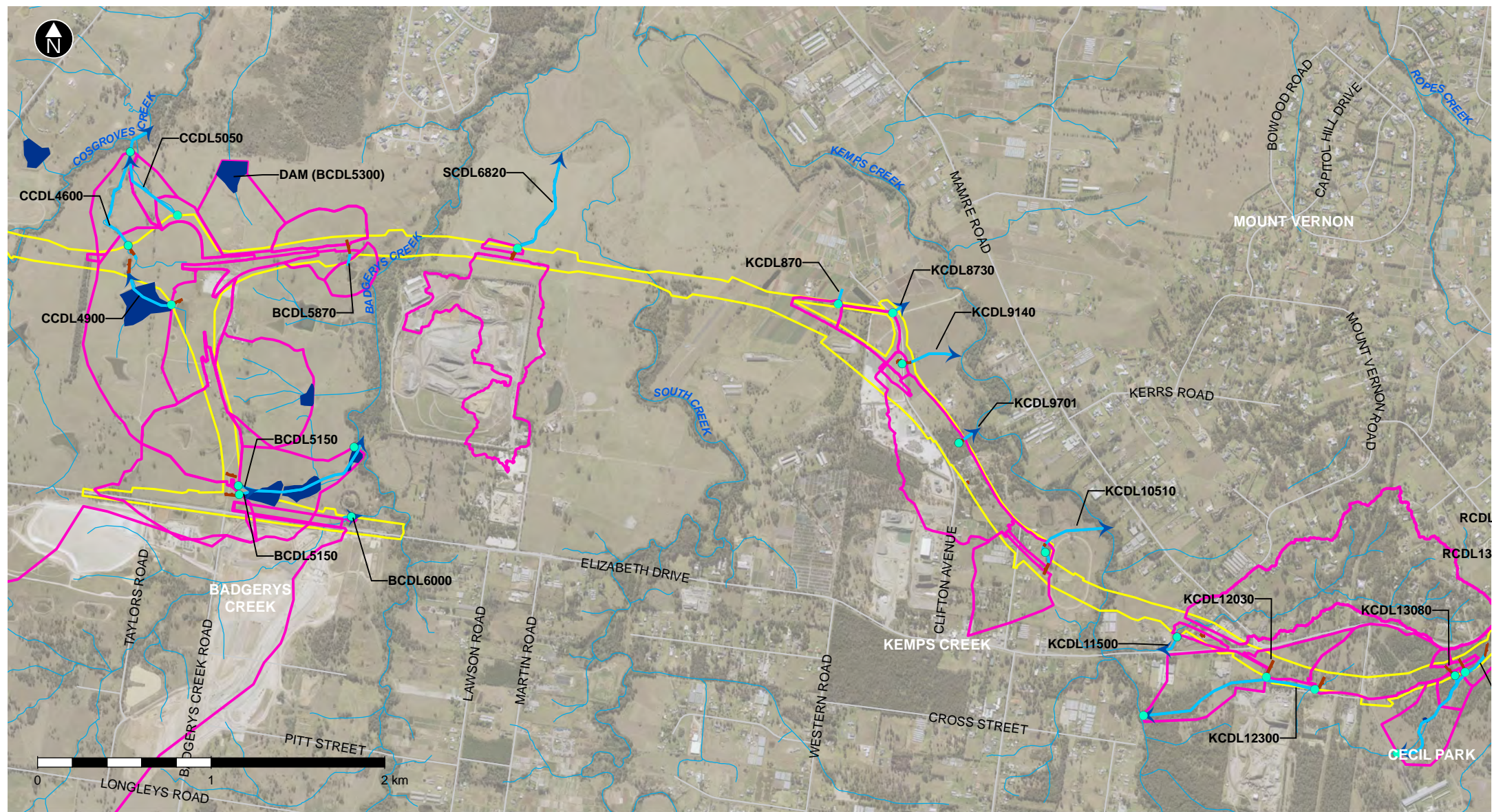


- Waterways
- Main roads
- The amended project operational footprint
- Points of interest
- Minor drainage lines that have been assessed in the EIS and/or the amended project
- Direction of flow
- Farm Dams that have been assessed
- Cross drainage culverts
- Minor drainage channel catchments - with project

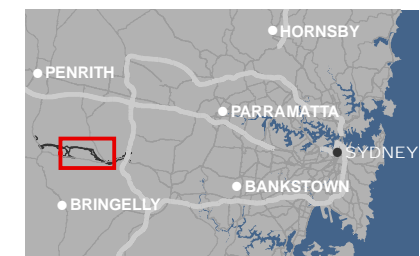
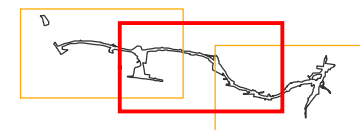


**Figure 6-51** Minor drainage lines and farm dams



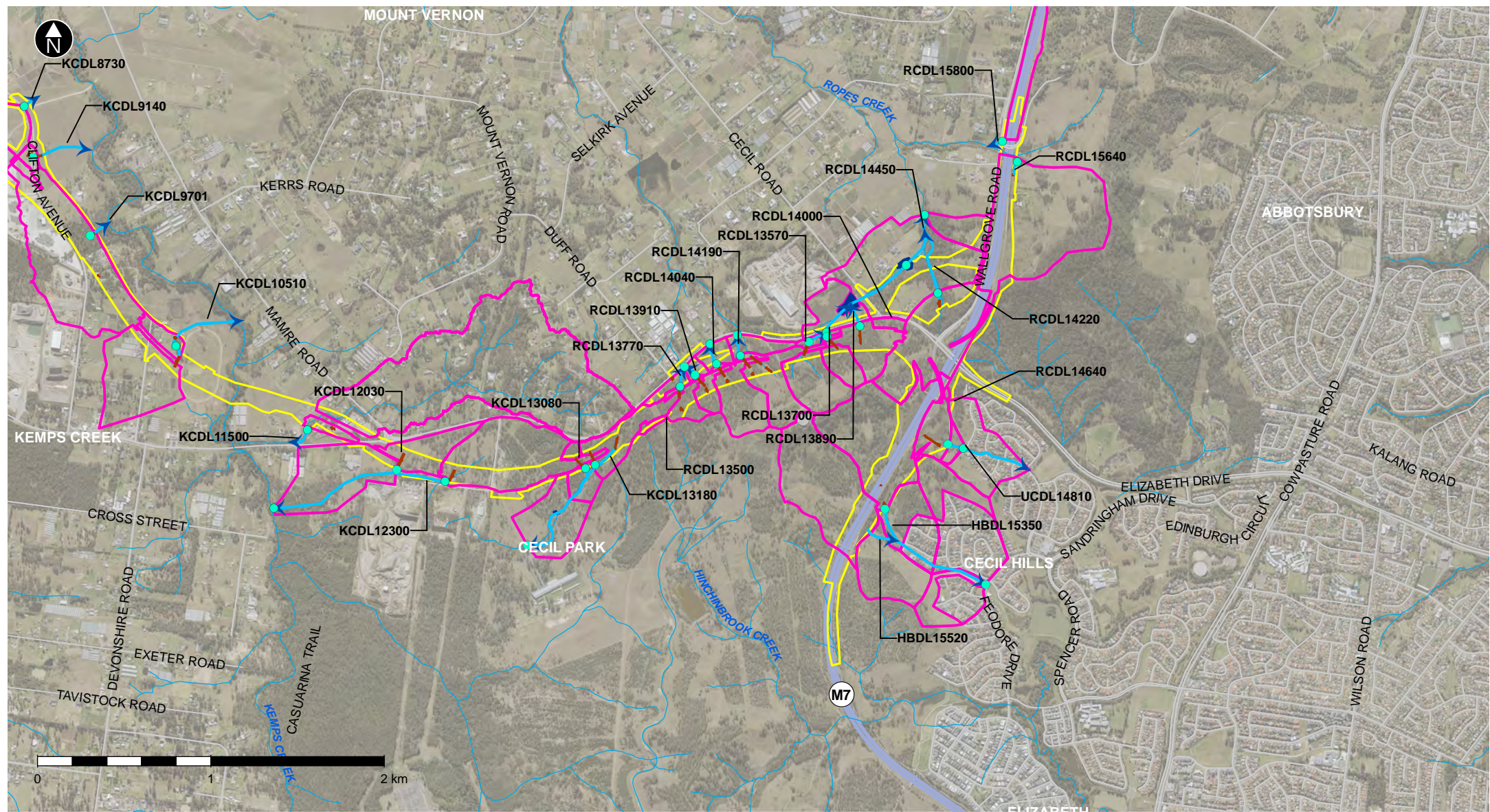


- |                                           |                                                                                    |                                                  |
|-------------------------------------------|------------------------------------------------------------------------------------|--------------------------------------------------|
| Waterways                                 | Points of interest                                                                 | Farm Dams that have been assessed                |
| Main roads                                | Minor drainage lines that have been assessed in the EIS and/or the amended project | Cross drainage culverts                          |
| The amended project operational footprint | Direction of flow                                                                  | Minor drainage channel catchments - with project |

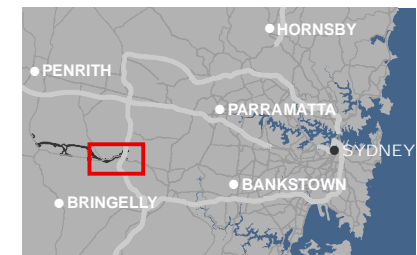
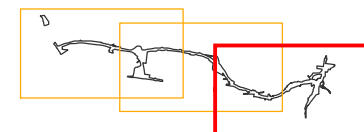


**Figure 6-51** Minor drainage lines and farm dams





- |                                           |                                                                                    |                                                  |
|-------------------------------------------|------------------------------------------------------------------------------------|--------------------------------------------------|
| Waterways                                 | Points of interest                                                                 | Farm Dams that have been assessed                |
| Motorway                                  | Minor drainage lines that have been assessed in the EIS and/or the amended project | Cross drainage culverts                          |
| Main roads                                | Direction of flow                                                                  | Minor drainage channel catchments - with project |
| The amended project operational footprint |                                                                                    |                                                  |



**Figure 6-51** Minor drainage lines and farm dams



Table 6-54 Changes to the minor drainage line assessment as a result of the proposed design changes

| Catchment      | Drainage line | Land ownership | Approximate change in peak flow at operational footprint (%)                         | Potential impacts prior to the implementation of environmental management measures                                                                                                                                                                                                                                                                                                                                                                                                                   | Proposed mitigation measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Residual impacts                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|----------------|---------------|----------------|--------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Badgerys Creek | BC DL 5870    | Private        | +27 to +54 which is higher than the project as described in the EIS of (of -3 to +3) | <ul style="list-style-type: none"> <li>The EIS predicted no adverse impact on the receiving drainage line due to the minor change in flow</li> <li>Increased flows to the farm dam associated with the amended project would be about 27 per cent in 100 year Average Recurrence Interval (ARI) which would adversely impact on the performance of the existing spillway and its scour protection</li> <li>Increase in the peak flow rate can cause scour of the downstream drainage line</li> </ul> | <ul style="list-style-type: none"> <li>No mitigation measures were proposed in the EIS as no impacts were expected. However additional measures are required mitigate impacts from the amended project</li> <li>During detailed design an assessment would be undertaken into the impact the project would have on the characteristics of flow over the spillway of the affected dam. Adjustments may need to be made to the spillway of the dam that would include its armouring using dumped rock rip rap.</li> <li>During detailed design an assessment would be undertaken on the potential alternative design including discharging the pavement drainage to Badgerys Creek on the other side of the motorway instead of directing the flow to the existing farm dam to minimise the potential impacts on the existing dam.</li> </ul> | <ul style="list-style-type: none"> <li>The EIS predicted a very minor reduction in rate and volume of runoff into the farm dam, however there would be increase in the rate and volume of runoff into the farm dam as a result of the amended project</li> <li>The EIS predicted the dam would fill and overtop less frequently due to the reduction in the volume of runoff, however the dam is likely to fill and overtop more frequently as a result of an increase in the volume of runoff associated with the amended project</li> <li>The EIS predicted a very minor change in the peak flow rate and volume of runoff to the receiving downstream drainage line, however there would be a substantial increase as a result of the amended project</li> </ul> |



| Catchment      | Drainage line | Land ownership | Approximate change in peak flow at operational footprint (%)                           | Potential impacts prior to the implementation of environmental management measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Proposed mitigation measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Residual impacts                                                                                                                                                                                                                                                                                                                                                                                 |
|----------------|---------------|----------------|----------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Badgerys Creek | BC DL 6000    | Private        | -1 to +1                                                                               | <ul style="list-style-type: none"> <li>Drainage line was not identified as being impacted in the EIS (new impact)</li> <li>The amended project would not have an adverse impact on the receiving drainage line due to the minor change in flow</li> </ul>                                                                                                                                                                                                                                                                                                    | No mitigation measure is proposed at this location.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | There would be a minor increase in the rate and volume of runoff into the receiving drainage line.                                                                                                                                                                                                                                                                                               |
| Ropes Creek    | RC DL 14220   | Private        | +12 to +54, which is higher than the project as described in the EIS of (of -4 to +25) | <ul style="list-style-type: none"> <li>The EIS predicted that an increase in the 2 to 10 year ARI flow may impact adversely on the existing culverts beneath Wallgrove Road/Elizabeth Drive intersection, potentially causing flooding at the intersection for these storm events</li> <li>The increase in the two to 100 year ARI flow as a result of the amended project may impact adversely on the existing culverts beneath Wallgrove Road/Elizabeth Drive intersection. This may cause flooding at the intersection for these storm events.</li> </ul> | <p>Mitigation measures for the amended project would remain consistent with those identified in the EIS. They include:</p> <ul style="list-style-type: none"> <li>Further modelling would be undertaken during detailed design to verify the amended project impacts on the characteristics of flows in the culverts beneath the Wallgrove Road/Elizabeth Drive intersection.</li> <li>Subject to modelling and verification of the amended project impacts, mitigation could include provision of a detention basin within the amended operational footprint to minimise the potential adverse impacts to the existing culverts.</li> <li>The modelling would also be used to demonstrate that the proposed mitigation measures will be effective based on the design as modelled.</li> </ul> | <p>The residual impacts of the amended project would remain consistent with those identified in the EIS. They include:</p> <ul style="list-style-type: none"> <li>There would be a minor increase in the rate and volume of runoff into receiving drainage line</li> <li>The assessment found that the project would not increase the scour potential in the receiving drainage line.</li> </ul> |

| Catchment          | Drainage line | Land ownership | Approximate change in peak flow at operational footprint (%)                            | Potential impacts prior to the implementation of environmental management measures                                                                                                                                                                                                                                                                                                                             | Proposed mitigation measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Residual impacts                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|--------------------|---------------|----------------|-----------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Hinchinbrook Creek | HB DL 15350   | Private        | -29 to +37, which is higher than the project as described in the EIS of (of -19 to +37) | <p>Potential impacts of the amended project would remain consistent with those identified in the EIS. They include:</p> <ul style="list-style-type: none"> <li>No increase in peak flow rates for storm events from 10 year ARI to 100 year ARI</li> <li>Peak flow rate would increase in the 2 year ARI storm event, increasing risk of scour potential in the downstream receiving drainage line.</li> </ul> | <p>Mitigation measures for the amended project would remain consistent with those identified in the EIS. They include:</p> <ul style="list-style-type: none"> <li>Further modelling would be undertaken during detailed design to verify the amended project impacts on the characteristics of flows in this receiving drainage line.</li> <li>Subject to modelling outcomes and verification of project impacts, mitigation could include provision of scour protection and a detention basin within the amended operational footprint.</li> </ul> | <p>Potential residual impacts of the amended project would remain consistent with those identified in the EIS. They include:</p> <ul style="list-style-type: none"> <li>There would be a minor increase in the rate and volume of runoff into receiving drainage line in the frequent rain events. However, there would be a substantial reduction in the rate and volume of runoff into the receiving drainage line in the major storms.</li> <li>The assessment found that the amended project would not increase the scour potential in the receiving drainage line</li> </ul> |

| Catchment   | Drainage line            | Land ownership | Approximate change in peak flow at operational footprint (%)                           | Potential impacts prior to the implementation of environmental management measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Proposed mitigation measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Residual impacts                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|-------------|--------------------------|----------------|----------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Ropes Creek | RC DL 14450 <sup>1</sup> | Private        | +3 to +31, which is higher than the project as described in the EIS of (of +11 to +53) | <ul style="list-style-type: none"> <li>The EIS predicted an afflux of 10 millimetres on the existing watercourse in the private property at the project (operational) boundary, however under the amended project there may be flooding impacts to private properties (lot 28/DP654786, 1/724970 6/629798 and 2/2954 at the amended operational footprint</li> <li>The increase in the peak flow rate attributable to the amended project has the potential to increase the scour potential in the receiving downstream drainage line. This is consistent with the EIS.</li> </ul> | <p>Mitigation measures for the amended project would remain consistent with those identified in the EIS. They include:</p> <ul style="list-style-type: none"> <li>Further modelling would be undertaken during detailed design to confirm the impact on flows to this drainage line and the appropriate mitigation measures which could include a detention basin and scour protection.</li> <li>Modelling at detailed design would be used to confirm that proposed mitigation measures are effective and feasible.</li> <li>All potential management measures would be considered in consultation with the affected property owner.</li> </ul> | <ul style="list-style-type: none"> <li>The EIS identified there would only be a minor increase in the rate and volume of runoff into receiving drainage line</li> <li>The EIS assessment found that the project would not increase the scour potential in the receiving drainage line</li> <li>However scour potential associated with the amended project may increase in the receiving drainage line if appropriate mitigation measures are not implemented.</li> </ul> |



| Catchment   | Drainage line | Land ownership | Approximate change in peak flow at operational footprint (%) | Potential impacts prior to the implementation of environmental management measures                                                                                                                                                                                                                                                                                 | Proposed mitigation measures                                                                                                                                                                                                                                                                                                                                                                                                          | Residual impacts                                                                                                                                                                    |
|-------------|---------------|----------------|--------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Ropes Creek | RC DL 15800   | Public         | +1 to +4                                                     | <ul style="list-style-type: none"> <li>This drainage line was not identified as being impacted in the EIS (new impact)</li> <li>The increase in the peak flow rates due to the road and bridge widening of the M7 Motorway associated with the amended project is minor. However, this may impact on the performance of the downstream drainage system.</li> </ul> | <ul style="list-style-type: none"> <li>Further modelling would be undertaken during detailed design to verify the amended project impacts on the characteristics of flows in this receiving drainage line.</li> <li>Subject to modelling outcomes and verification of project impacts, mitigation could include provision of upgrade to downstream drainage or a detention basin within the amended operational footprint.</li> </ul> | <ul style="list-style-type: none"> <li>There would be a minor increase in the rate and volume of runoff into receiving drainage line as a result of the amended project.</li> </ul> |

### 6.9.4.2 Operational phase

The amended project would require changes to six permanent operational water quality basins:

- Three permanent basins (B14880, B14881 and B1351) would require relocation (**Figure 6-52** and **Figure 6-53**)
  - Two would be located near the M7 Motorway southbound
  - One would be located near the Elizabeth Drive intersection at the Western Sydney International Airport
- Three permanent basins would require changes to their sizes (as documented in the EIS) due to changes in the road pavement catchment area (**Figure 6-54**)
  - Two operational water quality basins would be located near Badgerys Creek on the main M12 Motorway alignment and would be approximately 30 per cent larger (B5800 and B6200)
  - One operational water quality basin located upstream of Cosgrove Creek would decrease in size by approximately 25 per cent (B4080).

Other proposed changes would not require modifications to the remaining operational water quality controls described in the EIS. The performance water quality controls set out in the EIS will be verified as the detailed design develops for the project to ensure the objectives of the project are achieved.

### 6.9.5 Environmental management measures

Surface water quality and hydrological impacts associated with the proposed changes are generally consistent with impacts described in Section 7.9 of the EIS. Three environment management measures have been revised, however, to include the updated guidelines and address the assessment undertaken for the amended project. The revised environmental management measures for impacts of surface water quality and hydrology contamination are outlined in **Table 6-55**, with additional text shown in **bold** and removed text shown as strikethrough text.

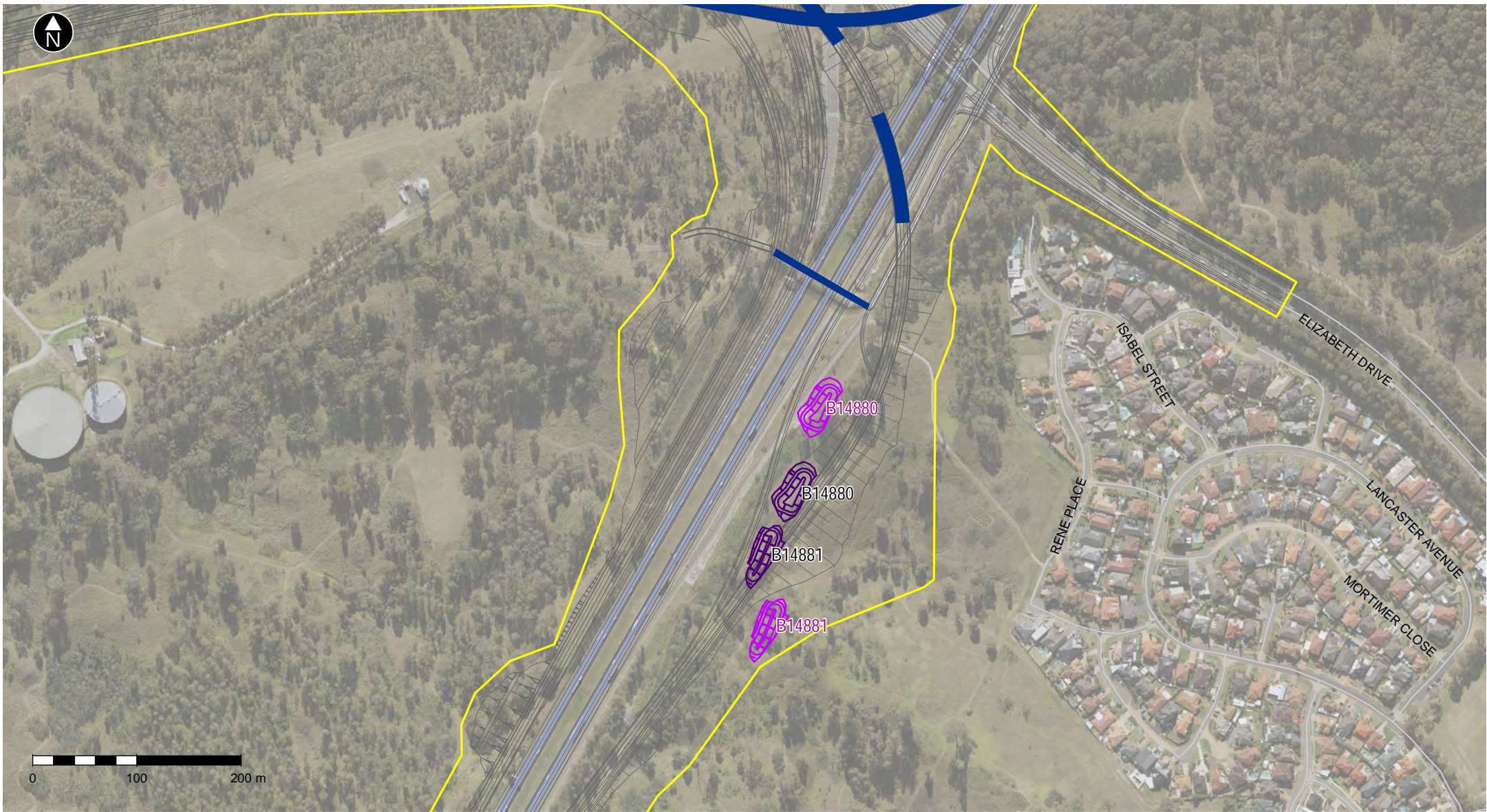
Table 6-55 Revised environmental management measures (surface water quality and hydrology) (bold and strikethrough text shows change from EIS)

| Impact                        | Reference | Environmental management measure                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Responsibility     | Timing                                                       |
|-------------------------------|-----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|--------------------------------------------------------------|
| Surface water quality impacts | SWH05     | <p>A construction water quality monitoring program will be developed and included in the CSWMP for the project to establish baseline conditions, observe any changes in surface water and groundwater during construction, and inform appropriate management responses.</p> <p>The program will be based on the water quality monitoring methodology water quality indicators and the monitoring locations identified in the Surface water and hydrology assessment report (Appendix M <b>of the EIS</b>) and <b>supplementary memo (Appendix I of the amendment report)</b>, and Groundwater quality and hydrology assessment report (Appendix N <b>of the EIS</b>) and <b>supplementary memo (Appendix J of the amendment report)</b>.</p> | TfNSW / Contractor | Prior to construction, and during construction and operation |

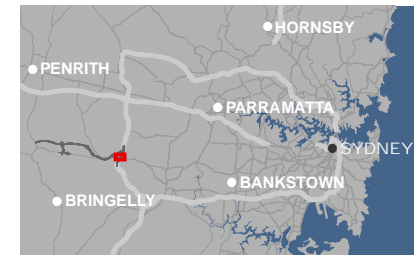
| Impact                  | Reference | Environmental management measure                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Responsibility | Timing          |
|-------------------------|-----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|-----------------|
|                         |           | <p>Baseline monitoring will be carried out monthly for a minimum of 12 months before the start of construction. As a minimum this will include three wet weather sampling events over six months where feasible.</p> <p>Sampling locations and monitoring methodology to be carried out during construction will be further developed in detailed design in accordance with the Guideline for Construction Water Quality Monitoring (RTA 2003b) and the <b>Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZG, 2018)</b> <del>'ANZECC water quality guidelines'</del> (ANZECC/ARMCANZ 2000). It will include collection of samples for analysis from sedimentation basin discharge points, visual monitoring of other points of release of construction waters and monitoring of downstream waterways.</p> |                |                 |
|                         | SWH07     | <p>The performance water quality controls developed for the design set out in the EIS <b>and the amended water quality and hydrology controls outlined in the amendment report</b> document (including but not limited to temporary and permanent sediment basins) will be verified as the detailed design develops for the project to ensure the objectives of the project are achieved.</p> <p>In the instance that <b>water quality (MUSIC) modelling carried out</b> during detailed design it cannot be demonstrated that the water quality controls would be effective in mitigation potential impacts, additional mitigation measures would be identified and implemented <b>where possible</b>.</p>                                                                                                                            | Contractor     | Detailed design |
| Impacts on water bodies | SWH13     | <p>A set of hydrologic and hydraulic models will be developed, which are to be used to define the nature of both main stream flooding and major overland flow along the full length of the project operational footprint under pre- and post-project conditions. The hydraulic model is to extend a sufficient distance upstream and downstream of the <b>amended</b> project operational footprint, to negate any boundary effects and to define the full extent of any impact that the project will have on patterns of both main stream flooding and major overland flow. The hydraulic model(s) is to be based on the TUFLOW (or equivalent) two-dimensional (in plan) hydraulic modelling software.</p>                                                                                                                           | Contractor     | Detailed design |



| Impact | Reference | Environmental management measure                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Responsibility | Timing |
|--------|-----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|--------|
|        |           | <p>The models will be used to verify the nature and extent of impacts and to confirm the type of mitigation measures required, <b>including potential mitigation measures identified throughout the EIS (see Table 5-9 in Appendix M of the EIS) and the amendment report (see Table 5-6 in this memorandum).</b></p> <p>The models will also be used during detailed design to describe the interaction between the project and flows particularly with respect to culverts and to assist in refining the design for flows arriving at and travelling through culverts.</p> |                |        |

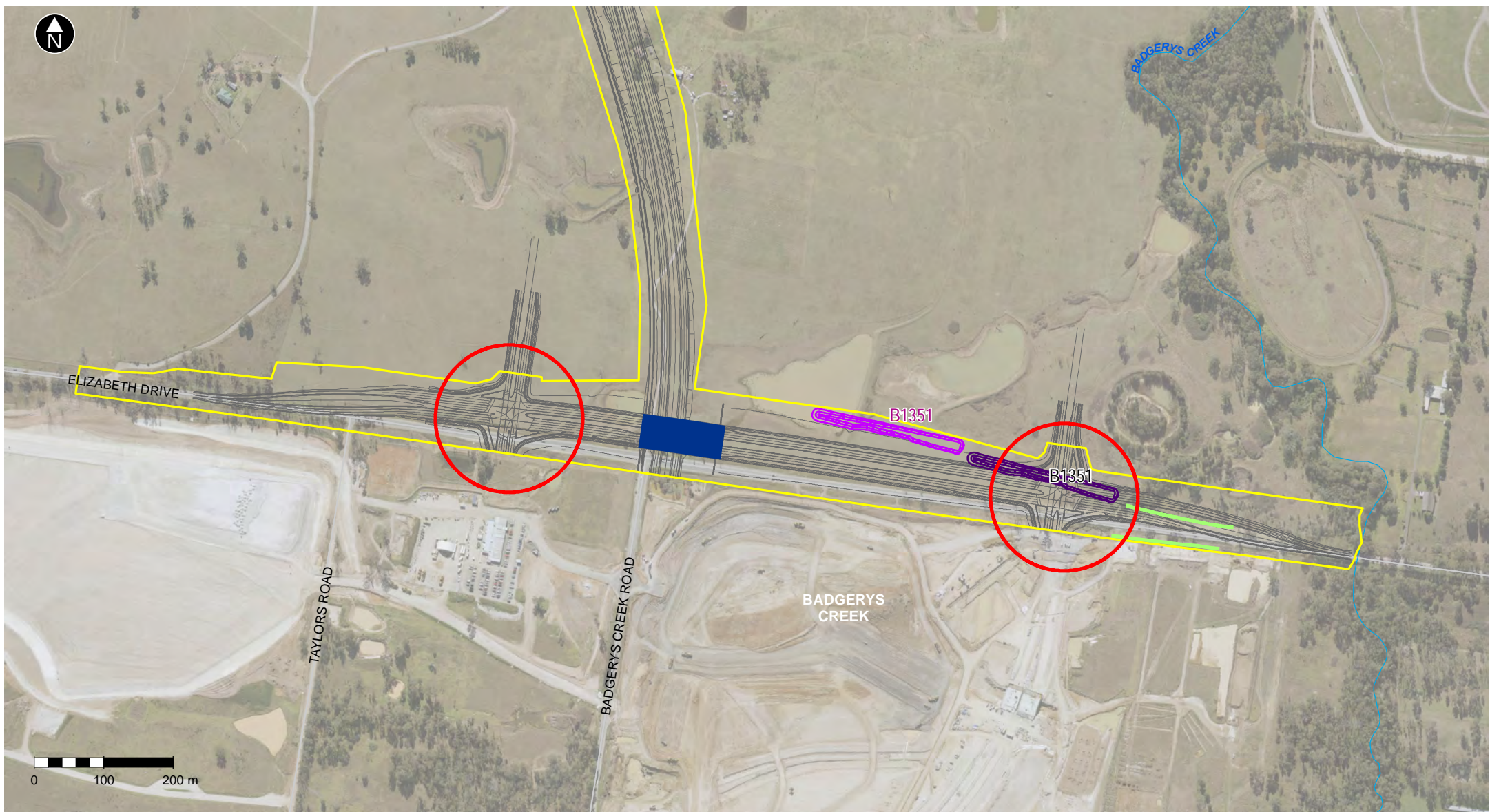


- The amended project
- Bridges
- The amended project operational footprint
- Permanent water quality basins as per EIS
- Amended permanent water quality basin

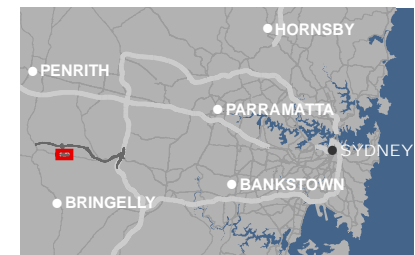


**Figure 6-52** Basin moved near M7 Southbound





- The amended project
- The amended project bridges
- The amended project operational footprint
- Waterways
- Water quality swales
- Permanent water quality basins as per EIS
- Amended permanent water quality basin
- Intersection connecting into the Western Sydney International Airport  
Note: Indicative, subject to detailed design

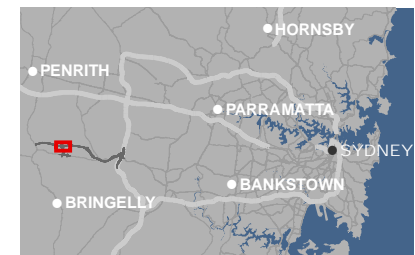


**Figure 6-53** Revised location of permanent water quality basin B1351





- The amended project
- The amended project bridges
- The amended project operational footprint
- ~ Waterways
- Water quality swales
- Permanent water quality basins as per the EIS
- Amended permanent water quality basins



**Figure 6-54** Permanent water quality basins requiring an increase in size

## 6.10 Groundwater quality and hydrology

The groundwater quality and hydrology supplementary technical memorandum is provided in **Appendix J**, and a summary is provided below. This section should be read in conjunction with Section 7.10 of the EIS and the groundwater quality and hydrology assessment report provided in Appendix N of the EIS.

The groundwater quality and hydrology supplementary technical memorandum in **Appendix J** includes a number of clarifications in relation to the assessment methodology, potential construction impacts and management measures, which provide further context behind the groundwater assessment prepared for the EIS and amended project. This is discussed in the relevant sections below.

### 6.10.1 Assessment methodology

The assessment focused on changes to potential groundwater impacts associated with changes to the construction and operational footprints, and vertical alignment from the project presented in the EIS. The assessment methodology involved:

- Desktop assessment – groundwater level data was supplemented using WaterNSW's (2020) online bore database to evaluate if the spatial coverage of groundwater level data in the EIS could be improved
- Impact assessment – assessment of dewatering impacts was carried out to estimate potential groundwater inflows and reductions to groundwater levels if excavations extend below the water table and are drained.

The study area presented in Section 7.10.2 of the EIS comprised a two kilometre buffer around the EIS construction footprint. This area is therefore considered sufficient to capture the amended construction footprint and has not been updated for this assessment. The study area is shown in **Figure 6-55**.

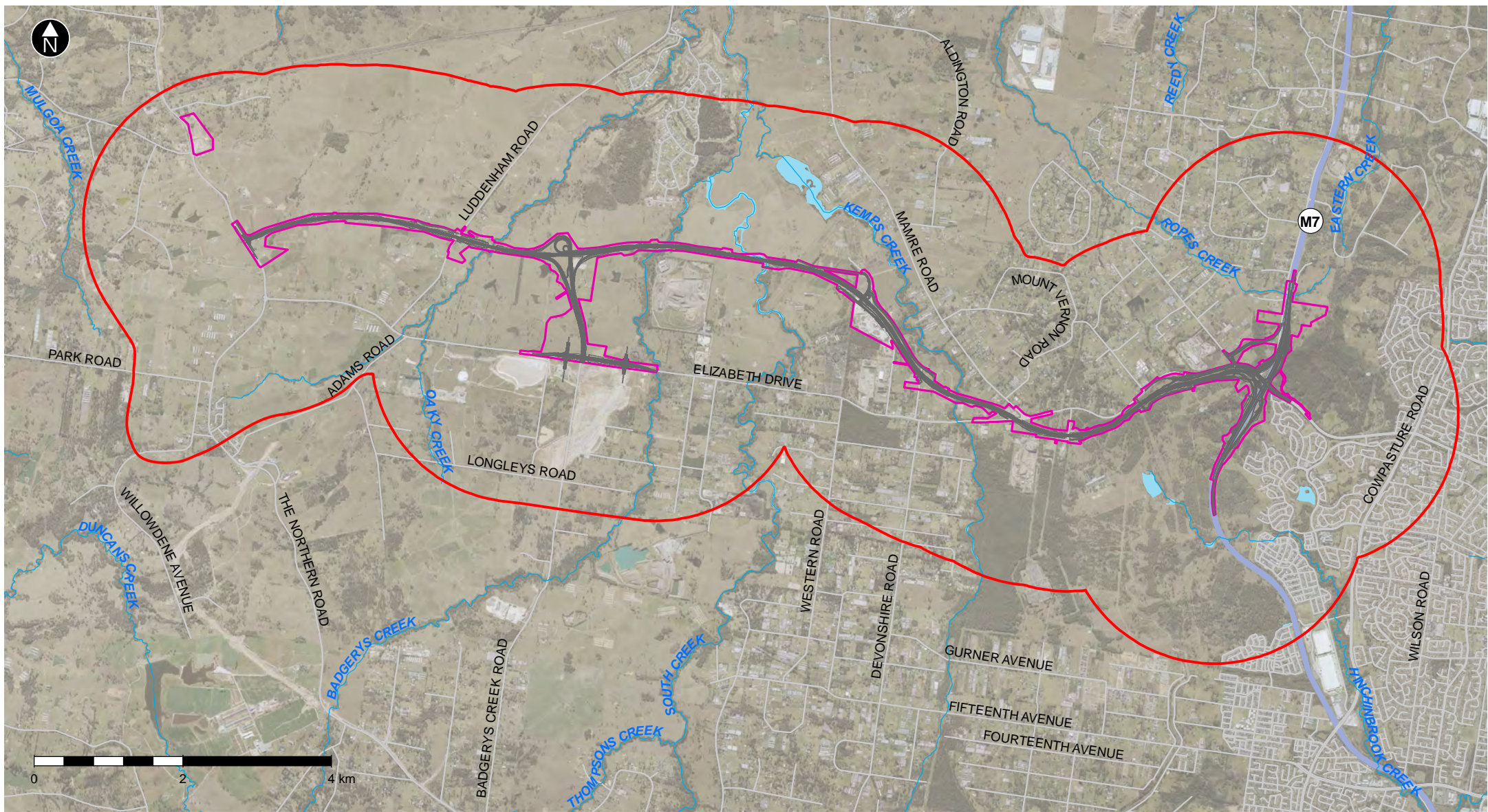
As the study area was unchanged from that described in the EIS, no site inspections or field investigations were determined to be required for the assessment. See Section 2.6.2 of **Appendix J** for further detail on the assessment methodology.

#### 6.10.1.1 Clarifications

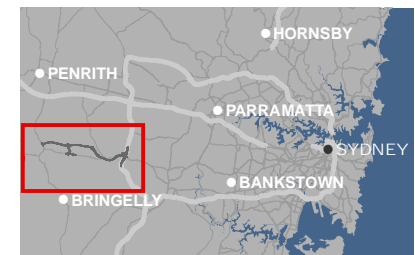
The memorandum in **Appendix J** includes a number of clarifications on the assessment methodology, which provide further context behind the groundwater assessment prepared for the EIS, including:

- Groundwater level range – project monitoring bores. The memorandum in **Appendix J** addresses concern raised by DPIE Water regarding accuracy of groundwater levels given the short-period over which monitoring occurred. Groundwater monitoring was carried out at most monitoring bores between February 2018 and August 2018. The assessment was also informed by a cumulative rainfall deviation (CRD) plot which included rainfall data from the Badgerys Creek station between January 1996 and February 2019. Based on the CRD trends and timing of the project's groundwater monitoring period, groundwater levels measured during the monitoring period are anticipated to be higher than long-term averages. Appendix N of the EIS presented the entire range of available data from project monitoring bores, and from this, for drawdown and groundwater inflow assessment purposes, conservatively adopted the maximum monitored groundwater level.





- The amended project (Elizabeth Drive connection)
- Waterways
- Motorway
- Main roads
- Groundwater assessment study area
- The amended project construction footprint



**Figure 6-55** Groundwater study area for the amended project



- Groundwater level range – non-project monitoring bores. The memorandum in **Appendix J** addresses concern raised by DPIE Water regarding the accuracy of groundwater levels given the omission of maximum wet weather groundwater levels. The BOM's (2018) online Australian Groundwater Explorer did not contain water level records for bores in the study area, as defined in the EIS. Subsequent to the EIS, the online WaterNSW (2020) bore database was reviewed as part of the supplementary groundwater assessment of the amended project to assess water level records for bores inside the study area. There is only one location that monitors the shallow groundwater systems applicable to the project. The data from the multiple bores in this location cannot be used to infer maximum wet weather groundwater levels, as the data periods are either too short or the data is interpreted to be erroneous.
- 'Aquifers' and impacts. The memorandum in **Appendix J** addresses the requests from DPIE Water for more detail regarding interaction with aquifers and more information regarding interaction with Hawkesbury Sandstone and seepage faces. Project data, surrounding data and the subsequently developed conceptual hydrogeological model indicate aquifers are not present in the near surface profile which the project is associated with. Groundwater systems near the land surface are conceptualised as low yielding and saline. Potentially relatively higher yielding aquifers, if present, would be substantially deeper than the project, with relatively higher yields and lower salinity likely best obtained from Hawkesbury Sandstone groundwater systems. Hawkesbury Sandstone is anticipated to commence at levels which are at least about 75 metres deeper than the minimum project design surface level in the study area.
- Modelling. The memorandum in **Appendix J** addresses the request from DPIE Water for more hydrological information at the Western Cut. For the EIS, site specific modelling on the drawdown associated with one area of road cutting which may intersect the water table was completed. The only anticipated potential drawdown for the project as described in the EIS was an area referred to as the 'western cut'. Additional road cuttings associated with the amended project which may intersect the water table have been identified and are discussed in Section 5 of **Appendix J**.

## 6.10.2 Existing environment

Section 7.10.3 of the EIS provides a detailed description of the existing environment within which the project is located, including groundwater conditions. The existing environment has not changed since the preparation of the EIS and is still applicable to the amended project.

## 6.10.3 Assessment of potential impacts

### 6.10.3.1 Clarifications

The memorandum in **Appendix J** includes a number of clarifications in response to issues raised by DPIE Water on the assessment of potential construction impacts, which provide further context behind the groundwater assessment prepared for the EIS, including:

- Consolidation. The memorandum in **Appendix J** addresses concern regarding the potential impact of compaction (consolidation) on aquifers and GDEs. Borehole Standard Penetration Test (SPT) data indicates alluvial material is generally sufficiently stiff/dense to circumvent groundwater level impacts due to consolidation. However, it is noted that relatively softer material was observed at Kemps Creek. Bridges are proposed at the major creeks, including Kemps Creek. Consolidation of alluvial material will not occur underneath bridges as such areas will not be filled. Potential increases in groundwater levels due to surcharge loading, if any, are expected to be minimal and limited to areas in the vicinity of fill placement.

- Dewatering. The memorandum in **Appendix J** addresses concern regarding the potential impacts of dewatering on GDEs. Dewatering is only anticipated at the 'western cut', plus two additional road cuttings associated with the proposed design changes (see **Section 6.10.3.2**).
- Potential impacts to GDEs. The memorandum in **Appendix J** addresses concern regarding the potential impact of compaction on GDEs and the request for further information regarding drawdown. Potential groundwater level impacts to the GDEs due to compaction are considered unlikely. Potential increases in groundwater levels due to surcharge loading, if any, are expected to be very small, and limited to areas in the vicinity of fill placement. Drawdown from the 'western cut' is highly unlikely to impact GDEs as the nearest mapped potential GDE to the 'western cut' is about 240 metres away from the cut, which is outside the calculated extent of groundwater level reduction of about 60 metres.

### **6.10.3.2 Construction impacts**

The EIS identified one location where the project may intersect the water table, the western cut, located about 1500 metres east of The Northern Road. The amended project would result in two additional areas of cut that may potentially intersect the water table. Both areas are in the vicinity of the Western Sydney International Airport interchange and are a result of the proposed lowering of this intersection. These are the Airport interchange northern cut and the Airport interchange southern cut.

The location of these additional areas of cut is shown in **Figure 6-56** and described in further detail in the sections below.

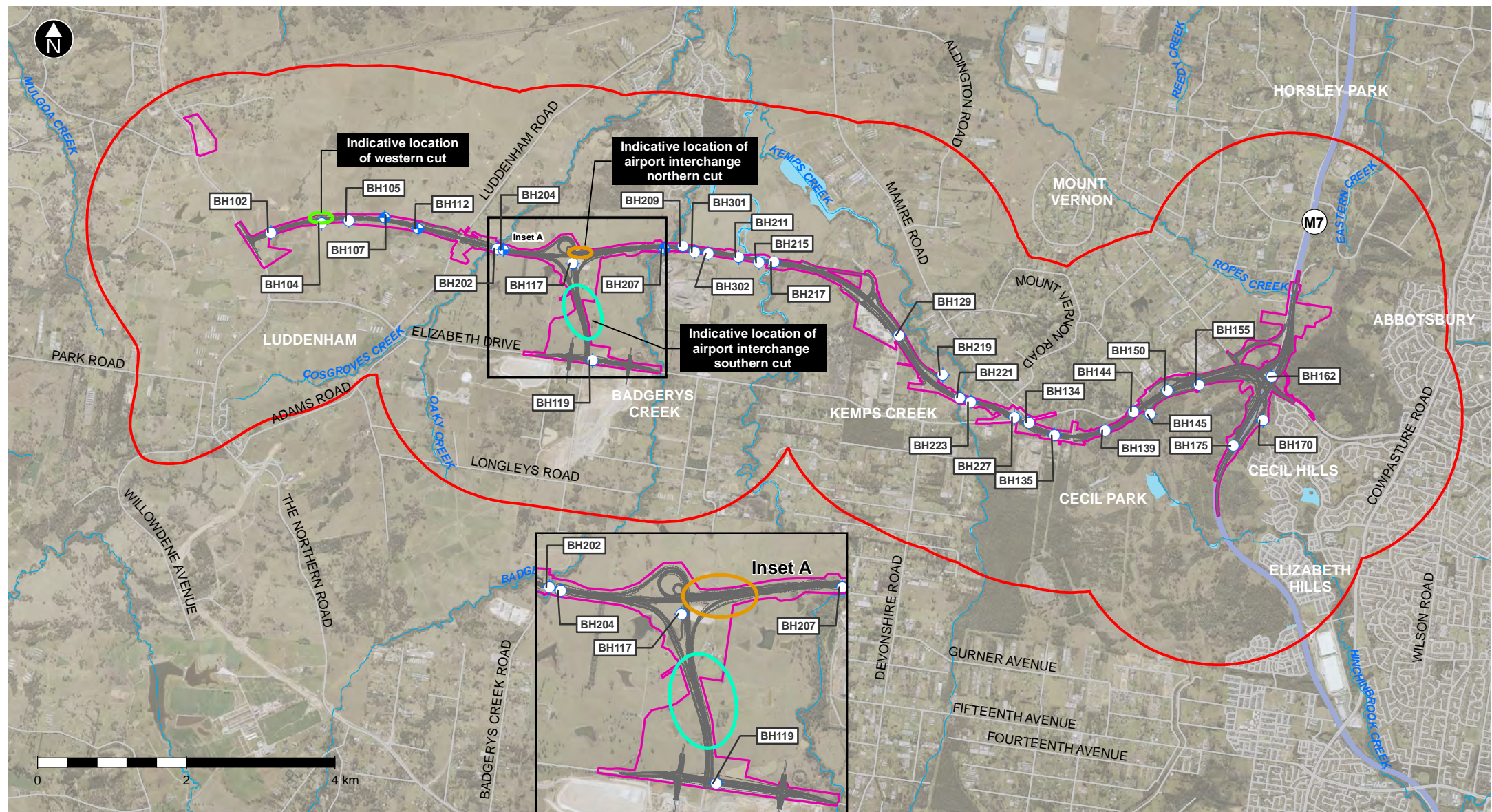
#### **Groundwater inflows**

Groundwater impacts associated with the western cut documented in the EIS would not change as a result of the amended project.

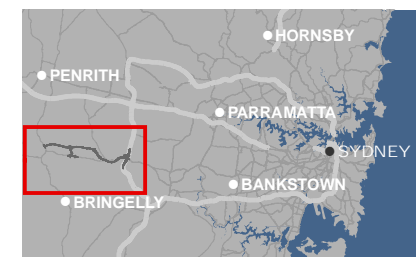
The amended project would result in two additional areas of cut that may potentially intersect the water table, these are:

- Airport interchange northern cut
  - The minimum amended project finished design level is about 57 metres AHD, which is lower than the EIS design level at this location by about nine metres AHD
  - The amended project design level is about four metres lower than the maximum monitored groundwater level at BH117 (60.79 metres AHD), which is located about 100 metres west of the cut's western extent
  - A water table penetration depth of four metres was adopted for assessment as a result of the above
  - A conservative area of 60,000 square metres was used for groundwater inflow estimation purposes as it represents the entire cutting area
- Airport interchange southern cut
  - Minimum amended project finished design level is about 60 metres AHD, which is lower than EIS design level at this location by about two metres AHD
  - Perched local groundwater system near groundwater monitoring bore BH119 (about 400 metres south of the cut) based on monitoring data
  - A water table penetration depth of four metres was adopted for assessment as a result of nearby monitoring (BH120)
  - A conservative area of 30,000 square metres was used for groundwater inflow estimation purposes as it represents the entire cutting area.





- |                                                    |                                              |                                               |
|----------------------------------------------------|----------------------------------------------|-----------------------------------------------|
| — The amended project (Elizabeth Drive connection) | ● Project groundwater monitoring bores       | ○ Indicative location of western cut          |
| ~ Waterways                                        | □ Groundwater assessment study area          | ○ Indicative airport interchange northern cut |
| — Motorway                                         | □ The amended project construction footprint | ○ Indicative airport interchange southern cut |
| — Main roads                                       |                                              |                                               |



**Figure 6-56** Three areas of cut associated with the amended project



For the airport interchange northern cut, the estimated groundwater inflow rate (conservative estimate) is anticipated to be in the range of 0.8 to 8.4 kilolitres per day. However, based on project specific hydraulic conductivity testing values, the probable groundwater inflow rate is anticipated to be more likely in the range of 0.8 to 1.6 kilolitres per day. Most or all the groundwater inflow is anticipated to be evaporated, even for the scenario with the highest inflow rate.

For the airport interchange southern cut, the estimated groundwater inflow rate (conservative estimate) is anticipated to be in the range of 0.6 to 6.5 kilolitres per day. However based on project specific hydraulic conductivity testing values, the probable groundwater inflow rate is anticipated to be in the range of 0.6 to 1.2 kilolitres per day. Similarly with the northern cut, most or all the groundwater inflow is anticipated to be evaporated, even for the scenario with the highest inflow rate.

Overall, the entire range of groundwater inflow rates are considered low.

### Groundwater levels

The maximum predicted change in groundwater level change due to road cuttings intersecting the water table is about four metres at both the airport interchange northern and southern cuts, with a maximum areal drawdown extent of about 220 metres.

The magnitude of potential drawdown associated with the two additional project cuts that may intersect the water table is sufficiently small such that:

- Regional groundwater drawdown will not occur
- Regional groundwater flows directions will not change
- Changes to groundwater system levels, if any, are anticipated to be highly localised to the project footprint and limited to the near surface groundwater systems.

The estimated changes to groundwater levels due to potential drawdown meet the minimal impact considerations outlined in the NSW Aquifer Interference Policy (DPI NOW, 2012) for GDEs and existing bores. Potential impacts to groundwater for the amended project are predicted to be minor and localised.

### Groundwater dependent ecosystems

There are no mapped GDEs or existing licensed bores within the area of the maximum drawdown areal extent for either of the two additional areas of cut.

The nearest mapped GDE to the Airport interchange northern cut is Badgerys Creek riparian zone. This is approximately 620 metres east of the cut. The nearest mapped GDE to the airport interchange southern cut is Badgerys Creek riparian zone, which is approximately 690 metres east of the cut.

Given that the estimated maximum drawdown areal extent for the airport interchange northern cut or airport interchange southern cut does not encroach upon areas of mapped GDEs, the estimated changes to groundwater levels due to potential drawdown meet the minimal impact considerations outlined in the NSW Aquifer Interference Policy (DPI NOW, 2012) for GDEs. This is consistent with the project as described in the EIS.

### Groundwater bores

There are no existing licensed bores within the area of the maximum drawdown areal extent for either of the two additional areas of cut for the amended project, with the nearest bore about 450 metres away.

As discussed above, the estimated changes to groundwater levels due to potential drawdown meet the minimal impact considerations outlined in the NSW Aquifer Interference Policy (DPI NOW, 2012) for existing bores.

### Groundwater take and licensing

As discussed in Section 2.2.1 of EIS, the project is exempt from the need for water use approval, a water supply work approval and a WAL.

For the purpose of assigning a volume for groundwater accounting, groundwater take from the western cut and airport interchange northern and southern cuts is summarised in **Table 6-56** for the amended project. **Table 6-56** presents the maximum estimated groundwater inflow for each groundwater inflow area. Therefore, the inflow volumes are considered conservative.

The annual estimate groundwater inflow from all three cuts as a result of the amended project is 7.87 megalitres per year. A water balance for both groundwater and surface water is provided in **Section 6.9.3**.

Table 6-56 Estimated groundwater take for amended project

| Road cutting area                        | Maximum estimated groundwater inflow rate (kL/day) | Maximum estimated groundwater inflow rate (ML/yr) |
|------------------------------------------|----------------------------------------------------|---------------------------------------------------|
| Western cut                              | 6.75                                               | 2.46                                              |
| Airport interchange northern cut         | 8.36                                               | 3.05                                              |
| Airport interchange southern cut         | 6.45                                               | 2.36                                              |
| Maximum total inflow volume = 7.87 ML/yr |                                                    |                                                   |

### Groundwater contamination and discharge

In the EIS, discharging potential groundwater inflows from the western cut was assessed as unlikely to impact sensitive receiving environments. This is consistent with the amended project.

There is currently no groundwater water quality data for the areas of the airport interchange northern cut and airport interchange southern cut. Potential discharge of groundwater inflows from these cuts, however, is not anticipated to result in adverse impacts to the receiving environments because the estimated inflow rates are very low (about 0.01 litres per second from each cut). All inflow rate scenarios would likely mostly or fully evaporate prior to being discharged.

Section 7.10.4 of the EIS identified the following potential groundwater contamination related risks during construction:

- Accidental spills or leakages of hazardous materials may result in groundwater contamination
- If groundwater is contaminated, construction workers coming into contact with this groundwater may be subjected to a human health risk
- Construction works may mobilise contaminants towards sensitive receiving environments.

The above risks are applicable to the airport interchange northern and southern cuts and are also assessed as low risk due to the very low inflow rates and likely evaporation of inflows prior to being discharged. Groundwater monitoring would further reduce risks to human health and the environment.

### 6.10.3.3 Operational impacts

Impacts to groundwater during the operational phase of the amended project are assessed to be generally consistent with those described in the EIS. This is because both the amended project and the EIS project are assessed as unlikely to cause changes to regional groundwater levels and flow directions, with regional drawdown not anticipated. Changes to groundwater systems, if any, are anticipated to be highly localised to the project footprint and limited to the near surface groundwater systems.

### 6.10.4 Cumulative impact

The cumulative groundwater quality and hydrology impacts associated with the amended project would be likely to remain unchanged from the assessment carried out as per Section 7.10.5 of the EIS, due to:

- All areas of identified road cuttings which may extend below the water table (ie western cut and airport interchange northern and southern cuts) are not expected to regionally impact groundwater flows and levels. Drawdown heights at these cuts and the expected areal drawdown extents are minimal and localised.
- Groundwater quality impacts of the project are expected to be minimal and highly localised.
- Given the project is unlikely to result in substantial impacts to groundwater alone, it is therefore also not anticipated to result in cumulative impacts in conjunction with surrounding projects.

### 6.10.5 Environmental management measures

Groundwater impacts associated with the amended project are generally consistent with impacts described in the EIS and would therefore be managed through the implementation of the proposed management measures described in Section 7.10.6 of the EIS. Two additional environmental management measures to manage the groundwater quality and hydrology impacts are proposed, however, along with slight amendments to two existing management measures to address the new cuttings. These are outlined in **Table 6-57**. Additional text is shown in **bold**.

The memorandum in **Appendix J** also includes a clarification on future sites for replacement bores, where construction will remove existing sites noted in the EIS. The groundwater monitoring program shown in Section 7.2 of Appendix N of the EIS indicates that bores BH104, BH107 and BH112 would require replacement during the construction period. The groundwater monitoring program (GW01) for the amended project would now include the two additional areas of cut at the airport interchange as well as the western cut for the construction phase and operational phase. The groundwater indicators to be monitored for the amended project will be as per Section 7.10.6 of the EIS. Groundwater monitoring locations for the baseline, construction and operational phases of the amended project are clarified in **Table 6-58**.



Table 6-57 Revised environmental management measures (groundwater quality and hydrology)  
(bold text shows change from EIS)

| Impact                                     | Reference | Environmental management measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Responsibility       | Timing                                         |
|--------------------------------------------|-----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|------------------------------------------------|
| Impacts on groundwater quality and flows   | GW01      | <p>Groundwater monitoring will be carried out as part of the construction water quality monitoring program for the project. The groundwater monitoring will be based on the water quality monitoring methodology, water quality indicators and the monitoring locations shown in Appendix N <b>of the EIS and Table 7-1 in the groundwater supplementary technical memorandum (Appendix J of amendment report)</b>.</p> <p>Baseline groundwater monitoring will be carried out at least monthly for at least six months before construction. Monitoring will also be carried out at least monthly during construction and will continue for at least six months of operation to verify that there are no groundwater impacts, and that management measures are adequate.</p>                                                                                                                                                | TfNSW/<br>Contractor | Prior to construction, and during construction |
| Alteration of groundwater flows and levels | GW02      | <p>Potential impacts on groundwater flows will be reconsidered as the detailed design for the project progresses, particularly in relation to the project's vertical alignment and extent of road cuttings. The aim of this will be to ensure that the groundwater controls proposed for the design as set out in this document would remain effective in mitigating groundwater impacts.</p> <p>In the instance that, during detailed design it cannot be demonstrated that the groundwater controls would be effective in mitigating potential impacts, or if observed groundwater inflow rates into the western cut <b>or airport interchange northern and southern cuts</b> are higher than estimated, additional measures will be implemented to minimise potential impacts to groundwater to minimise potential impacts on groundwater flows due to road cuttings or other sub-surface components of the project.</p> | Contractor           | Detailed design                                |
| Alteration of groundwater flows and levels | GW03      | <p><b>Installation of supplementary groundwater monitoring bores in the area of both airport interchange cuts would be carried out following project approval, at detailed design stage, to better understand groundwater depths and levels (and groundwater quality) in these areas.</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Contractor           | Detailed design                                |

| Impact                                     | Reference | Environmental management measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Responsibility | Timing                     |
|--------------------------------------------|-----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|----------------------------|
| Alteration of groundwater flows and levels | GW04      | <p>Groundwater will be monitored at the airport interchange northern and southern cuts and the western cut during the construction phase and operational phase as outlined in Table 7-1 in the groundwater supplementary technical memorandum (Appendix J of amendment report). The groundwater indicators to be monitored will be as per Section 7.2.5 of Appendix N of the EIS.</p> <p>Groundwater inflows to the airport interchange northern and southern cuts and the western cut are to be observed by the groundwater monitoring contractor during the construction and operational phases at monthly intervals. As part of observing the airport interchange northern and southern cuts and the western cut groundwater inflows, the groundwater monitoring contractor is to estimate the groundwater inflow rates and note the areas where groundwater inflow is occurring.</p> <p>During construction, if groundwater inflows are observed from the airport interchange northern and southern cuts and the western cut, the groundwater quality from the cut is to be sampled.</p> <p>Operational phase groundwater quality sampling, including the quality sampling of the airport interchange northern and southern cuts and the western cut inflows, is to occur at a monthly interval for at least 6 months.</p> | Contractor     | Construction and operation |

Table 6-58 Groundwater monitoring locations for the baseline, construction and operational phases of the amended project

| Monitoring type                                                       | Monitoring locations                                                                                                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                        |
|-----------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                       | Baseline phase                                                                                                                                                                             | Construction phase                                                                                                                                                                                                                                                                                                                                                                                                    | Operational phase                                                                                                                                      |
| Groundwater quality monitoring                                        | EIS dataset locations (BH104, BH112, BH145, BH202, BH207, BH209, BH217, BH223, BH301, BH302), plus supplementary post-EIS and amendment report monitoring at BH104, BH107, BH112 and BH145 | BH104, BH107, BH112 and BH145. However, at some point during construction, bores BH104, BH107, BH112 will be decommissioned and replaced with newly drilled and constructed bores. Once replaced, groundwater quality monitoring is to be undertaken at the replacement bores, plus continue at BH145.<br><br>Western cut, plus airport interchange northern cut and airport interchange southern cut                 | BH145, plus the bores that replace BH104, BH107, BH112.<br><br>Western cut, plus airport interchange northern cut and airport interchange southern cut |
| Groundwater level monitoring                                          | All project bores (except BH301 and BH302, which were installed to monitor gas)                                                                                                            | All project bores (except BH301 and BH302, which were installed to monitor gas) until the bores get progressively decommissioned during construction.<br><br>All bores except BH145 will be decommissioned.<br><br>Bores BH104, BH107, BH112 will be replaced with newly drilled and constructed bores. Once replaced, groundwater level monitoring is to be undertaken at the replacement bores, plus continue BH145 | BH145, plus the bores that replace BH104, BH107, BH112.                                                                                                |
| Groundwater inflows (observation of inflow rates and areas of inflow) | Not applicable                                                                                                                                                                             | Western Cut, plus airport interchange northern cut and airport interchange southern cut                                                                                                                                                                                                                                                                                                                               | Western Cut, plus airport interchange northern cut and airport interchange southern cut                                                                |



## 6.11 Soils and contamination

The soils and contamination supplementary technical memorandum is provided in **Appendix K**, and a summary is provided below. This section should be read in conjunction with Section 8.1 of the EIS and the soils and contamination assessment report provided in Appendix O of the EIS.

### 6.11.1 Assessment methodology

The assessment methodology comprised the following:

- Review of existing information to determine if the proposed changes to the construction footprint (as part of the amended project) would be located within or closer to existing areas of environmental interest (AEIs) identified in the EIS
- Site investigation carried out in January 2020, focusing on areas of the amended construction footprint that lie outside the EIS construction footprint
- Impact assessment, identifying changes to potential impacts to human health and environmental receivers from contamination and latent soil conditions exposed during construction and operation of the amended project.

The site investigation area, groundwater bore search area and broader study area for the soils and contamination assessment (see Section 8.1.2 of the EIS) were all updated for the supplementary assessment (see **Figure 6-57**). The amended study areas and their purposes are defined as follows:

- Amended site investigation area – Accessible areas within the amended construction footprint, and nearby land uses and potential AEIs where the site investigation was carried out
- Amended groundwater bore search area – The amended construction footprint and about a 500 metres radius, which was used to identify nearby groundwater bores
- Amended broader study area – The amended construction footprint and about a two kilometres radius. This study area is used to assess regional soil and geological conditions.

### 6.11.2 Existing environment

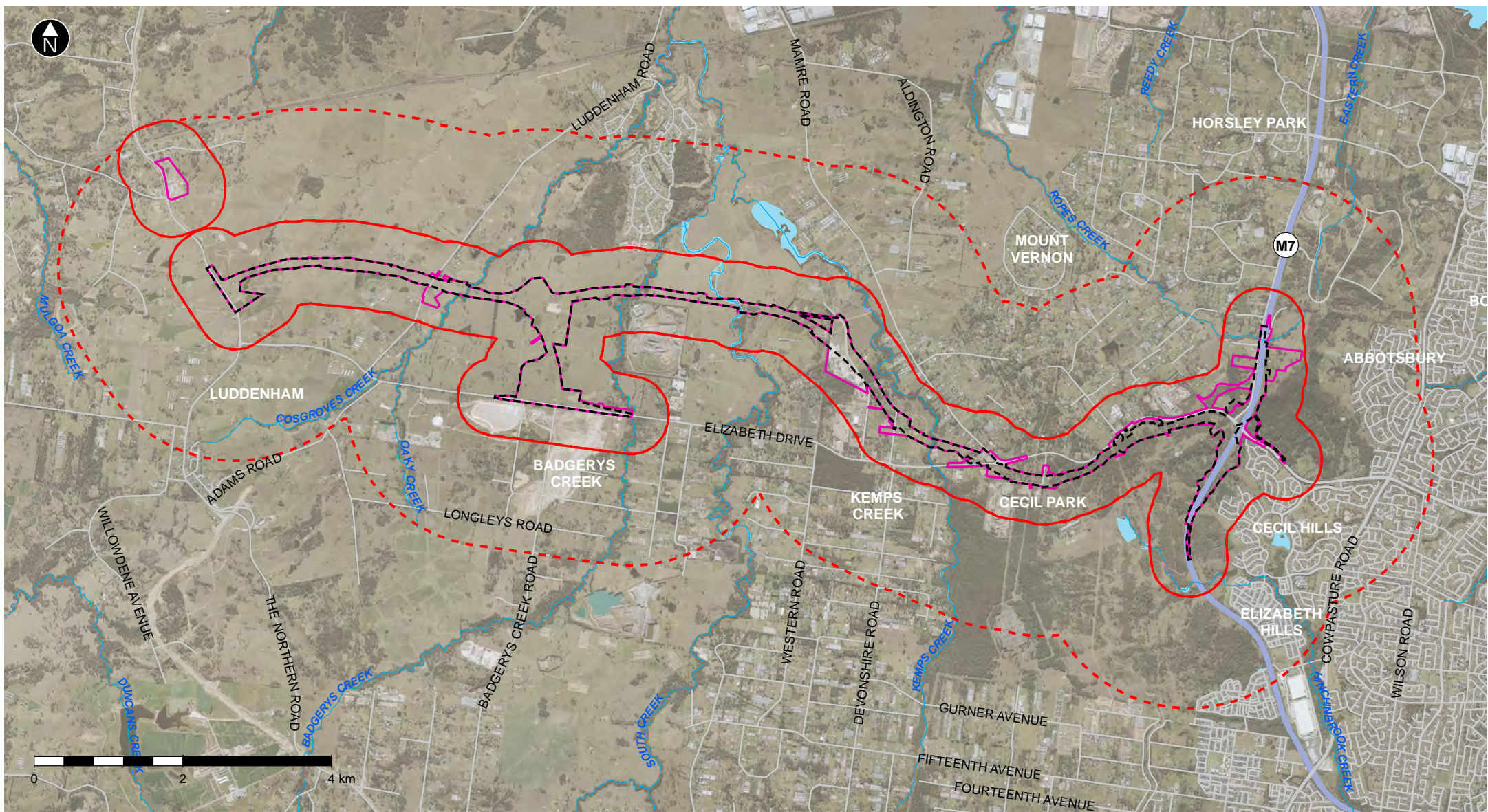
The existing environment described in Section 8.1.3 of the EIS is still applicable to the amended project, with the exception of soil landscapes and contamination which is discussed in the following sections.

#### 6.11.2.1 *Soil landscapes*

Section 8.1.3 of the EIS identified four soil landscape types; Luddenham, Picton, Blacktown and South Creek. A small area was also mapped as Disturbed Terrain.

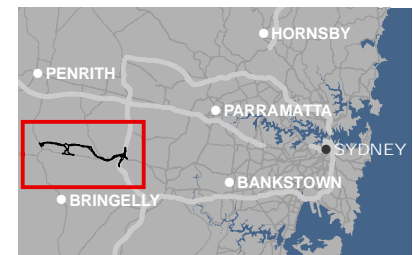
In addition to the soil landscapes identified in the EIS, the ancillary facilities between Clifton Avenue and Salisbury Avenue for the amended project are located within the Berkshire Park soil landscape type. Relevant limitations for the project include a very high wind erosion hazard if cleared, gully, sheet and rill erosion on dissected areas, localised seasonal waterlogging, localised flood hazard, low fertility and impermeable soils.





- The project construction footprint as per EIS
- The amended project construction footprint
- Amended study area for the purpose of the groundwater bore search (500 m)
- Amended broader study area (2 km)

- ~~~~~ Waterways
- Motorway
- Main roads



**Figure 6-57** Soils and contamination study area for the amended project



### 6.11.2.2 Contamination

#### Renamed AEIs

Twenty-nine AEIs were identified within the broader study area that could pose a potential contamination risk to construction activities of the project as described in the EIS, and contain contaminants of concern.

A review of the additional information during this supplementary assessment has resulted in the renaming of two of the AEIs discussed in the EIS:

- AEI 7
  - Formerly: Former Kari & Ghossayn Pty Ltd (Solid Waste Landfill)
  - Now: Area of waste and imported fill
- AEI 9
  - Formerly: Sydney Recycling Park / Wanless Recycling
  - Now: Sydney Recycling Park / Wanless Recycling and Former Kari & Ghossayn Pty Ltd (Solid Waste Landfill).

#### Risk exposure rating review

Seven of these AEIs identified in the EIS were identified to have a moderate to high exposure risk rankings (see Section 4.1 of **Appendix K**). Risk exposure rankings were reassessed for all the AEIs to understand changes due to the amended project. The following AEI risk ratings have changed from the EIS, including:

- AEI 6: PGH Bricks and Pavers. This AEI would experience an increase in risk rating from low to moderate due to the amended project being closer in proximity to the AEI and located within the potential contamination distribution range (laterally and vertically)
- AEI 9: Sydney Recycling Park/ Wanless Recycling and Former Kari & Ghossayn Pty Ltd (Solid Waste Landfill). This AEI would experience an increase in risk rating from low to moderate due to the amended project being closer in proximity to the AEI and located within the potential contamination distribution range (laterally and vertically)
- AEI 21: Area of illegally dumped material. This AEI would experience an increase in risk rating from moderate to high due to the confirmed presence of asbestos containing material during the site investigation.

Further detail on these AEIs is provided in **Section 6.11.3**.

#### AEIs associated with proposed changes

The only area of the amended project that is not covered by the groundwater bore search area as described in the EIS, is the additional construction ancillary facility east of The Northern Road (AF 10). Desktop reviews for the proposed location of AF 10 conclude that:

- There is no known or expected occurrence of ASS within the vicinity of the location of AF 10
- The potential for encountering acid rocks at the location of AF 10 is considered to be extremely low given the underlying geology consists of Bringelly shales which has no documented occurrence of acid rock to date
- There are no registered groundwater wells within a 500 metre radius of AF 10



- There are no contaminated sites or regulated sites (ie current notices) registered with the NSW EPA identified within 500 metres of additional ancillary area AF 10
- One premise within the area of additional ancillary area AF 10 or within approximately 500 metres of AF 10 which was historically or is currently licensed by the NSW EPA. This premise is located next to the amended project to the west and comprises CPB Contractors Pty Limited; Road construction (see AEI 23 in **Table 6-59**).

### Amended AEIs

Based on the desktop review and site investigations, four additional AEIs have been identified for the amended project and are described in **Table 6-59**, two with a moderate risk rating. Three of these (AEI 24, 25 and 26) were identified during site investigation. There are, therefore, 33 AEIs relevant to the amended project. There would be no changes to the findings on areas of identified historical filling as a result of the amended project.

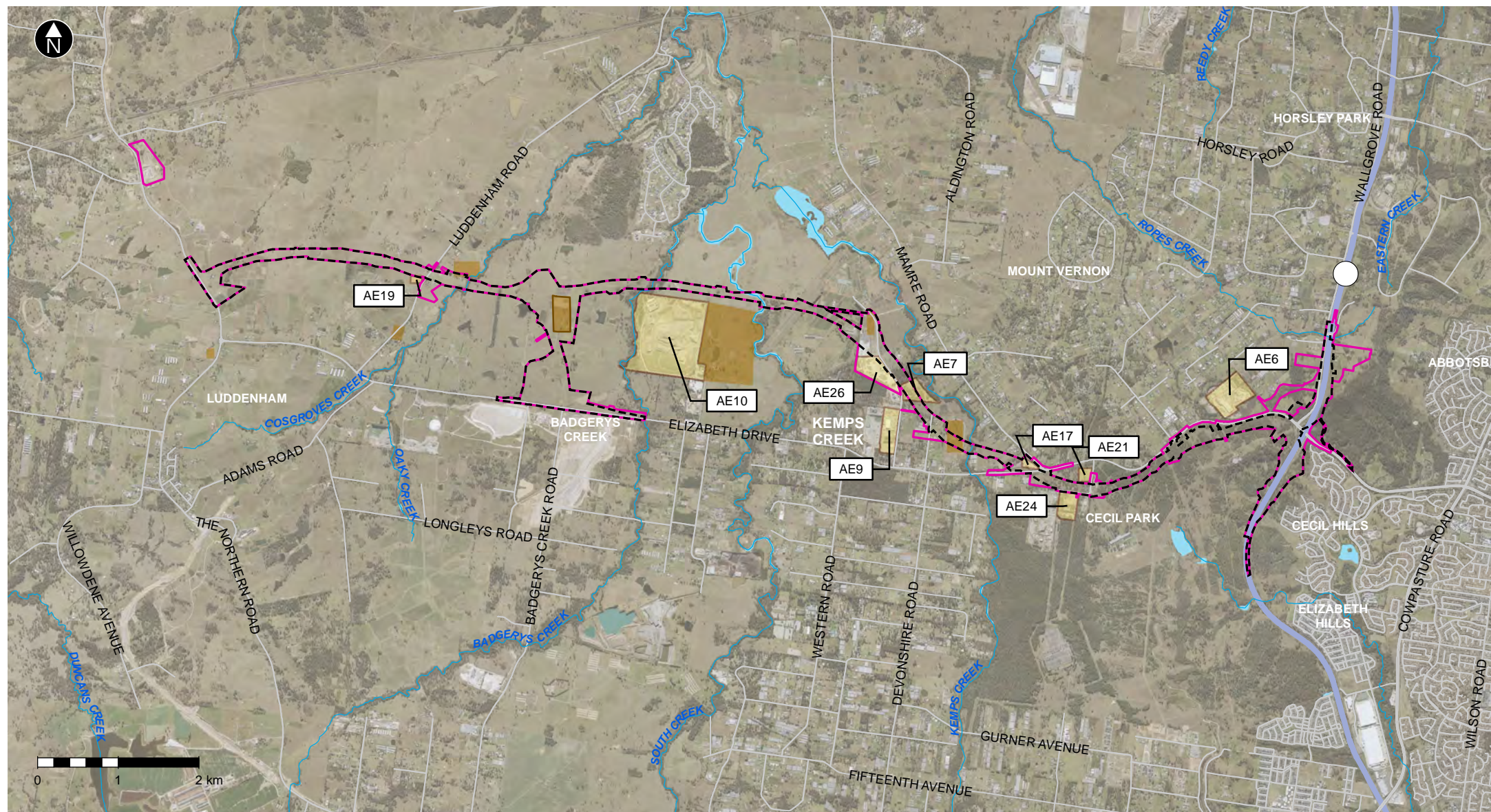
In addition, the assessment identified that the two additional areas of cut; Airport interchange northern cut and Airport interchange southern cut (see **Figure 6-56**), are located within a potential area of existing fill.

In summary, there would be a total of 11 AEIs identified as having a moderate to high risk rating for the amended project (an increase from seven AEIs identified in the EIS), including:

- AEI 6: PGH Bricks and Pavers (re-assessed risk rating – low to moderate)
- AEI 7: Area of waste and imported fill
- AEI 9: Sydney Recycling Park/ Wanless Recycling and Former Kari & Ghossayn Pty Ltd (Solid Waste Landfill) (re-assessed risk rating – low to moderate)
- AEI 10: SUEZ Kemps Creek Resource Recovery Park
- AEI 17: Stockpiles within Hi-quality Quarry Group Head Office
- AEI 19: Miscellaneous construction activities and stockpiles of building materials
- AEI 21: Area of illegally dumped material
- AEI 24: Stockpiles within the OzSource property (new AEI)
- AEI 26: TreeServe (new AEI)
- Generic AEI: Potential areas of existing fill
- Generic AEI: Historical uncontrolled earthworks containing asbestos and buildings/ structures.

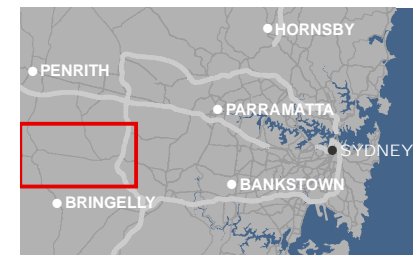
The location of AEIs with a moderate to high rating for the amended project is shown in **Figure 6-58**.





- Waterways
- Motorway
- Main roads
- The project construction footprint as per EIS
- The amended project construction footprint
- Potential areas of existing fill
- Areas of environmental interest:

| Site Id | Site name                                                                                        |
|---------|--------------------------------------------------------------------------------------------------|
| 6       | PGH Bricks and Pavers                                                                            |
| 7       | Area of waste and imported fill                                                                  |
| 9       | Sydney Recycling Park/ Wanless Recycling & Former Kari & Ghossayn Pty Ltd (Solid Waste Landfill) |
| 10      | SUEZ Kemps Creek Resource Recovery Park                                                          |
| 17      | Stockpiles within Hi-quality Quarry                                                              |
| 19      | Miscellaneous construction activities and stockpiles of building materials                       |
| 21      | Area of significant flytipped waste                                                              |
| 24      | Stockpiles within the OzSource Property                                                          |
| 26      | TreeServe (wood processing, stockpiles of woodchips, logs and fire wood)                         |



**Figure 6-58** Amended AEIs with moderated to high ranking and potential fill areas



Table 6-59 Additional AEIs identified for the amended project

| AEI | Site                                                    | Location                                                                                                                             | Potential contaminants of concern                                                                                                                                                                                                | Risk rating |
|-----|---------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|
| 23  | CPB Contractors Pty Limited- Road construction          | Between Eaton Road, Luddenham and Glenmore Parkway at Orchard Hills and Luddenham (next to additional ancillary facility site AF 10) | Heavy metals, total recoverable hydrocarbons (TRH), benzene, toluene, ethylbenzene and xylene (BTEX), phenols and poly-aromatic hydrocarbons (PAH), organochlorine Pesticides (OCP), organophosphorus Pesticides (OPP), asbestos | Low         |
| 24  | Stockpiles within the OzSource property                 | Range Road, Cecil Park (within amended construction footprint south of Range Road)                                                   | Heavy metals, BTEX, asbestos, PAH, OCP, OPP, polychlorinated biphenyls (PCB), TRH associated with stockpiled material                                                                                                            | Moderate    |
| 25  | Large area of fill placed in stockpiles                 | 2161-2177 Elizabeth Drive, Luddenham (800 metres south of amended construction footprint)                                            | Heavy metals, BTEX, asbestos, PAH, OCP, OPP, PCB, TRH associated with stockpiled fill material                                                                                                                                   | Low         |
| 26  | TreeServe – stockpiles of woodchips, logs and fire wood | 90 Clifton Avenue, Kemps Creek (within the amended construction footprint)                                                           | Heavy metals, BTEX, PAH, TRH, (volatile organic compound) VOC associated with the onsite, processing of wood products (ie woodchips, large logs and firewood) and machinery/plant used to handle and process the wood.           | Moderate    |

## 6.11.3 Assessment of potential impacts

### 6.11.3.1 Construction impacts

#### Soil contamination

Table 8-9 in the EIS identified that a Phase 2 Detailed Site Investigation (Phase 2 DSI) would be carried out for the six AEIs identified as having a risk ranking of moderate or high, and for AEIs where PAH has been identified in soils at concentrations exceeding the respective human health investigation levels. Based on the amended project, an additional two AEIs would require a Phase 2 DSI. The following eight AEIs would require a Phase 2 DSI, with additional AEIs shown in **bold**:

- AEI 7: Area of waste and imported fill
- AEI 10: SUEZ Kemps Creek Resource Recovery Park
- AEI 17: Stockpiles within Hi-quality Quarry Group Head Office
- AEI 19: Miscellaneous construction activities and stockpiles of building materials
- AEI 21: Area of significant illegally dumped material



- **AEI 24: Stockpiles within the OzSource property**
- **AEI 26: TreeServe (wood processing, stockpiles of woodchips, logs and fire wood)**
- Generic AEI: Potential areas of existing fill.

Further soil investigations would also be required in areas of the amended construction footprint located adjacent to the following three AEIs:

- AEI 6: PGH Bricks and Pavers
- AEI 9: Sydney Recycling Park/ Wanless Recycling and Former Kari & Ghossayn Pty Ltd (Solid Waste Landfill)
- AEI 10: SUEZ Kemps Creek Resource Recovery Park.

Additional soil investigations for potential contaminants of concern for the area's current and historical agricultural land use and areas of potential fill, would be also required at the two additional areas of cut (airport interchange northern cut and airport interchange southern cut) (see **Section 6.10.3**).

### Groundwater contamination

As discussed in **Section 6.10.3**, the EIS identified one location where the project may intersect the water table, the western cut. The amended project would result in two additional areas of cut that may potentially intersect the water table, airport interchange northern cut and airport interchange southern cut.

At all three areas of cut, estimated inflow rates are considered very low and would likely mostly or fully evaporate prior to being discharged. The potential discharge of groundwater inflows are therefore not anticipated to impact the receiving environment. However, where excavations for these cuts encounter groundwater there is the potential for impacts to human health through the possibility of construction workers to come into direct contact with the groundwater during excavation works.

The groundwater quality at these proposed cut locations could be impacted by general filling and historical or current agricultural land use in the vicinity of these cuts. Based on the potential for human health impacts to construction workers, groundwater would be required to be assessed for potential contaminants of concern including, heavy metals, TRH, BTEX, PAH, PCB, OCP, OPP and nutrients.

#### **6.11.3.2 Operational impacts**

Soil and contamination impacts during the operational phase of the amended project are assessed to be generally consistent with those described in the EIS.

As discussed in **Section 6.10.3**, groundwater inflows during operation at the two additional areas of cut are likely to be the same or less than during construction due to reduced hydraulic gradients. Similarly, discharge volumes (if there are any) would be less during operation. Adverse impacts to receiving environments due to potential operational groundwater discharge from the additional areas of cuts are therefore not anticipated to impact the receiving environments.

#### **6.11.4 Cumulative impacts**

The cumulative soil and contamination impacts associated with the amended project would be likely to remain unchanged from the assessment carried out as per Section 8.1.5 of the EIS.

### 6.11.5 Environmental management measures

The environmental management measures identified in Section 8.1.6 of the EIS are considered appropriate to manage the soil and contamination impacts associated with the amended project. The proposed changes would not require any additional environmental management measures.

However, one environment management measure (SC05) has been revised to include the additional sites requiring a Phase 2 DSI as discussed in **Section 6.11.3.1**. The revised environmental management measures for impacts of soils and contamination are presented in **Table 6-60**, with additional text shown in **bold** and removed text shown as strikethrough text (~~example~~).

Table 6-60 Revised environmental management measures (soils and contamination) (bold and strikethrough text shows change from EIS)

| Impact                                        | Reference | Environmental management measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Responsibility | Timing                |
|-----------------------------------------------|-----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|-----------------------|
| Impacts of soil and groundwater contamination | SC05      | <p>Detailed site (contamination) investigations will be carried out in accordance with the NSW EPA (1995) Sampling Design Guidelines and other NSW EPA endorsed guidance including the NEPM (2013) guidelines within the following AEI locations to confirm the presence of contamination before the start of construction at these locations:</p> <ul style="list-style-type: none"> <li>• <b>AEI 17: Stockpiles within Hi-quality Quarry Group Head Office</b></li> <li>• Within AEI 19: the area of miscellaneous construction activities and stockpiles of building materials along Luddenham Road (Lot 1, DP228498)</li> <li>• Within AEI 7: <b>Area of waste and imported fill</b> <del>Former Kari and Ghossayn solid waste landfill (Lot 17, Clifton Avenue)</del></li> <li>• Within AEI 21: Area of illegally dumped material along Range Road, Cecil Park</li> <li>• <b>Within AEI 24: Stockpiles within the OzSource property</b></li> <li>• <b>Within AEI 26: TreeServe (wood processing, stockpiles of woodchips, logs and fire wood)</b></li> <li>• Within the 'potential areas of existing fill' identified in the Soils and contamination assessment report (<b>Appendix K</b> <del>Appendix G</del>) for the <b>amended</b> project.</li> </ul> <p>Further soil investigations will be required in areas of the amended construction footprint located adjacent to the following two AEIs to confirm the presence of contamination before the start of construction at these locations:</p> <ul style="list-style-type: none"> <li>• <b>Within AEI 6: PGH Bricks and Pavers</b></li> </ul> | Contractor     | Prior to construction |

| Impact | Reference | Environmental management measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Responsibility | Timing |
|--------|-----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|--------|
|        |           | <ul style="list-style-type: none"> <li>• <b>Within AEI 9: Sydney Recycling Park/ Wanless Recycling and Former Kari &amp; Ghossayn Pty Ltd (Solid Waste Landfill)</b></li> <li>• <b>AEI 10: SUEZ Kemps Creek Resource Recovery Park</b></li> </ul> <p><b>Additional soil and groundwater investigations will be required in the areas of additional cut around the airport interchange northern cut and airport interchange southern cut to further assess the potential impacts to the amended project.</b></p> <p>Depending on results of the investigations, or if remediation is deemed required at any site within the amended construction footprint, a Remedial Action Plan will be prepared before construction.</p> |                |        |



## 6.12 Air quality

The air quality updated technical memorandum is provided in **Appendix L**, and a summary is provided below. This section should be read in conjunction with Section 8.2 of the EIS and the air quality assessment report provided in Appendix P of the EIS.

### 6.12.1 Assessment methodology

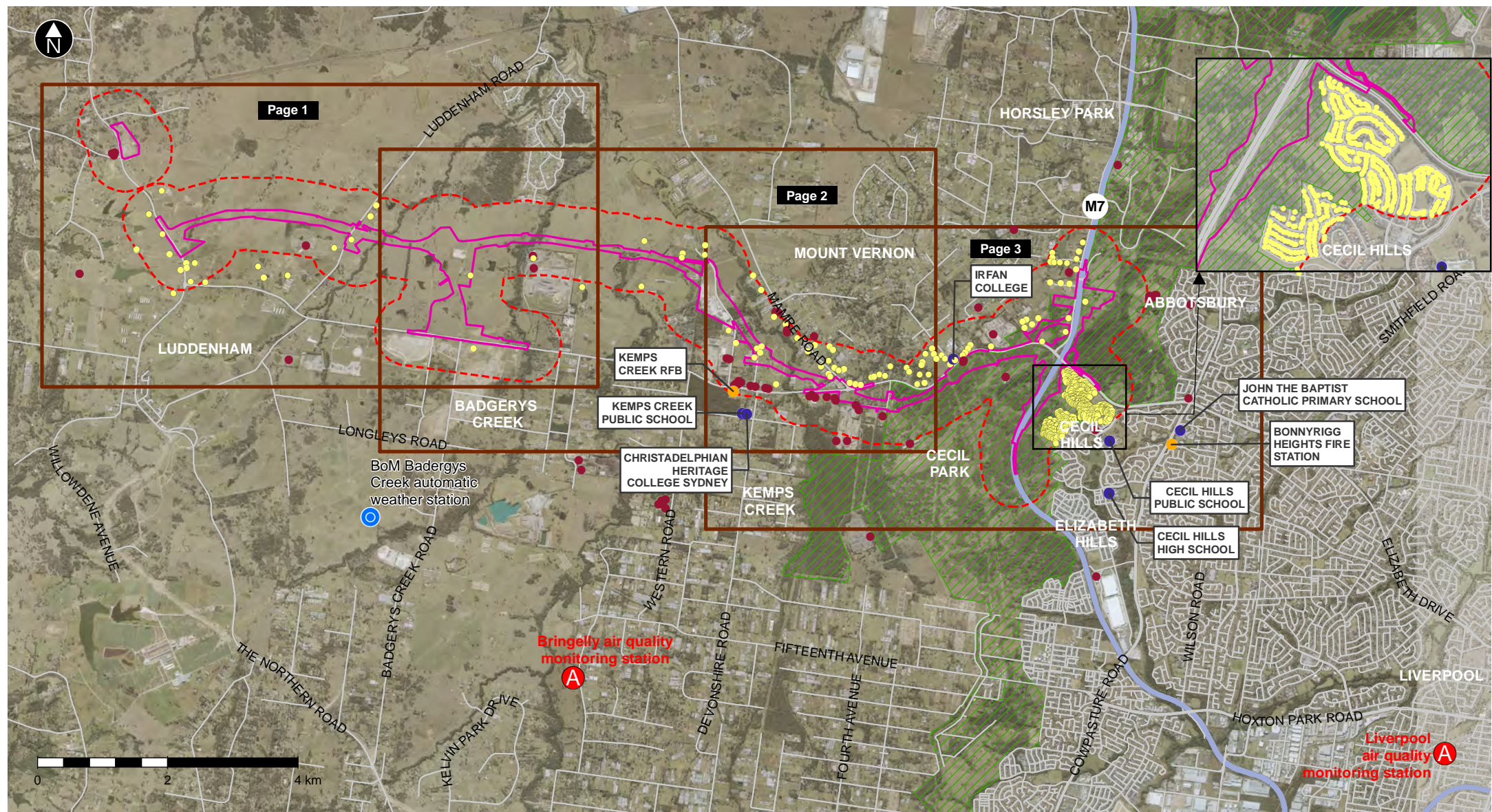
The assessment methodology comprised the following:

- Review of details of the amended project – to identify key air quality-related risks during construction and operation
- Review of statutes, policies and guidelines – to determine if any additional statutes, policies and guidelines would be applicable to the amended project
- Inclusion of updated data, where available – including updated traffic conditions, land-use data, planned road network and public transport updates, and updated transport modelling
- Use of the United Kingdom Institute of Air Quality Management (UK IAQM) semi-quantitative risk-based approach – to assess any changes in potential construction air quality impacts as a result of the amended project compared to those described in the EIS
- Application of the Tool for Roadside Air Quality (TRAQ) – to predict changes in potential operational air quality impacts as a result of the amended project for the same scenarios as described in the EIS
  - Results were then compared with the air quality impacts predicted for the project as described in the EIS to determine how air quality impacts would be changed from what was previously assessed
  - While the impact assessment criteria from the NSW EPA's 'Approved Methods for the Modelling and Assessment of Air Pollutants in NSW' (Approved Methods) (2016) do not specifically apply to road projects, they were also considered to provide an indication of the project's impact on air quality during operation
- Review of changes to potential cumulative air quality impacts as a result of the amended project
- Review of measures to mitigate or otherwise effectively manage any potential impacts detailed in the EIS.

The construction study area for the updated air quality assessment is shown in **Figure 6-59**. This represents a 350 metre buffer from the amended construction footprint. The operational study area for the updated air quality assessment is shown in **Figure 6-60**. This represents a 200 metre buffer from the amended construction footprint.

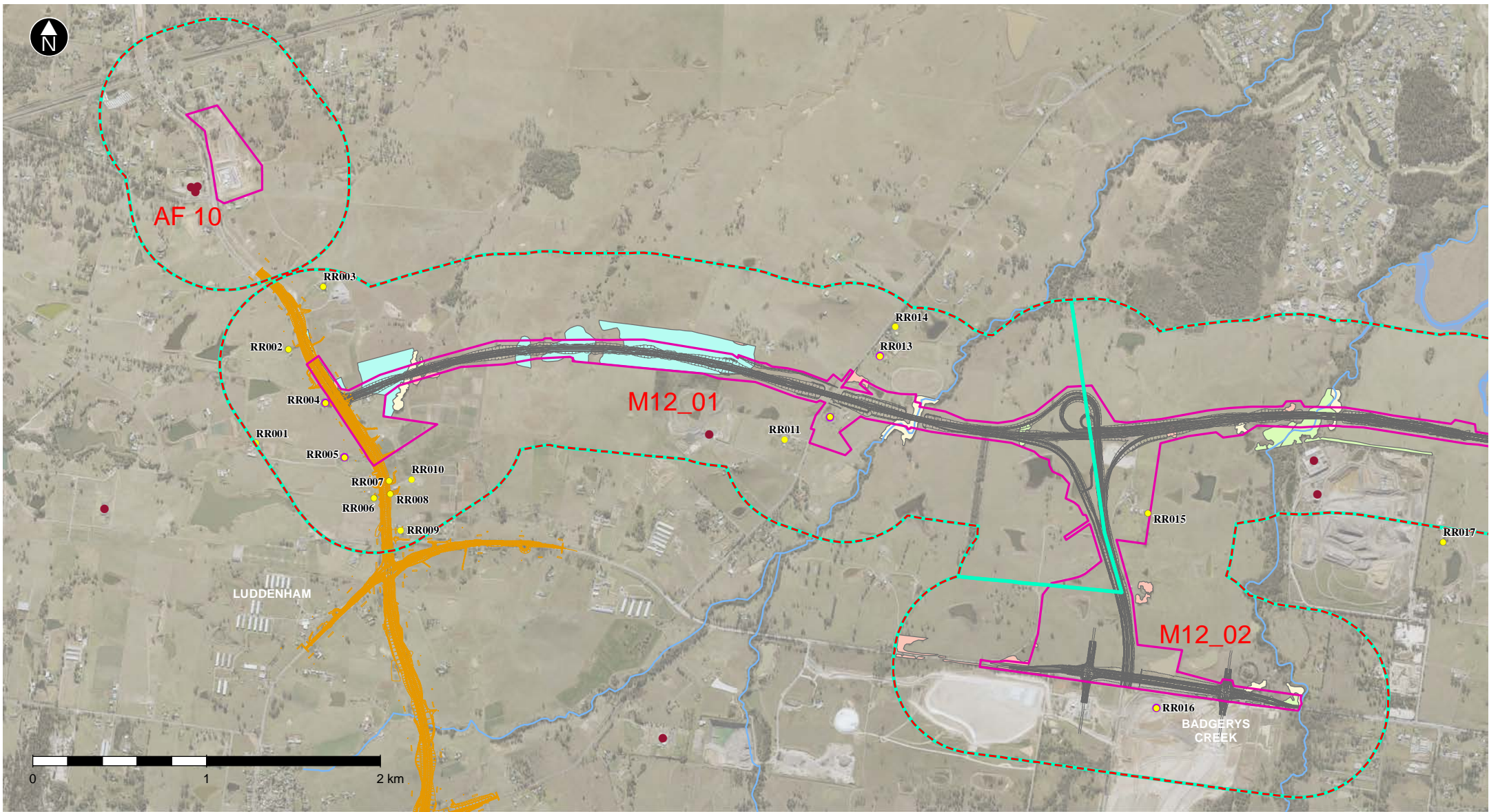
Emissions were assessed for the construction and operational road segments presented in **Figure 6-59** and **Figure 6-60** respectively. The operational road segments are consistent with those described in the EIS. The construction road segments are generally consistent with those described in the EIS, but with one additional road segment added (see **Figure 6-59**). This segment accounts for risks associated with AF 10 as a result of the amended project. This ancillary facility would be located outside the area covered by the construction assessment segments for the project as described in the EIS.



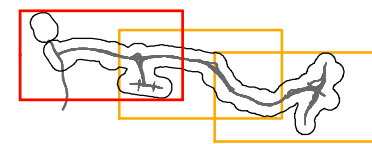


**Figure 6-59** Amended construction air quality study area and nearby sensitive receivers



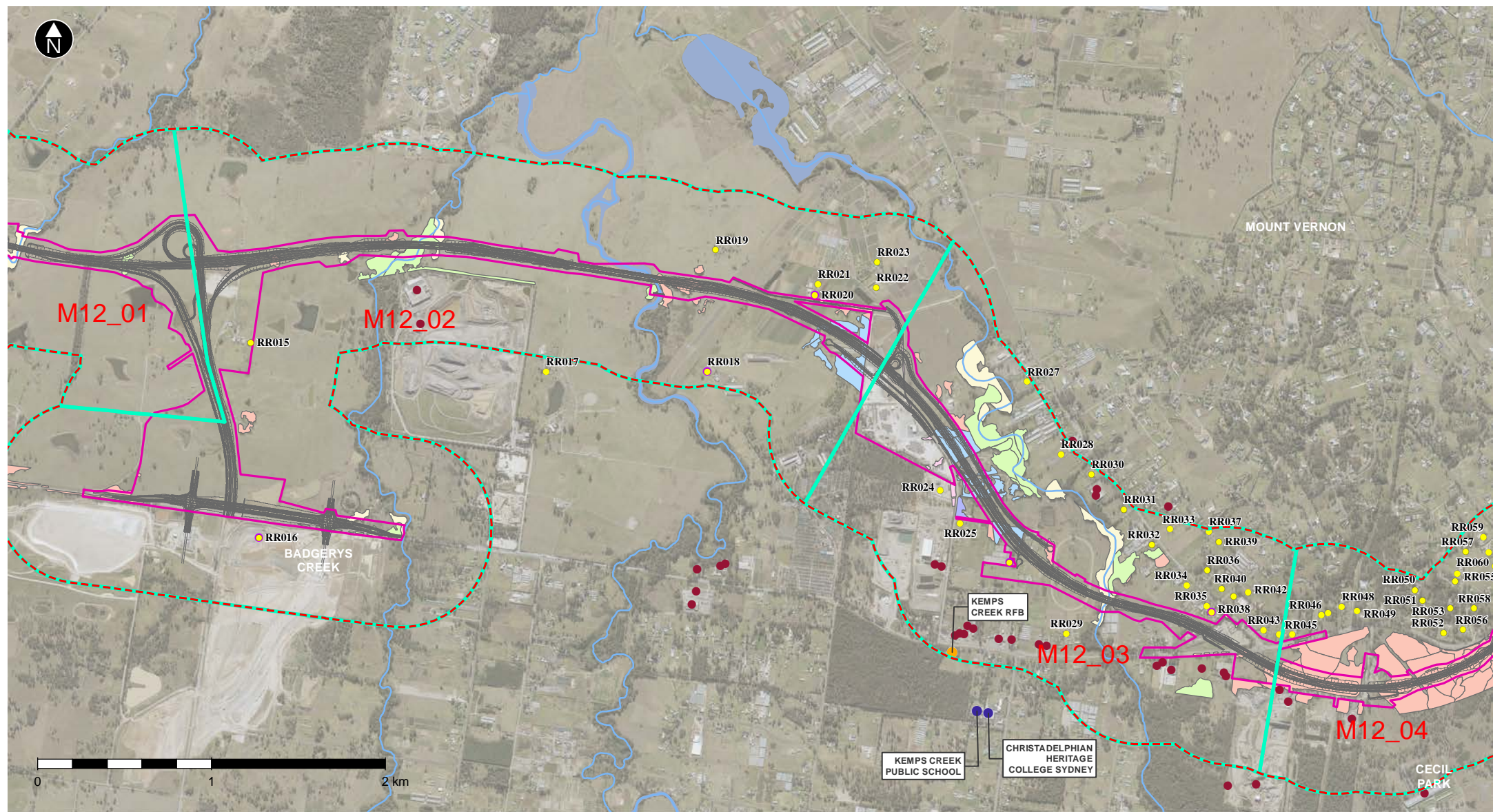


- |                                                                                                                                                                                                                                                        |                                                                                                                               |                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                              |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>The amended project</li> <li>Part of The Northern Road upgrade project</li> <li>The amended project construction footprint</li> <li>Amended study area (construction)</li> <li>Construction segments</li> </ul> | <b>Receivers</b> <ul style="list-style-type: none"> <li>Residential</li> <li>Nearest receivers</li> <li>Commercial</li> </ul> | <b>Threatened Ecological Communities (TEC)</b> <ul style="list-style-type: none"> <li>Cumberland Plain Woodland in the Sydney Basin Bioregion</li> <li>Cumberland Plain Woodland in the Sydney Basin Bioregion (derived grassland form)</li> </ul> | <ul style="list-style-type: none"> <li>River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions</li> <li>Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions</li> </ul> |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|



**Figure 6-59** Amended construction air quality study area and nearby sensitive receivers





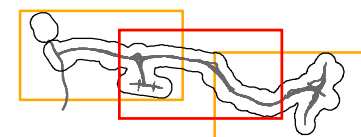
- The amended project
- The amended project construction footprint
- - - Amended study area (construction)
- Construction segments

- Receivers**
- Residential
  - Educational facility
  - Emergency services
  - Nearest receivers
  - Commercial

- Threatened Ecological Communities (TEC)**
- Castlereagh Scribbly Gum Woodland in the Sydney Basin Bioregion
  - Cooks River/Castlereagh Ironbark Forest in the Sydney Basin Bioregion
  - Cumberland Plain Woodland in the Sydney Basin Bioregion

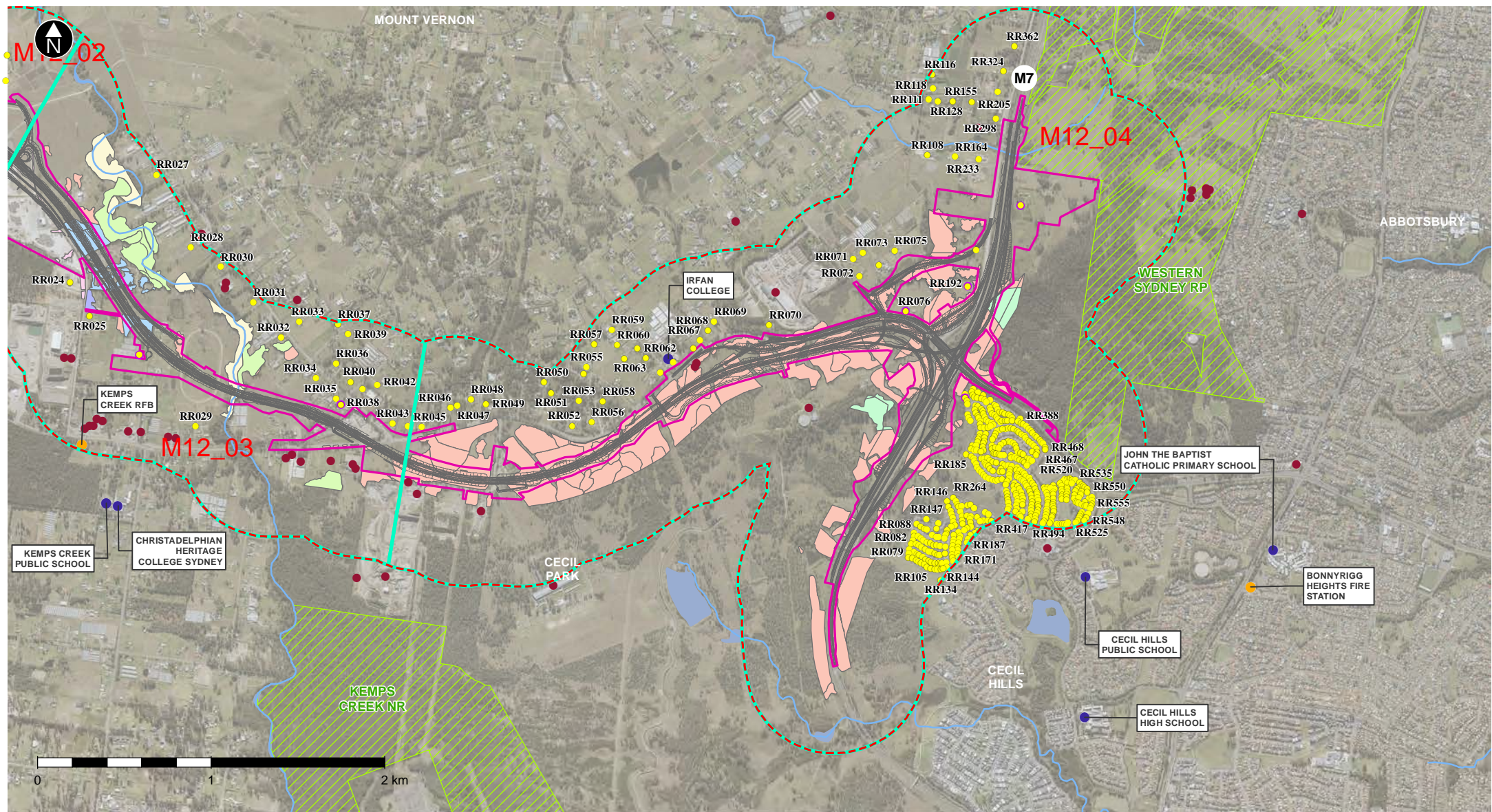
- River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions
- Shale Gravel Transition Forest in the Sydney Basin Bioregion
- Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions

- NPWS estate / reserves



**Figure 6-59** Amended construction air quality study area and nearby sensitive receivers





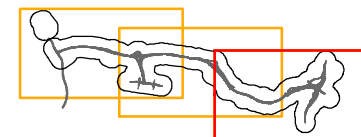
- The amended project
- The amended project construction footprint
- - - Amended study area (construction)
- Construction segments

- Receivers**
- Residential
  - Educational facility
  - Emergency services
  - Nearest receivers
  - Commercial

- Threatened Ecological Communities (TEC)**
- Castlereagh Scribbly Gum Woodland in the Sydney Basin Bioregion
  - Cooks River/Castlereagh Ironbark Forest in the Sydney Basin Bioregion
  - Cumberland Plain Woodland in the Sydney Basin Bioregion
  - Moist Shale Woodland in the Sydney Basin Bioregion

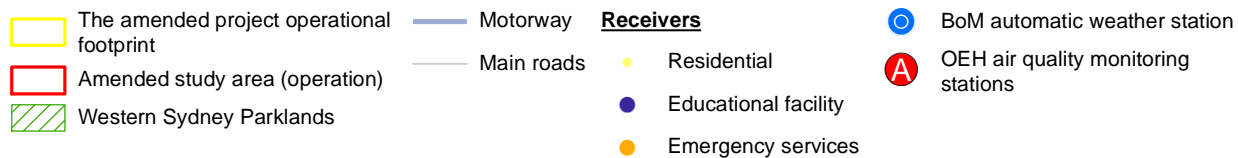
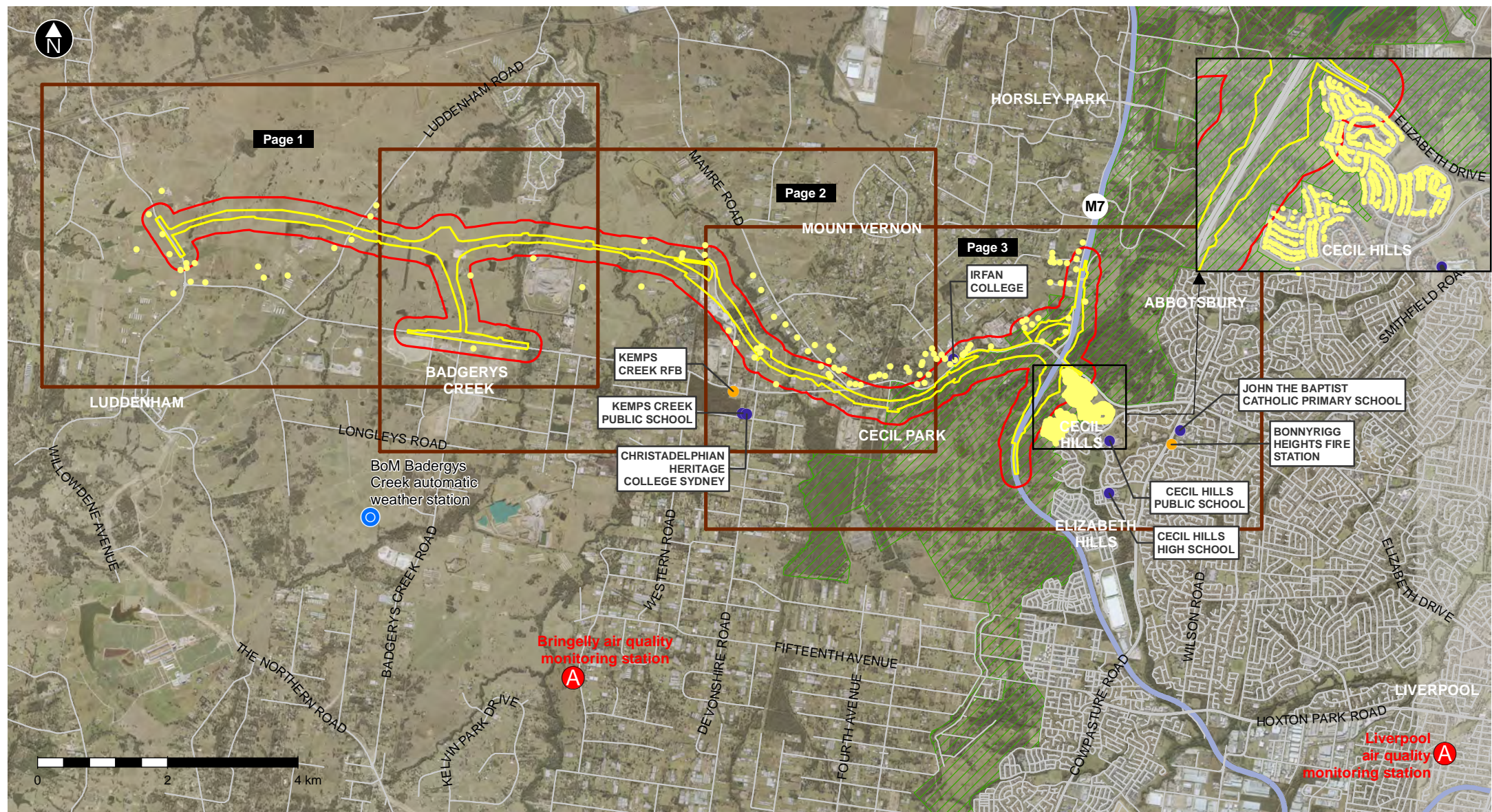
- River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions
- Shale Gravel Transition Forest in the Sydney Basin Bioregion
- Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions

- NPWS estate / reserves



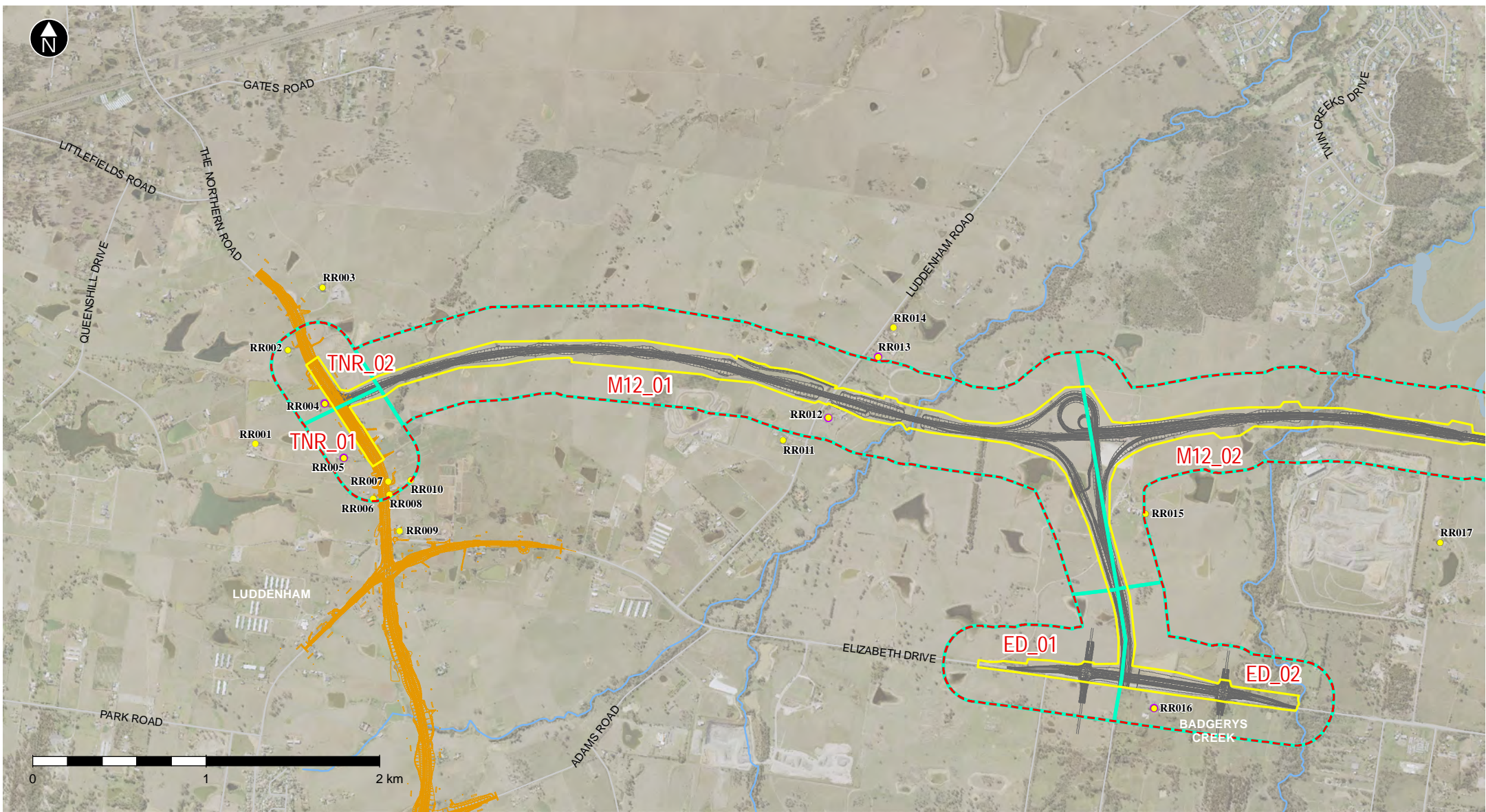
**Figure 6-59** Amended construction air quality study area and nearby sensitive receivers



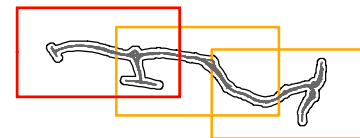


**Figure 6-60** Amended operational air quality study area and nearby sensitive receivers



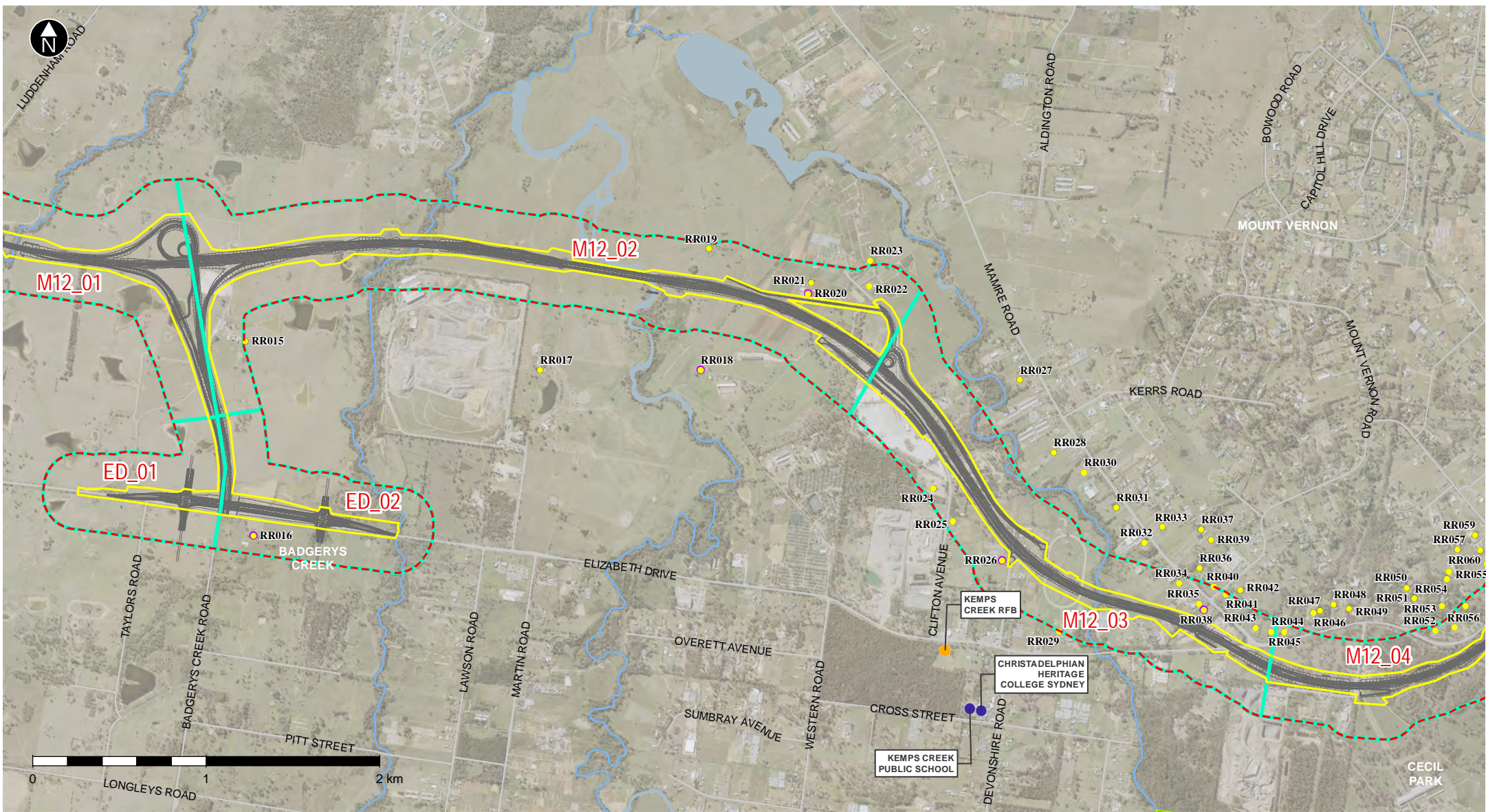


- The amended project
  - The amended project operational footprint
  - Amended study area (operation)
  - Operational segments
- Receivers**
- Residential
  - Nearest receivers

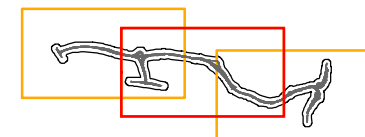


**Figure 6-60** Amended operational air quality study area and nearby sensitive receivers



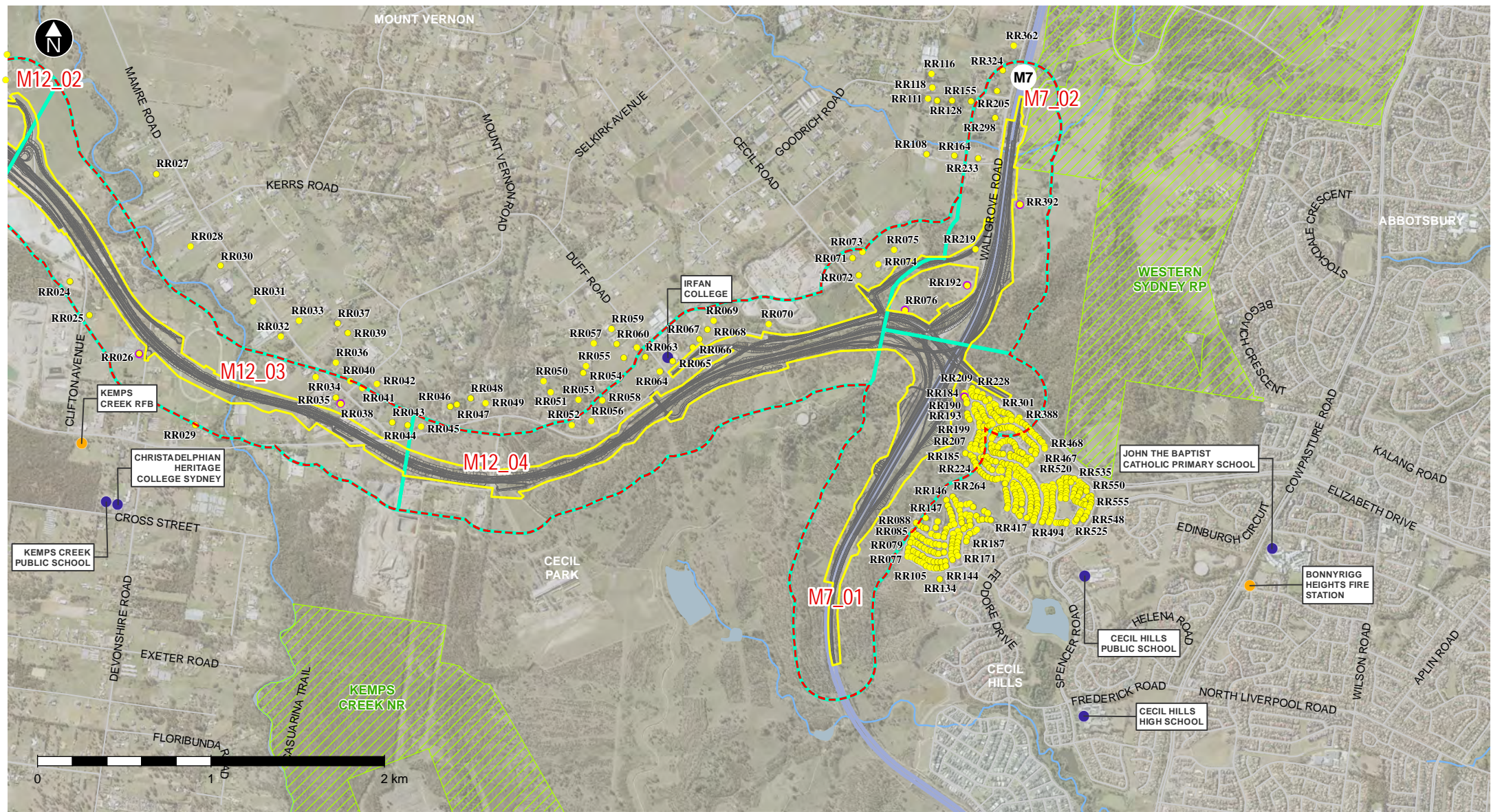


- |                                                                                                                                                                                                    |                                                          |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------|
| — The amended project                                                                                                                                                                              | <b>Receivers</b>                                         |
| <span style="border: 1px solid yellow; display: inline-block; width: 20px; height: 10px;"></span> The amended project operational footprint                                                        | <span style="color: yellow;">●</span> Residential        |
| <span style="border: 1px dashed red; display: inline-block; width: 20px; height: 10px;"></span> Amended study area (operation)                                                                     | <span style="color: blue;">●</span> Educational facility |
| <span style="border: 1px solid cyan; display: inline-block; width: 20px; height: 10px;"></span> Operational segments                                                                               | <span style="color: orange;">●</span> Emergency services |
| <span style="background: repeating-linear-gradient(45deg, transparent, transparent 2px, yellow 2px, yellow 4px); display: inline-block; width: 20px; height: 10px;"></span> NPWS estate / reserves | <span style="color: purple;">●</span> Nearest receivers  |

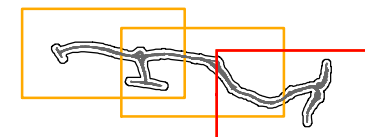


**Figure 6-60** Amended operational air quality study area and nearby sensitive receivers





- The amended project
- The amended project operational footprint  
 Amended study area (operation)  
 Operational segments  
 NPWS estate / reserves
- Receivers**
- Residential
  - Educational facility
  - Emergency services
  - Nearest receivers



**Figure 6-60** Amended operational air quality study area and nearby sensitive receivers



## 6.12.2 Existing environment

The existing environment described in Section 8.2.3 of the EIS is still applicable to the amended project. Changes to the alignment of the M12 Motorway and amended construction footprint would result some changes to the construction activities and operational traffic flows along some portions of the project. This is further described in **Section 6.12.3**.

## 6.12.3 Assessment of potential impacts

### 6.12.3.1 Construction impacts

The semi-quantitative method developed by the UK IAQM (2014) was used to assess the potential for dust impacts during the construction phase of the project as described in the EIS for the assessment segments M12\_01 to M12\_04 shown in **Figure 6-59**. The amended project was assessed under the same approach, consisting of:

- Step 1: screening review
- Step 2A: evaluating the potential magnitude of the works
- Step 2B: determining receiver sensitivities to dust soiling, human health and ecological dust impacts
- Step 2C: estimating the risk of dust soiling, human health and ecological dust impacts if no mitigation measures are applied
- Step 3: mitigation and management, involving the development of mitigation measures for each work location depending on the level of risk determined in Step 2
- Step 4: residual risks, involving evaluation of any residual dust related risks following the application of the mitigation measures in Step 3 to verify that a suitable level of mitigation has been applied to reduce the impact to the extent practicable.

For the assessment segments shown in Figure 8-13 of the EIS, the results of Step 1 and Step 2A of the IAQM methodology for the amended project were found to be consistent with the results identified for the EIS (See Section 8.2.4 of the EIS).

However, there were changes to Step B sensitivity ratings along assessment segments M12\_01 and M12\_04 as a result of the changes in setback distances to surrounding sensitive receivers associated with the amended project. Step 2B sensitivity ratings for dust soiling along M12\_01 changed for earthworks, construction and track-out activities. These ratings increased from low (as described in the EIS) to medium for all three activities. Human health impact sensitivity ratings along segment M12\_01 also changed for earthworks, construction and track-out activities. These ratings increased from medium (described in the EIS) to high for all three activities.

Along M12\_04, human health impact sensitivity ratings changed for earthworks, construction and track-out activities. These ratings increased from medium (described in the EIS) to high for all three activities.

The unmitigated risk ratings under Step 2C were subsequently also increased for earthworks, construction and track-out along construction assessment segments M12\_01 and M12\_04 as a result of the changes in setback distances to surrounding receivers for the amended project. These ratings increased from low (described in the EIS) to medium for earthworks, construction and track-out (dust soiling, M12\_01); from medium (described in the EIS) to high for earthworks, construction and track-out (human health, M12\_01); and from medium (described in the EIS) to high for earthworks, construction and track-out (human health, M12\_04).

Dust soiling, human health and ecological dust risk ratings along the other remaining segments assessed in the EIS (M12\_02 and M12\_03) remained consistent with those identified in the EIS.

Updated unmitigated construction dust risk values for the amended project are described in **Table 6-61**. Where the potential impact is changed from that described in Table 8-26 of the EIS, the impact is presented in **bold** text.

As AF 10 lies outside the assessment segments presented in the EIS, an additional segment has been added to address risks associated with AF 10 as a result of the amended project. The initial screening review (UK IAQM Step 1) undertaken for AF 10 identified the presence of human and ecological receivers within the construction study area (See **Figure 6-59**), and it was determined that the next IAQM steps of assessment would be required for the facility. Given that the land where AF 10 would be established is already being used as an ancillary facility for The Northern Road project, the potential magnitude of dust emissions (ie UK IAQM Step 2A) for demolition and construction activities was determined to be negligible. A dust magnitude rating of 'small' was estimated for earthworks to account for the limited bulk materials being stored and managed at the site. A dust magnitude rating of 'large' was determined for track-out (ie emissions associated with construction-related traffic) movements given the high number of traffic movements expected to be generated at the site per day.

As described **Table 6-61**, the highest unmitigated risk rating (Step 2C) around AF 10 was a 'medium' risk, associated with the potential for human health and ecological effects from dust generated from traffic movements associated with the facility. Unmitigated risk ratings of 'negligible' were predicted for the 'demolition' and 'construction' phases as the site is already cleared and is being used as a construction ancillary facility for The Northern Road project.

Under Step 2C, an unmitigated 'high' potential risk remains the highest unmitigated level for the amended project assessed (including AF 10). This remains consistent with the highest risk rating identified in the EIS.

The environmental management measures presented in Table 8-36 of the EIS were developed to mitigate and effectively manage this level of risk using guidance from the UK IAQM method. No changes to these measures would be required for the amended project, with these measures also to be applied at the proposed ancillary facility (AF 10). With the application of these measures, it is expected that there would be no significant residual dust-related impacts during construction, as was determined in Section 8.2.4 of the EIS.

In addition to construction dust, there were a range of other potential construction related air quality impacts that were considered for the amended project. These include:

- Exhaust emission from the combustion of fossil fuels
- Odours arising from uncovered contaminated and/or hazardous materials
- Airborne hazardous materials (eg asbestos and fungal spores).

Potential impacts from construction plant and equipment exhaust emissions, and potential odour impacts and impacts from airborne hazardous materials during demolition activities and excavation/handling of contaminated soils and areas of illegal dumping are not anticipated, due to the expected intensity of construction activities, setback distances from surrounding sensitive receivers, and the linear nature of the project. This is consistent with the impacts of the project as described in the EIS.

Table 6-61 Unmitigated construction dust risk values for the amended project (bold text shows change from EIS)

| Construction area                                                                                                              | Activity     | Dust soiling       |                                | Human health impacts |                              | Ecological effects |                 |
|--------------------------------------------------------------------------------------------------------------------------------|--------------|--------------------|--------------------------------|----------------------|------------------------------|--------------------|-----------------|
|                                                                                                                                |              | Project as per EIS | Amended project                | Project as per EIS   | Amended project              | Project as per EIS | Amended project |
| M12_01 – M12 Motorway between The Northern Road and Western Sydney International Airport entrance/exit (including connections) | Demolition   | Low risk           | Low risk                       | Medium risk          | Medium risk                  | Medium risk        | Medium risk     |
|                                                                                                                                | Earthworks   | Low risk           | <b>Medium risk (increased)</b> | Medium risk          | <b>High risk (increased)</b> | High risk          | High risk       |
|                                                                                                                                | Construction | Low risk           | <b>Medium risk (increased)</b> | Medium risk          | <b>High risk (increased)</b> | High risk          | High risk       |
|                                                                                                                                | Track-out    | Low risk           | <b>Medium risk (increased)</b> | Medium risk          | <b>High risk (increased)</b> | High risk          | High risk       |
| M12_02 – M12 Motorway between Western Sydney International Airport entrance/exit road and Clifton Avenue                       | Demolition   | Medium risk        | Medium risk                    | Medium risk          | Medium risk                  | Medium risk        | Medium risk     |
|                                                                                                                                | Earthworks   | Medium risk        | Medium risk                    | High risk            | High risk                    | High risk          | High risk       |
|                                                                                                                                | Construction | Medium risk        | Medium risk                    | High risk            | High risk                    | High risk          | High risk       |
|                                                                                                                                | Track-out    | Medium risk        | Medium risk                    | High risk            | High risk                    | High risk          | High risk       |
| M12_03 – M12 Motorway between Clifton Avenue and Elizabeth Drive near Mamre Road                                               | Demolition   | Low risk           | Low risk                       | Medium risk          | Medium risk                  | Medium risk        | Medium risk     |
|                                                                                                                                | Earthworks   | Low risk           | Low risk                       | Medium risk          | Medium risk                  | High risk          | High risk       |
|                                                                                                                                | Construction | Low risk           | Low risk                       | Medium risk          | Medium risk                  | High risk          | High risk       |
|                                                                                                                                | Track-out    | Low risk           | Low risk                       | Medium risk          | Medium risk                  | High risk          | High risk       |



| Construction area                                                                 | Activity     | Dust soiling       |                 | Human health impacts |                       | Ecological effects |                 |
|-----------------------------------------------------------------------------------|--------------|--------------------|-----------------|----------------------|-----------------------|--------------------|-----------------|
|                                                                                   |              | Project as per EIS | Amended project | Project as per EIS   | Amended project       | Project as per EIS | Amended project |
| M12_04 – M12 Motorway between Elizabeth Drive near Mamre Road and the M7 Motorway | Demolition   | Medium risk        | Medium risk     | Medium risk          | Medium risk           | Medium risk        | Medium risk     |
|                                                                                   | Earthworks   | Medium risk        | Medium risk     | Medium risk          | High risk (increased) | High risk          | High risk       |
|                                                                                   | Construction | Medium risk        | Medium risk     | Medium risk          | High risk (increased) | High risk          | High risk       |
|                                                                                   | Track-out    | Medium risk        | Medium risk     | Medium risk          | High risk (increased) | High risk          | High risk       |
| Ancillary facility 10 (AF 10)                                                     | Demolition   | N/A                | Negligible      | N/A                  | Negligible            | N/A                | Negligible      |
|                                                                                   | Earthworks   | N/A                | Negligible      | N/A                  | Low                   | N/A                | Low             |
|                                                                                   | Construction | N/A                | Negligible      | N/A                  | Negligible            | N/A                | Negligible      |
|                                                                                   | Track-out    | N/A                | Low             | N/A                  | Medium                | N/A                | Medium          |

### 6.12.3.2 *Operational impacts*

Changes in air quality were predicted for the amended project and compared to the changes in air quality predicted for the project as described in the EIS for the following pollutants:

- Particulate matter as PM<sub>10</sub>
- Particulate matter as PM<sub>2.5</sub>
- Carbon Monoxide (CO)
- Nitrogen dioxide (NO<sub>2</sub>)
- Volatile organic compounds (VOCs).

Changes in concentrations of the above pollutants are graphed in Appendix L.

Results for each pollutant are presented below. In summary, it was found that the amended project would not result in any substantial changes to the local operational air quality outcomes compared to the project as described in the EIS. It is noted that existing local annually averaged PM<sub>2.5</sub> concentrations were already measured at the EPA's eight µg/m<sup>3</sup> impact assessment criterion.

Regional air quality was also assessed. In summary, it was found that the amended project would not result in any significant changes to regional operational air quality outcomes compared with the project as described in the EIS.

#### Particulate matter as PM<sub>10</sub>

##### **The M12 Motorway:**

- Total 24-hour averaged PM<sub>10</sub> concentrations predicted to remain below the EPA's impact assessment criterion of 50 µg/m<sup>3</sup> for the amended project, consistent with the project as per the EIS
  - Worst-case 24-hour averaged PM<sub>10</sub> concentrations were predicted to increase by up to 5.4 µg/m<sup>3</sup> (in 2036) at the most-affected surrounding sensitive receiver compared with existing conditions. This increase is slightly higher than the predicted level in the EIS (up to 3.8 µg/m<sup>3</sup>)
- Total annually averaged PM<sub>10</sub> concentrations were predicted to remain below the EPA's 25 µg/m<sup>3</sup> impact assessment criteria for the amended project, consistent with the project as per the EIS
  - Annually averaged PM<sub>10</sub> contributions from the amended project of up to approximately 2 µg/m<sup>3</sup> were predicted at the most-affected surrounding sensitive receiver. This is comparable with the highest contribution determined in the EIS (1.5 µg/m<sup>3</sup>).

##### **The Northern Road:**

- Total 24-hour averaged PM<sub>10</sub> concentrations were predicted to remain below the EPA's 50 µg/m<sup>3</sup> impact assessment criteria, consistent with the project as per the EIS
  - 24-hour averaged PM<sub>10</sub> concentrations were predicted to increase by up to 4.1 µg/m<sup>3</sup> at the most-affected surrounding sensitive receiver (in 2036) as a result of the project compared with existing conditions. This is comparable with the EIS where the highest increase compared with existing conditions was 4.3 µg/m<sup>3</sup>
  - Worst-case changes between respective 2026 and 2036 project and no project options remained consistent with what was presented in the EIS, with changes of less than two µg/m<sup>3</sup> also being predicted.

- Total annually averaged PM<sub>10</sub> concentrations at receivers within the operational study area around TNR were predicted to remain below the EPA's 25 µg/m<sup>3</sup> impact assessment criteria, consistent with the project as per the EIS
  - Annually averaged PM<sub>10</sub> contributions from the amended project were comparable with the values presented in the EIS.

#### **The M7 Motorway:**

- Total 24-hour averaged PM<sub>10</sub> concentrations from the amended project remained below the EPA's impact assessment criterion (50 µg/m<sup>3</sup>), consistent with the project as per the EIS
  - The relative worst-case 24-hour averaged PM<sub>10</sub> concentrations for the amended project compared with the equivalent 2026 and 2036 no project scenarios were higher than the worst-case relative project and no project comparisons presented in the EIS by about 0.9 µg/m<sup>3</sup>. This was a result of changes to 'project' and 'no project' traffic forecasts that were applied for the amended project. Decreases between project and no project options were described for the project as described in the EIS.
- Total annually averaged PM<sub>10</sub> concentrations at receivers within the operational study area around the M7 Motorway were predicted to remain below the EPA's 25 µg/m<sup>3</sup> impact assessment criteria, consistent with the project as per the EIS
  - Relative annually averaged PM<sub>10</sub> contributions from the amended project are predicted to increase compared with the values presented in the EIS. For the amended project, the highest relative project to no project contribution was around 0.6 µg/m<sup>3</sup> higher, compared with marginal decreases (up to 0.5 µg/m<sup>3</sup>) for project options presented in the EIS. Again, this change is a result of the traffic forecasts applied in the amendment assessment.

#### **Elizabeth Drive:**

- No change in outcomes (ie instances of exceedances of the EPA's impact assessment criteria) for the 24-hour averaged PM<sub>10</sub> concentrations are predicted for the amended project compared with the project as described in the EIS, consistent with the project as per the EIS
  - Worst-case relative increases between project and no-project options up to 0.4 µg/m<sup>3</sup> were predicted for the amended project. Decreases between project and no project options were described for the project as described in the EIS. This was a result of changes to project and no project traffic forecasts that were applied for the amended project. As a result, total 24-hour PM<sub>10</sub> concentrations were predicted to remain well below the EPA's 50 µg/m<sup>3</sup> impact assessment criterion.
- Total annually averaged PM<sub>10</sub> concentrations at receivers within the operational study area around Elizabeth Drive were predicted to remain below the EPA's 25 µg/m<sup>3</sup> impact assessment criteria, consistent with the project as per the EIS
  - Worst-case annually averaged PM<sub>10</sub> contribution increases from the amended project compared with the relevant no project options was 0.9 µg/m<sup>3</sup>. This was a result of changes to project and no project traffic forecasts that were applied for the amended project.

#### **Particulate matter as PM<sub>2.5</sub>**

##### **The M12 Motorway:**

- Total 24-hour averaged PM<sub>2.5</sub> concentrations were predicted to remain below the EPA's impact assessment criterion of 25 µg/m<sup>3</sup>, consistent with the project as per the EIS
  - 24-hour averaged PM<sub>2.5</sub> concentrations were predicted to increase by up to 5.4 µg/m<sup>3</sup> (in 2036) at the most-affected surrounding sensitive receiver compared with existing conditions. This increase is slightly higher than the predicted level in the EIS (up to 3.8 µg/m<sup>3</sup>).



- There were no receivers where increases greater than 2  $\mu\text{g}/\text{m}^3$  compared with existing concentrations were predicted, consistent with the project as per the EIS
  - Annually averaged  $\text{PM}_{2.5}$  contributions from the amended project of up to approximately two  $\mu\text{g}/\text{m}^3$  were predicted at the most-affected surrounding sensitive receiver. It is noted that local annually averaged  $\text{PM}_{2.5}$  concentrations were already measured at the EPA's eight  $\mu\text{g}/\text{m}^3$  impact assessment criterion.

#### **The Northern Road:**

- Total 24-hour averaged  $\text{PM}_{2.5}$  concentrations were predicted to remain below the EPA's 25  $\mu\text{g}/\text{m}^3$  impact assessment criteria, consistent with the project as per the EIS
  - 24-hour averaged  $\text{PM}_{2.5}$  concentrations were predicted to increase by up to 4.5  $\mu\text{g}/\text{m}^3$  at the most-affected surrounding sensitive receiver (in 2036) as a result of the project compared with existing conditions. This is comparable with the EIS where the highest increase compared with existing conditions was 4.3  $\mu\text{g}/\text{m}^3$
- There were no receivers where  $\text{PM}_{2.5}$  contributions of more than two  $\mu\text{g}/\text{m}^3$  were predicted, consistent with the project as per the EIS.
  - Worst-case annually averaged  $\text{PM}_{2.5}$  contributions from the amended project remained comparable with the results presented in the EIS. For the amended project, the worst-case total (road contribution plus background) concentration was 10.7  $\mu\text{g}/\text{m}^3$ . This increase is slightly higher than the predicted level in the EIS (10.4  $\mu\text{g}/\text{m}^3$ ), noting that local annually averaged  $\text{PM}_{2.5}$  concentrations were already measured at the EPA's eight  $\mu\text{g}/\text{m}^3$  impact assessment criterion.

#### **The M7 Motorway:**

- Total 24-hour averaged  $\text{PM}_{2.5}$  concentrations from the amended project were predicted to remain below the EPA's impact assessment criterion (25  $\mu\text{g}/\text{m}^3$ )
  - The relative worst-case 24-hour averaged  $\text{PM}_{2.5}$  concentrations for the amended project compared with the equivalent 2026 and 2036 no project options were higher than the values presented in the EIS by approximately 0.9  $\mu\text{g}/\text{m}^3$ . This was a result of changes to project and no project traffic forecasts that were applied for the amended project.
- Annually averaged  $\text{PM}_{2.5}$  concentrations were predicted to result in one additional receiver experiencing contributions of more than 2  $\mu\text{g}/\text{m}^3$  when compared to the EIS.
  - For the amended project, the worst-case (road contribution plus background) concentration was 11.5  $\mu\text{g}/\text{m}^3$ . This is consistent with the predicted level in the EIS (11.5  $\mu\text{g}/\text{m}^3$ ), noting that local annually averaged  $\text{PM}_{2.5}$  concentrations were already measured at the EPA's eight  $\mu\text{g}/\text{m}^3$  impact assessment criterion.
  - There was no change predicted in the number of receivers that would experience roadway contributions of more than two  $\mu\text{g}/\text{m}^3$  between the 2026 amended project and no project options compared with the results described in the EIS.
  - For 2036, it was predicted that there would be one additional receiver for the amended project (compared to the EIS) where roadway contributions would increase from the one to two  $\mu\text{g}/\text{m}^3$  category to the greater than two  $\mu\text{g}/\text{m}^3$  category compared with the 2036 no project option.

The total number of receivers in the study area around the M7 Motorway predicted to experience contributions of more than two  $\mu\text{g}/\text{m}^3$  as a result of the amended project would remain 61 which is consistent with the EIS (noting that this additional receiver near the M7 Motorway is offset by the one receiver reduction near The Northern Road).

### Elizabeth Drive:

- Total 24-hour PM<sub>2.5</sub> concentrations were predicted to remain below the EPA's 25 µg/m<sup>3</sup> impact assessment criterion, as was determined in the EIS.
- For annually averaged PM<sub>2.5</sub> contributions, there were no receivers where increases greater than two µg/m<sup>3</sup> compared with existing concentrations were predicted, consistent with the project as per the EIS
  - For the amended project, annually averaged PM<sub>2.5</sub> contributions at the most-affected receiver increased marginally (contributions up to 1.2 µg/m<sup>3</sup> compared with 0.9 µg/m<sup>3</sup> for the project as described in the EIS). This was a result of changes to project and no project traffic forecasts that were applied for the amended project.
  - Roadway contributions at the worst-affected receiver for both assessment scenarios (option 1 and option 2) were predicted to remain below two µg/m<sup>3</sup>. This is consistent with the project as described in the EIS.

### Carbon monoxide (CO)

There would be no change in outcomes for the amended project compared with the project as described in the EIS. The highest 1-hour and 8-hour averaged CO contributions from the amended project both remained below one mg/m<sup>3</sup> at the most-affected sensitive receivers. The resulting total concentrations remained well below the EPA's 1-hour and 8-hour impact assessment criteria of 10 mg/m<sup>3</sup> and 30 mg/m<sup>3</sup> respectively.

### Nitrogen dioxide (NO<sub>2</sub>)

There would be no change in outcomes for the amended project compared with the project as described in the EIS. The highest 1-hour and annually averaged NO<sub>2</sub> contributions from the amended project were 26 µg/m<sup>3</sup> and 5 µg/m<sup>3</sup> at the most-affected sensitive receivers. These values are four µg/m<sup>3</sup> and one µg/m<sup>3</sup> higher than the respective 1-hour and annually averaged worst-case contributions predicted in the EIS (of 22 µg/m<sup>3</sup> and four µg/m<sup>3</sup> respectively). This change occurs at the most affected receiver within the operational study area around the M7 Motorway as a result of the updated project and no project forecasts applied for the amended project review. Resulting total 1-hour and annually averaged NO<sub>2</sub> concentrations were predicted to remain well below the EPA's respective 246 µg/m<sup>3</sup> and 62 µg/m<sup>3</sup> impact assessment criteria.

### Volatile Organic Compounds (VOCs)

There would be no change in outcomes for the amended project compared with the project as described in the EIS. The highest 1-hour averaged VOC contribution from the amended project predicted at a sensitive receiver would remain at less than one µg/m<sup>3</sup> as per the project as described in the EIS. This is well below the EPA's 29 µg/m<sup>3</sup> impact assessment criterion.

### Regional air quality

Given that emissions from vehicle exhausts, wearing of tyres, vehicle braking, the road surface, and re-entrainment exhibit a pronounced spatial decline with distance from the roadway, and that contributions for the amended project were determined to be comparable with the EIS, it was determined that the emissions from the amended project would be consistent with those for the project as described in the EIS not lead to concentration contributions at levels that would adversely affect measured air quality conditions at the nearest Bringelly and Liverpool DPIE (Environment, Energy and Science) air quality monitoring stations.

As a result, it is unlikely that the amended project would have a measurable effect on background regional air quality, consistent with the regional air quality impacts of the project as described in the EIS.

#### 6.12.4 Cumulative impacts

Considering the revised construction footprint for the amended project and the suitability of the existing controls determined in the EIS, it is similarly expected that emissions to air during construction of the amended project would present a limited risk of regional cumulative impacts.

Considering the limited geographical changes to the design from what was assessed in the EIS; how contributions for the amended project were determined to be comparable to the project described in the EIS and that contributions from other nearby road projects have already been incorporated into the impact assessment (see Section 8.2.5 of the EIS); cumulative operational air quality impacts associated with the amended project are also expected to remain consistent with those described in the EIS.

#### 6.12.5 Environmental management measures

The air quality impacts associated with the amended project are generally consistent with the impacts described in the EIS. The environmental management measures identified in Section 8.2.6 of the EIS are therefore considered appropriate to manage the air quality impacts associated with the amended project. No additional or amended environmental management measures are required for the amended project.



## 6.13 Health and safety

This section has been prepared to identify and assess the potential construction, operation and cumulative health and safety impacts of the amended project, including an assessment of the proposed changes against the impacts documented in the EIS. This section should be read in conjunction with the assessment undertaken for the project described in the EIS, which is discussed in Section 8.3 of the EIS.

### 6.13.1 Assessment methodology

The assessment focused on changes to potential health and safety impacts associated with the amended project, when compared to the project as described in the EIS.

The assessment involved a review of the potential health and safety impacts identified in Section 8.3 of the EIS against the design changes and proposed construction updates described in **Chapter 3** and **Chapter 4** to identify changes to health and safety impacts associated with the amended project.

The study area described in Section 8.3.2 of the EIS has not been changed as a result of the amended project.

### 6.13.2 Existing environment

The existing health and safety environment is described in Section 8.3.3 of the EIS and is still applicable to this assessment.

### 6.13.3 Assessment of potential impacts

#### 6.13.3.1 Construction impacts

The EIS identified a number of potential impacts on the local population's health and safety that may occur during the construction of the project. These impacts include:

- Workplace hazards
- Environmental hazards
- Impacts on public health and ability to carry out physical activity and/or complete journeys using active modes of travel
- Road and pedestrian safety
- Bushfire risks
- Dangerous goods handling risks.

Potential impacts associated with the amended project are discussed in the following sections.

#### Workplace hazards

Given that the proposed construction updates described in **Chapter 4** would not substantially alter the nature of construction sites as described in the EIS, the construction workplace risk of the amended project would be moderate as was identified in the EIS, and potential workplace hazards would remain consistent those described in the EIS.

## Environmental hazards

Health risks associated with the construction of the amended project may be present due to exposure to the following environmental hazards:

- Air quality impacts
  - As described in **Section 6.12**, there would be no material change in construction dust risk ratings from the amended project from what was determined for the project as described in the EIS
  - As a result, there would continue to be a low to moderate risk of dust impacts during construction, and potential air quality environmental hazards would remain consistent with those described in the EIS
- Noise and vibration impacts
  - High construction noise impacts would be likely at the nearest receivers to the project when noise intensive equipment such as rock-breakers or concrete saws are in use
  - As described in **Section 6.7**, noise impacts of the amended project are generally consistent with those of the project as described in the EIS, however, the amended project would result in additional impacts to receivers located near work being undertaken on Elizabeth Drive, south of the motorway-to-motorway interchange at the M7 Motorway. This is not anticipated to constitute a substantial environmental hazard
  - As described in **Section 6.7**, there would be a minor increase in the number of structures located within the recommended minimum working distance for vibration, which is not anticipated to constitute a substantial environmental hazard
- Lighting, electrocution or fire hazards
  - Given that the construction updates described in **Chapter 4** do not substantially alter the construction lighting and electricity, or any other potential fire hazards from that described in the EIS, potential lighting, electrocution and fire hazards remain consistent with those described in the EIS
- Exposure to hazardous materials
  - **Section 6.11** identifies three additional AEIs for the amended project where asbestos may be present. However, intrusive asbestos investigations would be carried out along the construction footprint to assess asbestos risks before construction
  - As a result, asbestos exposure to workers or nearby residents remain consistent with those described in the EIS and asbestos exposure to workers or nearby residents is not anticipated
- Gas contamination
  - There is a moderate risk of gas contamination from excavation activities in the vicinity of landfills as identified in the EIS. This remains consistent for the amended project
  - As described in **Section 6.11**, gas contamination risk as a result of the amended project would be comparable to the impacts documented in the EIS
  - Elevated gas concentrations are likely to be relatively localised and would be further investigated before construction of the project

- Contaminated land exposure
  - **Section 6.11** presents a qualitative risk assessment to assess the potential risk of these construction activities to human health and environments
  - Further detailed investigation of areas of environmental interest would be carried out to determine if there are concentrations of polycyclic aromatic hydrocarbons or the presence of asbestos that could be harmful to human health.

### Physical activity

The construction footprint of the amended footprint would continue to encroach into the Western Sydney Parklands and is near Kemps Creek Nature Reserve. During construction, access into the Parklands and Kemps Creek Nature Reserve would continue to be maintained in consultation with the Western Sydney Parklands Trust and National Parks and Wildlife Service. The community would therefore have continuous access to the physical activity and recreation opportunities offered by both parks, consistent with the access provided in the project as described in the EIS.

Construction of the amended project would also impact on a number of walking and cycling paths, including the Wylde Mountain Bike Trail. The amended project would result in the permanent loss of facilities and sections of trails within the operational footprint of the amended project. This is consistent with the project as described in the EIS and the amended project would continue to require the redesign and relocation of these facilities prior to construction starting. Construction of the amended project would result in increased noise and dust, causing temporary disruptions. In addition, the car park of the Wylde Mountain Bike Trail would be used as an additional construction ancillary facility as described in **Section 4.1**. These disruptions are anticipated to be minor and temporary in nature, however, and would be similar to the disruptions resulting from the project as described in the EIS.

Other walking and cycling paths, including the Cecil Hills walking track, the Jacquetta Close pedestrian pathway and the M7 Motorway shared path, would also experience temporary disruptions. These disruptions, however, are anticipated to be minor and temporary in nature, and would be consistent with the expected disruptions resulting from the project as described in the EIS.

In summary, access would be maintained for walking and cycling paths during construction of the amended project, which may include temporary diversions. As a result, the amended project would continue to provide the same opportunities for the local population to carry out physical exercise.

### Access to social infrastructure

The amended construction footprint would be adjacent to the Kemps Creek Sporting and Bowling Club, with an additional construction ancillary facility located to the east of the club. In addition, utility amendments and enabling works for the amended project may take place in the vicinity of the club. Access to the club, including pedestrian access, vehicular access, parking arrangements and signage would be maintained in consultation with affected business owners. As a result, operation of and access to the club would continue to be maintained during construction of the amended project and would be consistent with the project as described in the EIS.

Access to other social infrastructure in the local area is not anticipated to significantly disrupt access to other local infrastructure and would be consistent with the EIS. As a result, the amended project would continue to provide the same opportunities for the local population to access social infrastructure.



## Road and pedestrian safety

The construction of the amended project would result in an average of 229 truck movements per day. This is an increase of about 15 truck movements per day from the project as described in the EIS. This is not considered to be a substantial increase, and it is considered that the construction traffic management plan implemented for the amended project would adequately manage traffic, pedestrian and cycling safety.

As a result, road safety impacts would be low and temporary in nature and would remain consistent with those described in the EIS.

## Bushfire risks

The amended project would be partially located within and near bushfire prone land. However, the increased clearing of vegetation for the amended project (**Section 6.1**) would create a fire break between residential areas of Mount Vernon, Kemps Creek, Cecil Park, Cecil Hills and Abbotsbury, reducing the risk of a bushfire. The proposed construction updates described in **Chapter 4** would not result in additional construction activities involving flammable materials and ignition sources.

As a result, bushfire risks would be similar to those described in the EIS.

## Handling and use of dangerous goods

The proposed construction updates described in **Chapter 4** would not result in changes to hazardous substances that would be transported to the site and used within the construction footprint during construction of the amended project. In addition, dangerous goods would continue to be handled in accordance with relevant legislation and codes.

As a result, the hazards and risks associated with handling and use of dangerous goods are considered to be low and would be consistent with those described in the EIS.

## Distribution of health risks and benefits

The health and safety risks associated with construction of the amended project would be concentrated within and close to the amended project construction footprint. Given this, health risk impacts on workers and the community in the wider study area would be minimal.

As a result, the distribution of health risks and benefits of the construction of the amended project would remain consistent with those described in the EIS.

## Public safety

The proposed construction updates described in **Chapter 4** would not result in changes to risks of electrocution, gas, fire or other hazards that may impact public safety as a result of the amended project. Consultation with utility service providers would continue to be undertaken as described in **Chapter 5**.

As the amended project is not located near any mine subsidence developments or mine subsidence districts, subsidence risks have not been further considered.

As a result, the public safety risks of the construction of the amended project would remain consistent with those described in the EIS.

### 6.13.3.2 *Operational impacts*

The following potential impacts on the local population's health and safety were identified to occur during the operation of the project as described in the EIS:

- Workplace hazards
- Exposure to environmental hazards
- Physical activity
- Access to social infrastructure
- Road safety
- Pedestrian safety
- Emergency facilities
- Bushfire risks
- Handling and use of dangerous goods
- Distribution of health risks and benefits
- Public safety
- Bird strikes.

Changes to the above potential impacts as a result of the amended project are discussed below.

#### Workplace hazards

Workplace hazards that could occur during the operation of the project are related to road maintenance activities. Given that the proposed design changes described in **Chapter 4** do not substantially alter the nature of road maintenance activities, the workplace hazard risks of the operation of the amended project would remain consistent with those described in the EIS. With the effective implementation of relevant guidelines and procedures, the impacts on operational workplace hazards would therefore be low.

#### Environmental hazards

Health risks associated with the operation of the amended project may be present due to exposure to the following environmental hazards:

- Noise
  - As described in **Section 6.7**, the amended project would result in an increase in the total buildings requiring consideration of additional noise mitigation from road traffic noise when compared to the EIS, mainly due to an increase to the operational footprint to account for works on Elizabeth Drive and realigned Wallgrove Road.
  - Noise levels associated with road traffic noise in the amended project would generally be consistent with noise levels predicted in the EIS during the day, however levels would decrease by up to 4 dB at night when compared to those presented in the EIS, mainly due to the updated traffic modelling used to assess the amended project.
  - Maximum noise levels of the amended project would generally be consistent with the EIS, however levels at dwellings adjacent to the realigned Wallgrove Road in NCA04 would be up to 7 dB higher than the EIS due to the design of the amended project moving closer to dwellings.
  - These impacts are not anticipated to constitute an environmental hazard.

- Air quality
  - Air quality environmental hazards were considered in Section 8.2 of the EIS
  - As described in **Section 6.12**, there would be no substantial change in local air quality outcomes for the amended project from what was determined for the project as described in the EIS. Potential air quality environmental hazards would remain largely consistent with those described in the EIS.
- Contamination and asbestos hazards
  - As described in **Section 6.11**, contamination and asbestos impacts are consistent with those of the project as described in the EIS. As a result, once operational the contamination hazards of the project would be minor in nature and are not anticipated to constitute an environmental hazard.

### Physical activity

The project as described in the EIS would result in the permanent loss of land in the Western Sydney Parklands and the redesign of the Wylde Mountain Bike Trail, with associated change in recreation opportunities. It would also impact other walking and cycling paths which would be realigned as determined during detailed design. This is consistent with the amended project.

The amended project would continue to provide a shared user path. Changes to the shared user path are proposed as described in the EIS (see **Section 3.3.2**). These are not anticipated to result in any changes to how the shared user path would be used for physical activity, however.

As a result, the amended project would continue to provide the same opportunities for the local population to carry out physical exercise.

### Access to social infrastructure

The proposed design changes described in **Chapter 4** would not substantially change the alignment of the amended project compared to the project as described in the EIS. While the amended project would result in the permanent loss of land in the Western Sydney Parklands, this is consistent with the project as described in the EIS and wider access to the Parklands would continue to be improved for pedestrians and cyclists.

As a result, the amended project would continue to provide the same opportunities for the local population to access social infrastructure as the project described in the EIS.

### Road safety

The proposed design changes described in **Chapter 4** would not change the amended project's provision of an alternative route to the Western Sydney International Airport that would be more direct than Elizabeth Drive and the local road network.

As described in **Section 3.1.2**, combining two M7 Motorway off-ramps into a single exit point from the motorway before diverging for access to M12 Motorway or Elizabeth Drive would improve operational performance and driver safety. This is due to the reduction in locations where vehicles would be merging left and decelerating to exit the motorway. A single exit point would also reduce driver confusion. Similarly, for the ramps exiting the M12 Motorway, the combination into a signal exit point from the motorway before diverging would improve safety and performance.

As a result, the safety of motorists, pedestrians and cyclists would be improved from that described in the EIS and would have a beneficial impact.



## Pedestrian safety

The shared user path would continue to be grade-separated at all road crossings along the M12 Motorway and while the crossing at The Northern Road would continue to be at grade. The amended shared user path as described in **Section 3.3.2** would still underpass the airport access road.

As a result, the amended project would continue to provide safer access for pedestrians and cyclists than the existing road network.

## Emergency facilities

The proposed design changes described in **Chapter 4** would not substantially change emergency facilities from those of the project as described in the EIS. Emergency crossovers and heavy vehicle stopping bays would continue to be provided at required intervals and would be appropriately located where road geometry allows for suitable visibility and sufficient space for vehicles. Emergency telephone bays would continue to be provided at each integrated speed limit and lane use sign location. Each bay would be designed to allow a car to park clear of the motorway shoulder and safely access the emergency telephone.

As a result, the amended project would continue to provide the required emergency facilities.

## Bushfire risks

The proposed design changes described in **Chapter 4** would not change the project's invulnerability to bushfire. The new road surfaces built for the amended project would continue to create a buffer between vegetated areas, particularly in the Western Sydney Parklands.

As a result, the bushfire risks of the operation of the amended project would remain consistent with those described in the EIS. The amended project is not expected to be a significant bushfire hazard during operation.

## Handling and use of dangerous goods.

The nature of the proposed design changes described in **Chapter 4** would not change the risk of a vehicle collision associated with the operation of the amended project.

As a result, hazards and risks associated with handling and use of dangerous goods during operation are considered to be low and would remain consistent with those described in the EIS.

## Distribution of health risks and benefits

The nature of the proposed design changes described in **Chapter 4** would not change the health risks and benefits of the amended project.

As a result, the operation of the amended project would continue to have a generally positive benefit to health and safety – both for the immediate community and the wider western Sydney.

## Public health

The amended project would continue to be located within a Public Safety Area (PSA) as described in Section 5.5.5 of the EIS. Potential interaction between the amended project design and the PSA would be the subject of ongoing consultation during detailed design to ensure that the relevant guidelines from the National Airports Safeguarding Framework are considered appropriately, minimising risks to public safety.

As a result, impacts to public health during operation of the amended project would be consistent with those associated with the project as described in the EIS.

## Bird strikes

The proposed design changes described in **Chapter 4** do not include any additional permanent water quality basins located within 13 kilometres of Western Sydney International Airport. The type and design of permanent water quality basins for the amended project would be further investigated during detailed design to confirm their suitability and develop appropriate mitigation measures.

As a result, no additional risk of bird strike is anticipated for the amended project compared to the project described in the EIS.

### 6.13.4 Opportunities for health improvement

Once operational, the amended project would continue to provide access and connectivity, and additional opportunities for people to increase levels of physical exercise. The amended project would also continue to reduce existing bushfire health risks by creating an effective bushfire buffer.

As a result, the beneficial health and safety impacts of the amended project would be consistent with the project as described in the EIS. These are discussed in Section 8.3.5 of the EIS.

### 6.13.5 Environmental management measures

The health and safety impacts associated with the amended project are generally consistent with the impacts described in the EIS. The environmental management measures identified in Section 8.3.6 of the EIS are therefore considered appropriate to manage the health and safety impacts associated with the amended project. No additional or amended environmental management measures are required for the amended project.

## 6.14 Sustainability

An assessment of the amended project against the principles of sustainability was undertaken for the amended project and is described in this section. This assessment has been carried out to include recent updates to the policy and planning settings as described in Section 8.4.1 of the EIS. This section should be read in conjunction with Section 8.4 of the EIS, which describes the assessment of the project as described in the EIS against the principles of sustainability and demonstrates how sustainability was integrated into the project design.

### 6.14.1 Policy and planning setting

Section 8.4.1 of the EIS outlines the relevant aims and objectives of key legislation, policies and guidelines that have directed the consideration and integration of sustainability into the project design and initial assessment. These include relevant targets and strategies to improve Government efficiency. The policy and planning setting was made up of 16 documents. Only one of these has been updated since exhibition of the EIS, namely the Environmental Sustainability Strategy 2015-19 (Roads and Maritime, 2016).

During the preparation of the EIS, TfNSW released a new sustainability strategy, the Environmental Sustainability Strategy 2019-2023 (Roads and Maritime, 2019). This builds on, and supersedes, the Roads and Maritime Environmental Sustainability Strategy 2015-19 (Roads and Maritime, 2016). The amended project will be delivered in accordance with the new strategy.

The Environmental Sustainability Strategy 2019-2023 (Roads and Maritime, 2019) outlines ten focus areas aimed to address the most important sustainability aspects associated with the delivery of road projects. These focus areas are:

1. Energy and carbon management – aims to minimize energy use and reduce carbon emissions without compromising the delivery of services.
  - Energy use and greenhouse gas emissions were estimated for the amended project (see **Section 6.16**)
  - A project-specific objective to minimize energy use and greenhouse gas emissions generated by the project was set as part of the EIS (see Section 8.4.1 of the EIS).
2. Climate change resilience – aims to design and construct transport infrastructure to be resilient or adaptable to climate change impacts.
  - A climate change risk assessment was completed for the project as part of the EIS and has been updated in see **Section 6.16**)
  - A project-specific objective to maximise the resilience of the project to climate change impacts was set as part of the EIS.
3. Air quality – aims to minimise the air quality impacts and support initiatives that aim to reduce transport related air emissions.
  - An air quality impact assessment was completed for the project and measures to minimise impacts on air quality were identified (see **Section 6.12**)
  - A project specific objective to minimise pollution generated by the project was set as part of the EIS (see Section 8.4.1 of the EIS).



4. Resource use and waste management – aims to minimise the use of non-renewable resources and minimise the quantity of waste disposed to landfill.
  - Key waste streams that would be generated, and measures to minimise waste quantities, were identified for the amended project (see **Section 6.15**)
  - The volume of materials that would be used to construct the project, and the embodied energy within these materials, was identified as part of the EIS and a project-specific objective to optimise resource efficiency and waste management was set as part of the EIS (see Section 8.4.1 of the EIS).
5. Pollution control – aims to minimise noise, water and land pollution, road construction, operation and maintenance activities.
  - The potential for the project to result in pollution impacts was assessed as part of the EIS and this amendment report (see **Sections 6.7, 6.9, 6.10, 6.11 and 6.12**).
  - A project-specific objective to minimise pollution generated by the project was set as part of the EIS (see Section 8.4.1 of the EIS).
6. Biodiversity – seeks to improve outcomes for biodiversity by avoiding, mitigating or offsetting the potential impact of roads projects on plants, animals and their environments.
  - Biodiversity impacts, and measures to minimise impacts on biodiversity, were identified for the project (see **Section 6.1**).
  - A project-specific objective to minimise impacts caused by the project on biodiversity was set as part of the EIS (see Section 8.4.1 of the EIS).
7. Heritage (Aboriginal and non-Aboriginal) – seeks to manage and conserve cultural heritage according to its heritage significance and contribute to the awareness of the past.
  - Assessment of Aboriginal heritage and non-Aboriginal heritage (see **Section 6.5 and Section 6.6**) impacts and opportunities for enhancement were carried out for the amended project
8. Liveable communities – aims to provide high quality urban design outcomes that contribute to the liveability of communities in NSW.
  - A supplementary socio-economic impact assessment was carried out which identifies potential impacts and benefits from the amended project on the community (see **Section 6.4**).
  - Urban and landscape design features were incorporated into the amended project design (see **Section 6.3**).
  - A project-specific objective to enhance liveability of local communities for the project was set as part of the EIS (see Section 8.4.1 of the EIS).
9. Sustainable procurement – aims to procure goods, services, materials and works for infrastructure development that over their lifecycle deliver value for money and contribute the environmental, social and economic wellbeing of the community.
  - Procurement would largely be considered in future stages of the project (see **Chapter 7**).
10. Corporate sustainability – aims to communicate sustainability objectives for TfNSW's employees, contractors and other key stakeholders, and foster a culture which encourages innovative thinking to address sustainability challenges.
  - Corporate sustainability would largely be considered in future stages of the project.

The EIS identified indicative sustainability objectives and targets to be implemented during the delivery of the project. These objectives and targets would be refined in accordance with the Environmental Sustainability Strategy 2019-2023 (Roads and Maritime, 2019) during the detailed design phase of the project.

### 6.14.2 Sustainability implementation

Section 8.4.2 of the EIS describes the ways in which sustainability themes and objectives were considered within the design of the project and within the preparation of the EIS. This was carried through to the design of the amended project and preparation of this amendment report, and would be implemented during detailed design, construction and operation of the amended project.

Sustainability outcomes would continue to largely be achieved within future stages of the project; namely detailed design, construction and operation.

### 6.14.3 Ecologically sustainable development

Ecologically sustainable development (ESD) is development that improves the total quality of life, both now and in the future, in a way that maintains the ecological processes on which life depends (Ecologically Sustainable Development Steering Committee, 1992). Section 8.4.2 of the EIS outlines the indicative objectives and targets for the project which would continue to be applied to the amended project through detailed design, construction and operation. Section 11.1.3 of the EIS outlines the ways in which the principles of ecologically sustainable development were considered throughout the development of the project. This has been carried through to the design of the amended project.

### 6.14.4 Environmental management measures

The environmental management measure identified in Section 8.4.4 of the EIS are considered appropriate to ensure the overarching sustainability objectives for the project will be met. The amended project would not require any additional or amended environmental management measures.

## 6.15 Waste

The potential waste generated by construction and operation of the project and the proposed waste management approach for the project was provided in Section 8.5 of the EIS. This section has been prepared to identify and assess the potential construction, operation and cumulative waste impacts of the amended project, including an assessment of the proposed changes against the impacts documented in the EIS.

This section should be read in conjunction with Section 8.5 of the EIS.

### 6.15.1 Assessment methodology

Potential waste streams for the project as described in the EIS were identified via a desktop assessment and potential waste types and quantities were estimated by reviewing the construction and operational activities for the project, as well as relevant guidelines and waste generated by similar projects. The desktop assessment has been updated to account for the amended construction and operational activities presented in **Chapter 3** and **Chapter 4**.

### 6.15.2 Construction waste

The likely waste streams that have the potential to be generated by the project as described in the EIS is outlined in Table 8-51 of the EIS. The construction of the amended project would not be substantially altered as a result of the construction changes presented in **Chapter 4**. As such, the amended project is not anticipated to generate additional waste streams. The likely waste generated under each of these waste streams is discussed below.

#### 6.15.2.1 Excavation

The earthwork quantities for the amended project as compared to those for the project as described in the EIS are provided in **Table 4-3**. In summary, an additional 734,000 cubic metres of cut material would be excavated for the amended project. This is an increase of about 52 per cent from the project as described in the EIS. As the amended project would require a greater quantity of fill material than the quantity of excavation material that would be generated during construction, surplus excavated material would be minimal and consistent with that described in the EIS.

Wherever possible, excavated material for the amended project would be stockpiled and re-used onsite, as described in the EIS. As the amended project would require a greater quantity of fill material than the quantity of excavation material that would be generated during construction. It is therefore anticipated that all excavated material that is suitable for reuse would be used within the amended project.

Where excavated material cannot be reused onsite, it would be managed in order of priority identified in Section 8.5.3 of the EIS:

- Transfer to other TfNSW projects for reuse in accordance with the NSW EPA's excavated public road resource recovery exemption
- Transfer to an approved TfNSW stockpile site for reuse on a future project only if a specific project was identified before stockpiling and statutory/regulatory requirements under the *Protection of the Environment Operations Act 1997* (NSW) (POEO Act) are met. If a project cannot be identified the material would not be stockpiled
- Transport off site for reuse by a third party in accordance with relevant NSW EPA resource recovery exemption or to a NSW EPA licensed waste recovery facility
- Dispose at an accredited materials recycling or waste disposal facility.



### 6.15.2.2 Stockpile management

Large stockpiles for the project as described in the EIS would be located at AF 1, AF 2 and AF 3. In addition, the amended project would require new stockpiles at AF 9, AF 10 and AF 11. **Table 6-62** provides the anticipated stockpile volumes, and where these volumes have changed from those estimated for the project as described in the EIS.

In summary, while the quantities of waste stored within AF 1, AF 2 and AF 3 would not substantially increase, additional stockpiles present at AF 8, AF 10 and AF 13 would increase the total stockpiled waste to 2,227,000 cubic metres. This is an increase of 368,000 cubic metres (about 20 per cent) from the stockpile volumes for the project as described in the EIS.

The stockpile management and spoil transport procedures outlined in Section 8.5.3 of the EIS would not be changed as a result of the construction updates described in **Chapter 4** and so would continue to apply to the amended project.

Table 6-62 Estimated stockpile volumes

| Stockpiled waste | Estimated stockpile volume (cubic metres) <sup>1</sup> |                  |                                                                   |
|------------------|--------------------------------------------------------|------------------|-------------------------------------------------------------------|
|                  | As per the EIS                                         | Amended project  | Change between the project as per the EIS and the amended project |
| AF 1             | 60,000                                                 | 60,000           | 0                                                                 |
| AF 2             | 1,466,000                                              | 1,468,000        | 2,000                                                             |
| AF 3             | 333,000                                                | 333,000          | 0                                                                 |
| AF 9             | NA                                                     | 233,000          | 233,000                                                           |
| AF 10            | NA                                                     | 41,000           | 41,000                                                            |
| AF 11            | NA                                                     | 92,000           | 92,000                                                            |
| <b>Total</b>     | <b>1,859,000</b>                                       | <b>2,227,000</b> | <b>An increase of 368,000</b>                                     |

<sup>1</sup> These estimated stockpile volumes were incorrectly stated as being per waste stream in the EIS. As the waste streams stored in each stockpile would vary during construction, this table presents the worst case estimate stockpile volume for large stockpiles at each ancillary facility

### 6.15.2.3 Waste disposal locations

The amended project would require a greater quantity of fill material than the quantity of excavation material that would be generated during construction. It is therefore anticipated that all excavated material that is suitable for reuse would be used within the amended project. The remaining material that is determined unsuitable for reuse would be transported offsite for reuse, recycling or disposal at an appropriately licensed facility. Where excavated material is deemed unsuitable for reuse or emplacement due to contamination, it would be taken to a waste facility licensed to accept the waste. This would be consistent with the project as described in the EIS.

The selection of waste disposal and recovery facilities would be dependent on the nature and volume of waste streams generated and the capacity of the receiving facilities at the time of the waste generation.

#### **6.15.2.4 Potential impacts**

Without the implementation of appropriate environmental management measures, waste generated by the amended project has the potential to result in the following impacts:

- Excessive material being directed to landfill due to inadequate collection, reuse, and recycling
- Impacts on human health resulting associated with various types of waste being generated and stored onsite, with the potential for misclassification or mishandling resulting in potential cross contamination
- Environmental impacts from the incorrect storage, classification, transport and disposal of waste
- Dust impacts due to incorrect storage, handling, transport and disposal of spoil
- Noise impacts associated with waste disposal and stockpile management
- Traffic impact associated with the inadequate removal and transport of waste offsite.

Given that the proposed construction updates described in **Chapter 4** would not substantially change the volumes, types or management of construction-generated waste, the risk of the above impacts would be minor. This is consistent with those described in the EIS.

### **6.15.3 Operational waste**

Waste generated by the operation of the project would be limited and would be from maintenance and minor repair works. Given that maintenance and minor repair works would not be substantially changed as a result of the proposed design changes presented in **Chapter 4**, the operational waste streams and impacts of the amended project would remain consistent with those described in the EIS and would be minimal.

### **6.15.4 Cumulative impacts**

#### **6.15.4.1 Construction impacts**

As the amended project is expected to have a fill deficit, disposal of excavated material is not relevant to cumulative impacts with the exception of contaminated material. If the construction of any of the road or rail projects assessed is anticipated to have a surplus of excavated material, it may be possible to use that fill material for the construction of the M12 Motorway, reducing the total quantity of reusable material generated by projects across Sydney that is sent to landfill. The western Sydney area has sufficient capacity for waste management facilities to accept waste from the concurrent or overlapping construction of multiple projects. As a result, cumulative construction waste impacts for the amended project would be consistent with those described in the EIS and are considered to be minor.

#### **6.15.4.2 Operational impacts**

The operation of the amended project and any other road and rail projects in its vicinity would be minimal and would be able to be handled by the waste management market in western Sydney. As a result, cumulative construction waste impacts of the amended project would be consistent with those described in the EIS and are considered to be minor.

### **6.15.5 Environmental management measures**

The environmental management measures identified for the project as described in the EIS (see Section 8.5.6 of the EIS) are considered appropriate to manage the waste impacts associated with the amended project. The amended project would not require any additional or amended environmental management measures.

## 6.16 Climate change risk and greenhouse gas

A climate change risk assessment and greenhouse gas (GHG) assessment was carried out for the amended project. This assessment is described below and should be read in conjunction with Section 8.6 of the EIS.

### 6.16.1 Assessment methodology

#### 6.16.1.1 *Climate change risk assessment*

The methodology for the supplementary climate change risk assessment was prepared in accordance with the policy and planning setting detailed in Section 8.6.1 of the EIS.

The approach adopted for the supplementary climate change risk assessment comprises the same five steps as described in Section 8.6.2 of the EIS, as detailed below. It should be noted that the risks identified in the supplementary climate change risk assessment would be the same for option 1 and option 2, as a worst case scenario has been assessed.

#### Climate change risk assessment step 1: Pre-screening

A pre-screening exercise was carried out to determine whether the amended project would continue to be impacted by climate change, and would therefore require a climate change risk assessment to be carried out.

The amended project was considered against each of the issues listed in Section 8.6.2 of the EIS and it was determined that they would not substantially change as a result of the amended project, due to the nature of proposed design changes and construction updates described in **Chapter 3** and **Chapter 4**. It was therefore concluded that the amended project would be consistent with the project as described in the EIS and a climate change risk assessment is required. The amended project would continue to be susceptible to impacts from climate change.

#### Climate change risk assessment Step 2: Risk screening

A screening was carried out to identify the amended project's potential exposure to relevant climate change impacts. Initial direct and indirect climate change risks were identified using the screening matrix described in Section 8.6.2 of the EIS. It was determined that the climate change risks to all project components listed in Section 8.6.2 of the EIS would be unchanged as a result of the amended project.

As a result, the potential variables of climate change risks for the amended project would be consistent with those of the project as described in the EIS, and that the following climate risks would be further investigated:

- Extreme rainfall
- Extreme temperature
- Mean surface temperature
- Wind speed
- Mean rainfall
- Atmospheric carbon dioxide
- Bushfire weather.



### Climate change risk assessment Step 3: Risk assessment

The overall risk rating for the climate risks identified in Step 2 were assessed using the likelihood of the impact occurring and the likely consequence of the impact using the likelihood scale presented in **Table 6-63**, and the likely consequence of the impact (if it occurred) using the consequence scale presented in **Table 6-64**.

By combining the likelihood and consequence levels, an overall risk rating was determined for each risk using the combined risk likelihood and consequence matrix presented in **Table 6-65**. These overall risk ratings present what the risks to the project are before the implementation of any mitigation or adaptation treatments.

Table 6-63 Climate change risk likelihood scale

| Likelihood level | Description                                                                    | Likelihood |
|------------------|--------------------------------------------------------------------------------|------------|
| Almost certain   | Likely to occur frequently in most circumstances within the project lifecycle. | > 81 %     |
| Likely           | Likely to occur often in most circumstances within the project lifecycle.      | 51-80 %    |
| Possible         | Likely to occur on occasions within the project lifecycle.                     | 21-50 %    |
| Unlikely         | Could occur at some time but not often within the project lifecycle.           | 11-20 %    |
| Rare             | May occur at some time but unusual within the project lifecycle.               | 1-10 %     |
| Improbable       | Could occur but very improbable within the project lifecycle.                  | < 1 %      |

Table 6-64 Climate change risk consequence scale

| Consequence level | Definition                                                                                                                                                                                                |
|-------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Catastrophic      | <ul style="list-style-type: none"><li>Irreversible large-scale impact</li><li>Permanent damage</li><li>Regulatory intervention maximum fines and penalties and/or</li></ul>                               |
| Severe            | <ul style="list-style-type: none"><li>&gt;5 years and &lt;10 years impact.</li><li>Irreparable damage of cultural significance and/or</li><li>Tier 1 prosecution (up to \$5 million)</li></ul>            |
| Major             | <ul style="list-style-type: none"><li>Long-term (&gt;24 months but &lt; five years)</li><li>Tier 2 prosecution (up to \$1 Million corporate) and/or</li><li>Partial impairment of the ecosystem</li></ul> |
| Serious           | <ul style="list-style-type: none"><li>Short to mid-term (&lt;24 months) impact Notification to regulator</li></ul>                                                                                        |
| Moderate          | <ul style="list-style-type: none"><li>Short term repairable damage or social impact on local population &lt;12 months)</li></ul>                                                                          |
| Minor             | <ul style="list-style-type: none"><li>Localised impacts rectified by on site resources and/or</li><li>Isolated, easily contained, no lasting effects</li></ul>                                            |

Table 6-65 Climate change risk likelihood and consequence combination matrix

| Likelihood | Consequence |          |          |          |          |              |
|------------|-------------|----------|----------|----------|----------|--------------|
|            | Minor       | Moderate | Serious  | Major    | Severe   | Catastrophic |
| Frequent   | Moderate    | High     | High     | Extreme  | Extreme  | Extreme      |
| Likely     | Moderate    | Moderate | High     | High     | Extreme  | Extreme      |
| Possible   | Low         | Moderate | Moderate | High     | High     | Extreme      |
| Unlikely   | Low         | Low      | Moderate | Moderate | High     | High         |
| Rare       | Low         | Low      | Low      | Moderate | Moderate | High         |
| Improbable | Low         | Low      | Low      | Low      | Moderate | Moderate     |

#### Climate change risk assessment Step 4: Risk evaluation

All risks identified as having moderate, high or extreme risk in Step 3 were identified as requiring treatment (see **Section 6.16.3.1**). Risks evaluated as low were determined not to require further consideration.

#### Climate change risk assessment Step 5: Risk treatment/adaptation

Mitigation or adaptation treatment was identified for all moderate, high and extreme risks with the aim of reducing the original unmitigated risk ratings (see **Section 6.16.3.1**).

##### 6.16.1.2 Greenhouse gas assessment

A greenhouse gas assessment was carried out for the project as described in the EIS in accordance with the methodology outlined in the Greenhouse Gas Assessment Workbook for Road Projects (the Workbook) (Transport Authorities Greenhouse Group, 2013). This supplementary greenhouse gas assessment for the amended project was not prepared in accordance with the workbook, as the amended project comprises a combination of concept and strategic designs that would be further developed through detailed design. The sections of the amended project that have been designed to strategic level only do not contain all relevant information required to be input into the methodology outlined in the workbook.

This supplementary assessment therefore focuses on changes in quantities of greenhouse gases associated with the amended project compared to the project as described in the EIS. It consists of two steps as follows.

#### Greenhouse gas step 1: Define the assessment boundary

The assessment boundary of the GHG assessment, which is defined as the emission scopes and sources and the types of GHG considered for the assessment, was described in Section 8.6.2 of the EIS. The assessment boundary of the supplementary GHG assessment would not change from that described in the EIS.

The following six GHGs were considered for the assessment carried out in the EIS and the amendment report:

- Carbon dioxide
- Methane
- Nitrous oxide
- Sulphur hexafluoride
- Hydro fluorocarbons
- Perfluorocarbons.

Each GHG behaves differently in the atmosphere with respect to its ability to trap outgoing radiation and in respect to their lifespan in the atmosphere. Each GHG was compared to the global warming potential of carbon dioxide over a 100-year period in order to achieve a single unit of measurement. The global warming potential of each GHG was determined based on the latest NGA Factors. The resulting aggregated emissions are referred to in terms of tonnes of carbon dioxide equivalent emissions (tCO<sub>2</sub>-e).

## Greenhouse gas step 2: Determine the quantity of GHG emissions generated by each emissions source

### Construction

The GHG emissions from construction of the project as described in the EIS were estimated using the Carbon Gauge GHG Calculator for Roads Project Version 01.130612 (Carbon Gauge) as described in Section 8.6.2 of the EIS.

The amended project comprises a combination of concept and strategic designs that would be further developed through detailed design. As such, the Carbon Gauge could not be utilised. In order to calculate the GHG emissions for the amended project, the changes in construction (see **Chapter 4**) were therefore quantified, and then added to the quantities identified in the EIS, resulting in the amended project quantify as presented in **Table 6-66**.

As described in **Table 6-66**, several key construction elements, including the total number of bridges constructed, the area of the construction footprint and the total quantity of pavement required would be increased by about 26 per cent for the amended project compared with the project as described in the EIS. Increases associated with other key construction elements, including traffic movements and water use, would be less. This assessment adopted a conservative approach with the application of a 26 per cent increase to the total construction GHG emissions as described in the EIS, which is considered a conservative scenario.

It should be noted that the construction greenhouse gas assessment covers both option 1 and option 2, as a worst case scenario has been adopted for each of the construction elements described in **Table 6-66**.



Table 6-66 Percentage changes in construction elements for the amended project compared to the project as described in the EIS

| Construction element                                                   | Quantity as per in the EIS | Amended project quantity | Percentage increase between the project as per the EIS and the amended project (%) |
|------------------------------------------------------------------------|----------------------------|--------------------------|------------------------------------------------------------------------------------|
| Total number of construction traffic movements (see <b>Table 4-7</b> ) | 164,002 movements          | 165,079 movements        | 0.7                                                                                |
| Number of bridges constructed (see <b>Section 4.1</b> )                | 19 bridges                 | 24 bridges               | 26                                                                                 |
| Quantity of water used in construction (see <b>Section 4.2.7</b> )     | 676 ML                     | 822 ML                   | 22                                                                                 |
| Area of construction footprint <sup>1</sup> (see <b>Section 4.3</b> )  | 354 ha                     | 441 ha                   | 25                                                                                 |
| Total pavement quantity (see <b>Table 4-3</b> )                        | 231,000 m <sup>3</sup>     | 290,000 m <sup>3</sup>   | 26                                                                                 |

<sup>1</sup> Inclusive of all vegetation cleared

## Operation

Operational GHG emissions would result from:

- Operational electricity use, including powering of street lighting, variable message signs and traffic signals
- Ongoing maintenance, including use of diesel fuel for the operation of maintenance vehicles and machinery and embodied energy within materials for maintaining the road
- Use of the road by vehicles.

The methodology for determining the increase in each operational GHG emission is discussed below. The GHG assessment carried out for the construction and operation of the amended project was based on the design as set out in this document and construction activities outlined in **Chapter 3** and **Chapter 4**. It is noted that the operational greenhouse gas assessment would be the same for option 1 and option 2, as a worst case scenario has been assessed.

### **Operational electricity use and ongoing maintenance**

Operational electricity use and emissions associated with the ongoing maintenance of the project as described in the EIS were estimated using the Carbon Gauge assessment method (see Section 8.6 of the EIS). As described above, information required to input into the Carbon Gauge is not available for the amended project. As a result, Carbon Gauge could not be used to assess the operational maintenance GHG emissions of the amended project.

In order to estimate operational electricity and ongoing maintenance GHG emissions, an 11 per cent increase was applied to operational electricity and operational maintenance GHG emissions from the project as described in the EIS. This was determined by assessing the key changes in the operation of the amended project as described in **Table 6-67**. The operational footprint is inclusive of all operational design components of the amended project, including areas requiring ongoing maintenance, street lighting, variable message signs and traffic signals. As a result, it was determined that this would represent a conservative approach.

Table 6-67 Percentage changes in the amended project operational footprint compared to the operational footprint of the project as described in the EIS

| Size of operational footprint as per the EIS | Size of amended project operational footprint | Percentage increase between the project as per the EIS and the amended project |
|----------------------------------------------|-----------------------------------------------|--------------------------------------------------------------------------------|
| 285 hectares                                 | 317 hectares                                  | 11 per cent                                                                    |

### **Road use by vehicles**

For emissions generated by road users of the project as described in the EIS the Tools for Roadside Air Quality (TRAQ) tool was used (see Section 8.6 of the EIS). TRAQ was used to determine emissions associated with current and future operational road use, both with and without the amended project. The methodology of which is consistent with that described in Section 8.6.5 of the EIS.

As described in **Section 6.3**, traffic forecasts for western Sydney have been refined, resulting in a substantial reduction in future trips to the South West Growth Area and the Western Sydney Employment Area. As a result, the forecast future traffic movements without the project, and therefore the estimated GHG emissions without the project that were fed into the TRAQ assessment to determine future background concentrations, have been reduced from those described in the EIS. GHG emissions modelled using TRAQ took account of:

- The expected mix of road users (vehicle types)
- Average number of vehicles
- Length of road
- Average and peak traffic speeds
- Surface roughness
- Road gradient.

Changes to these components from the project as described in the EIS are considered to be minor.

## **6.16.2 Existing environment**

### **Climate change**

The existing climate change environment, including climate change considerations for road projects and climate change projections, was described in Section 8.6.3 of the EIS and is still applicable to this assessment.

### **Greenhouse gases**

The existing greenhouse gas environment, including an inventory of greenhouse gases, was described in Section 8.6.3 of the EIS and is still applicable to this assessment.

## 6.16.3 Impact assessment

### 6.16.3.1 *Climate change risk assessment*

#### Construction

Three potential climate change scenarios were identified as having moderate to high unmitigated risk rating for the amended project, which is consistent with the project as described in the EIS. The risks identified during construction are listed in **Table 6-68**. The ratings assume the incorporation of standard construction controls but otherwise were identified for the project before the identification and inclusion of mitigation measures into the design as set out in this document.

A residual risk assessment was carried out in accordance with the methods outlined in **Section 6.16.1.1** to consider the climate change risks following the implementation of adaptation measures. The construction adaptation measures and residual likelihood, consequence and risk are consistent with those for the project as described in the EIS and are presented in **Table 6-68**. It is noted that the residual risk assessment took into account changes to Australia's climate since the time of writing the EIS.

In summary, three risks to construction were identified as having a moderate residual risk. This is an increase from the two low and one moderate risks identified for the project as described in the EIS. This is considered to be a result of increased likelihood and/or consequence of climate change in Australia, rather than an increased risk of the amended project.

#### Operation

The 12 potential climate change risk scenarios that were identified for the operation of the project as having moderate or high unmitigated risk rating, and their comparison to the project as described in the EIS, are listed in **Table 6-69**. The ratings assume the incorporation of standard construction controls but otherwise were identified for the project before the identification and inclusion of mitigation measures into the design as set out in this document. Three risks to operation were identified as having a rating of high, and nine risks to operation were identified as having a rating of moderate. This is consistent with the project as described in the EIS. Consistent with Section 8.6.4 of the EIS, unmitigated risks that were identified as having a low rating have not been described in **Table 6-69** as they were not considered to require any additional risk treatment, as these risks are considered tolerable.

A residual risk assessment was carried out in accordance with the methods outlined in **Section 6.16.1.1** to consider the risks following the implementation of adaptation measures. The operational adaptation measures and residual likelihood, consequence and risk are presented in **Table 6-69**. 18 risks identified during the climate change assessment for the project as described in the EIS as having a low unmitigated risk rating are not repeated here. It is noted that the residual risk assessment took into account changes to Australia's climate since the time of writing the EIS.



In summary, the following residual risks were identified:

- Nineteen low risks. This is a decrease of three from the 22 moderate risks identified for the project as described in the EIS.
- Nine moderate risks. This is consistent with the nine moderate risks identified for the project as described in the EIS.
- Four high risks. This is an increase of three from the one high risk identified for the project as described in the EIS.

These changes to climate change risks are considered to be a result of increased likelihood and/or consequence of climate change in Australia, rather than an increased risk of the amended project.

Table 6-68 Unmitigated and residual risks to the amended project, compared to the project as described in the EIS (construction)

| Risk scenario                                                                                                                                                                                                                                       | Unmitigated risk rating for the project as described in the EIS | Unmitigated risk rating for the amended project | Adaptation/mitigation options                                                                                                                                                                                                                                                                                                                                                        | Likelihood | Consequence | Residual risk rating for the amended project | Residual risk rating for the project as described in the EIS |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------|-------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|-------------|----------------------------------------------|--------------------------------------------------------------|
| Extreme heat                                                                                                                                                                                                                                        |                                                                 |                                                 |                                                                                                                                                                                                                                                                                                                                                                                      |            |             |                                              |                                                              |
| Increased frequency, severity and duration of extreme temperatures (days exceeding 35°C) leading to adverse health impacts for construction workers and potential health and safety incidents.                                                      | Moderate                                                        | Moderate                                        | Adaptive management approach to be applied to workplace health and safety planning. This includes use of TfNSW Work Health and Safety Procedures. Examples of potential work health safety practices may include stop work protocols for extreme heat days, or increased training and education for personnel regarding health and safety procedures during periods of extreme heat. | Unlikely   | Serious     | Moderate                                     | Low                                                          |
| Extreme precipitation                                                                                                                                                                                                                               |                                                                 |                                                 |                                                                                                                                                                                                                                                                                                                                                                                      |            |             |                                              |                                                              |
| Increased frequency, severity and duration of extreme precipitation events leading to unsuitable and unsafe conditions for construction to proceed, resulting in an increase in 'stop work' days and subsequent delays to the construction program. | Moderate                                                        | Moderate                                        | The location of temporary construction ancillary facilities has considered the risk of flood and strong winds associated with severe storm events, with site uses more vulnerable to the impacts of severe storms located away from the areas of highest risk to minimise impact.                                                                                                    | Unlikely   | Serious     | Moderate                                     | Moderate                                                     |

| Risk scenario                                                                                                                                                                                                                                                     | Unmitigated risk rating for the project as described in the EIS | Unmitigated risk rating for the amended project | Adaptation/mitigation options                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Likelihood | Consequence | Residual risk rating for the amended project | Residual risk rating for the project as described in the EIS |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------|-------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|-------------|----------------------------------------------|--------------------------------------------------------------|
| Bushfires                                                                                                                                                                                                                                                         |                                                                 |                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |            |             |                                              |                                                              |
| Increased frequency and severity of bushfires leading to smoke generation, resulting in potential health effects for construction workers and health and safety incidents, potential increase in 'stop work' days, and subsequent delays to construction program. | Moderate                                                        | Moderate                                        | Adaptive management approach to be applied to workplace health and safety planning. This includes use of TfNSW Work Health and Safety Procedures. Examples of potential work health safety practices may include stop work protocols for extreme heat days, or increased training and education for personnel regarding health and safety procedures during periods of extreme heat.<br><br>Variable messaging signs to be used to display messages warning drivers of changes in conditions. Variable messaging signs are proposed as part of the project. | Unlikely   | Major       | Moderate                                     | Low                                                          |



Table 6-69 Unmitigated and residual risks to the amended project, compared to the project as described in the EIS (operation)

| Risk scenario                                                                                                                                                                                                 | Unmitigated risk rating for the project as described in the EIS | Unmitigated risk rating for the amended project | Adaptation/mitigation options                                                                                                                                                                                                                                                                                                                                                        | Likelihood | Consequence  | Residual risk rating for the amended project | Residual risk rating for the project as described in the EIS |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------|-------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|--------------|----------------------------------------------|--------------------------------------------------------------|
| Extreme heat                                                                                                                                                                                                  |                                                                 |                                                 |                                                                                                                                                                                                                                                                                                                                                                                      |            |              |                                              |                                                              |
| Increased frequency, severity and duration of extreme temperatures (days exceeding 35 °C) leading to increased stress of carriageway to bridge connections resulting in structural failure of carriageway.    | High                                                            | High                                            | Detailed design to consider the full range of potential temperature extremes on the project (particularly bridge structures) which may occur as a result of climate change and choose materials able to withstand heat where feasible, to minimise the likelihood of infrastructure failures.                                                                                        | Unlikely   | Catastrophic | High                                         | Moderate                                                     |
| Increased frequency, severity and duration of extreme temperatures (days exceeding 35 °C) leading to adverse health impacts for maintenance workers and potential health and safety incidents for road users. | Moderate                                                        | Moderate                                        | Adaptive management approach to be applied to workplace health and safety planning. This includes use of TfNSW Work Health and Safety Procedures. Examples of potential work health safety practices may include stop work protocols for extreme heat days, or increased training and education for personnel regarding health and safety procedures during periods of extreme heat. | Unlikely   | Serious      | Moderate                                     | Low                                                          |

| Risk scenario                                                                                                                                                                        | Unmitigated risk rating for the project as described in the EIS | Unmitigated risk rating for the amended project | Adaptation/mitigation options                                                                                                                                                                                                                                                                                                            | Likelihood | Consequence | Residual risk rating for the amended project | Residual risk rating for the project as described in the EIS |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------|-------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|-------------|----------------------------------------------|--------------------------------------------------------------|
| Extreme rainfall                                                                                                                                                                     |                                                                 |                                                 |                                                                                                                                                                                                                                                                                                                                          |            |             |                                              |                                                              |
| Increased rainfall from severe storm events resulting in increased scour of embankments and cuttings, leading to increased likelihood of landslips causing damage to infrastructure. | Moderate                                                        | Moderate                                        | Detailed design to consider inclusion of measures to reduce velocity and volume of stormwater flows to reduce potential impact of scour.<br>All roads and bridges to be sealed, cleared areas to be landscaped and scour protection to be installed.                                                                                     | Rare       | Major       | Low                                          | Low                                                          |
| Increased rainfall from severe storm events leading to a higher frequency of floods resulting in overtopping of the road and complete loss of infrastructure service.                | Moderate                                                        | Moderate                                        | Stormwater infrastructure was designed to ensure flood immunity for the motorway up to and including the one in 100-year storm event.                                                                                                                                                                                                    | Unlikely   | Major       | Moderate                                     | Moderate                                                     |
| Increased rainfall from severe storm events leading to higher velocity runoff flows through creeks, resulting in increased scour and damage to the asset.                            | Moderate                                                        | Moderate                                        | Detailed design to consider energy dissipation at culvert outlets when velocities exceed existing magnitudes.<br>Stormwater infrastructure was designed to ensure suitable conveyance to minimise change in flow velocities and has considered future conditions under climate change. No substantial change in velocity is anticipated. | Unlikely   | Serious     | Moderate                                     | Moderate                                                     |

| Risk scenario                                                                                                                                                                                                        | Unmitigated risk rating for the project as described in the EIS | Unmitigated risk rating for the amended project | Adaptation/mitigation options                                                                                                                                                                                                                                                                           | Likelihood | Consequence | Residual risk rating for the amended project | Residual risk rating for the project as described in the EIS |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------|-------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|-------------|----------------------------------------------|--------------------------------------------------------------|
| Extreme rainfall event leading to accident/s resulting in potential health and safety incidents for road user or active transport users.                                                                             | High                                                            | High                                            | Variable messaging signs to be used to display messages warning drivers of changes in weather and traffic conditions. Variable messaging signs are proposed as part of the project                                                                                                                      | Unlikely   | Severe      | High                                         | High                                                         |
| Bushfires                                                                                                                                                                                                            |                                                                 |                                                 |                                                                                                                                                                                                                                                                                                         |            |             |                                              |                                                              |
| Increased frequency and severity of bushfires leading to reduced visibility due to smoke, resulting in road users being unable to view signs, signals and other vehicles, and potential health and safety incidents. | Moderate                                                        | Moderate                                        | Variable messaging signs to be used to display messages warning drivers of changes in weather and traffic conditions. Variable messaging signs are proposed as part of the project.                                                                                                                     | Unlikely   | Major       | Moderate                                     | Moderate                                                     |
| Increased frequency and severity of bushfires leading to smoke generation, resulting in health effects for maintenance workers and road users, and potential health and safety incidents.                            | Moderate                                                        | Moderate                                        | Adaptive management approach to be applied to workplace health and safety planning. This includes use of TfNSW Work Health and Safety Procedures. Variable messaging signs can display messages warning drivers of changes in conditions. Variable messaging signs are proposed as part of the project. | Unlikely   | Major       | Moderate                                     | Moderate                                                     |



| Risk scenario                                                                                                                                            | Unmitigated risk rating for the project as described in the EIS | Unmitigated risk rating for the amended project | Adaptation/mitigation options                                                                                                                                                                                                                                                                                                                            | Likelihood | Consequence  | Residual risk rating for the amended project | Residual risk rating for the project as described in the EIS |
|----------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------|-------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|--------------|----------------------------------------------|--------------------------------------------------------------|
| Increased frequency and severity of bushfires resulting in increased maintenance and damage to landscaping                                               | Moderate                                                        | Moderate                                        | Detailed design to consider the use of native species which are typically more fire tolerant and can more rapidly regenerate after fire events.                                                                                                                                                                                                          | Unlikely   | Serious      | Moderate                                     | Moderate                                                     |
| Increased frequency and severity of bushfires resulting in impact on trucks carrying dangerous goods, leading to explosions and associated risk to life. | High                                                            | High                                            | Median crossovers and heavy vehicle emergency stopping bays proposed as part of the project.<br>Variable messaging signs can display messages notifying trucks carrying dangerous goods to cease travel in that direction and direct them to the nearest stopping bay or median crossover. Variable messaging signs are proposed as part of the project. | Rare       | Catastrophic | High                                         | Moderate                                                     |
| Increased frequency and severity of bushfires leading to increased fauna movement onto the motorway, resulting in increased accidents.                   | Moderate                                                        | Moderate                                        | Detailed design to maintain fauna passage along main creek lines under bridge structures                                                                                                                                                                                                                                                                 | Possible   | Serious      | Moderate                                     | Moderate                                                     |

| Risk scenario                                                                                                                                                                                  | Unmitigated risk rating for the project as described in the EIS | Unmitigated risk rating for the amended project | Adaptation/mitigation options                                                                                                                                                                                                                                                                                                                            | Likelihood | Consequence | Residual risk rating for the amended project | Residual risk rating for the project as described in the EIS |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------|-------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|-------------|----------------------------------------------|--------------------------------------------------------------|
| Increased frequency and severity of bushfires leading to road closures, resulting in restricted access and increased congestion for road users and emergency vehicles                          | Moderate                                                        | Moderate                                        | Median crossovers and heavy vehicle emergency stopping bays proposed as part of the project.<br>Variable messaging signs can display messages notifying trucks carrying dangerous goods to cease travel in that direction and direct them to the nearest stopping bay or median crossover. Variable messaging signs are proposed as part of the project. | Unlikely   | Serious     | Moderate                                     | Low                                                          |
| Droughts                                                                                                                                                                                       |                                                                 |                                                 |                                                                                                                                                                                                                                                                                                                                                          |            |             |                                              |                                                              |
| Long periods of dry weather leading to a build-up of fuel, rubber and brake dust on road surfaces, resulting in a decrease in skid resistance and increase in accidents in wet weather events. | Moderate                                                        | Moderate                                        | Variable messaging signs can post changes to speed limits and alert drivers to changes in conditions. Variable messaging signs are proposed as part of the project.                                                                                                                                                                                      | Possible   | Major       | High                                         | Moderate                                                     |
| Long periods of dry weather leading to a build-up of rubber and brake dust on road surfaces, resulting in increased runoff of pollutants from the carriageway.                                 | Moderate                                                        | Moderate                                        | Water quality treatment features are proposed as part of the project, consisting of grassed swales and water quality basins. Water quality treatment features will be further considered within detailed design.                                                                                                                                         | Possible   | Moderate    | Moderate                                     | Low                                                          |

### 6.16.3.2 Greenhouse gas assessment

#### Construction

Construction emissions for the amended project were calculated using the methodology described in **Section 6.16.1.2**. The scope 1, scope 2 and scope 3 emissions that would be generated by the amended project based on the emissions source are presented in **Table 6-70**.

It is estimated that the amended project would generate about 342,225 tCO<sub>2</sub>-e of total construction GHG emissions over the entire duration of construction. As described in **Section 6.16.1.2**, this represents a 26 per cent increase from the emissions of the project as described in the EIS and is considered to be a worst case scenario. This is comprised of 148,441 tCO<sub>2</sub>-e of scope 1 emissions and 193,774 tCO<sub>2</sub>-e of scope 3 emissions. No material scope 2 emissions sources were identified for the construction of the project as described in the EIS, and consequently no scope 2 GHG emissions were quantified for the amended project.

Table 6-70 Construction GHG emissions of the amended project compared to the project as described in the EIS

| Emissions type    | Percentage of total emissions (%) <sup>1</sup> | Emissions of the project as per the EIS (tCO <sub>2</sub> -e) | Emissions of the amended project (tCO <sub>2</sub> -e) | Change in emissions between the project as described in the EIS and amended project (tCO <sub>2</sub> -e) |
|-------------------|------------------------------------------------|---------------------------------------------------------------|--------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|
| Scope 1 emissions | 43                                             | 117,810                                                       | 148,441                                                | 30,631                                                                                                    |
| Scope 2           | 0                                              | 0                                                             | 0                                                      | 0                                                                                                         |
| Scope 3           | 57                                             | 153,789                                                       | 193,774                                                | 39,985                                                                                                    |
| <b>Total</b>      | <b>100</b>                                     | <b>271,607</b>                                                | <b>342,225</b>                                         | <b>70,618</b>                                                                                             |

<sup>1</sup> Given the method used to calculate GHG emissions for the amended project (see **Section 6.16.1.2**), the percentage distribution of scope 1, scope 2 and scope 3 emissions would not change as a result of the amended project

#### Operation

Activities that would generate GHG emission during operation of the amended project are consistent with those of the project as described in the EIS. These are listed in **Table 6-71**. Operational emissions for the amended project were calculated using the methodology described in **Section 6.16.1.2**.

**Table 6-71** lists the total GHG emissions associated with each emission source for both the amended project and compares this to that of the project as described in the EIS. The use of the road by vehicles is further broken down to the year of opening (2026) and 10 years into operation (2036). In summary, the GHG emissions increases for electricity use and road maintenance but decreases for vehicle road use. This decrease is due to the changes in traffic movements described in **Section 6.1.6** and represents a positive change.



Table 6-71 GHG emissions during operation of the amended project as compared to the project as described in the EIS

| Emission source               | Project as per EIS (tCO <sub>2</sub> -e per annum) | Amended project (tCO <sub>2</sub> -e per annum) | Difference (tCO <sub>2</sub> -e per annum) | Difference (%)  |
|-------------------------------|----------------------------------------------------|-------------------------------------------------|--------------------------------------------|-----------------|
| Electricity use <sup>1</sup>  | 20,399                                             | 22,643                                          | + 2,244                                    | 11              |
| Road maintenance <sup>2</sup> | 25,996                                             | 28,865                                          | + 2,860                                    | 11              |
| Use of road by vehicles 2026  | 93,194                                             | 86,248                                          | -6,946                                     | Reduction of 7  |
| Use of road by vehicles 2036  | 144,006                                            | 126,749                                         | -17,257                                    | Reduction of 12 |

<sup>1</sup>namely the use of diesel fuel for the operation of maintenance vehicles and machinery and embodied energy within materials for maintaining the road

<sup>2</sup>eg for powering street lighting, variable message signs and traffic signals

The total GHG emissions associated with vehicle contributions fuel combustion from traffic using the road network and the M12 Motorway was assessed further and is summarised in **Table 6-72**. A comparison was made of GHG emissions that would be produced by the project against a 'no build' scenario where vehicles use the existing road network (ie the 'without project' scenario).

**Table 6-72** shows that an increase in GHG emissions from fuel consumption is expected from the year of opening, and a further increase in GHG emissions is expected from the future year scenario. This is consistent with the project as described in the EIS, and is directly associated with the substantial increase in traffic using the road network and the M12 Motorway.

Table 6-72 GHG emissions from fuel consumption for the amended project as compared to the project as described in the EIS (tCO<sub>2</sub>-e)

| Year | Without project* | With project as per the EIS | With amended project | Difference between without project and with project as per the EIS | Difference between without project and with amended project |
|------|------------------|-----------------------------|----------------------|--------------------------------------------------------------------|-------------------------------------------------------------|
| 2026 | 50,140           | 93,194                      | 86,248               | 43,054                                                             | 36,108                                                      |
| 2036 | 62,056           | 144,006                     | 126,749              | 81,950                                                             | 64,693                                                      |

\*This was described in Table 8-68 of the EIS as being 51,948 for the 2026 and 144,006 for 2036. This has been revised for this assessment as a result of the updated traffic forecasts for western Sydney described in **Section 6.16.1.2**.

\*\*This was described in Table 8-68 of the EIS as being 41,246 tCO<sub>2</sub>-e for 2026 and 60,557 for 2036. This has been revised in this assessment as a result of the updated 'without project' GHG emissions described above.

## 6.16.4 Cumulative impacts

### 6.16.4.1 *Climate change risks*

#### Construction

The climate change risk assessment identified the same three potential risks with a risk rating of moderate or greater associated with the amended project construction. As per the project as described in the EIS, these relate to increase in extreme heat, extreme precipitation and bushfire. The risks identified for the amended project during construction would not be altered by the presence of multiple projects being constructed near one another.

As per the project as described in the EIS, other risks with identified lower risk ratings for the project may increase in conjunction with other projects being constructed nearby. However, the likelihood, and therefore overall risk of cumulative climate change risks resulting in serious consequences is generally considered low and would be consistent with those described in Section 8.6.5 of the EIS.

#### Operation

The nature of the proposed changes presented in **Chapter 3** and **Chapter 4** are not considered to substantially impact the climate change risks considered for the amended project. As a result, potential risks that may result from the operation of the amended project with consideration of other projects being carried out in the area are consistent with those described in Section 8.6.5 of the EIS.

The adaptation measures identified in Table 8-64 of the EIS would increase the amended project's resilience to climate change and reduce the cumulative impact of any climate change risks on the amended project or surrounding environment.

### 6.16.4.2 *Greenhouse gases*

#### Construction

The cumulative impacts of greenhouse gases for the amended project compared to the project as described in the EIS during construction are listed in **Table 6-73**. The combined estimated scope 1, scope 2 and scope 3 GHG emissions for the construction of the amended project are about 342,225 tCO<sub>2</sub>-e per annum (see **Section 6.16.3.2**). When compared to the most recent Australia inventory (532.9 megatonnes of CO<sub>2</sub>-e) and NSW inventory (130.3 megatonnes of CO<sub>2</sub>-e) of GHG emissions the construction of the amended project would contribute about 0.06 per cent of Australia's total annual GHG emissions and 0.26 per cent of NSW's total annual GHG emissions. This is not substantially increased from the contributions of the project as described in the EIS which would contribute 0.05 per cent and 0.21 per cent respectively (see **Table 6-73**).

The total contribution of the construction of the amended project to the effects of climate change would therefore be considered minor and consistent with those of the project as described in the EIS.

Table 6-73 Comparison of cumulative impacts of greenhouse gases for the amended project compared to the project as described in the EIS (construction)

| Greenhouse gas emissions                                     | Emissions of the project as described in the EIS | Emissions of the amended project | Change in emissions between the project as described in the EIS and the amended project |
|--------------------------------------------------------------|--------------------------------------------------|----------------------------------|-----------------------------------------------------------------------------------------|
| Volume of combined emissions (tCO <sub>2</sub> -e per annum) | 271,607                                          | 342,225                          | + 70,618                                                                                |
| Contribution to total NSW emissions (%)                      | 0.21                                             | 0.26                             | + 0.05                                                                                  |
| Contribution to total Australia emissions (%)                | 0.05                                             | 0.06                             | + 0.01                                                                                  |

## Operation

The cumulative impacts of greenhouse gases for the amended project have been compared to the project as described in the EIS during construction and are listed in **Table 6-74**. The estimated total emissions for the operation and maintenance of the amended project are about 109,468 tCO<sub>2</sub>-e per annum at year of opening (see **Section 6.16.3.2**). When compared to the most recent Australia inventory (532.9 megatonnes of CO<sub>2</sub>-e) of GHG emissions the amended project would contribute about 0.02 per cent of Australia's total annual GHG emissions in its year of opening, which is consistent to those of the project as described in the EIS.

When compared to the most recent NSW inventory (130.3 megatonnes of CO<sub>2</sub>-e) of GHG emissions the amended project would contribute about 0.08 per cent of NSW's total annual GHG emissions in its year of opening, which represents a decrease in emissions when compared to the project as described in the EIS which would contribute 0.09 per cent of NSW's total annual GHG emissions in its year of opening.

In its year of opening the amended project would contribute about 0.5 per cent of a total of 23.1 megatonnes of CO<sub>2</sub>-e GHG emissions generated by the road transportation in NSW. This is consistent with the contributions of the project as described in the EIS.

The total contribution of the operation and maintenance of the amended project to the effects of climate change would therefore be either consistent with or improved from the project as described in the EIS.



Table 6-74 Comparison of cumulative impacts of greenhouse gases for the amended project compared to the project as described in the EIS (operation)

| Greenhouse gas emissions                                     | Emissions of the project as described in the EIS | Emissions of the amended project | Change in emissions between the project as described in the EIS and the amended project |
|--------------------------------------------------------------|--------------------------------------------------|----------------------------------|-----------------------------------------------------------------------------------------|
| Volume of combined emissions (tCO <sub>2</sub> -e per annum) | 114,006                                          | 109,468                          | -4,538 (decrease in emissions)                                                          |
| Contribution to total NSW emissions (%)                      | 0.09                                             | 0.08                             | -0.01 (decrease in emissions)                                                           |
| Contribution to total Australia emissions (%)                | 0.02                                             | 0.02                             | No change                                                                               |
| Contribution to total NSW road transportation emissions      | 0.5                                              | 0.5                              | No change                                                                               |

### 6.16.5 Environmental management measures

The environmental management measures identified in Section 8.6.6 of the EIS are considered appropriate to minimise the climate change and greenhouse gas impacts of the amended project. No additional or amended environmental management measures are required for the amended project.

## 7 Revised environmental management measures

The EIS for the project identified a range of environmental outcomes and management measures that would be required to avoid or reduce the environmental impacts (see Chapter 9 of the EIS). After consideration of the issues raised in the public submissions and the impact assessment carried out for the amended project, the environmental management measures for the project have been revised.

Should the amended project be approved, the revised environmental management measures in **Table 7-1** would guide the subsequent phases of development. **Bold** text has been used to identify measures, or parts of measures, that were additional and/or modified from those provided in the EIS. Strikethrough text has been used to identify measures, or parts of measures, that are no longer required. Environmental management measures have been renumbered (when compared to those presented in Chapter 9 of the EIS) to reflect the revised environmental management measures provided below.

Where additional and/or modified environmental management measures have been included in response to the submissions report for the project, they are highlighted in orange. Where they have been included in response to the design changes and construction updates as part of the amended project that are described in **Chapter 3** and **Chapter 4**, they are highlighted in blue.

Table 7-1 Summary of revised environmental management measures (bold and strikethrough text shows change from EIS)

| Environmental issue             | Reference | Environmental management measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Responsibility       | Timing                                        |
|---------------------------------|-----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|-----------------------------------------------|
| General                         |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                      |                                               |
| Community consultation          | G01       | <p>A Community Communication Strategy will be prepared for the project to facilitate communication with the local community including relevant Government agencies, Councils, adjoining affected landowners and businesses, and other relevant stakeholders that may be affected by the project. The strategy will:</p> <p>Identify people or organisations to be consulted during the delivery of the project</p> <ul style="list-style-type: none"> <li>• Set out procedures and mechanisms for the regular distribution of information about the project</li> <li>• Outline mechanisms to keep relevant stakeholders updated on site construction activities, schedules and milestones</li> <li>• Outline avenues for the community to provide feedback (including a 24-hour, toll free project information and complaints line) or to register complaints and through which TfNSW will respond to community feedback</li> <li>• Outline a process to resolve complaints and issues raised.</li> </ul> <p>The Community Communication Strategy will include a Construction Fatigue Protocol to minimise impacts associated with construction fatigue. The Protocol will include consideration of noise attenuation and restriction of out-of-hours work or use of noise intensive equipment where reasonable and feasible.</p> | TfNSW/<br>Contractor | Prior to construction                         |
| General construction management | G02       | <p>A CEMP will be prepared and implemented for the project in accordance with the Department of Infrastructure, Planning and Natural Resources Guideline for the Preparation of Environmental Management Plans (DIPNR 2004), for the ongoing management of environmental issues during construction of the project.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Contractor           | Prior to construction and during construction |



| Environmental issue                                                              | Reference | Environmental management measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | Responsibility | Timing                |
|----------------------------------------------------------------------------------|-----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|-----------------------|
| Biodiversity                                                                     |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                |                       |
| All biodiversity impacts                                                         | B01       | <p>A CFFMP will be prepared. The measures in the CFFMP will include:</p> <ul style="list-style-type: none"> <li>• A site specific induction</li> <li>• Identification of clearing limits and exclusion fencing</li> <li>• Pre-clearance surveys</li> <li>• Vegetation clearing procedures</li> <li>• An unexpected finds procedure</li> <li>• Procedures for weed management and monitoring</li> <li>• A process for de-watering farm dams and the relocation of aquatic fauna</li> <li>• Provision of supplementary fauna habitat (eg nest boxes).</li> </ul> | Contractor     | Prior to construction |
|                                                                                  | B02       | A Habitat Compensation Plan (HCP) will be prepared and implemented as part of the CFFMP for the project. The HCP will target those species that will be impacted by the loss of hollows. Measures will include: nest boxes, reuse of salvaged hollows and/or new technologies eg chainsaw hollows), as well as replacement of woody debris and bushrock with consideration to Guide 5 and Guide 8 of Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects (RTA, 2011).                                                                | Contractor     | Prior to construction |
| Removal of native vegetation, threatened species, and threatened species habitat | B03       | Native vegetation, threatened species and threatened species habitat removal will be minimised where practicable through detailed design. This will include avoiding the nest and surrounds of the White-bellied Sea-Eagle, where practicable.                                                                                                                                                                                                                                                                                                                 | Contractor     | Detailed design       |
|                                                                                  | B04       | Biodiversity offsets for the project will be purchased and managed in accordance with the Biodiversity Offset Strategy prepared for the project.                                                                                                                                                                                                                                                                                                                                                                                                               | TfNSW          | Prior to operation    |

| Environmental issue                                                              | Reference | Environmental management measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Responsibility | Timing                |
|----------------------------------------------------------------------------------|-----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|-----------------------|
| Removal of native vegetation, threatened species, and threatened species habitat | B05       | <p>Pre-clearing surveys will be carried out in accordance with Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects (RTA, 2011) (Guide 1: Pre-clearing process). The following species identified on or near the study area will require particular attention:</p> <ul style="list-style-type: none"> <li>• White-bellied Sea-Eagle</li> </ul> <p>If design cannot avoid the White-bellied Sea-Eagle nest, then pre-clearing measures to avoid impact on the nest will be implemented. This will include pre-clearing survey to establish if it is currently being used and removal of the nest by an ecologist experienced in similar procedures. The potential impacts of habitat removal will be minimised by removing the nest outside of the nesting period (typically lays between June and September, with young remaining in the nest for 70 days). <del>Time will be allowed on either side of the nesting period to allow individuals to select and construct a new nest site before clearing.</del></p> <p><b>An initial pre-clearing inspection will be carried out at least 21 days prior to commencement of clearing, to give the ecologist time to check the nest and then relocate if needed.</b></p> <ul style="list-style-type: none"> <li>• Cumberland Plain Land Snail</li> </ul> <p>Pre-clearance surveys will be carried out immediately before clearing works by a qualified ecologist in all vegetated areas to be disturbed that were identified as known or potential habitat for Cumberland Plain Land Snail (see <b>Figure 6-6</b>). As identified in the CFFMP, all individual Cumberland Plain Land Snails found during pre-clearance surveys will be translocated to adjacent areas of suitable habitat.</p> | Contractor     | Prior to construction |

| Environmental issue                                         | Reference | Environmental management measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Responsibility     | Timing              |
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| Removal of native vegetation and threatened species habitat | B06       | <p>An unexpected threatened species finds procedure will be developed as part of the CFFMP and based on Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects (RTA, 2011) (Guide 1: Pre-clearing process).</p> <p>The procedure will include requirements for workers to be made aware of the potential flora and fauna species that may be encountered during construction (including training staff on species identification) and outline the process for the identification and management of unexpected flora and fauna.</p> <p>In the event that any threatened species are identified during construction, the following steps would be carried out:</p> <ol style="list-style-type: none"> <li>1. Stop work immediately in the location of the unexpected find to avoid any potential impacts.</li> <li>2. Notify the environmental manager.</li> <li>3. Environmental manager will arrange for an ecologist to conduct an assessment of significance of the likely impact, develop management options, and notify DPIE, EESG, and <del>DoEE</del> <b>DAWE</b> as appropriate.</li> <li>4. If a significant impact is unlikely to occur, re-begin work and maintain regular site inspections.</li> <li>5. If a significant impact is likely to occur: <ol style="list-style-type: none"> <li>a. Consult with DPIE, EESG and <del>DoEE</del> <b>DAWE</b> as appropriate.</li> <li>b. Obtain approvals, licenses or permits as required.</li> <li>c. Re-begin work once advice is sought and necessary approvals, licenses and permits are obtained.</li> </ol> </li> <li>6. Include species in subsequent inductions, toolbox talks and update the CEMP.</li> </ol> | Contractor         | During construction |
|                                                             | B07       | Vegetation and habitat removal will be carried out in accordance with Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects (RTA, 2011) (Guide 4: Clearing of vegetation and removal of bushrock).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Contractor         | During construction |
|                                                             | B08       | Revegetation will be carried out in accordance with Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects (RTA, 2011) (Guide 3: Re-establishment of native vegetation) and the Landscape Plan prepared for the project.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | TfNSW / Contractor | During construction |



| Environmental issue                     | Reference  | Environmental management measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Responsibility    | Timing                       |
|-----------------------------------------|------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------|------------------------------|
|                                         | B09        | Habitat will be replaced or re-instated in accordance with Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects (RTA, 2011) (Guide 5: Re-use of woody debris and bushrock and Guide 8: Nest boxes). A Habitat Compensation Plan, as described in B02 will include this measure.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Contractor        | During construction          |
| Riparian vegetation and aquatic impacts | B10        | Removal of riparian vegetation at creek crossings will be minimised and vegetation connectivity across the riparian zone will be maintained where possible.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Contractor        | During construction          |
|                                         | B11        | Measures to protect aquatic and riparian habitat will be outlined in the CFFMP and protected in accordance with <i>Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects</i> (RTA, 2011) ( <i>Guide 10: Aquatic habitats and riparian zones</i> ) and Section 3.3.2 <i>Standard precautions and mitigation measures</i> of the Policy and guidelines for fish habitat conservation and management (DPI, 2013).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Contractor        | Prior to construction        |
| Aquatic impacts                         | <b>B12</b> | <p><b>A snag management plan would be prepared as part of the CFFMP for the project for snag removal and relocation at Badgerys Creek, Kemps Creek and South Creek in accordance with the Policy and guidelines for fish habitat conservation and management (DPIE, 2013). The management plan will be informed by additional field work which will provide details of the snags to be relocated (such as numbers and locations) and relocation methods.</b></p> <p><b>In accordance with Section 3.2.5.2 of the Policy and guidelines for fish habitat conservation and management (DPI 2013), the snag management plan will:</b></p> <ul style="list-style-type: none"> <li>• <b>Clearly outline the objectives to be achieved</b></li> <li>• <b>Document the actions to be taken for each individual snag</b></li> <li>• <b>Detail the methods and machinery to be use</b></li> <li>• <b>Specify the season or time period over which the works will be carried out.</b></li> </ul> | <b>Contractor</b> | <b>Prior to construction</b> |
|                                         | B13        | Creek adjustments will be investigated and removed or minimised during detailed design where feasible. Proposed creek adjustments will be designed such that they result in minimal changes to flow velocities.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Contractor        | Detailed design              |

| Environmental issue | Reference | Environmental management measures                                                                                                                                                                                                                                                                                                                                                  | Responsibility       | Timing              |
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|                     | B14       | Creek corridors will be revegetated with locally native riparian vegetation, in accordance with the requirements of the Policy and guidelines for fish habitat conservation and management (DPI, 2013) and in consideration of the Guidelines for instream works on waterfront land (DPI, 2012). The creek channels will be rehabilitated to preconstruction conditions or better. | TfNSW/<br>Contractor | During construction |
|                     | B15       | Bridge pier locations within instream (main waterway channel) or on creek banks will be avoided during detailed design at the South Creek, Cosgroves Creek, Badgerys Creek and Kemps Creek crossings. Where avoidance is not possible, further biodiversity assessment will be required.                                                                                           | Contractor           | Detailed design     |
|                     | B16       | Large woody debris will be retained for creek crossing works where practicable. Any large woody debris placed in the realigned waterways will be relocated in consultation with an ecologist.                                                                                                                                                                                      | Contractor           | During construction |
|                     | B17       | Permanent and temporary waterway crossings will be designed and constructed to maintain fish passage in accordance with Why do Fish Need to Cross the Road? Fish Passage Requirements for Waterway Crossings (Fairfull and Witheridge, 2003). Crossing types should be matched to waterway type as per Table 1 in Fairfull and Witheridge (2003).                                  | Contractor           | During construction |
|                     | B18       | The temporary application of mulch during construction will be managed to avoid the potential for material and tannin run-off into waterways. This will include limiting the application of mulch near waterways where practicable.<br>The application of mulch for permanent landscaping must be designed and planned to avoid material and tannin runoff.                        | TfNSW/<br>Contractor | During construction |
|                     | B19       | Emergency response protocols and procedures will be included in the Project CEMP and implemented in the event of a contaminant spill or leak.                                                                                                                                                                                                                                      | Contractor           | During construction |
|                     | B20       | Spill kits will be located to allow for timely response to uncontained spills. Site inductions will include a briefing on the use of spill kits.                                                                                                                                                                                                                                   | Contractor           | During construction |

| Environmental issue                                                  | Reference | Environmental management measures                                                                                                                                                                                                                                                                                                                                                                                                               | Responsibility | Timing                                  |
|----------------------------------------------------------------------|-----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|-----------------------------------------|
| Groundwater Dependent Ecosystems                                     | B21       | Interruptions to water flows associated with groundwater dependent ecosystems will be minimised through detailed design.                                                                                                                                                                                                                                                                                                                        | Contractor     | Detailed design                         |
| Changes to hydrology                                                 | B22       | Changes to existing surface water flows will be minimised through detailed design.                                                                                                                                                                                                                                                                                                                                                              | Contractor     | Detailed design                         |
| Fragmentation of identified biodiversity links and habitat corridors | B23       | Connectivity measures will be implemented in accordance with Wildlife Connectivity Guidelines for Road Projects (TfNSW, under preparation). Fencing will be located to reduce roadkill of fauna species and funnel animals to creek crossings where safe passage will be available. Detailed design is to retain fauna passage at all four main creek lines (Cosgroves, South, Kemps and Badgerys Creeks).                                      | Contractor     | Detailed design and during construction |
| Edge effects on adjacent native vegetation and habitat               | B24       | Exclusion zones will be set up at the limit of clearing in accordance with Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects (RTA, 2011) (Guide 2: Exclusion zones).<br><b>Exclusion zones will be set up to protect potential indirect impacts to threatened flora in accordance with the areas identified in the EIS and this amendment report (including Figure 1-2 of Appendix A of this amendment report).</b> | Contractor     | During construction                     |
| Injury and mortality of fauna                                        | B25       | Fauna will be managed in accordance with Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects (RTA, 2011) (Guide 9: Fauna handling).                                                                                                                                                                                                                                                                                   | Contractor     | During construction                     |
| Invasion and spread of pest species                                  | B26       | Weed species will be managed in accordance with Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects (RTA, 2011) (Guide 6: Weed management).                                                                                                                                                                                                                                                                           | Contractor     | During construction                     |
| Invasion and spread of pathogens and disease                         | B27       | Pathogens will be managed in accordance with Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects (RTA, 2011) (Guide 2: Exclusion zones).                                                                                                                                                                                                                                                                              | Contractor     | During construction                     |



| Environmental issue                | Reference | Environmental management measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Responsibility | Timing                                        |
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| Noise, light and vibration         | B28       | Shading impacts will be minimised through detailed design of bridge and culvert structures. The need for artificial lighting during construction and operation will be minimised through detailed design where feasible, including directing lighting away from vegetated areas where practicable.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Contractor     | Detailed design, during construction          |
| Transport and traffic              |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                |                                               |
| Construction transport and traffic | TT01      | <p>A construction transport and traffic management plan (CTTMP) will be prepared as part of the CEMP in consultation with relevant local Councils, and in accordance with relevant guidelines. The CTTMP will outline:</p> <ul style="list-style-type: none"> <li>• Staging and planning of works to minimise the need to occupy roads where practicable, including identification of haulage routes</li> <li>• Safe alternative routes for pedestrians and cyclists in accordance with relevant safety and accessibility standards</li> <li>• The requirements for traffic control plans to be prepared for each work area which will include details of site access and specific traffic control measures (including signage) to manage traffic movements</li> <li>• Road safety audit requirements</li> <li>• Parking arrangements for construction staff</li> <li>• Identification of access arrangements at construction sites detailing vehicle access movements</li> <li>• Measures to minimise changes to the existing road network, property access, bus stops and pedestrian/cyclist facilities where feasible</li> <li>• Measures to communicate and notify of any changes in traffic conditions on roads or paths to road users, emergency services, public transport operators, and other relevant stakeholders</li> <li>• Measures to manage construction traffic interfaces and access arrangements with Western Sydney International Airport and Sydney Metro – Western Sydney Airport</li> </ul> | Contractor     | Prior to construction and during construction |

| Environmental issue                                       | Reference | Environmental management measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Responsibility     | Timing                                                            |
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|                                                           |           | <ul style="list-style-type: none"> <li>Requirements for appropriate warning and signage for traffic and other road users such as cyclists and pedestrians in the vicinity of work areas and work site access, and road diversions.</li> </ul>                                                                                                                                                                                                                                                                                                                                             |                    |                                                                   |
|                                                           | TT02      | Changes to bus stops will be implemented in consultation with TfNSW, relevant councils, and relevant bus operators. Alternate temporary bus stops will be provided with appropriate signage to direct commuters. Safe access will be provided in accordance with relevant safety and accessibility standards.                                                                                                                                                                                                                                                                             | Contractor         | Prior to construction, during construction and after construction |
|                                                           | TT03      | Movements of haulage vehicles will be planned to minimise movements on the road network during the AM and PM peak periods where practicable.                                                                                                                                                                                                                                                                                                                                                                                                                                              | Contractor         | Prior to construction and during construction                     |
| Impacts on M7 Motorway traffic and shared user path users | TT04      | Consultation will be carried out with the operators of the M7 Motorway to develop measures to manage the potential impacts of construction within the operating M7 Motorway corridor.                                                                                                                                                                                                                                                                                                                                                                                                     | TfNSW / Contractor | Detailed design, prior to construction, and during construction   |
|                                                           | TT05      | <p>TfNSW will continue to work with Western Sydney Parklands Trust to support the delivery of a shared user path within Western Sydney Parklands to connect from Range Road to the existing M7 Motorway shared user path.</p> <p>If it is determined during consultation that the shared user path connection through the Western Sydney Parklands will not be delivered, TfNSW will provide an alternative alignment for the shared user path in this section via either Elizabeth Drive, or alongside the M12 Motorway from Range Road to the M7 Motorway shared user path network.</p> | TfNSW              | Detailed design, during construction                              |

| Environmental issue                                                                     | Reference | Environmental management measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Responsibility     | Timing                                                          |
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| Damage or impacts on local road infrastructure                                          | TT06      | A road dilapidation report will be prepared before impacts on local roads in consultation with relevant councils and other relevant stakeholders. The report will document the existing conditions of local roads and outline measures to repair damage to roads from heavy vehicle movements associated with the project.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Contractor         | Prior to construction                                           |
| Impacts on property access                                                              | TT07      | Existing property access would be maintained at all times.<br>Any changes to access arrangements or alternative access that are necessary during construction will be done with consultation with the landowner. Any changes to access will provide the same equivalent pre-existing level of access unless agreed to by the land owner.<br>Property access that is physically affected by the project will be reinstated to at least an equivalent standard, in consultation with the landowner.                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | TfNSW / Contractor | Detailed design, prior to construction, and during construction |
| Impacts on businesses                                                                   | TT08      | A signage strategy will be prepared as part of the CTTMP to provide for appropriate signage for businesses where existing signage is obscured/no longer visible or where customers are required to use alternative access to reach the businesses during construction.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Contractor         | Prior to construction                                           |
| Urban design, landscape character                                                       |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                    |                                                                 |
| Impacts on views and landscape character from construction and operation of the project | LVIA01    | An Urban Design and Landscape Plan (UDLP) will be prepared to minimise landscape character and visual impacts, and detail and guide the implementation of landscape features to be installed as part of the project, including re-vegetation requirements.<br>This will include requirements for the provision of vegetative screening to soften the appearance of structural elements of the project such as noise walls and provide screening of sensitive views. The UDLP will also consider the requirements of the heritage interpretation framework that will be prepared for the project (NAH02).<br>The UDLP will be prepared in accordance with applicable guidelines, be consistent with the concept project identity in the EIS and relevant urban design objectives and principles for the project including consideration of implementation of Crime Prevention Through Environmental Design (CPTED) principles, and in consultation with relevant councils. | Contractor / TfNSW | Detailed design                                                 |



| Environmental issue | Reference | Environmental management measures                                                                                                                                                                                                                                                                                                                                  | Responsibility | Timing                                                         |
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|                     | LVIA02    | A detailed Landscape Plan will be prepared for the project and implemented throughout construction. The plan will guide the implementation of measures to minimise landscape character and visual impacts, including revegetation requirements.                                                                                                                    | Contractor     | Detailed design, prior to construction and during construction |
|                     | LVIA03    | Existing vegetation within the construction footprint will be retained and protected where possible. This includes densely vegetated areas such as remnant riparian forests and Cumberland Woodlands in Western Sydney Parkland.                                                                                                                                   | Contractor     | Detailed design and during construction                        |
|                     | LVIA04    | Site levels and grades for the project will integrate with the surrounding terrain to help the visual assimilation of the project into the surrounding landscape where practicable. Engineered slopes will have gradients no steeper than 3H:1V where possible to maximise the establishment of vegetation on these batters and allow for appropriate maintenance. | Contractor     | Detailed design                                                |
|                     | LVIA05    | Project elements such as ancillary facility hoardings will be designed and maintained to minimise impacts on landscape character and visual amenity. This will include selecting colours and materials that are visually recessive and blend into the surrounding landscape where practicable, and the prompt removal of graffiti.                                 | Contractor     | Detailed design, prior to construction and during construction |
|                     | LVIA06    | Where noise mitigation such as noise barriers are required, they will be designed with the aim of minimising visual impacts.                                                                                                                                                                                                                                       | Contractor     | Detailed design                                                |

| Environmental issue   | Reference | Environmental management measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Responsibility     | Timing                                                         |
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|                       | LVIA07    | Temporary and permanent lighting will be designed and implemented with consideration of: <ul style="list-style-type: none"> <li>• The need to orientate lighting to minimise light spill and glare impacts on nearby receivers</li> <li>• The need to minimise vandalism and maintenance requirements</li> <li>• Requirements of the National Airports Safeguarding Framework (NASF) (National Airports Safeguarding Advisory Group, n.d.) for operational lighting</li> <li>• Opportunities to implement sustainability initiatives in design such as energy efficient or solar lighting.</li> </ul> | Contractor         | Detailed design, prior to construction and during construction |
|                       | LVIA08    | <b>TfNSW will investigate opportunities to undertake early tree planting in consultation with landowners to soften impact of structural elements and screen sensitive views.</b>                                                                                                                                                                                                                                                                                                                                                                                                                      | <b>TfNSW</b>       | <b>Prior to and during construction</b>                        |
| Urban design elements | LVIA09    | The findings and recommendation of the Aboriginal cultural heritage design process managed by Balarinji will be incorporated into the urban design and implemented as part of the project, including interpretive initiatives.                                                                                                                                                                                                                                                                                                                                                                        | TfNSW / Contractor | Detailed design, prior to construction and during construction |
|                       | LVIA10    | Shared user paths to be delivered as part of the project will not preclude connections to future open space corridors and land use as identified in the Western Sydney Land Use and Infrastructure Implementation Plan (LUIIP) (DPE 2018). Where further design of adjacent open space corridors is undertaken, shared user paths will be provided to connect at an appropriate location. Shared user paths will be designed to be located away from road-side edges to provide an immersive landscape experience for pedestrians and cyclists, where possible.                                       | TfNSW / Contractor | Detailed design                                                |
|                       | LVIA11    | Establish an Urban Design Review Panel to provide advice and input into the development of the UDLP.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | TfNSW              | Detailed design                                                |

| Environmental issue          | Reference | Environmental management measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Responsibility | Timing                                    |
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|                              | LVIA12    | Highly visible elements of the project including potential noise barriers, retaining walls, bridge structures and urban design material selection will be designed to satisfy functional requirements and adopt the design principles detailed in the M12 Motorway EIS Landscape Character, Visual Impact Assessment and Urban Design Report. The proposed designs will be documented in the relevant UDLP for the project.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Contractor     | Detailed design                           |
|                              | LVIA13    | Consider a standard design for retaining walls and major structures across the project, to present a coordinated 'suite of elements'.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Contractor     | Detailed design                           |
| Safety in design             | LVIA14    | The project must consider CPTED principles during detailed design to minimise safety risks to all users. The project must carry out periodic CPTED reviews by a qualified professional and implement any additional recommendations where reasonable and feasible.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Contractor     | Detailed design                           |
| Revegetation and landscaping | LVIA15    | <p>A tree management strategy will be prepared for the project, outlining:</p> <ul style="list-style-type: none"> <li>Measures to minimise tree removal to retain and protect as many trees within the construction footprint as reasonable and feasible</li> <li>Measures to avoid damage to trees that are to be retained within the construction footprint to ensure the maintenance of health and stability of the trees in accordance with AS4970-2009 Protection of trees on development sites</li> <li>Requirements for the pruning of trees to be carried out by a suitably qualified person in accordance with AS 4373-2007 Pruning of amenity trees</li> <li>Consideration of maintenance requirements and safety standards</li> <li>Requirements for the replacement trees where removal cannot be avoided including: <ul style="list-style-type: none"> <li>Net increase in the number of trees (not identified as within an EEC)</li> <li>Where it is not practicable to plant trees in the operational footprint an alternative location will be identified in consultation with relevant councils and in consideration of future development in the local area</li> </ul> </li> <li>Minimum pot size in accordance with part 3.2.1 (Rural road reserves) in the TfNSW Landscape Guideline (2018) subject to long-term viability of the plant.</li> </ul> | Contractor     | Detailed design and prior to construction |



| Environmental issue                   | Reference | Environmental management measures                                                                                                                                                                                                                                                                                                  | Responsibility     | Timing                                     |
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|                                       | LVIA16    | Revegetation for the project will consider the land use requirements of the National Airports Safeguarding Framework (NASF) (National Airports Safeguarding Advisory Group, n.d.) to minimise the risk of wildlife strikes at the Western Sydney Airport.                                                                          | Contractor         | Detailed design                            |
|                                       | LVIA17    | Carry out appropriate soil analysis and identify soil preparation requirements for landscaping treatments to inform the Urban Design and Landscaping Plan and vegetation management in accordance with TfNSW Batter Surface Stabilisation Guideline (Roads and Maritime 2015).                                                     | Contractor         | Detailed design and during construction    |
| Socio-economic, land use and property |           |                                                                                                                                                                                                                                                                                                                                    |                    |                                            |
| Property acquisition and lease        | SLP01     | Areas of land leased for the purposes of construction will be reinstated at the end of the lease to at least equivalent standard in consultation with the landowner.                                                                                                                                                               | Contractor         | During construction                        |
|                                       | SLP02     | All partial and full acquisitions and associated property adjustments will be carried out in accordance with the requirements of the <i>Land Acquisition (Just Terms Compensation) Act 1991</i> and the Land acquisition reform 2016 in consultation with landowners.                                                              | TfNSW              | Prior to construction                      |
|                                       | SLP03     | A Personal Manager - Acquisition (PMA) will be appointed to assist landowners and residents who may be affected by acquisition requirements for the project. The PMA will provide ongoing support for relocated persons, including dispute resolution and counselling, and provision of contact information for relevant services. | TfNSW              | Detailed design                            |
|                                       | SLP04     | Property adjustments, including replacement of farm infrastructure (such as fencing) and relocation of property access, prior to work that impact the property will be carried out in consultation with property owners/ business managers.                                                                                        | Contractor / TfNSW | Prior to construction, during construction |
| Utility impacts                       | SLP05     | The project will be designed with the aim of minimising impacts on existing utilities and services, in consultation with utility owners and/or providers of services where feasible and reasonable.                                                                                                                                | Contractor / TfNSW | Detailed design                            |

| Environmental issue             | Reference | Environmental management measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Responsibility     | Timing                                        |
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|                                 | SLP06     | Utility owners and/or providers of services will be identified and consulted with before works start, to determine the requirements for access to, protection of, or relocation of services. Disruption to existing services will be minimised where feasible and local residents and businesses will be notified before any planned disruption.                                                                                                                                                                                                                                                                                       | Contractor         | Prior to construction                         |
| Agricultural land use           | SLP07     | Construction activities will be planned to minimise disruption to existing agricultural operations/activities in surrounding properties where feasible and reasonable (eg stock access, access to farm dams, etc) unless otherwise agreed by the landowner.                                                                                                                                                                                                                                                                                                                                                                            | Contractor         | Prior to construction                         |
| Social infrastructure           | SLP08     | Adjustments to facilities in Western Sydney Parklands (eg walking and cycling trails and Sydney International Shooting Centre access) will be carried out in consultation with the Western Sydney Parklands Trust.                                                                                                                                                                                                                                                                                                                                                                                                                     | TfNSW / Contractor | Prior to construction and during construction |
|                                 | SLP09     | TfNSW will continue to work with Western Sydney Parklands Trust to support their delivery of a replacement for the Wylde Mountain Bike Trail by Western Sydney Parklands Trust.                                                                                                                                                                                                                                                                                                                                                                                                                                                        | TfNSW              | Prior to construction                         |
| Impacts on community facilities | SLP10     | <p>Ongoing consultation regarding management of potential impacts will be carried out in accordance with the Community Communication Strategy with the following community facilities:</p> <ul style="list-style-type: none"> <li>• Kemps Creek Sporting and Bowling Club</li> <li>• Kemps Creek Cougars Baseball Club</li> <li>• Science of the Soul Study Centre</li> <li>• Muhammadi Welfare Association of Australia</li> <li>• Schools such as Kemps Creek Public School and Christadelphian Heritage College, and Irfran College</li> <li>• Western Sydney Parklands</li> <li>• Sydney International Shooting Centre.</li> </ul> | TfNSW / Contractor | Prior to construction and during construction |

| Environmental issue             | Reference    | Environmental management measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Responsibility            | Timing                                               |
|---------------------------------|--------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|------------------------------------------------------|
| Construction fatigue            | SLP11        | Construction fatigue will be managed in accordance with the Community Communication Strategy.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | TfNSW / Contractor        | Prior to construction and during construction        |
| Impacts on businesses           | SLP12        | On-going consultation will be carried out with local business owners that may be impacted during construction (including owners of agricultural businesses) in accordance with the Community Communication Strategy for the project.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | TfNSW / Contractor        | Prior to construction and during construction        |
|                                 | SLP13        | A business impact risk register will be established and maintained for the duration of construction to identify and manage specific impacts on individual businesses.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Contractor                | Prior to construction and during construction        |
| <b>Employment opportunities</b> | <b>SLP14</b> | <b>Employment opportunities for the project will align with the commitments outlined in the Western Sydney City Deal (2018), including targets for Indigenous, social and local employment and procurement.</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <b>TfNSW / Contractor</b> | <b>Prior to construction and during construction</b> |
| Aboriginal heritage             |              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                           |                                                      |
| General                         | AH01         | <p>A construction cultural heritage management plan (CCHMP) will be developed for the project in consultation with the project RAPs and EESG. The CCHMP will include:</p> <ul style="list-style-type: none"> <li>An unexpected finds procedure for the discovery of Aboriginal ancestral remains, Aboriginal objects or new Aboriginal sites consistent with TfNSW Standard Management Procedure Unexpected Heritage Items (Roads and Maritime, 2015). This procedure will also outline requirements to manage unexpected human remains finds in accordance with NSW statutory requirements, and relevant guidelines and standards prepared by EESG. The Procedure will outline the process for consulting with the RAPs in the event that previously unidentified Aboriginal heritage is discovered.</li> </ul> | Contractor                | Prior to construction                                |



| Environmental issue | Reference | Environmental management measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Responsibility     | Timing          |
|---------------------|-----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|-----------------|
|                     |           | <ul style="list-style-type: none"> <li>• Procedures for the management and curation of salvaged Aboriginal objects</li> <li>• Detailed locations and installation procedures for fencing and protective coverings</li> <li>• Details of permissible activities inside protected Aboriginal areas</li> <li>• Details of permissible activities inside protected Aboriginal areas</li> <li>• Procedures for consideration of heritage aspects within site inductions and toolbox talks for construction workers and supervisors.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                    |                 |
|                     | AH02      | <p>A detailed Aboriginal Cultural Salvage Strategy will be prepared for the project in consultation with project RAPs and EESG to guide the salvage excavation process for Aboriginal sites that will be salvaged. The strategy will address specific questions about each site and will be based on the salvage excavation methodology outlined in the ACHAR and prepared in consultation with EESG and project RAPs.</p> <p>All salvage collections and excavations will be carried out by a suitably qualified and experienced archaeologist. The method and extent of excavation required, and management of artefacts finds will be determined in consultation with project RAPs and EESG.</p> <p>Following completion of all salvage works associated with Aboriginal heritage sites, an Aboriginal Cultural Heritage Report will be prepared in accordance with relevant guidelines and in consultation with project RAPs and EESG. The Aboriginal Cultural Heritage Report will document all results of the salvage activities including analysis of artefacts from collections and excavations and management of all artefact finds.</p> | TfNSW / Contractor | Detailed design |

| Environmental issue                                | Reference | Environmental management measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Responsibility | Timing                                                         |
|----------------------------------------------------|-----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|----------------------------------------------------------------|
| Impacts on Aboriginal heritage during construction | AH03      | <p>A work method statement will be prepared for the works within identified Aboriginal sites in consultation with a suitably qualified and experienced archaeologist. The method statement will be prepared to minimise impacts on Aboriginal sites where feasible, including input into detailed design. Measures will include (but not be limited to):</p> <ul style="list-style-type: none"> <li>• Designing and locating bridges (including bridge pylons), haulage routes and other access roads to minimise potential disturbance of soils where feasible</li> <li>• Focusing protection measures on the zone within 100 metres of creeks including consideration of opportunities to cover the original cultural deposits in temporary protective barriers such as geotextile fabric and a layer of clean fill.</li> </ul> | Contractor     | Detailed design, prior to construction and during construction |
| Impacts on identified cultural deposits            | AH04      | An investigation will be carried out during detailed design to minimise impacts on the CHRP site where feasible.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Contractor     | Detailed design                                                |
|                                                    | AH05      | <p>Investigations will be carried out during detailed design to determine the feasibility of retaining cultural deposits between the pylons of bridges or elevated structures at the following sites:</p> <ul style="list-style-type: none"> <li>• BCW</li> <li>• BCE</li> <li>• SCW T1</li> <li>• SCW T2</li> <li>• SCE.</li> </ul> <p>This will include covering the original cultural deposits beneath temporary protective barriers such as geotextile fabric and a layer of clean fill material.</p>                                                                                                                                                                                                                                                                                                                         | Contractor     | Detailed design                                                |

| Environmental issue | Reference | Environmental management measures                                                                                                                                                                                                                                                                                                                                                                                           | Responsibility            | Timing                                               |
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|                     | AH06      | Salvage collection of surface artefacts will be carried out at the following sites: <ul style="list-style-type: none"> <li>• BCE</li> <li>• SCW T2</li> <li>• KCW</li> <li>• PCP8</li> <li>• CHRP</li> <li>• RR</li> <li>• M12A1</li> <li>• Isolated artefact 4</li> <li>• TNR-AFT-14.</li> </ul>                                                                                                                           | Contractor / TfNSW        | Prior to construction                                |
|                     | AH07      | Salvage excavation will be carried out at the following sites: <ul style="list-style-type: none"> <li>• CCW</li> <li>• BWB</li> <li>• BCW</li> <li>• SCW T1</li> <li>• SCW T2</li> <li>• SCE</li> <li>• KCW</li> <li>• CHRP.</li> </ul> <p>The methodology and extent of excavations required for the above sites will be in accordance with site specific requirements outlined in the ACHAR prepared for the project.</p> | Contractor / TfNSW        | Prior to construction                                |
|                     | AH08      | <b>Exclusion zones will be set up in the form of an appropriate barrier / fencing along the portion of AHIMS site 45-5-2721 (PAD-OS-7) that extends into the amended construction footprint, with visible signage notifying construction personnel to avoid ground impacts.</b>                                                                                                                                             | <b>Contractor / TfNSW</b> | <b>Prior to construction and during construction</b> |



| Environmental issue     | Reference   | Environmental management measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Responsibility            | Timing                       |
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|                         | <b>AH09</b> | <b>Archaeological text excavation will be carried out at PAD-OS-7 in the instance that construction restrictions result in impacts to that site. Test excavations would be conducted in accordance with Requirement 16a of the Code of Practice (DECCW 2010), Stage 2 PACHCI (Roads and Maritime 2011) and in consultation with RAPs.</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | <b>Contractor / TfNSW</b> | <b>Prior to construction</b> |
| Non-Aboriginal heritage |             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                           |                              |
| General                 | NAH01       | <p>A construction cultural heritage management plan (CCHMP) will be prepared for the project as part of the CEMP in consultation with DPC (Heritage). The CCHMP will include as a minimum:</p> <ul style="list-style-type: none"> <li>• A list, plan and maps with GIS layers showing the location of identified heritage items both within, and near, the construction footprint</li> <li>• A significance assessment and statement of significance for each item</li> <li>• Protocols and procedures including inductions and toolbox talks for all contractors and subcontractors working in the area to be informed of all exclusion zones, the elements and their significance, to prevent accidental damage or encroachment</li> <li>• Protocols and procedures to be implemented during construction to avoid or minimise impacts on items of heritage significance including protective fencing</li> <li>• The TfNSW Unexpected Heritage Items Procedure (Roads and Maritime, 2015) which would be followed in the event that unexpected heritage finds are uncovered during construction.</li> </ul> | Contractor                | Prior to construction        |
|                         | NAH02       | <p>A suitably qualified heritage specialist will be engaged to prepare a heritage interpretation framework to guide development of the detailed urban design for the project. This framework will be prepared in accordance with the Interpreting Heritage Places and Items Guidelines (NSW Heritage Office, 2005) and will include:</p> <ul style="list-style-type: none"> <li>• Integration of heritage themes and values to be incorporated</li> <li>• Collaboration with other design elements and themes for the project, including those associated with Western Sydney Airport and Sydney Metro – Western Sydney Airport, to develop an integrative design approach with surrounding development</li> <li>• Opportunities for design responses for Aboriginal and non-Aboriginal heritage.</li> </ul>                                                                                                                                                                                                                                                                                                  | Contractor / TfNSW        | Detailed design              |

| Environmental issue                           | Reference | Environmental management measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Responsibility     | Timing                                                         |
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|                                               | NAH03     | Impacts on Non-Aboriginal heritage items will be avoided or minimised where reasonable and feasible. Where impacts are unavoidable, works will be carried out in accordance with the measures for individual Non-Aboriginal heritage items outlined in measures NAH04 to NAH11.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | TfNSW / Contractor | Detailed design, prior to construction and during construction |
| McGarvie Smith Farm (Item 1, Penrith LEP 857) | NAH04     | <p>A suitably qualified heritage consultant will be engaged to prepare an archival photographic recording of the site in accordance with the Heritage Information Series How to prepare archival records of heritage items (NSW Heritage Office, 1998). This will include both buildings and landscape features such as dams, and earthworks. The recording will include a detailed map showing the location of the features.</p> <p>Options will be investigated to provide funding support to the property's current owner to prepare a thematic heritage study of CSIRO and other agricultural research stations, including both McGarvie Smith Farm and McMaster Field Station, and other relevant agricultural research stations and similar facilities located in NSW. The thematic study will include a review of the role of such properties in veterinary research, association with agricultural, pastoral and animal husbandry groups, use of pioneering methods and practices and contribution to the development of farming in Australia. In the event that landowners do not prepare this study, TfNSW will engage a heritage specialist to do so.</p> | TfNSW / Contractor | Detailed design and prior to construction                      |

| Environmental issue                                                                | Reference | Environmental management measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Responsibility     | Timing                                                         |
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| The Fleurs Radio Telescope Site<br>(Item 2, Penrith LEP 832)                       | NAH05     | <ul style="list-style-type: none"> <li>All extant elements of the radio telescopes and associated infrastructure, including rubbish mounds situated outside the construction footprint will be left intact</li> <li>Ground penetrating radar, or other remote sensing survey techniques, will be carried out under the supervision of a suitably qualified and experienced archaeologist before any ground disturbance within the heritage curtilage of the Fleurs Radio Telescope Site contained within the construction footprint to identify any sub-surface cables</li> <li>Measures will be included in the CHMP to describe how the heritage values of the site will be conserved and managed during construction</li> <li>TfNSW will engage a suitably qualified heritage consultant to prepare an archival photographic recording of the impacted areas of the property, in accordance with DPC (Heritage) guidelines (Heritage Council of NSW 2006)</li> <li>The heritage interpretation framework for the project (NAH02) will include interpretation measures that will improve community awareness of the history of the Fleurs Radio Telescope as well as determine suitable locations for the presentation of information that are publicly accessible.</li> </ul> | TfNSW / Contractor | Detailed design and prior to construction                      |
| Upper Canal System (Pheasants Nest Weir to Prospect Reservoir (Item 4, SHR 01373)) | NAH06     | <ul style="list-style-type: none"> <li>Relevant conservation policies outlined in the Upper Canal CMP (NSW Public Works Government Architect's Office, 2016) will be <b>considered during detailed design and</b> incorporated into CCHMP to ensure heritage fabric is not impacted by the project.</li> <li>The CCHMP will be consistent with and require implementation of relevant measures outlined in the Guidelines for development adjacent to the Upper Canal and Warragamba Pipelines (<del>Sydney Catchment Authority 2012</del>) (<b>WaterNSW 2020</b>) which sets out guidelines for designing, planning or assessing development on land adjacent to the canal at this location. <b>Additional structures identified in the construction footprint will be investigated and measures implemented to avoid or minimise impact.</b></li> <li>Guidelines and associated safe working distances to be adhered to for heritage structures as outlined in Appendix K of the EIS</li> <li>A safe working distance exclusion zone will be established around the exposed tunnel air shaft in the M7 Motorway median in accordance with the process outlined in noise and vibration management measures NV09 - NV10.</li> </ul>                                              | TfNSW / Contractor | Detailed design, prior to construction and during construction |



| Environmental issue             | Reference | Environmental management measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Responsibility     | Timing                                                         |
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| McMaster Field Station (Item 6) | NAH07     | <ul style="list-style-type: none"> <li>A suitably qualified heritage consultant will be engaged to prepare an archival photographic recording of the impacted area, in accordance with DPC (Heritage) guidelines (Heritage Council of NSW 2006). This will include both buildings and landscape features such as dams, and earthworks. The recording will include a detailed map showing the location of the features.</li> <li>Options will be investigated to provide funding support to property's current owner to prepare a thematic heritage study of CSIRO and other agricultural research stations, including both McMaster Field Station and McGarvie Smith Farm, and other relevant agricultural research stations and similar facilities located in NSW. The thematic study will include a review of the role of such properties in veterinary research, association with agricultural, pastoral and animal husbandry groups, use of pioneering methods and practices and contribution to development of farming in NSW and Australia. In the event that landowners do not prepare this study, TfNSW will engage a heritage specialist to do so.</li> <li>A potential use zone will be established around the McMaster Farm group of buildings, including a suitable buffer zone, and no construction activities will take place within this zone. This zone will be incorporated into the construction heritage management plan (CHMP). The potential use zone will include safe working distances to be adhered to for heritage structures as outlined in Appendix K of the EIS. Before occupying or utilising the buildings, a dilapidation survey will be carried out and a heritage architect will be engaged to advise on proposed modifications and management measures to avoid and minimise impact on the buildings.</li> </ul> | TfNSW / Contractor | Detailed design, prior to construction and during construction |

| Environmental issue                                     | Reference | Environmental management measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Responsibility     | Timing                                                         |
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| Fleurs Aerodrome (Item 7)                               | NAH08     | <ul style="list-style-type: none"> <li>A suitably qualified heritage consultant will be engaged to prepare an archival photographic recording of the impacted area before its disturbance and/or removal, in accordance with DPC (Heritage) guidelines (Heritage Council of NSW 2006). The recording will include a detailed map showing the location of the features.</li> <li>An interpretive framework developed for the project will include consideration of elements to enable the continued interpretation and understanding of the airstrip at Fleurs Aerodrome as a linear and continuous element. This will be carried out in consultation with Department of Defence and consider opportunities for involvement of veterans groups.</li> <li>Relevant guidelines and associated safe working distances will be adhered to for remaining heritage structures as outlined in the Appendix K of the EIS</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Contractor / TfNSW | Detailed design, prior to construction and during construction |
| Cecil Park School, Post Office and Church Site (Item 8) | NAH09     | <ul style="list-style-type: none"> <li>TfNSW will liaise with local museums and/or historical societies to arrange a long-term secure artefact repository for the artefact assemblage. Once that arrangement has been made, DPC (Heritage) will be notified for their records. In the short term, TfNSW will provide secure short-term secure storage for the assemblage.</li> <li><b>Archaeological salvage excavations will be carried out for the Cecil Park School, Post Office and Church Site (Item 8) in accordance with the research design and methodology outlined in the <i>M12 Motorway: Former Cecil Park Historical Complex Historical Archaeological Salvage Research Design and Methodology</i> (Jacobs, 2020).</b></li> <li><del>An Archaeological Research Design (ARD) for archaeological salvage of the former historical complex will be prepared and implemented prior to construction commencing by a suitably qualified historical archaeologist who fulfils the Heritage Council's Excavation Director Criteria to conduct open area excavation of a locally significant archaeological site. The ARD will include a revised impact assessment, revised research questions and a methodology to ensure archaeological relics within the project construction footprint are adequately investigated in accordance with standard NSW archaeological practice.</del></li> </ul> | Contractor / TfNSW | Detailed design                                                |

| Environmental issue                                                         | Reference | Environmental management measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Responsibility     | Timing                                                         |
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| South, Kemps and Badgerys Creek Confluence Weirs Scenic Landscape (Item 12) | NAH10     | <ul style="list-style-type: none"> <li>Management measures identified in the project UDLP (LVIA01) will be implemented during detailed design to minimise impacts on landscape and vistas</li> <li>Flooding management measures (F01 to F08) and surface water quality and hydrology management measures (SWH01 to SWH14) will be implemented to reduce broader impacts on the surrounding scenic landscape.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Contractor / TfNSW | Detailed design, prior to construction and during construction |
| Noise and vibration                                                         |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                    |                                                                |
| General construction noise and vibration                                    | NV01      | <p>A construction noise and vibration management plan (CNVMP) will be prepared for the project to mitigate and manage noise and vibration impacts during construction. The CNVMP will be implemented for the duration of construction of the project and will:</p> <ul style="list-style-type: none"> <li>Identify nearby sensitive receivers</li> <li>Include a description of the construction activities equipment and working hours</li> <li>Identify relevant noise and vibration performance criteria for the project and license and approval conditions.</li> <li>Include modelling results showing construction noise impacts based on detailed design information</li> <li>Outline standard and additional mitigation measures from the Construction Noise and Vibration Guideline (CNVG) (Roads and Maritime 2016) and information about when each will be applied</li> <li>Outline requirements for the development and implementation of an Out-of-hours Work Protocol</li> <li>Outline requirements for noise and vibration monitoring that will be carried out to monitor project performance associated with the noise and vibration criteria</li> <li>Describe community consultation and complaints handling procedures in accordance with the Community Communication Strategy to be developed for the project</li> </ul> | Contractor         | Prior to construction and during construction                  |



| Environmental issue | Reference | Environmental management measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Responsibility | Timing                                                         |
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|                     |           | <ul style="list-style-type: none"> <li>Outline measures to manage noise impacts associated with heavy vehicle movements both on and offsite</li> <li>Outline measures to minimise cumulative construction impacts and the likelihood for 'construction fatigue' from concurrent and consecutive projects in the area</li> <li>Outline requirements to minimise and manage construction fatigue, in consultation with the community.</li> </ul>                                                                                                                                                                                                                                                                                      |                |                                                                |
|                     | NV02      | Measures to minimise and manage construction fatigue are to be investigated through the planning of construction staging.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Contractor     | Detailed design, prior to construction and during construction |
|                     | NV03      | <p>Detailed noise assessments will be carried out for ancillary facilities with the potential to involve high noise generating activities (including batching plant operations). The assessments will consider the proposed site layouts and noise generating activities that will occur at the facilities and assess predicted noise levels against the relevant noise management criteria.</p> <p>The assessments will also consider the requirement for appropriate noise mitigation within ancillary facilities and adjacent to construction works, depending on the predicted noise levels. Any mitigation measures required will be implemented before the start of activities that generate noise and vibration impacts.</p> | Contractor     | Prior to construction                                          |
|                     | NV04      | <p>Monitoring will be carried out at the start of high noise and vibration activities to confirm that actual noise and vibration levels are consistent with the noise and vibration impact predictions. Where mitigation measures were included, measurements will be carried out to confirm the effectiveness.</p> <p>Where the monitoring identifies higher levels of noise and vibration compared to predicted levels, or where mitigation is shown to be ineffective against measured noise and vibration levels, additional mitigation measures will be identified and implemented to appropriately manage impacts where feasible and reasonable.</p>                                                                          | Contractor     | Construction                                                   |

| Environmental issue | Reference | Environmental management measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Responsibility     | Timing                                        |
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|                     | NV05      | Where reasonable and feasible, receivers identified as requiring at-property treatment for operational noise mitigation will be identified and offered treatment before construction activities begin that are likely to impact them.                                                                                                                                                                                                                                                                                                                  | TfNSW / Contractor | Prior to construction                         |
| Vibration impacts   | NV06      | Activities that generate vibration will be managed to avoid impacts on structures and sensitive receivers. This includes implementing appropriate safe working distances where practicable.                                                                                                                                                                                                                                                                                                                                                            | Contractor         | Prior to construction and during construction |
|                     | NV07      | The use of alternatives to vibration generating equipment will be considered where vibration impacts are predicted.                                                                                                                                                                                                                                                                                                                                                                                                                                    | Contractor         | During construction                           |
|                     | NV08      | Where works are within the minimum working distances and considered likely to exceed the cosmetic damage objectives (as shown in Figure 7-3 of Appendix <del>K</del> <b>G of this amendment report</b> ), construction works will not proceed unless: <ul style="list-style-type: none"> <li>• A different construction method with lower source vibration levels is used, where feasible</li> <li>• Attended vibration measurements are carried out at the start of the works to determine the risk of exceeding the vibration objectives.</li> </ul> | Contractor         | During construction                           |
|                     | NV09      | Building Condition Surveys will be offered in writing to property owners before construction where there is a potential for construction activities to cause structural or cosmetic damage. A comprehensive report will be prepared by a suitably qualified professional before the relevant works begin and will comprise a written and photographic condition.                                                                                                                                                                                       | Contractor         | Prior to construction                         |

| Environmental issue                                            | Reference | Environmental management measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Responsibility     | Timing                                        |
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| Vibrations impacts on the Upper Canal System and Gas Pipelines | NV10      | <p>Surveys will be carried out to confirm the existing condition of the WaterNSW Upper Canal System and Jemena high pressure gas pipelines to determine appropriate vibration criteria. This will also include consideration of distances from the vibration intensive activity (piling, rock-breaking and vibratory rolling), as well as ground conditions.</p> <p>A vibration criterion of a peak particle velocity (PPV) will be determined in consultation with the relevant utility/service providers, <b>including WaterNSW</b>.</p> <p>In-situ monitoring will be carried out to confirm the vibration levels and assess the impact of vibration. Where the monitoring identifies exceedances in the relevant criteria, or where impacts are identified, additional mitigation measures will be identified and implemented to appropriately manage impacts.</p>                                               | TfNSW / Contractor | Detailed design and during construction       |
| Vibration impacts on heritage structures                       | NV11      | <p>The following structures have the potential to be within the safe working distances for sensitive structures (Group 3 from DIN 4150):</p> <ul style="list-style-type: none"> <li>• Item 1: McGarvie Smith Farm</li> <li>• Item 2: Fleurs Radio Telescope Site</li> <li>• Item 4: Upper Canal System</li> <li>• Item 6: McMaster Field Station</li> <li>• Item 7: Fleurs Aerodrome.</li> </ul> <p>A detailed survey will be completed to determine the potential for vibration impacts and to define appropriate criteria for each heritage item. Vibration monitoring will be carried out when vibration intensive tasks are occurring within the minimum working distances to heritage structures. Where the monitoring identifies exceedances in the relevant criteria, or where impacts are identified, additional mitigation measures will be identified and implemented to appropriately manage impacts.</p> | Contractor         | Prior to construction and during construction |



| Environmental issue             | Reference | Environmental management measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Responsibility     | Timing                                                      |
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| Construction traffic noise      | NV12      | <p>Construction vehicle movements (both on and offsite) will be managed to minimise noise impacts. Where feasible, this will include (but not be limited to):</p> <ul style="list-style-type: none"> <li>• Establishment and use of internal haul routes, or existing major roads where this is not feasible</li> <li>• Restriction of heavy vehicle movements to standard construction hours</li> <li>• Locating traffic marshalling areas away from residences to minimise noise impacts from idling vehicles</li> <li>• Instructing workers on the operation of heavy vehicles entering and exiting the site to minimise noise.</li> </ul>                                      | Contractor         | During construction                                         |
| Cumulative construction impacts | NV13      | <p>The likelihood of cumulative construction noise impacts will be considered during detailed design when detailed construction schedules of other projects are available. Construction works will be scheduled with the aim of minimising concurrent works near sensitive receivers where possible in consultation with managers of other nearby projects that are likely to result in a cumulative impact. This will include the coordination of respite between the various construction projects where receivers are likely to experience concurrent construction impacts where feasible. Coordination between project teams would be carried out throughout construction.</p> | Contractor         | Prior to construction and during construction               |
| Operational noise and vibration | NV14      | <p>Operational noise and vibration mitigation measures will be identified in an Operational Noise and Vibration Review (ONVR).</p> <p>Requirements for mitigation measures, including quieter noise pavements, noise barriers, and at-property treatments, will be reviewed as part of the ONVR and as the detailed design progresses. The implementation of treatments will be carried out in accordance with TfNSW Noise Mitigation guidelines (2015).</p>                                                                                                                                                                                                                       | Contractor / TfNSW | Detailed design, during construction and prior to operation |

| Environmental issue                                               | Reference | Environmental management measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Responsibility     | Timing                |
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|                                                                   | NV15      | Within 12 months of start of operation of the project, actual operational noise performance will be compared to predicted operational noise performance. The need for additional mitigation or management measures to address identified operational performance issues and meet relevant operational noise criteria will be assessed and implemented where feasible and reasonable.                                                                                                                                                                                                                                                                                                                                                            | TfNSW              | During operation      |
| Flooding                                                          |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                    |                       |
| Potential changes to flood impacts resulting from detailed design | F01       | Further flood investigations and hydrological and hydraulic modelling will be carried out during detailed design to ensure the flood immunity objectives and design criteria for the project are met. The modelling will be used to define the nature of both main stream flooding and major overland flow along the full length of the project corridor under pre- and post-project conditions and to define the full extent of any impact that the project will have on patterns of both main stream flooding and major overland flow. The hydraulic model(s) will be based on two-dimensional hydraulic modelling software. The modelling will take into account any updated regional flood modelling and information available at the time. | Contractor         | Detailed design       |
| Flooding impacts on property                                      | F02       | Should the updated flood modelling show the project will result in an adverse flooding impact, TfNSW will consult with landowners regarding appropriate mitigation measures to be implemented by the contractor in relation to each individual property.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | TfNSW / Contractor | Detailed design       |
| Flooding impacts during construction                              | F03       | <p>A flood management plan will be prepared as part of the CEMP for the project and will detail the processes for flood preparedness, materials management, weather monitoring, site management and flood incident management. The flood management plan will be developed in accordance with:</p> <ul style="list-style-type: none"> <li>Managing Urban Stormwater, Soils and Construction, Volume 1 4th Edition, March 2004 (Landcom 2004) and Managing Urban Stormwater, Volume 2D – Main Road Construction (DECC 2008)</li> <li>TfNSW Erosion and Sedimentation Management Procedure (Roads and Traffic Authority 2009)</li> </ul>                                                                                                          | Contractor         | Prior to construction |

| Environmental issue                            | Reference  | Environmental management measures                                                                                                                                                                                                                                                          | Responsibility            | Timing                                  |
|------------------------------------------------|------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|-----------------------------------------|
|                                                |            | <ul style="list-style-type: none"> <li>TfNSW Technical Guideline: Temporary Stormwater Drainage for Road Construction (Roads and Maritime 2011)</li> <li>TfNSW Stockpile Management Guideline (Roads and Maritime 2011).</li> </ul>                                                        |                           |                                         |
| Flooding and creek adjustment impacts          | F04        | Creek adjustments would be re-considered and/or further refined to minimise the impact on the creeks during detailed design.                                                                                                                                                               | TfNSW / Contractor        | Detailed design                         |
| Flooding impacts of bridges and culverts       | F05        | Detailed construction staging plans will be developed during detailed design so that bridges and culverts are constructed in a way that minimises flood risk.                                                                                                                              | Contractor                | Detailed design                         |
|                                                | F06        | Measures to address potential impacts of culvert blockage on afflux will be further investigated during detailed design and may include the installation of debris deflectors, trash racks or similar on drainage inlets where reasonable and feasible.                                    | Contractor                | Detailed design                         |
|                                                | <b>F07</b> | <b>During the detailed design phase, TfNSW will seek to refine the design of the works at Elizabeth Drive near Badgerys Creek to minimise flood affectation. Mitigation measures may include adjustment of road levels and/or flood relief culverts through the road.</b>                  | <b>TfNSW / Contractor</b> | <b>Prior to and during construction</b> |
| Impacts on existing drainage systems           | F08        | Activities that may affect existing drainage systems during construction will be carried out so that existing hydraulic capacity of these systems is maintained where practicable.                                                                                                         | Contractor                | During construction                     |
| Flooding impacts during operation              | F09        | The proposed bridges, culverts and changes to watercourses will be further refined during the detailed design to minimise potential flooding impacts.                                                                                                                                      | TfNSW / Contractor        | Detailed design                         |
| <b>Consultation regarding flooding impacts</b> | <b>F10</b> | <b>Ongoing consultation will be carried out with Western Sydney International Airport and as further details of their flood management and earthworks are developed, these will be incorporated into an updated M12 Motorway flood model for the detailed design phase of the project.</b> | <b>TfNSW / Contractor</b> | <b>Prior to and during construction</b> |



| Environmental issue                 | Reference | Environmental management measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Responsibility | Timing                |
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| Surface water quality and hydrology |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                |                       |
| General                             | SWH01     | <p>A construction soil and water management plan (CSWMP) will be prepared for the project. The plan will outline measures to manage soil and water impacts associated with the construction works, including contaminated land.</p> <p>The CSWMP will provide:</p> <ul style="list-style-type: none"> <li>• Measures to minimise/manage erosion and sediment transport both within the construction footprint and offsite including requirements for the preparation of erosion and sediment control plans (ESCP) for all progressive stages of construction</li> <li>• Measures to manage waste including the classification and handling of spoil</li> <li>• Procedures to manage unexpected contaminated finds including asbestos which would be outlined in the contaminated land management plan and asbestos management plan to be prepared for the project</li> <li>• Measures to manage stockpiles including locations, separation of waste types, sediment controls and stabilisation</li> <li>• Measures to manage groundwater de-watering and impacts including mitigation required</li> <li>• Processes for de-watering of water that has accumulated on site and from sediment basins, including relevant discharge criteria</li> <li>• Measures to manage potential tannin leachate</li> <li>• Measures to manage accidental spills including the requirement to maintain materials such as spill kits</li> <li>• Measures to manage potential saline soils</li> <li>• Details of surface water and groundwater quality monitoring to be carried out before, throughout, and following construction</li> <li>• Controls for sensitive receiving environments including SEPP Coastal Wetlands which may include but not be limited to: <ul style="list-style-type: none"> <li>– Designation of ‘no go’ zones for construction plant and equipment</li> </ul> </li> </ul> | Contractor     | Prior to construction |

| Environmental issue   | Reference | Environmental management measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Responsibility     | Timing                                                                            |
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|                       |           | <ul style="list-style-type: none"> <li>– Creation of catch/diversion drains and sediment fences at the downstream boundary of construction activities where practicable to ensure containment of sediment-laden runoff and diversion toward sediment sump treatment areas (not sediment basins) to prevent flow of runoff to the SEPP Coastal Wetland.</li> <li>• Erosion and sediment control measures will be implemented and maintained at all work sites in accordance with the principles and requirements in Managing Urban Stormwater – Soils and Construction, Volume 1 (Landcom 2004) and Volume 2D (NSW Department of Environment, Climate Change and Water 2008), commonly referred to as the “Blue Book”, as well as relevant TfNSW Guidelines.</li> </ul> |                    |                                                                                   |
|                       | SWH02     | A soil conservation specialist will be engaged by both TfNSW and the Contractor for the duration of construction of the project to provide advice on the planning and implementation of erosion and sediment control including review of ESCPs.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | TfNSW / Contractor | Prior to construction and during construction                                     |
|                       | SWH03     | A water reuse strategy will be developed for both construction and operational phases of the project to reduce reliance on potable water. This strategy will be prepared during the detailed design stage and implemented throughout the project and will outline the construction and operational water requirements and potential water sources to supply the water demand in consultation with Sydney Water. Alternative water supply options to potable water will be investigated, with the aim of reusing water using recycled water where feasible.                                                                                                                                                                                                             | Contractor         | Detailed design, prior to construction, and throughout construction and operation |
| Impacts of stockpiles | SWH04     | <p>Stockpiles will be managed to minimise the potential for mobilisation and transport of dust and sediment in runoff in accordance with TfNSW Stockpile Sites Management Guideline (Roads and Maritime, 2015). This will include:</p> <ul style="list-style-type: none"> <li>• Minimising the number of stockpiles, area used for stockpiles, and time that they are left exposed</li> <li>• Locating stockpiles away from drainage lines, waterways and areas where they may be susceptible to wind erosion</li> <li>• Stabilising stockpiles, establishing appropriate sediment controls and suppressing dust as required.</li> </ul>                                                                                                                               | Contractor         | Construction                                                                      |

| Environmental issue           | Reference | Environmental management measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Responsibility     | Timing                                                       |
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| Surface water quality impacts | SWH05     | <p>A construction water quality monitoring program will be developed and included in the CSWMP for the project to establish baseline conditions, observe any changes in surface water and groundwater during construction, and inform appropriate management responses.</p> <p>The program will be based on the water quality monitoring methodology water quality indicators and the monitoring locations identified in the Surface water and hydrology assessment report (Appendix M <b>of the EIS</b>) and <b>supplementary memo (Appendix I of this amendment report)</b>, and Groundwater quality and hydrology assessment report (Appendix N <b>of the EIS</b>) and <b>supplementary memo (Appendix J of this amendment report)</b>.</p> <p>Baseline monitoring will be carried out monthly for a minimum of 12 months before the start of construction. As a minimum this will include three wet weather sampling events over six months where feasible.</p> <p>Sampling locations and monitoring methodology to be carried out during construction will be further developed in detailed design in accordance with the Guideline for Construction Water Quality Monitoring (RTA 2003) and the <b>Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZG, 2018)</b> <del>'ANZECC water quality guidelines' (ANZECC/ARMCANZ 2000)</del>. It will include collection of samples for analysis from sedimentation basin discharge points, visual monitoring of other points of release of construction waters and monitoring of downstream waterways.</p> | TfNSW / Contractor | Prior to construction, and during construction and operation |



| Environmental issue           | Reference | Environmental management measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Responsibility     | Timing                                  |
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| Surface water quality impacts | SWH06     | <p>An operational water quality monitoring program will be developed and implemented following the completion of construction to observe any changes in surface water and groundwater following construction, and inform appropriate management responses.</p> <p>The program will be based on the water quality monitoring methodology, water quality indicators, and the monitoring locations presented in the Surface water and hydrology assessment report (Appendix M of the EIS), and Groundwater quality and hydrology assessment report (Appendix N of the EIS).</p> <p>The monitoring program will be carried out monthly and will preferentially monitor following wet weather events when rainfall results in discharge from control sites or is greater than a nominated rainfall threshold which will be identified in detailed design. Monitoring will be carried out for a minimum of 12 months following the completion of construction, or until the affected waterways are certified by a suitably qualified and experienced independent expert as being rehabilitated to an acceptable condition and/or the permanent water quality structures are deemed to be operating satisfactorily.</p> <p>Should the results of monitoring identify that the water quality management measures are not effective in adequately mitigating water quality impacts, additional mitigation measures will be identified and implemented as required.</p> | TfNSW / Contractor | Prior to operation and during operation |
|                               | SWH07     | <p>The performance water quality controls developed for the design as set out in <b>the EIS and the amended water quality and hydrology controls outlined in this amendment report document</b> (including but not limited to temporary and permanent sediment basins) will be verified as the detailed design develops for the project to ensure the objectives of the project are achieved.</p> <p>In the instance that <b>water quality (MUSIC) modelling carried out</b> during detailed design cannot demonstrate that the water quality controls would be effective in mitigation potential impacts, potential additional mitigation measures would be identified and implemented <b>where possible</b>.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Contractor         | Detailed design                         |

| Environmental issue   | Reference    | Environmental management measures                                                                                                                                                                                                                                                                                                                                                                                                                   | Responsibility     | Timing                 |
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|                       | SWH08        | Further water quality assessment will be undertaken during detailed design to establish site specific discharge criteria for construction sediment basins.<br>Based on this, the number, location and size of the basins will be further refined during the detailed design with consideration to the relevant NSW EPA Environment Protection Licence application requirements and the environmental values of the downstream receiving waterway.   | TfNSW / Contractor | Detailed design        |
|                       | SWH09        | Practical measures to prevent water pollution and control, abate or mitigate impacts to the environment will be investigated at the detailed design stages of the project with the aim to make improvements to the currently proposed water quality controls. Such measures may include: <ul style="list-style-type: none"> <li>• Larger or high efficiency temporary basins</li> <li>• Alternative dry bioretention operational basins.</li> </ul> | TfNSW / Contractor | Detailed design        |
|                       | <b>SWH10</b> | <b>The use of water sensitive urban design measures will be considered during detailed design to meet water quality objectives.</b>                                                                                                                                                                                                                                                                                                                 | <b>Contractor</b>  | <b>Detailed design</b> |
| Impacts of dewatering | SWH11        | A de-watering management plan will be prepared as part of the CSWMP which will outline the de-watering methodology, supervision requirements, staff responsibilities and training, and approvals required before any de-watering activity begins.                                                                                                                                                                                                   | Contractor         | During construction    |

| Environmental issue     | Reference | Environmental management measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Responsibility | Timing                                        |
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| Impacts on water bodies | SWH12     | <p>The following measures will be carried out to manage activities within watercourses or on waterfront land:</p> <ul style="list-style-type: none"> <li>• Implementing practices to minimise disturbance of banks</li> <li>• Undertaking bank stabilisation and installing instream structures</li> <li>• Maintaining minimum flows to assist in maintaining the viability of aquatic communities and preventing barriers to fish passage</li> <li>• Constructing instream crossings during low flows and design so that drainage off crossing doesn't contribute sediment load to the stream</li> <li>• All drainage feature crossings (permanent and temporary watercourse crossings and stream diversions), drainage swales and depressions will be designed by a suitably qualified and experienced professional and will be designed and constructed in accordance with relevant guidelines.</li> </ul> | Contractor     | Prior to construction and during construction |



| Environmental issue              | Reference | Environmental management measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Responsibility | Timing          |
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|                                  | SWH13     | <p>A set of hydrologic and hydraulic models will be developed, which are to be used to define the nature of both main stream flooding and major overland flow along the full length of the project operational footprint under pre- and post-project conditions. The hydraulic model is to extend a sufficient distance upstream and downstream of the project operational footprint, to negate any boundary effects and to define the full extent of any impact that the project will have on patterns of both main stream flooding and major overland flow. The hydraulic model(s) is to be based on the TUFLOW (or equivalent) two-dimensional (in plan) hydraulic modelling software.</p> <p>The models will be used to verify the nature and extent of impacts and to confirm the type of mitigation measures required, <b>including potential mitigation measures identified throughout the EIS (see Table 5-9 in Appendix M of the EIS) and this amendment report and supplementary memo (see Table 5-6 in Appendix I of this amendment report).</b></p> <p>The models will also be used during detailed design to describe the interaction between the project and flows particularly with respect to culverts and to assist in refining the design for flows arriving at and travelling through culverts.</p> | Contractor     | Detailed design |
| Impacts on SEPP Coastal Wetlands | SWH14     | Consideration will be given to the design of operational water quality, erosion and sediment controls incorporated into the design of the construction access track being left in place upstream from the SEPP wetland, and within the proximity area of the SEPP Coastal Wetland ID117.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Contractor     | Detailed design |

| Environmental issue                        | Reference | Environmental management measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Responsibility     | Timing                                         |
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| Groundwater quality and hydrology          |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                    |                                                |
| Impacts on groundwater quality and flows   | GW01      | <p>Groundwater monitoring will be carried out as part of the construction water quality monitoring program for the project. The groundwater monitoring will be based on the water quality monitoring methodology, water quality indicators and the monitoring locations shown in Appendix N of the EIS and Table 7-1 in the groundwater supplementary technical memorandum (Appendix J of this amendment report).</p> <p>Baseline groundwater monitoring will be carried out at least monthly for at least six months before construction. Monitoring will also be carried out at least monthly during construction and will continue for at least six months of operation to verify that there are no groundwater impacts, and that management measures are adequate.</p>                                                                                                                                                  | TfNSW / Contractor | Prior to construction, and during construction |
| Alteration of groundwater flows and levels | GW02      | <p>Potential impacts on groundwater flows will be reconsidered as the detailed design for the project progresses, particularly in relation to the project's vertical alignment and extent of road cuttings. The aim of this will be to ensure that the groundwater controls proposed for the design as set out in this document would remain effective in mitigating groundwater impacts.</p> <p>In the instance that, during detailed design it cannot be demonstrated that the groundwater controls would be effective in mitigating potential impacts, or if observed groundwater inflow rates into the western cut <b>or airport interchange northern and southern cuts</b> are higher than estimated, additional measures will be implemented to minimise potential impacts to groundwater to minimise potential impacts on groundwater flows due to road cuttings or other sub-surface components of the project.</p> | Contractor         | Detailed design                                |
|                                            | GW03      | <b>Installation of supplementary groundwater monitoring bores in the area of both airport interchange cuts would be carried out at detailed design stage, to better understand groundwater depths and levels (and groundwater quality) in these areas.</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Contractor         | Detailed design                                |

| Environmental issue     | Reference   | Environmental management measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Responsibility    | Timing                                        |
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|                         | <b>GW04</b> | <p><b>Groundwater will be monitored at the airport interchange northern and southern cuts and the western cut during the construction phase and operational phase as outlined in Table 7-1 in the groundwater supplementary technical memorandum (Appendix J). The groundwater indicators to be monitored will be as per Section 7.2.5 of Appendix N of the EIS.</b></p> <p><b>Groundwater inflows to the airport interchange northern and southern cuts and the western cut are to be observed by the groundwater monitoring contractor during the construction and operational phases at monthly intervals. As part of observing the airport interchange northern and southern cuts and the western cut groundwater inflows, the groundwater monitoring contractor is to estimate the groundwater inflow rates and note the areas where groundwater inflow is occurring.</b></p> <p><b>During construction, if groundwater inflows are observed from the airport interchange northern and southern cuts and the western cut, the groundwater quality from the cut is to be sampled.</b></p> <p><b>Operational phase groundwater quality sampling, including the quality sampling of the airport interchange northern and southern cuts and the western cut inflows, is to occur at a monthly interval for at least 6 months.</b></p> | <b>Contractor</b> | <b>Construction and operation</b>             |
| Soils and contamination |             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                   |                                               |
| Salinity                | SC01        | <p>Construction within areas of moderate to high risk saline soils will be managed in accordance with the CSWMP. Specific measures will also include (but not be limited to):</p> <ul style="list-style-type: none"> <li>• Ongoing groundwater monitoring of salinity as part of the water quality monitoring program</li> <li>• Identification and management of saline discharge sites</li> <li>• Progressive stabilisation and revegetation of exposed areas following disturbance as soon as is practicable</li> <li>• Testing to confirm the presence of saline soils in areas of high salinity potential prior to disturbance.</li> <li>• Soil salinity management will also be carried out in accordance with the NSW Department of Primary Industries (2014) Salinity Training Handbook.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Contractor        | Prior to construction and during construction |



| Environmental issue                           | Reference | Environmental management measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | Responsibility | Timing                                        |
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|                                               | SC02      | Testing will be carried out to confirm the presence of saline soils in areas of high salinity potential and to confirm the presence of ASS around creeks prior to disturbance.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Contractor     | Prior to construction and during construction |
| Impacts of soil and groundwater contamination | SC03      | <p>A contaminated land management plan (CLMP) will be prepared for the project. The CLMP will include:</p> <ul style="list-style-type: none"> <li>• Control measures to manage identified areas of contamination, including surface soils in the vicinity of TP303, TP304, TP310 and TP311 containing heavy metal and PAH concentrations</li> <li>• Procedures for unexpected contamination</li> <li>• Measures to manage potential ASS (as required based on testing results) within sediments of the creeks in the construction footprint to minimise impacts to the environment</li> <li>• Requirements for excavation of unexpected contaminants to be carried out in consultation with project Remedial Actions Plans.</li> <li>• Requirements for the disposal of contaminated waste in accordance with the POEO Act and the Protection of the Environment Operations (Waste) Regulation 2014.</li> </ul> | Contractor     | Prior to construction                         |
|                                               | SC04      | <p>An asbestos management plan (AMP) will be prepared as part of the CLMP for the project. The AMP will guide the excavation, handling, storage and disposal of management of asbestos discovered during construction, including procedures for any unexpected asbestos. The AMP will also outline requirements for the encapsulation of asbestos to be carried out in accordance with project Remedial Action Plans.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Contractor     | Prior to construction                         |

| Environmental issue | Reference | Environmental management measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Responsibility | Timing                |
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|                     | SCO05     | <p>Detailed site (contamination) investigations will be carried out in accordance with the NSW EPA (1995) Sampling Design Guidelines and other NSW EPA endorsed guidance including the NEPM (2013) guidelines within the following AEI locations to confirm the presence of contamination before the start of construction at these locations:</p> <ul style="list-style-type: none"> <li>• <b>AEI 17: Stockpiles within Hi-quality Quarry Group Head Office</b></li> <li>• Within AEI 19: the area of miscellaneous construction activities and stockpiles of building materials along Luddenham Road (Lot 1, DP228498)</li> <li>• Within AEI 7: <b>Area of waste and imported fill</b> <del>Former Kari and Ghossayn solid waste landfill (Lot 17, Clifton Avenue)</del></li> <li>• Within AEI 21: Area of illegally dumped material along Range Road, Cecil Park</li> <li>• <b>Within AEI 24: Stockpiles within the OzSource property</b></li> <li>• <b>Within AEI 26: TreeServe (wood processing, stockpiles of woodchips, logs and fire wood)</b></li> <li>• Within the 'potential areas of existing fill' identified in the Soils and contamination assessment report (Appendix K <del>Appendix Q</del>) for the <b>amended</b> project.</li> </ul> <p>Further soil investigations will be required in areas of the amended construction footprint located adjacent to the following two AEIs to confirm the presence of contamination before the start of construction at these locations:</p> <ul style="list-style-type: none"> <li>• <b>Within AEI 6: PGH Bricks and Pavers</b></li> <li>• <b>Within AEI 9: Sydney Recycling Park/ Wanless Recycling and Former Kari &amp; Ghossayn Pty Ltd (Solid Waste Landfill)</b></li> <li>• <b>AEI 10: SUEZ Kemps Creek Resource Recovery Park.</b></li> </ul> <p><b>Additional soil and groundwater investigations will be required in the areas of additional cut around the airport interchange northern cut and airport interchange southern cut to further assess the potential impacts to the amended project.</b></p> <p>Depending on results of the investigations, or if remediation is deemed required at any site within the amended construction footprint, a Remedial Action Plan will be prepared before the construction.</p> | Contractor     | Prior to construction |

| Environmental issue                           | Reference | Environmental management measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Responsibility | Timing                                               |
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| Impacts of soil and groundwater contamination | SC06      | Further intrusive asbestos investigations throughout the construction footprint will be carried out to assess asbestos risks before the start of construction. The investigations are to include visual assessments and ground truthing along the length of the project.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Contractor     | Prior to construction                                |
|                                               | SC07      | A hazardous building materials management plan will be prepared in accordance with relevant guidelines to manage the removal of known and unexpected hazardous building during demolition activities.<br><br>Before demolishing structures and/or buildings, a hazardous building materials audit will also be carried out in accordance with Australian Standard (AS 2601-2001) The demolition of structures. Where hazardous building materials are present, they will be managed to reduce the potential for contamination in accordance with the POEO Act and the Protection of the Environment Operations (Waste) Regulation (2014).                                                                                                                                                                                                                                            | Contractor     | Prior to construction and during construction        |
|                                               | SC08      | All waste will be classified in accordance with the NSW EPA's Waste Classification Guidelines, with appropriate records and disposal dockets retained for audit purposes.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Contractor     | Before and during construction                       |
|                                               | SC09      | <b>A section B site audit statement will be prepared for the asbestos encapsulation and for sites where intrusive investigations confirm highly complex contamination issues.</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Contractor     | <b>Prior to construction and during construction</b> |
| Soil gas contamination                        | SC10      | A detailed investigation will be carried out within the area next to the SUEZ Kemps Creek Resource Recovery Park to assess the extent of high-risk soil gas. A report will be prepared to document the outcomes of the investigation and outline measures to manage risks including nuisance odours to the surrounding area during excavation, and prevent the build-up of gases in buildings, basins, and sub-surface trenches and pits, and other enclosed spaces/depressions associated with the project during construction.<br><br>These investigations will be carried out in accordance (where applicable) with the Guideline for the Assessment and Management of Sites Impacted by Hazardous Ground Gases (NSW EPA 2012) and Assessing Risks Posed by Hazardous Ground Gases to Buildings Report (C665) (Wilson et al. 2007). This will include undertaking gas monitoring. | Contractor     | Prior to construction and during construction        |



| Environmental issue                             | Reference | Environmental management measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Responsibility | Timing                                        |
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|                                                 | SC11      | Should the further investigations determine that gas concentrations remain elevated near the project footprint, gas monitoring will be carried out during construction within the construction footprint next to the SUEZ Kemps Creek Resource Recovery Park. If excavations are to be carried out within enclosed structures, gas accumulation monitoring will be carried out before and during construction. On site gas monitoring will be carried out in accordance with the NSW EPA (2016) Environmental Guidelines: Solid Waste Landfills.                                                                                                                                                                                                                                                                                                 | Contractor     | During construction                           |
| Air quality                                     |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                |                                               |
| General air quality impacts during construction | AQ01      | <p>A construction air quality management plan (CAQMP) will be developed and implemented for the project to manage potential air quality impacts associated with construction. The CAQMP will identify activities that may results in air quality impacts and associated mitigation measures to avoid or minimise these impacts.</p> <p>The CAQMP will provide:</p> <ul style="list-style-type: none"> <li>• Measures to minimise dust generation associated with earthworks and other activities that disturb the ground surface, stockpiles, and haulage routes</li> <li>• Measures to minimise emissions from machinery and vehicles associated with the project</li> <li>• Procedures for inspection, monitoring and addressing any impacts where required.</li> </ul> <p>The CAQMP will be implemented for the duration of construction.</p> | Contractor     | Prior to construction and during construction |

| Environmental issue              | Reference | Environmental management measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | Responsibility | Timing              |
|----------------------------------|-----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|---------------------|
| Dust impacts during construction | AQ02      | <p>Dust generation will be minimised during construction where possible. Where practicable, specific measures will include (but not be limited to):</p> <ul style="list-style-type: none"> <li>• Regularly watering exposed and disturbed areas including stockpiles, especially during inclement weather conditions</li> <li>• Adjusting the intensity of activities based on measured and observed dust levels, weather forecasts and the proximity of and direction of the works in relation to the nearest surrounding receivers</li> <li>• Ensuring loads are covered, and any loose materials/debris are removed before vehicles exit the site</li> <li>• Minimising the number of stockpiles and amount of material stockpiled where practicable</li> <li>• Positioning stockpiling areas as far as possible from surrounding receivers, including potentially ecologically sensitive receivers</li> <li>• Limiting stockpiling activities during conditions where winds are blowing strongly in the direction(s) from the stockpiling location to nearby receivers</li> <li>• Consultation with nearby developers to co-ordinate and plan activities where practicable to minimise the potential for cumulative dust-related impacts</li> <li>• The planning and undertaking of demolition activities, including the removal of hazardous building materials in a manner that minimises dust generation. This will also include the removal of hazardous building materials before the start of general demolition works.</li> </ul> | Contractor     | During construction |
| Odours during construction       | AQ03      | <p>Odorous materials identified on site will be excavated in a staged process and exposed areas of odorous material will be kept to a minimum to reduce the total emissions from the site where feasible.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Contractor     | During construction |

| Environmental issue | Reference | Environmental management measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Responsibility | Timing                |
|---------------------|-----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|-----------------------|
| Health and safety   |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                |                       |
| General             | HS01      | <p>A work health safety management plan (WHSMP) will be prepared for the project. The WHSMP will include:</p> <ul style="list-style-type: none"> <li>• Details of the hazards and risks associated with construction activities</li> <li>• Risk management measures</li> <li>• Procedures to comply with all legislative and industry standard requirements</li> <li>• Use of appropriate personal protective equipment</li> <li>• Contingency plans, as required</li> <li>• An incident response management plan</li> <li>• Training for all personnel (including subcontractors) including site inductions, the recognition and awareness of site hazards and the locations of relevant equipment to protect themselves and manage any spills. All staff would have the relevant training and certificates.</li> </ul> | Contractor     | Prior to construction |
| Bushfire            | HS02      | Measures to mitigate and manage bushfire risk will be developed and included as part of site-specific hazard and risk management measures within the WHSMP. Measures will include the maintenance of ancillary facilities in a tidy and orderly manner and the storage and management of dangerous goods and hazardous materials in a safe location.                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Contractor     | Prior to construction |
| Incident response   | HS03      | <p>An incident response management plan will be developed and implemented.</p> <p>The response to incidents within the road will be managed in accordance with the memorandum of understanding between TfNSW and the NSW Police Service, NSW Rural Fire Service, NSW Fire Brigade and other emergency services.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Contractor     | Prior to construction |



| Environmental issue                                 | Reference | Environmental management measures                                                                                                                                                                                                                                                                                                       | Responsibility | Timing                                                  |
|-----------------------------------------------------|-----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|---------------------------------------------------------|
| Storage of dangerous goods and hazardous substances | HS04      | Storage, handling and use of dangerous goods and hazardous substances would be in accordance with the <i>Work Health and Safety Act 2011</i> and the <i>Storage and Handling of Dangerous Goods Code of Practice</i> (WorkCover NSW, 2005).                                                                                             | Contractor     | During construction and operation                       |
|                                                     | HS05      | Secure, bunded areas will be provided around storage areas for oils, fuels and other hazardous liquids.                                                                                                                                                                                                                                 | Contractor     | During construction                                     |
|                                                     | HS06      | Safety Data Sheets will be obtained for dangerous goods and hazardous substances stored onsite before their arrival.                                                                                                                                                                                                                    | Contractor     | During construction                                     |
| Contamination from transportation of hazardous good | HS07      | All hazardous substances will be transported in accordance with relevant legislation and codes, including the Road and Rail Transport (Dangerous Goods) (Road) Regulation 1998 and the 'Australian Code for the Transport of Dangerous Goods by Road and Rail' (National Transport Commission, 2008).                                   | Contractor     | During construction                                     |
| Sustainability                                      |           |                                                                                                                                                                                                                                                                                                                                         |                |                                                         |
| Project sustainability outcomes                     | SU1       | A sustainability management plan for the project will be developed and implemented during detailed design, to give effect to the sustainability strategy for the project. The management plan will detail measures to meet the sustainability objectives and targets and Infrastructure Sustainability rating tool credit requirements. | Contractor     | Throughout detailed design, construction, and operation |

| Environmental issue                             | Reference | Environmental management measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Responsibility     | Timing                |
|-------------------------------------------------|-----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|-----------------------|
| Waste                                           |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                    |                       |
| Inappropriate handling and/or disposal of waste | W01       | <p>A construction waste and resource management plan (CWRMP) will be prepared for the project and outline appropriate management procedures. It will include, but not be limited to:</p> <ul style="list-style-type: none"> <li>• Identification of the waste types and volumes that are likely to be generated by the project</li> <li>• Adherence to the waste minimisation hierarchy principles of avoid/reduce/reuse/recycle/dispose</li> <li>• Waste management procedures to manage the handling and disposal of waste, including unsuitable material or unexpected waste volumes</li> <li>• Identification of reporting requirements and procedures for tracking of waste types and quantities</li> <li>• A resource management strategy detailing the process to identify reuse options for surplus materials</li> <li>• A procurement strategy to minimise unnecessary consumption of materials and waste generation in accordance with relevant legislation and guidelines.</li> </ul> | TfNSW / Contractor | Prior to construction |
|                                                 | W02       | <p>A spoil management plan will be prepared for the project as part of the CWRMP and in line with the CSWMP. The spoil management plan will outline appropriate management procedures for the generation and importation of spoil. It will include, but not be limited to:</p> <ul style="list-style-type: none"> <li>• Procedures for classification of spoil</li> <li>• Identification of spoil reuse measures</li> <li>• Spoil stockpile management procedures</li> <li>• Spoil haulage routes</li> <li>• Spoil disposal and reuse locations</li> <li>• Imported spoil sources and volumes.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                        | Contractor         | During construction   |

| Environmental issue                                    | Reference | Environmental management measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Responsibility     | Timing                           |
|--------------------------------------------------------|-----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|----------------------------------|
|                                                        | W03       | Wherever feasible and reasonable, construction material will be sourced from within the Sydney region.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | TfNSW / Contractor | During construction              |
| Unexpected waste volumes and types during construction | W04       | Suitable areas will be identified to allow for contingency management of unexpected waste materials, including contaminated materials. Suitable areas will be required to be hardstand or lined areas that are appropriately stabilised and bunded, with sufficient area for stockpile storage.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | TfNSW / Contractor | During construction              |
| Climate change and greenhouse gas                      |           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                    |                                  |
| Climate change risks                                   | CC01      | <p>Detailed design will incorporate appropriate adaptation measures for all climate change risks with an original risk rating of moderate or above. These will include but not be limited to:</p> <ul style="list-style-type: none"> <li>• Consideration of the full range of potential temperature extremes on the project (particularly bridge structures) which may occur as a result of climate change and consider material capacity to withstand heat during material type selection to minimise the likelihood of infrastructure failures</li> <li>• Consideration of energy dissipation at culvert outlets when velocities exceed existing magnitudes</li> <li>• Consideration of the use of native species which are typically more fire tolerant and can more rapidly regenerate after fire events</li> <li>• Maintenance of fauna passage along main creek lines under bridges.</li> </ul> | Contractor         | Detailed design                  |
|                                                        | CC02      | A climate change monitoring and adaptive management framework will be prepared and implemented for the project. The framework will incorporate performance monitoring criteria and measures, and the requirement for periodic review of the climate change risk assessment and framework against updated climate data to ensure currency.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | TfNSW / Contractor | Detailed design and construction |



| Environmental issue | Reference | Environmental management measures                                                                                                                                                                                                                                                                                                                            | Responsibility     | Timing                                                          |
|---------------------|-----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|-----------------------------------------------------------------|
|                     | CC03      | An adaptive management approach will be applied to workplace health and safety planning during construction and operation in line with the WHSMP. This will include use of TfNSW Work Health and Safety Procedures.                                                                                                                                          | TfNSW / Contractor | Prior to construction, during construction and during operation |
| GHG emissions       | GG01      | Targets to reduce GHG emissions during construction and operation will be included in the project's sustainability management plan.                                                                                                                                                                                                                          | TfNSW / Contractor | Detailed design and construction                                |
|                     | GG02      | Updated GHG assessment based on the detailed design for the project and the final project when built will be carried out.                                                                                                                                                                                                                                    | Contractor         | Detailed design and construction                                |
|                     | GG03      | Vegetation removal will be minimised where practicable.                                                                                                                                                                                                                                                                                                      | Contractor         | Detailed design and construction                                |
|                     | GG04      | The procurement of goods and services will consider goods and services that: <ul style="list-style-type: none"> <li>• Are from local suppliers</li> <li>• Make use of recycled materials or materials with a low embodied energy content.</li> <li>• Are energy efficient or have low embodied energy</li> <li>• Minimise the generation of waste</li> </ul> | Contractor         | Detailed design and construction                                |
|                     | GG05      | Construction plant and equipment will be well maintained to maximise fuel efficiency.                                                                                                                                                                                                                                                                        | Contractor         | Construction                                                    |

| Environmental issue | Reference | Environmental management measures                                                                                                                                                                                                                                                                                                                  | Responsibility     | Timing                           |
|---------------------|-----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|----------------------------------|
| Cumulative impacts  |           |                                                                                                                                                                                                                                                                                                                                                    |                    |                                  |
| Cumulative impacts  | CU01      | Regular consultation will be carried out with nearby/adjoining projects and key stakeholders during the detailed design and construction phase to review potential cumulative impacts and integrate designs and construction methodologies (including traffic impacts and noise management), as far as practicable to minimise cumulative impacts. | TfNSW / Contractor | Detailed design and construction |
|                     | CU02      | Communication strategies across relevant TfNSW projects will be managed to be consistent in their messaging to the community to avoid confusion.                                                                                                                                                                                                   | TfNSW              | Detailed design and construction |

## 8 Conclusion

TfNSW proposes to amend the project in response to consultation with the community, businesses, landowners and government agencies, submissions received on the EIS and continued design development and refinement. The proposed changes to the project as described in the EIS include:

- Amendments to the motorway-to-motorway interchange at the M7 Motorway, including:
  - Changes to Elizabeth Drive and Cecil Road intersections, proposed exit ramps, the Wallgrove Road connection to Elizabeth Drive and proposed shared user path realignments
  - The widening of Elizabeth Drive under the M7 Motorway and approaches
- An option to provide a new connection between the M12 Motorway and Elizabeth Drive near the M7 Motorway interchange
- Two new signalised intersections into the Western Sydney International Airport, with provisions for future connection to potential developments north of the Western Sydney International Airport
- Additional and revised ancillary facilities to support the delivery of the project
- Lowering the height of the M12 Motorway in and around the Western Sydney International Airport interchange
- Reduction in the scope of work associated with the M12 Motorway and The Northern Road intersection
- Relocation of utilities
- Changes to property access and acquisition
- Changes to drainage
- Adjustments to construction access, hours, haulage, timing and material quantities.

The assessment in **Chapter 6** found impacts associated with the proposed project changes to be generally consistent with the impacts described in the EIS. The project would still result in impacts due to the removal of vegetation, including threatened ecological communities (TECs), disruptions to traffic and access during construction, visual and landscape character impacts associated with the introduction of new infrastructure elements, socio-economic impacts associated with changes to access and property acquisition, noise and vibration impacts, and impacts to items of both Aboriginal and non-Aboriginal heritage significance.

The key potential impacts and benefits that differ from the EIS for the amended project include additional vegetation removal resulting in increased impacts to TECs and threatened flora and fauna species; improved operational traffic performance due to updated data inputs to traffic modelling; additional property impacts due to acquisition and temporary leasing and an increase in the number of receivers eligible for noise mitigation due to an increase in the operational footprint of the amended project.

The project has applied the Framework for Biodiversity Assessment (FBA) (OEH 2014a) to quantify the impact of threatened species, populations and communities and developed a Biodiversity Offset Strategy to address the requirements of the Threatened Species Conservation Act 1995. A summary of the offset credits required for the project is provided in the biodiversity supplementary technical report (**Appendix A**). All residual impacts associated with biodiversity will be offset in accordance with the FBA.

Potential impacts associated with the amended project would be managed through the implementation of the environmental management measures outlined in **Chapter 7** of this report.



These measures have been revised since the EIS to consider the changes to the project and issues raised during EIS exhibition, responded to in the submissions report.

The amended project is considered justified in relation to its strategic transport need and its anticipated benefits in connecting the Western Sydney International Airport to Sydney's wider transport network, taking into account biophysical, economic and social considerations, including ecologically sustainable development and cumulative impacts.

DPIE will place this amendment report on exhibition for at least 14 days to provide the community and other stakeholders the opportunity to comment on the amended project. The document will be available for inspection at the DPIE website <https://www.planningportal.nsw.gov.au/major-projects/project/10226> and submissions can be made via the online form on the DPIE's website [www.planningportal.nsw.gov.au/major-projects/projects/on-exhibition](https://www.planningportal.nsw.gov.au/major-projects/projects/on-exhibition).

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Customer feedback  
Transport for NSW  
Locked Bag 928,  
North Sydney NSW 2059

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