



Australian Government

BUILDING OUR FUTURE



M12 Motorway

Appendix L

Air Quality updated technical memorandum

October 2020

Memorandum

Issued by Luke Spencer, Jacobs Group Australia Pty Ltd
Subject M12 Motorway amendment report – Air Quality updated technical memorandum
Client Transport for NSW
Project M12 Motorway
Date October 2020

1. Introduction and background

1.1 Overview

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.

TfNSW is seeking approval under Part 5, Division 5.2 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) to construct and operate the project. 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 key features of the project as described in the EIS is provided in Section 1.1 of the amendment report. This EIS was placed on public exhibition from 16 October to 18 November 2019.

TfNSW proposes to amend the project following further design development since the exhibition of the EIS. 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 are described in **Section 1.2**.

1.2 Proposed changes

The proposed changes to the project as described in the EIS are summarised below and are described in detail in Chapter 3 and Chapter 4 of the amendment report:

- 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 ancillary facilities to support the delivery of the project.

Refinements 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 as described in the EIS. For completeness, however, these refinements have been factored into the amended construction and operational footprint and included in the impact assessment described in this updated technical memorandum. The refinements are described in Section 3.3 and Section 4.2 of the amendment report and 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 project with all proposed changes is referred to as the amended project.

1.3 Amended project

1.3.1 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. This option would include some realignment of Wallgrove Road and widening of Elizabeth Drive at the motorway-to-motorway interchange at the M7 Motorway to facilitate the connection. 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 1-1**, 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 will be determined during the detailed design and construction phase of the project. The key features of each option are described in the following sections.

The proposed changes (see **Section 1.2**) would result in an amended construction footprint (**Figure 1-2**) and an amended operational footprint (**Figure 1-3**). The footprints would be the same for both options, with each footprint assuming the worst case scenario (ie option 2).

The assessment of potential impacts described in **Section 4** relates to the worst case scenario and covers both options, unless stated otherwise.

The key features of the amended project are listed in **Section 1.3.2** and include both options.

1.3.2 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 (see Section 1.1 of the amendment report), those changes are shown in **bold** text:

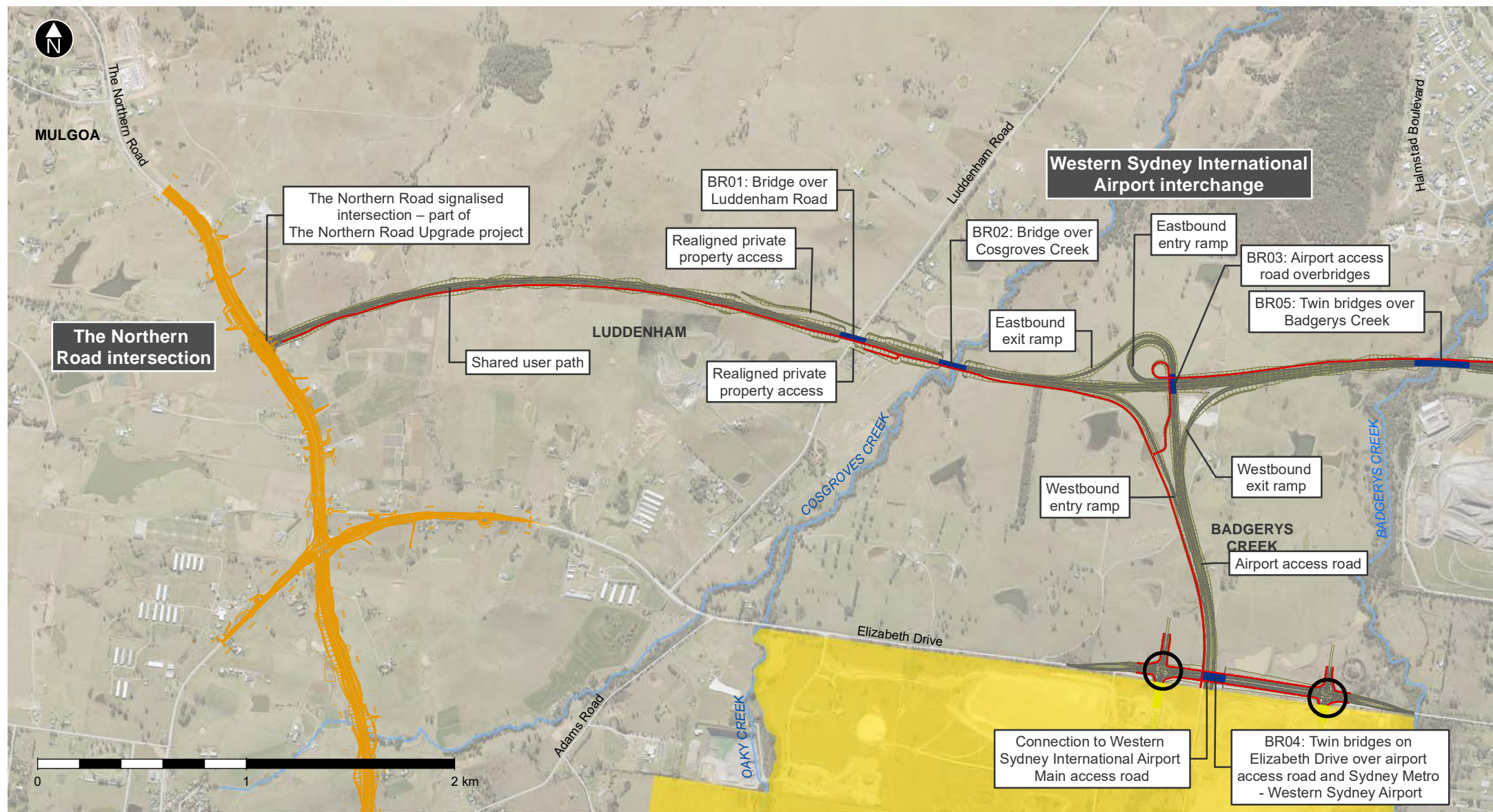
- A new dual-carriageway motorway between the M7 Motorway and The Northern Road with two lanes in each direction with a central median allowing future expansion to six lanes
- Motorway access via three interchanges/intersections:
 - A motorway-to-motorway interchange at the M7 Motorway and associated 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 the 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 basin
- 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 amended project is shown in **Figure 1-1**.

1.4 Purpose of document

This updated technical memo has been prepared in accordance with the Secretary's Environmental Assessment Requirements (SEARs) issued 30 October 2018 to support the amendment report. The purpose of this memo is to identify and assess the potential construction, operation and cumulative air quality impacts of the amended project, including an assessment of the proposed changes against the impacts documented in the EIS. Where required, this document recommends changes or feasible and reasonable additions to the management measures 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



Page 1 of 4

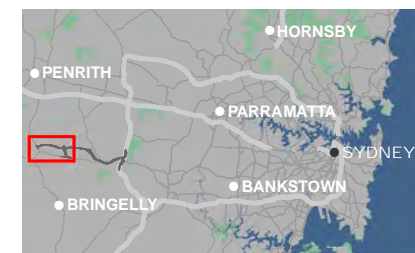
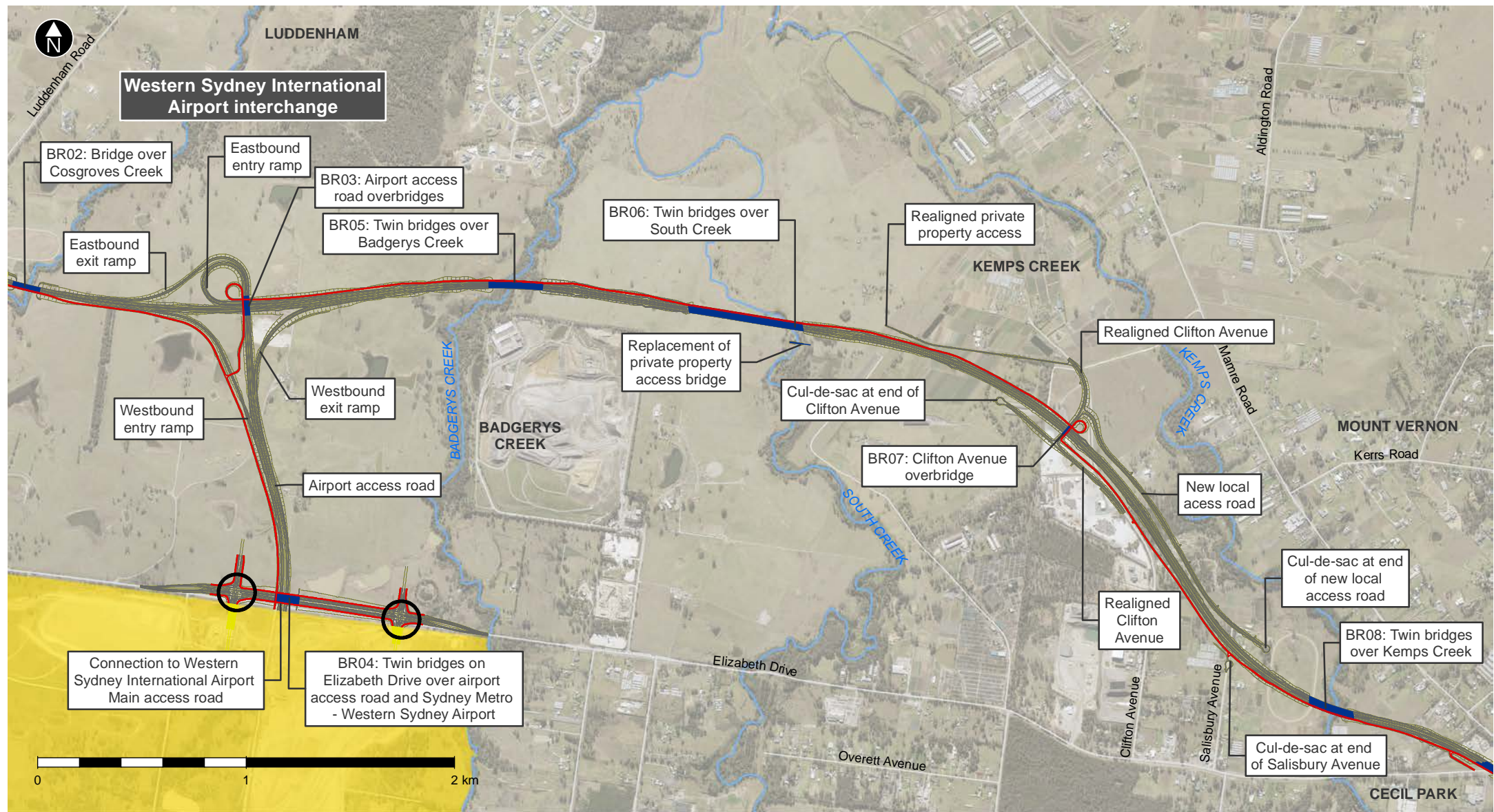
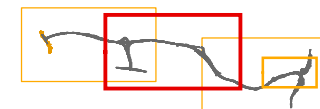


Figure 1-1 Key features of the amended project



- 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



Page 2 of 4

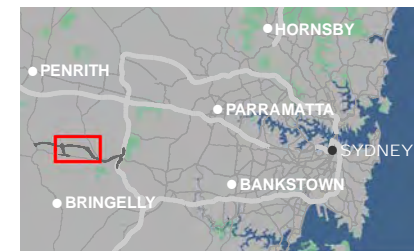
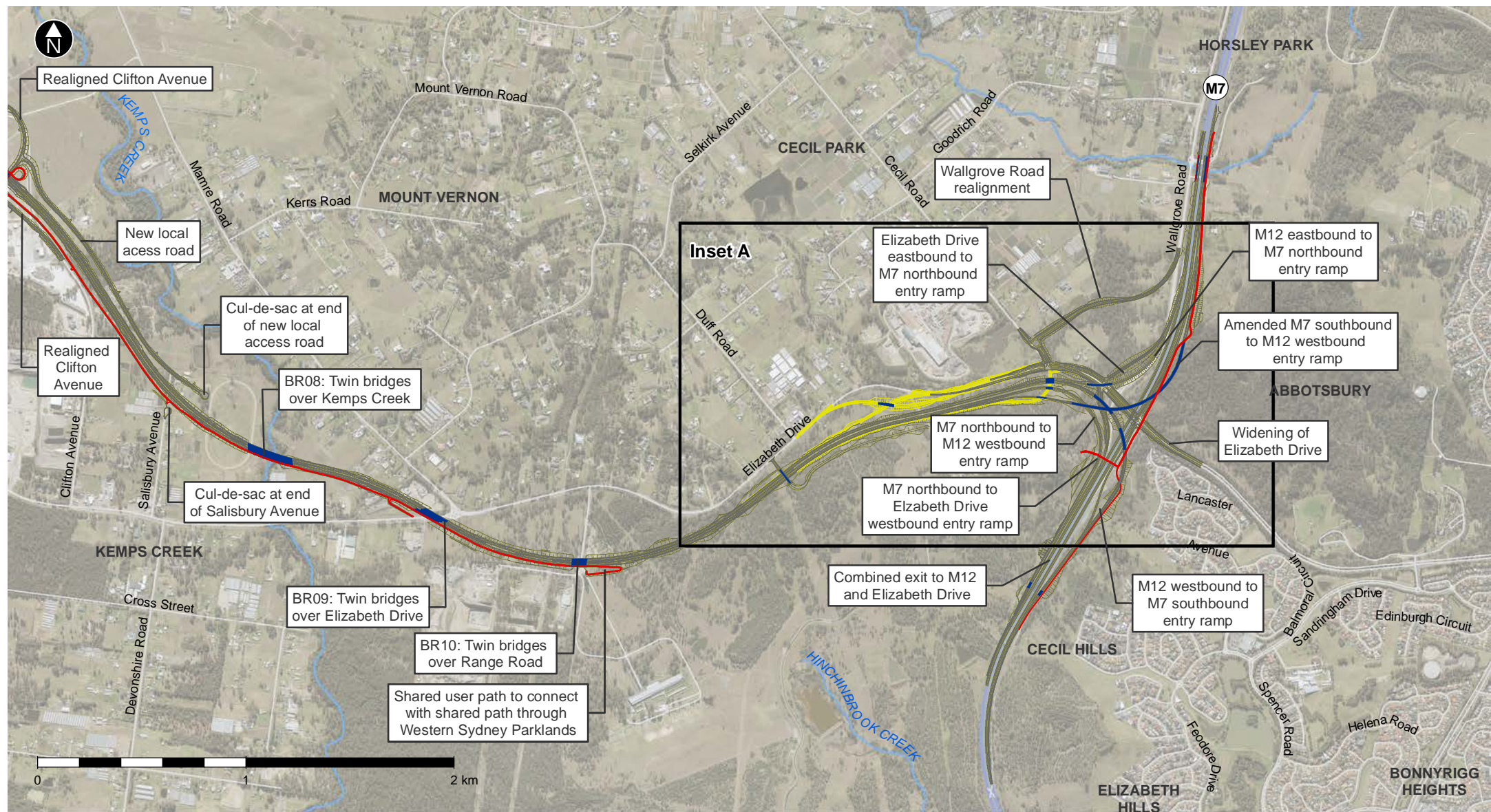
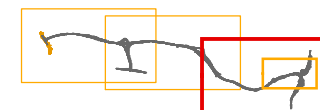


Figure 1-1 Key features of the amended project

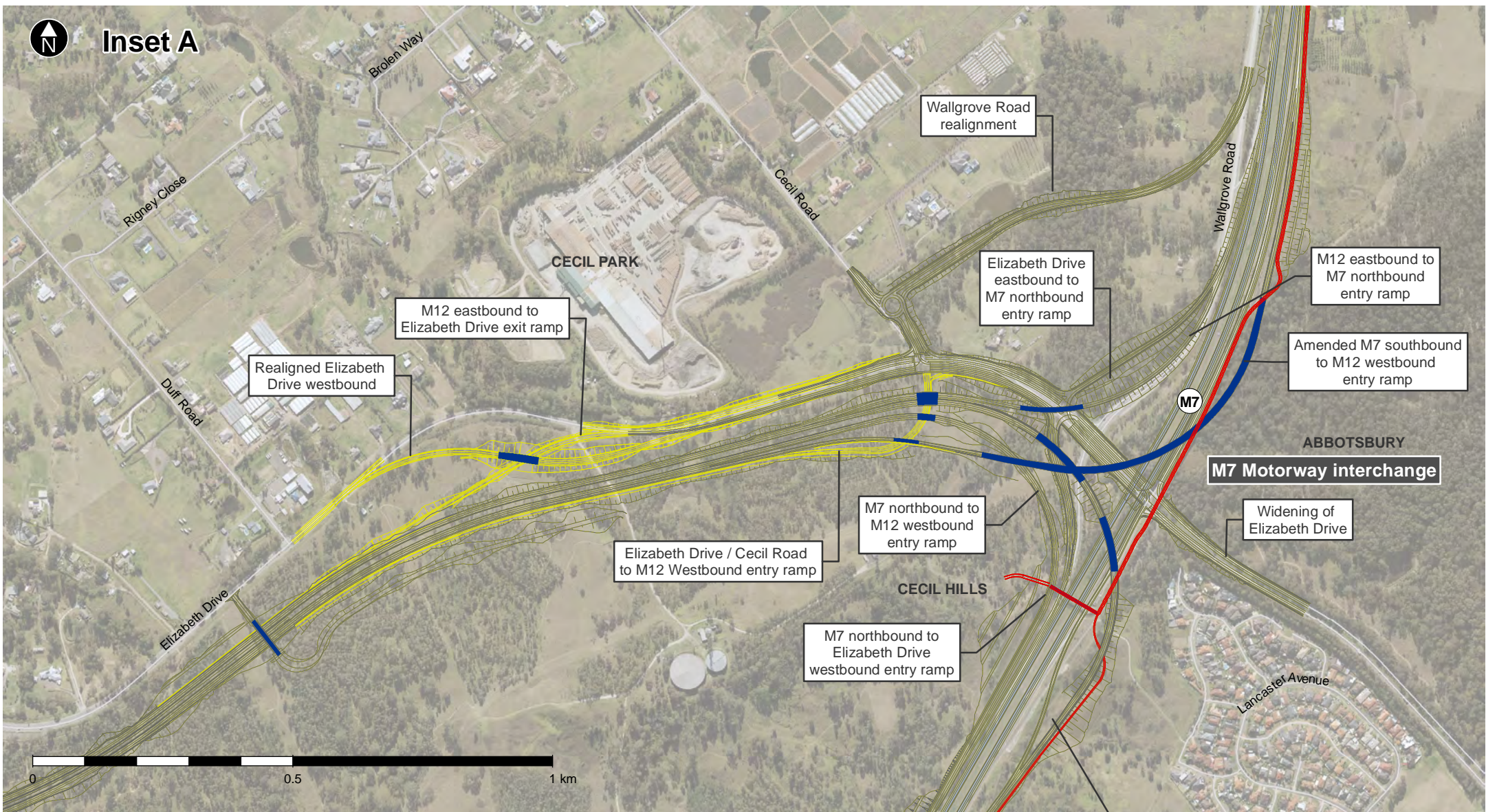


- The amended project
- The amended project (Elizabeth Drive connection)
- Shared user path
- Bridges
- Motorway
- Existing roads
- Waterways

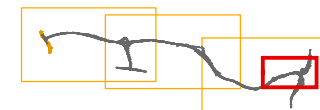


Page 3 of 4

Figure 1-1 Key features of the amended project



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



Page 4 of 4

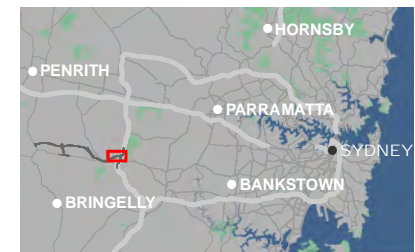
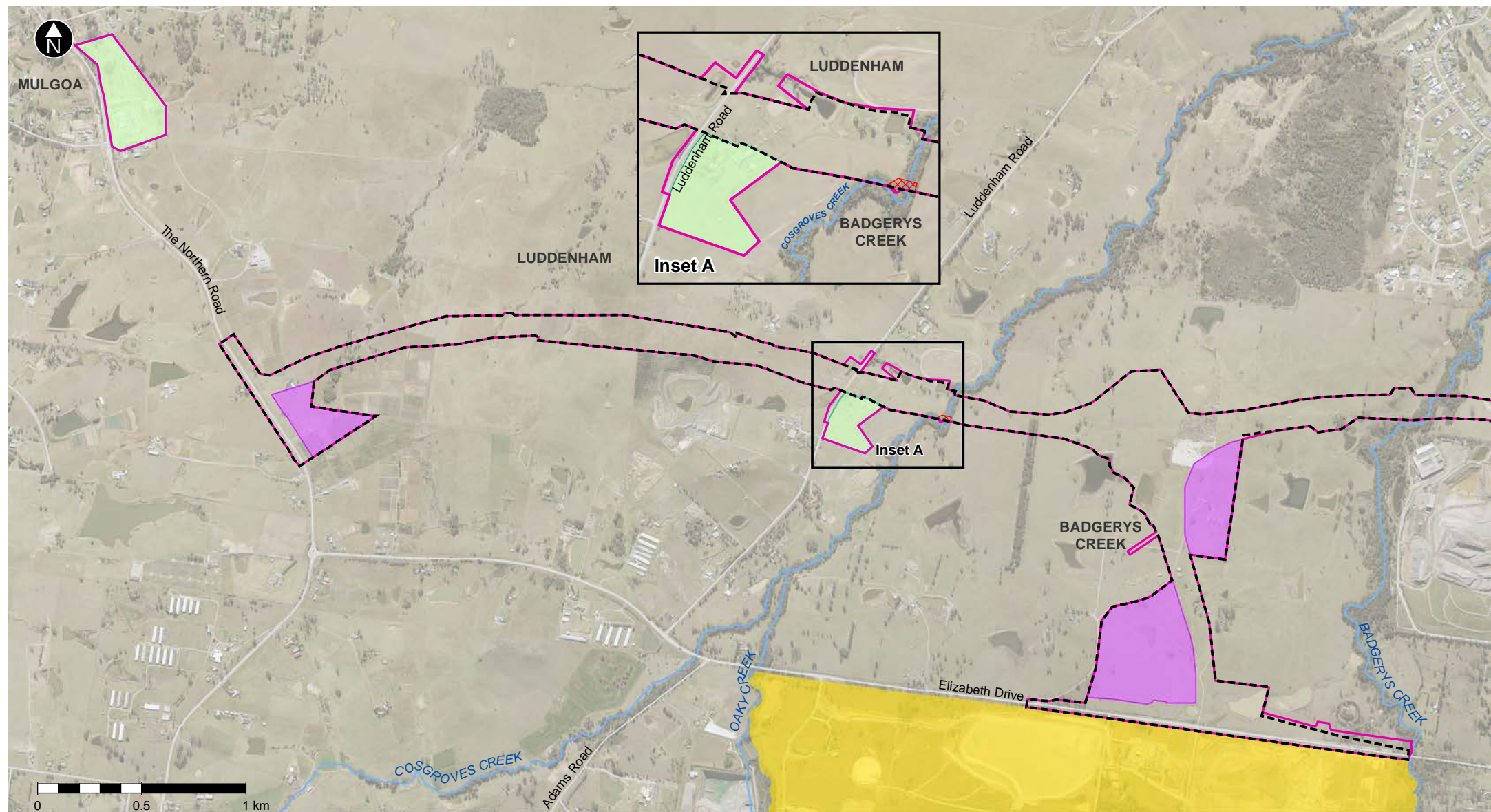
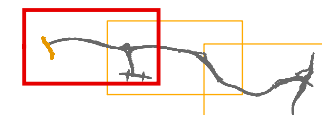


Figure 1-1 Key features of the amended project



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

- Ancillary facilities as per the EIS
- Additional ancillary facilities
- Western Sydney International Airport
- Waterways
- Motorway
- Existing roads



Page 1 of 4

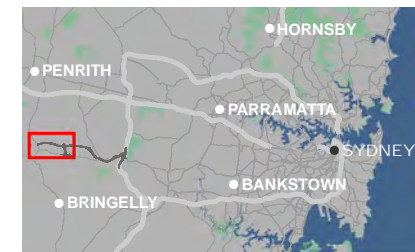
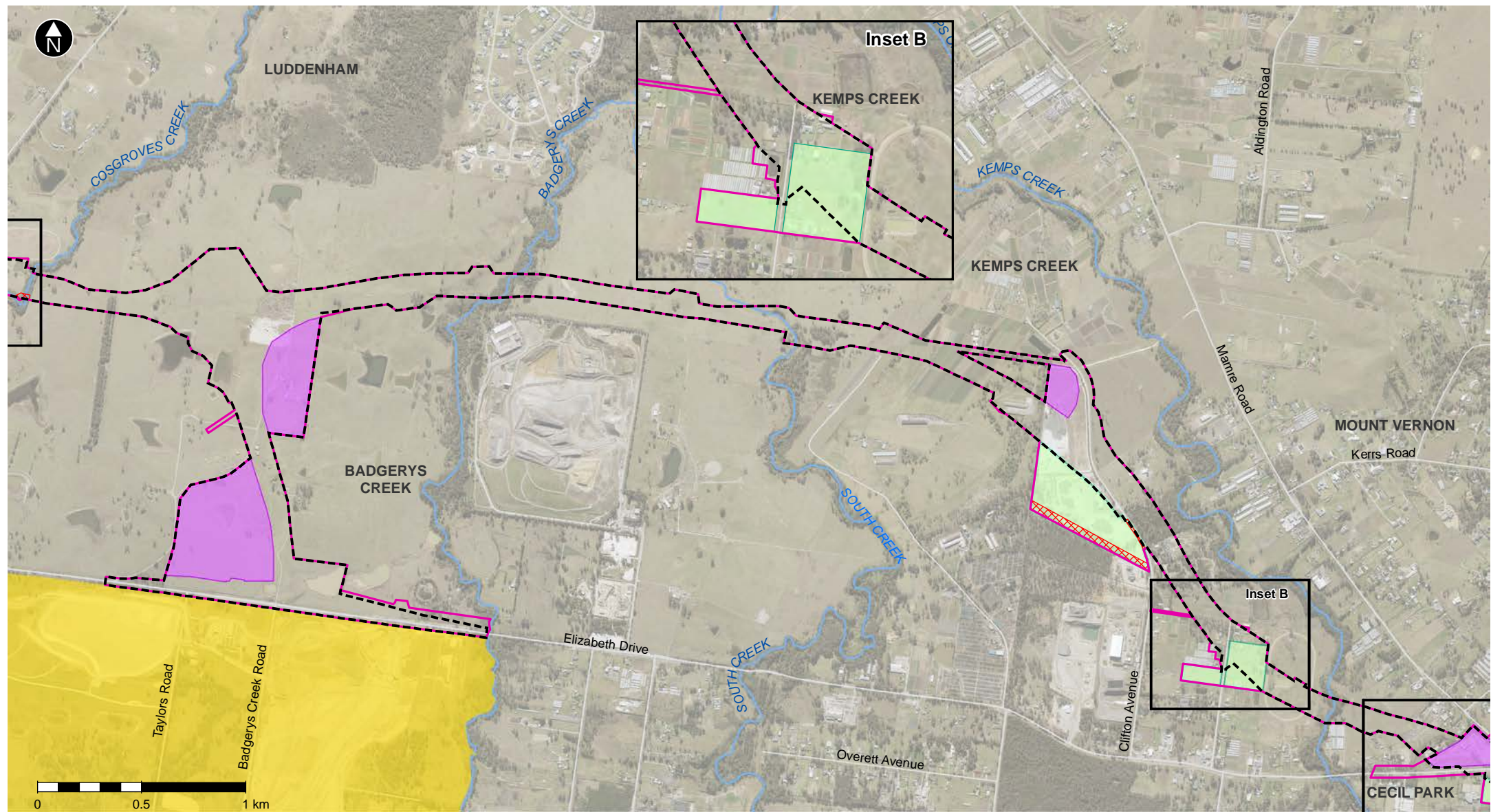


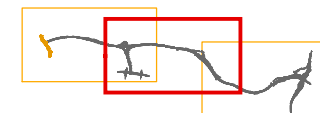
Figure 1-2 Construction footprints of the amended project and the project as described in the EIS



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

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

- Waterways
- Motorway
- Existing roads



Page 2 of 4

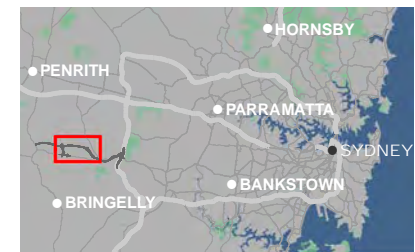
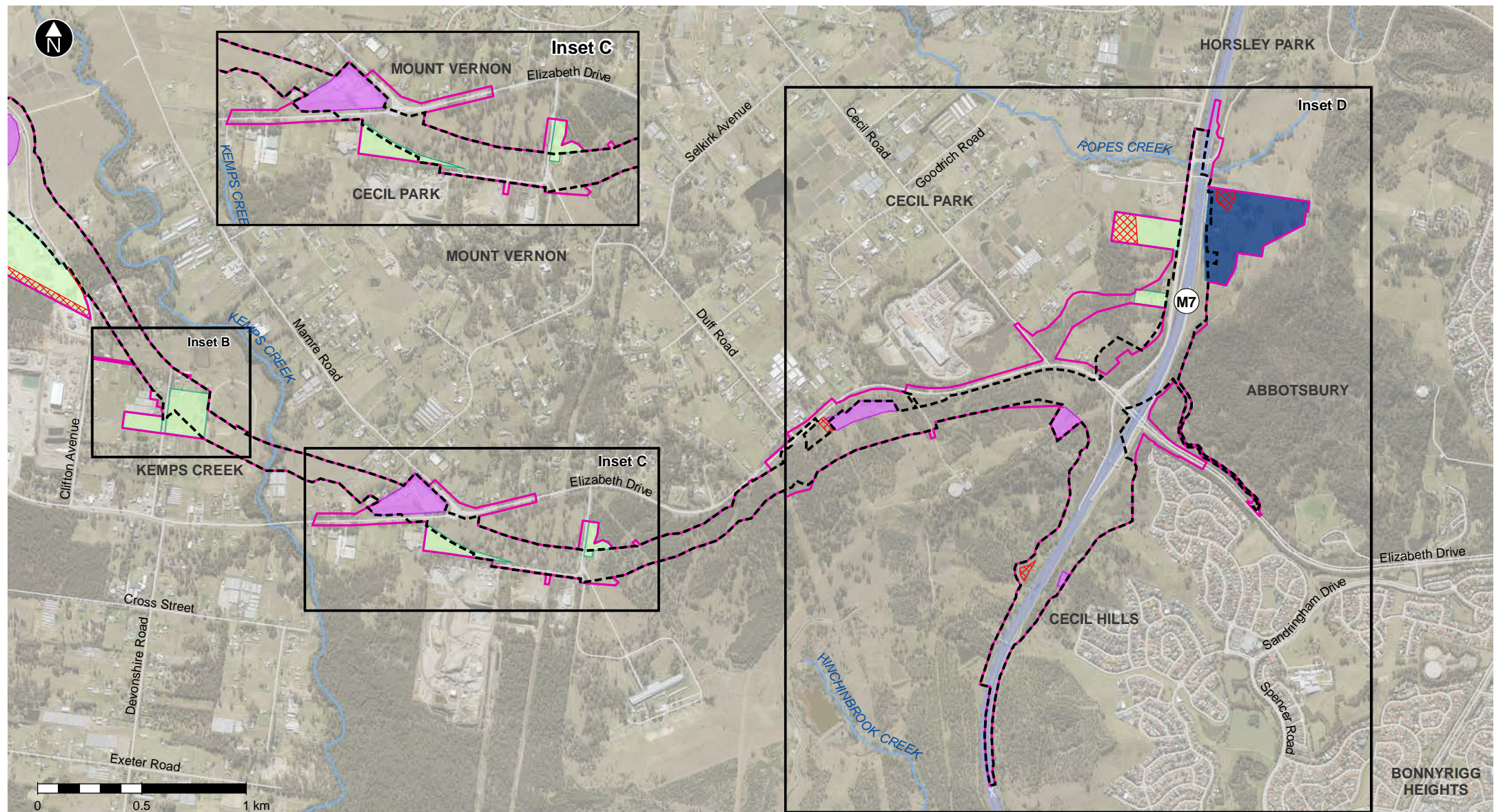
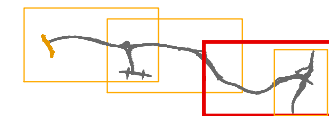


Figure 1-2 Construction footprints of the amended project and the project as described in the EIS



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

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



Page 3 of 4

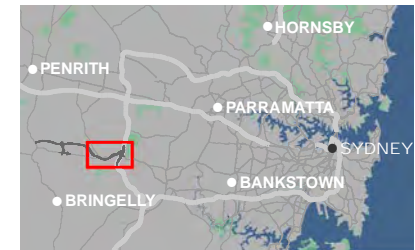
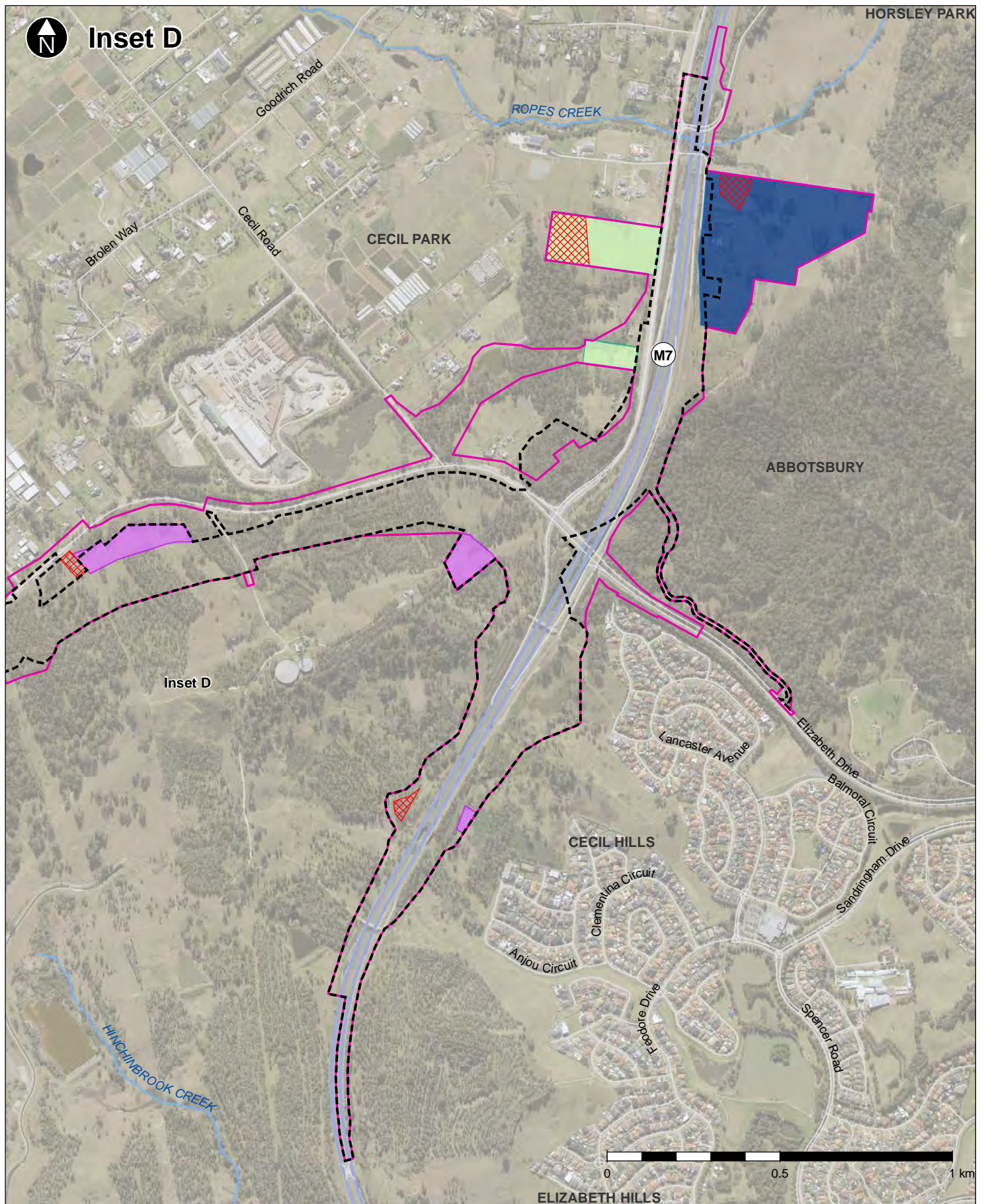
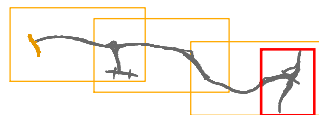


Figure 1-2 Construction footprints of the amended project and the project as described in the EIS



- The project construction footprint as per the EIS
- The amended project construction footprint
- The amended project exclusion zones
- Ancillary facilities as per the EIS
- Additional ancillary facilities
- Amended ancillary facilities



Page 4 of 4

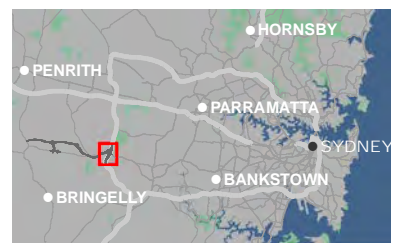
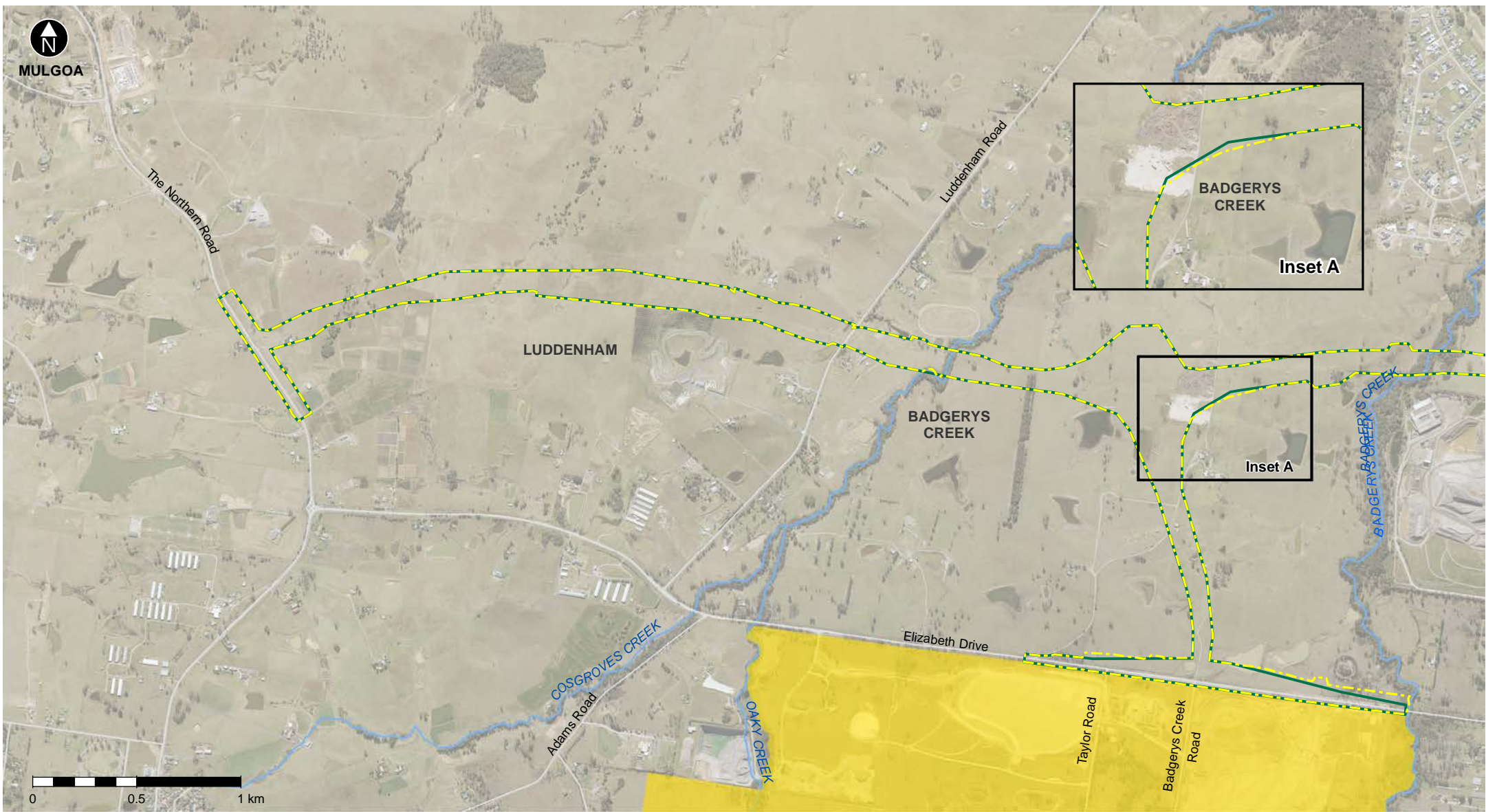
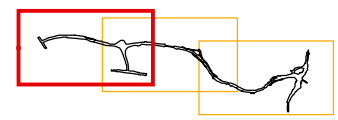


Figure 1-2 Construction footprints of the amended project and the project as described in the EIS



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



Page 1 of 3

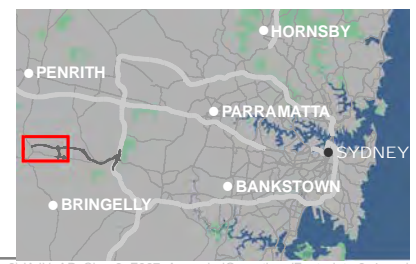
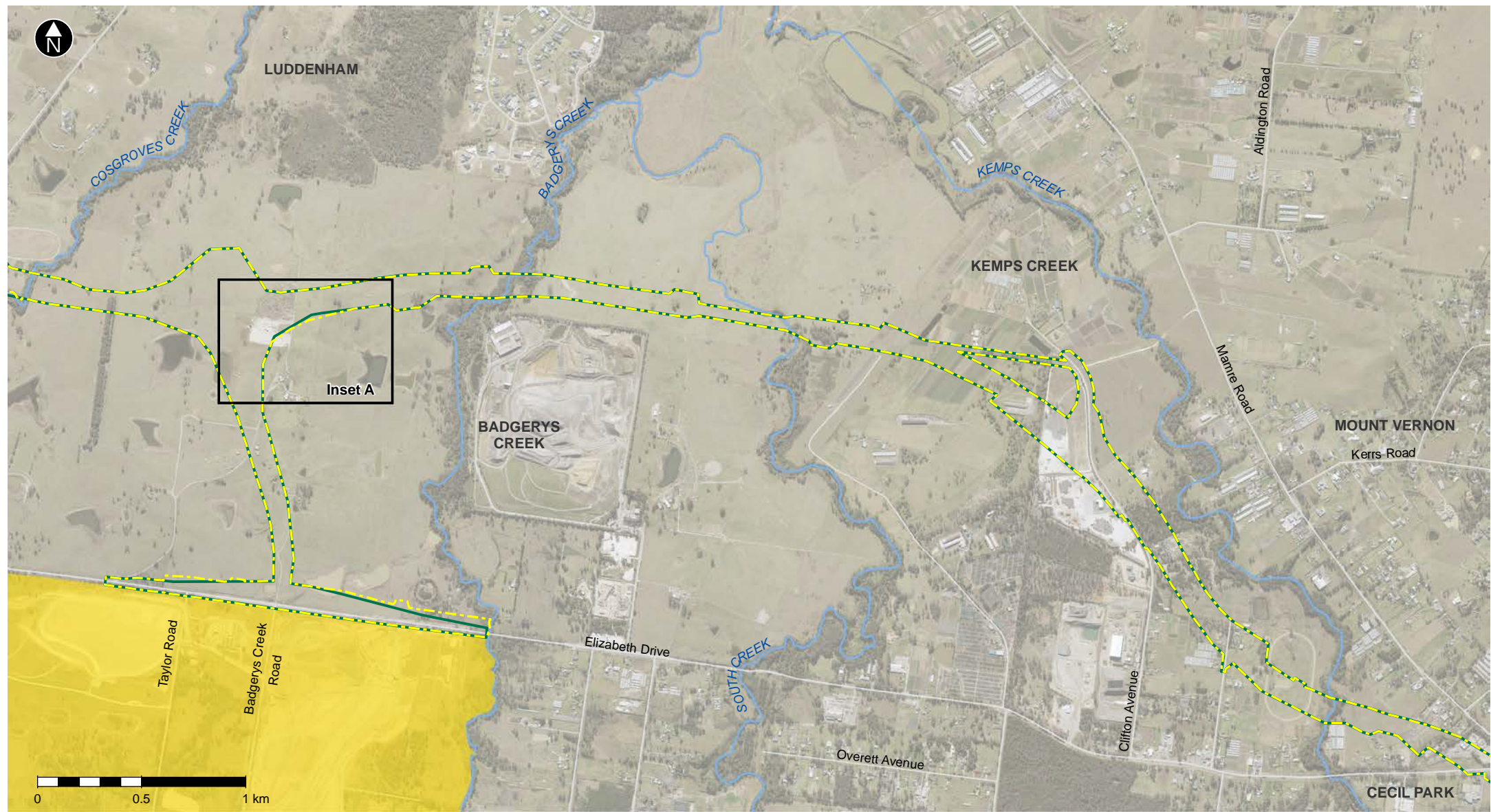
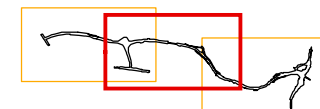


Figure 1-3 Operational footprints of the amended project and the project as described in the EIS



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



Page 2 of 3

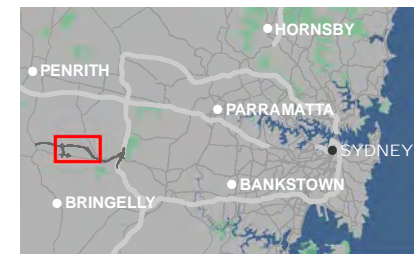
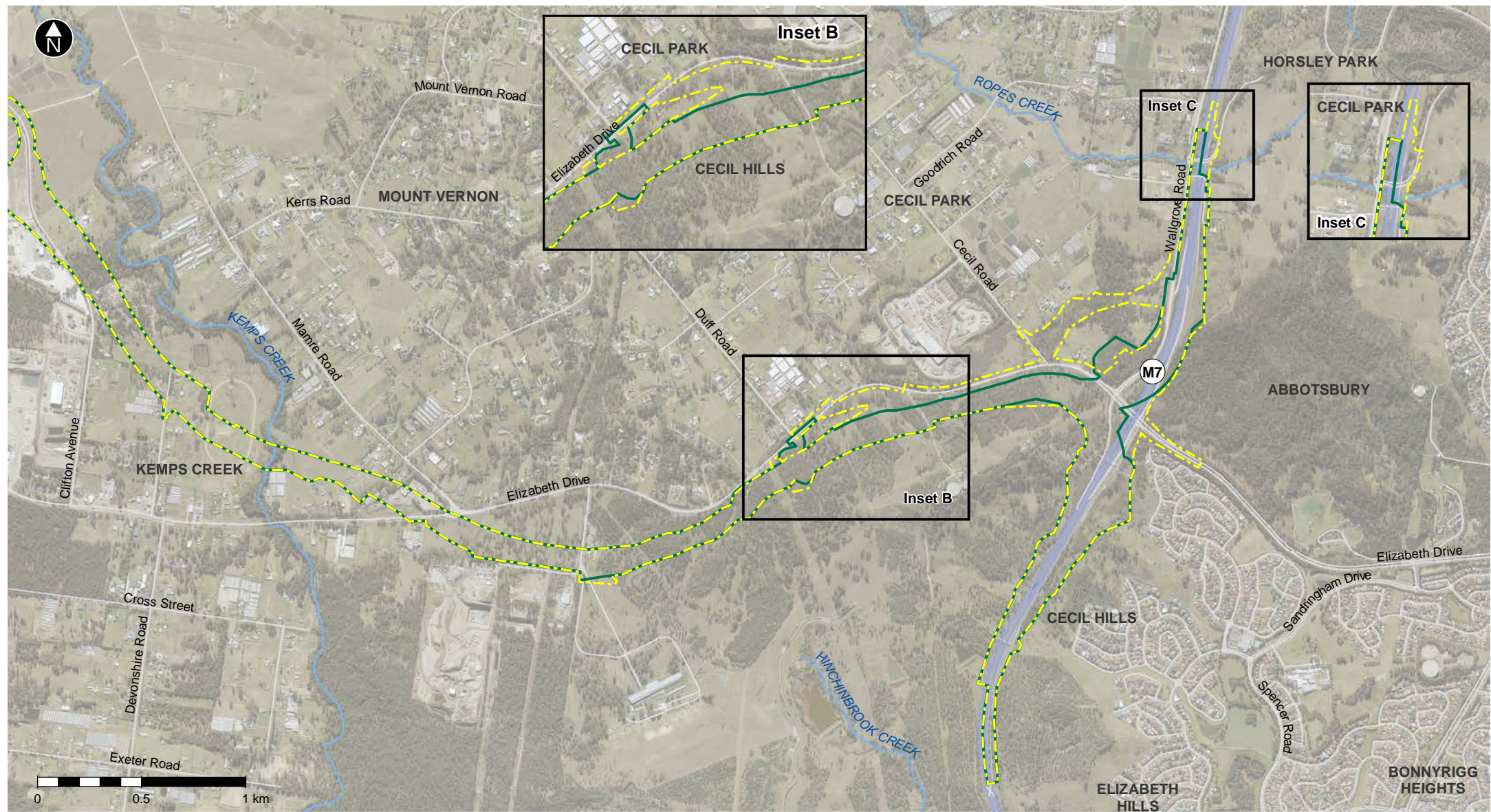
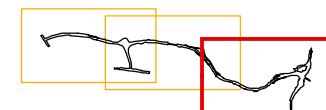


Figure 1-3 Operational footprints of the amended project and the project as described in the EIS



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



Page 3 of 3

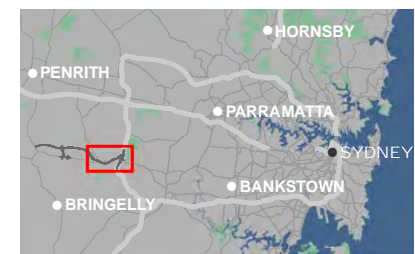


Figure 1-3 Operational footprints of the amended project and the project as described in the EIS

2. Assessment methodology

The methodology for this updated air quality impact assessment was prepared in accordance with the policy and planning setting detailed in Section 8.2.1 of the EIS. The assessments detailed in **Section 4** are based on the construction and operational footprints and, as such, relate to both options, unless stated otherwise.

The assessment involved the following:

- Reviewing details of the amended project to identify key air quality-related risks during construction and operation
- Determining if any additional statutes, policies and guidelines are applicable to the amended project
- Using the United Kingdom Institute of Air Quality Management (UK IAQM) semi-quantitative risk-based approach (as described in Section 8.2.2 of the EIS) to assess any changes in potential construction air quality impacts as a result of the amended project from those described in the EIS. The construction footprint changed from what was assessed in the EIS. Consequentially the distance of some receivers from construction activities would change and the UK IAQM methodology was applied to determine updated risk ratings and confirm whether measures determined in the EIS remained adequate. The assessment also incorporated the new proposed ancillary facility 10 (AF10)
- Applying the Roads and Maritime Tool for Roadside Air Quality (TRAQ) tool, (as described in Section 8.2.2 of the EIS) to predict changes in potential operational air quality impacts as a result of the amended project. Adjustments to the project alignment and updated traffic forecasts were considered in the review of the amended project
- Reviewing any changes to potential cumulative air quality impacts as a result of the amended project
- Reviewing measures to mitigate or otherwise effectively manage any potential impacts predicted detailed in the EIS.

2.1 Operational assessment

As discussed above, adjustments have been made to the project alignment, and traffic forecasts updates for the amended project have been considered in the assessment. This has included:

- Traffic conditions including the volume of flows, speeds and composition of light and heavy vehicles changed as a result of changes to land use forecast scenarios applied in the updated transport modelling. The transport assessment applied in the EIS utilised an adjusted LU14 forecast scenario for the wider area model for the South Western Growth Area and included the population and employment forecasts for the new airport transport corridor. Land-use data for the Western Sydney Aerotropolis was not available at the time, however traffic demand from the airport and business parks were factored into the previous transport modelling for the M12
- A number of planned network upgrades, including the Fifteenth Avenue upgrades, were included in the 2036 do minimum scenario that were at the time uncommitted to reflect the business-as-usual road network conditions that would occur if the Western Sydney Airport was opened and the M12 was not built. Future changes in the rail and bus network that were expected to be implemented prior to 2036 were accommodated in the Transport Model and based on forecast patronage a reduction in light vehicles was factored
- Updated transport modelling utilising the updated 2016 land-use data (LU16) demand was applied in this review. These traffic data, including details of how they have changed from the inputs applied in the EIS are listed in **Appendix A**

- Emissions were assessed from the same road segments as those displayed in Figure 8-12 of the EIS; ie:
 - M12_01 – M12 Motorway between The Northern Road and Western Sydney Airport entrance/exit
 - M12_02 – M12 Motorway between Western Sydney Airport entrance/exit road and Clifton Avenue
 - M12_03 – M12 Motorway between Clifton Avenue and Elizabeth Drive near Mamre Road
 - M12_04 – M12 Motorway between Elizabeth Drive near Mamre Road and the M7 Motorway
 - TNR_01 – The Northern Road between Elizabeth Drive and the M12 Motorway
 - TNR_02 – The Northern Road between the M12 Motorway and Littlefields Road
 - M7_01 – M7 Motorway south of the M12 Motorway intersection within the study area
 - M7_02 – M7 Motorway north of the M12 Motorway intersection within the study area
 - ED_01 – Elizabeth Drive between Adams Road and Western Sydney Airport entrance/exit
 - ED_02 – Elizabeth Drive between Western Sydney Airport entrance/exit and the M12 Motorway ramp near Mamre Road
- The operational air quality impacts of the amended project were assessed at receivers around the segments above for the following scenarios, as had been undertaken in the EIS:
 - Scenario 1 – existing operations
 - Scenario 2 – With project, at year of opening (2026)
 - Scenario 3 – Without the project (ie do nothing), at year of opening (2026)
 - Scenario 4 – With the project, 10 years after opening (2036)
 - Scenario 5 – Without the project (ie do nothing), 10 years after opening (2036)
- Results were then compared with the predictions presented in Section 8.2.4 of the EIS to determine how impacts would change from what was previously assessed. While the impact assessment criteria from the NSW Environment Protection Authority's 'Approved Methods for the Modelling and Assessment of Air Pollutants in NSW' (Approved Methods) (2016) (see Table 8-14 of the EIS) do not specifically apply to road projects, they were also considered to provide an indication of the project's impact on air quality during operations.

2.2 Study area

The study areas for this updated assessment is consistent with the study area used in the EIS (refer to Section 8.2.4); a 350 metre buffer from the amended construction footprint for the construction assessment; and a 200 metre buffer from construction footprint for the operational assessment (noting that TRAQ operational air quality prediction model evaluates impacts on a distance of 200 metres from the kerb). The new proposed ancillary facility 10 (AF10) is outside of this study area but has been covered by the construction impact assessment (see **Section 4.1**).

3. Existing environment

Section 8.2.3 of the EIS provided a detailed description of the existing environment surrounding the project, as relevant to the assessment of air quality. This included details of the prevailing local and regional climate and meteorological conditions and background air quality. The characterisation of the existing environment in the EIS remains relevant to the amended project.

Changes to the motorway alignment and amended construction footprint would result in the construction activities and operational traffic flows to be changed along some portions of the project.

Figure 3-1 and **Figure 3-2** below show the construction and operational study areas and relevant receivers in relation to the amended project.

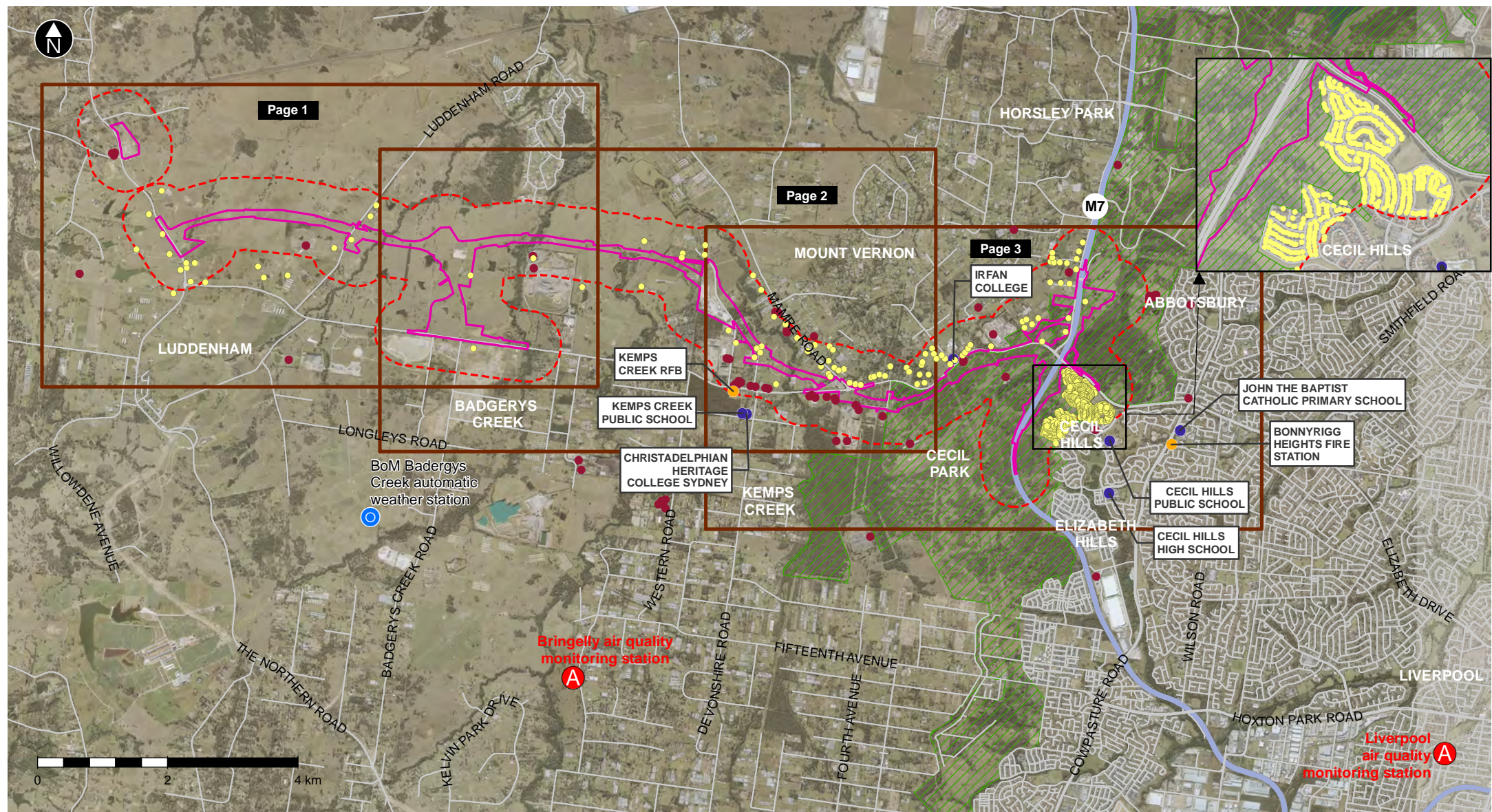
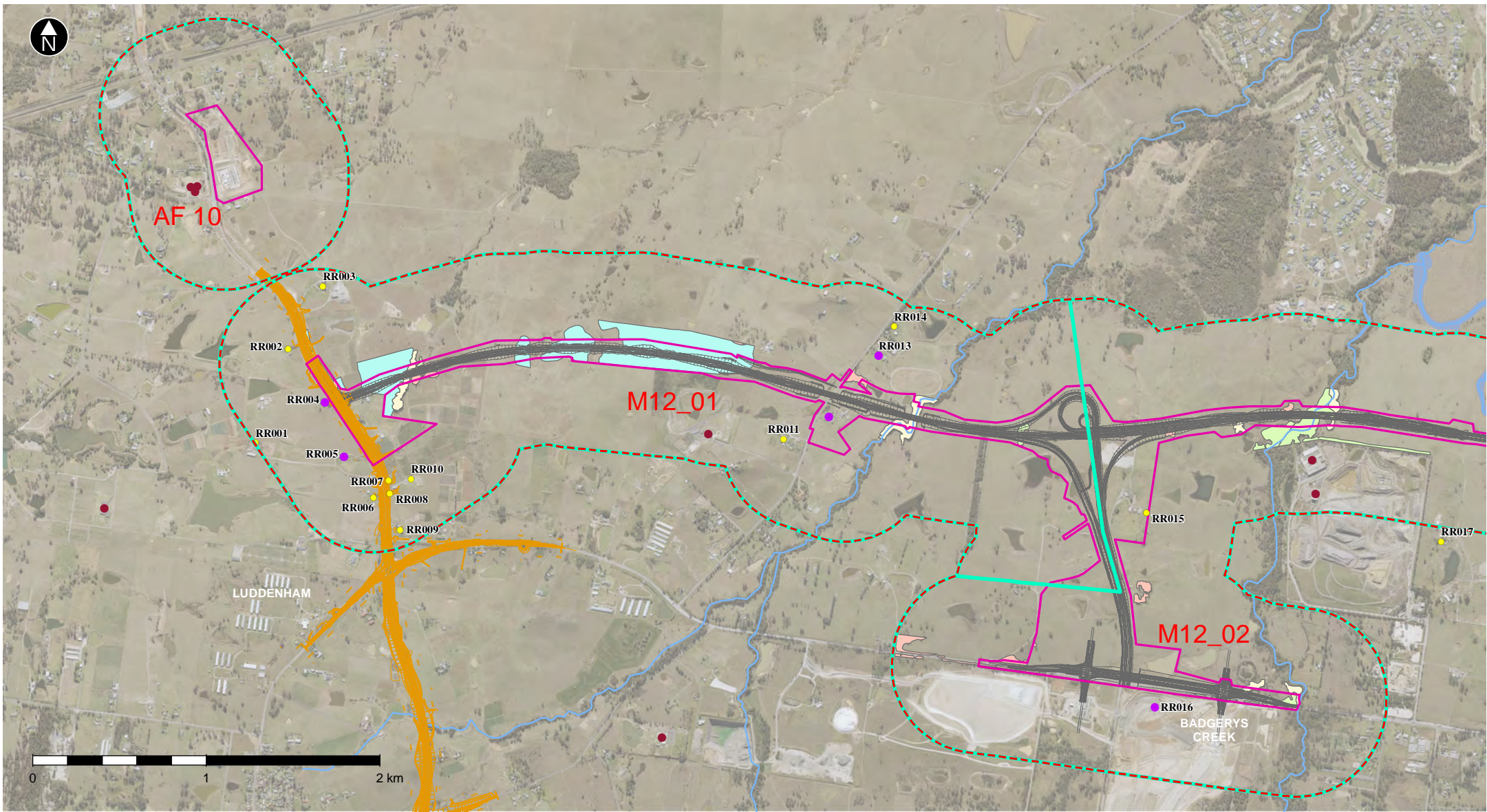


Figure 3-1 Amended construction air quality study area and nearby sensitive receivers



- | | | | |
|--|---|--|--|
| <ul style="list-style-type: none"> The amended project Part of The Northern Road upgrade project The amended project construction footprint Amended study area (construction) Construction segments | Receivers <ul style="list-style-type: none"> Residential Nearest receivers Commercial | Threatened Ecological Communities (TEC) <ul style="list-style-type: none"> Cumberland Plain Woodland in the Sydney Basin Bioregion Cumberland Plain Woodland in the Sydney Basin Bioregion (derived grassland form) | <ul style="list-style-type: none"> 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 |
|--|---|--|--|

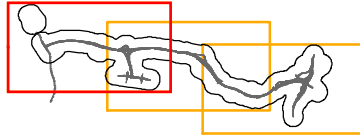
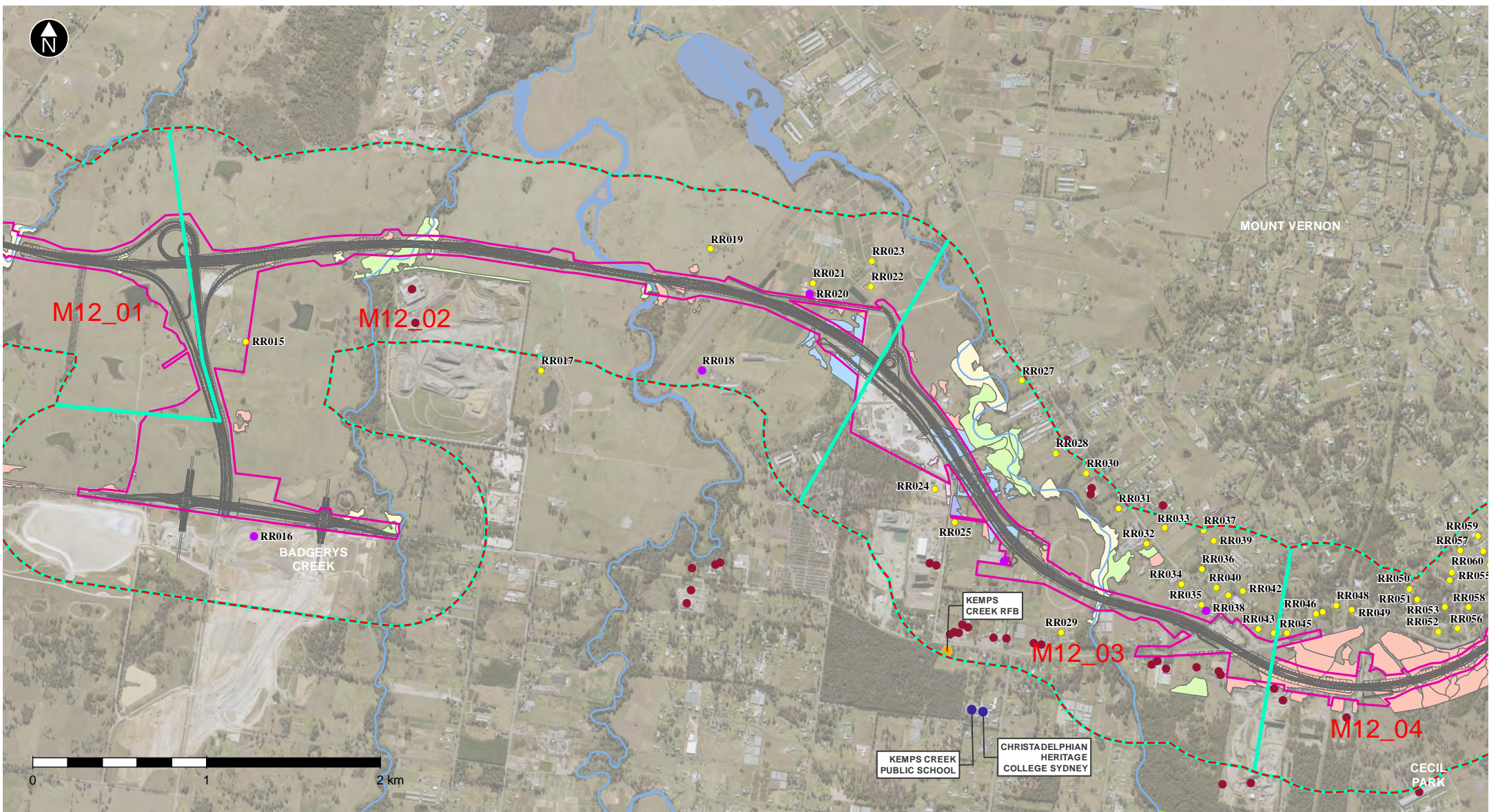


Figure 3-1 Amended construction air quality study area and nearby sensitive receivers



- 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

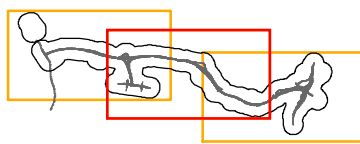


Figure 3-1 Amended construction air quality study area and nearby sensitive receivers

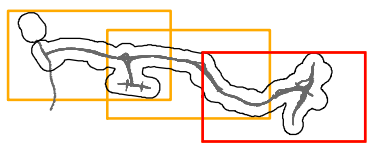
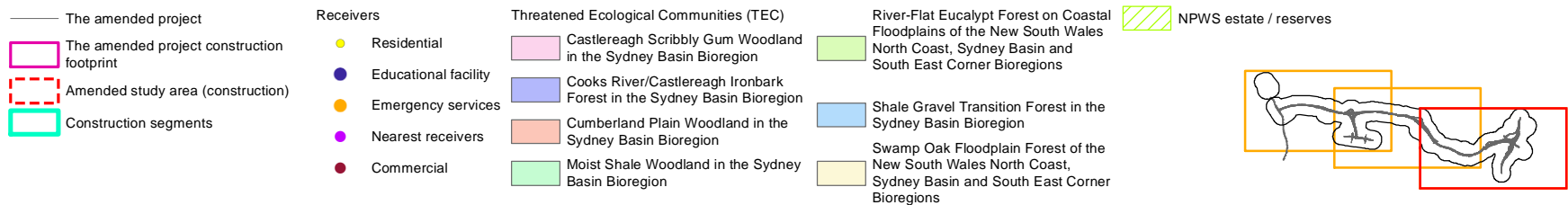
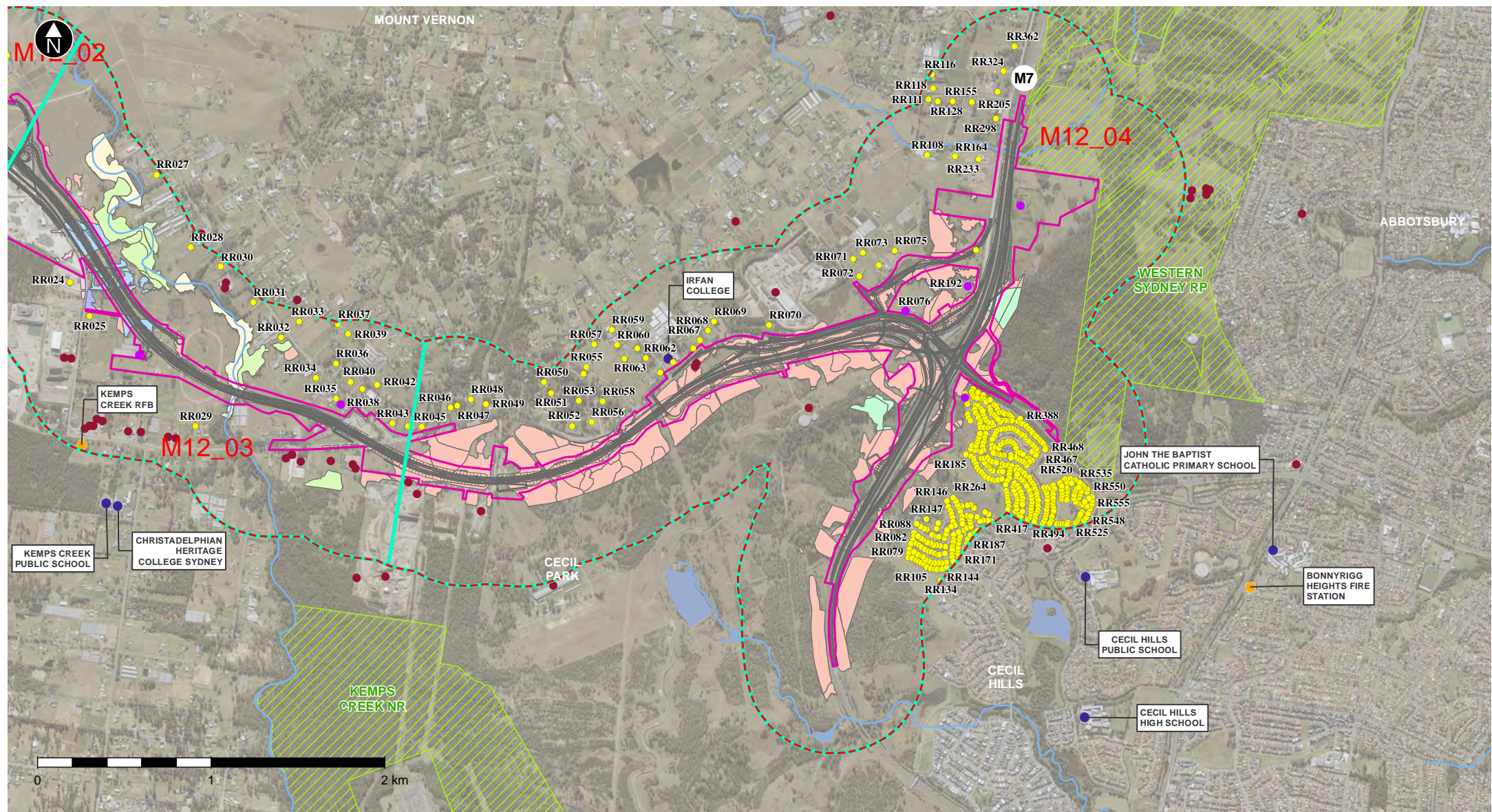


Figure 3-1 Amended construction air quality study area and nearby sensitive receivers

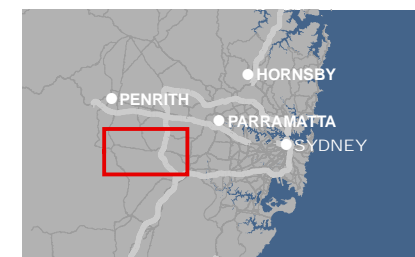
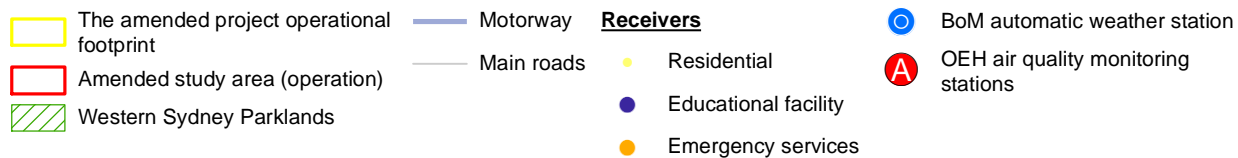
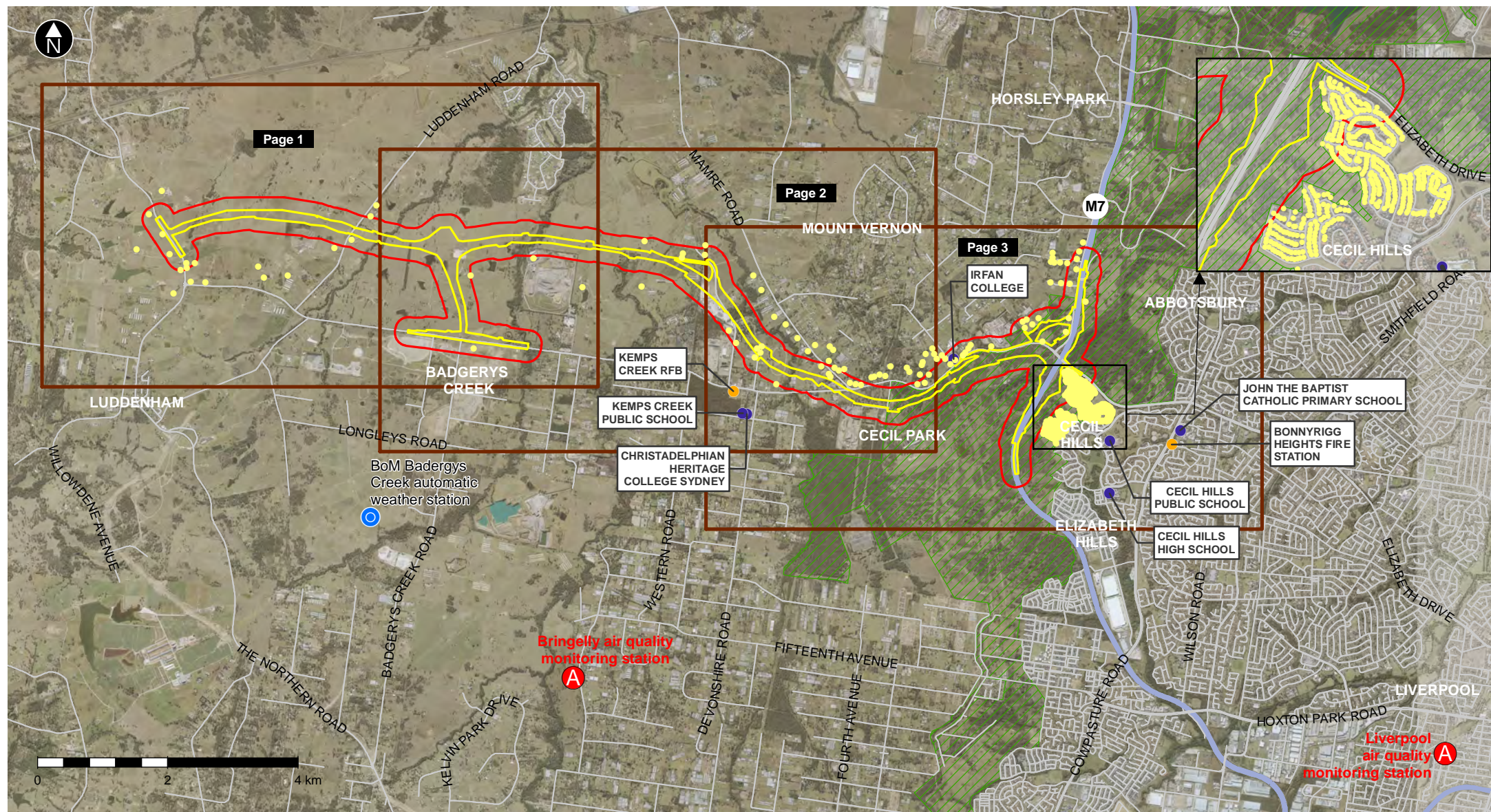
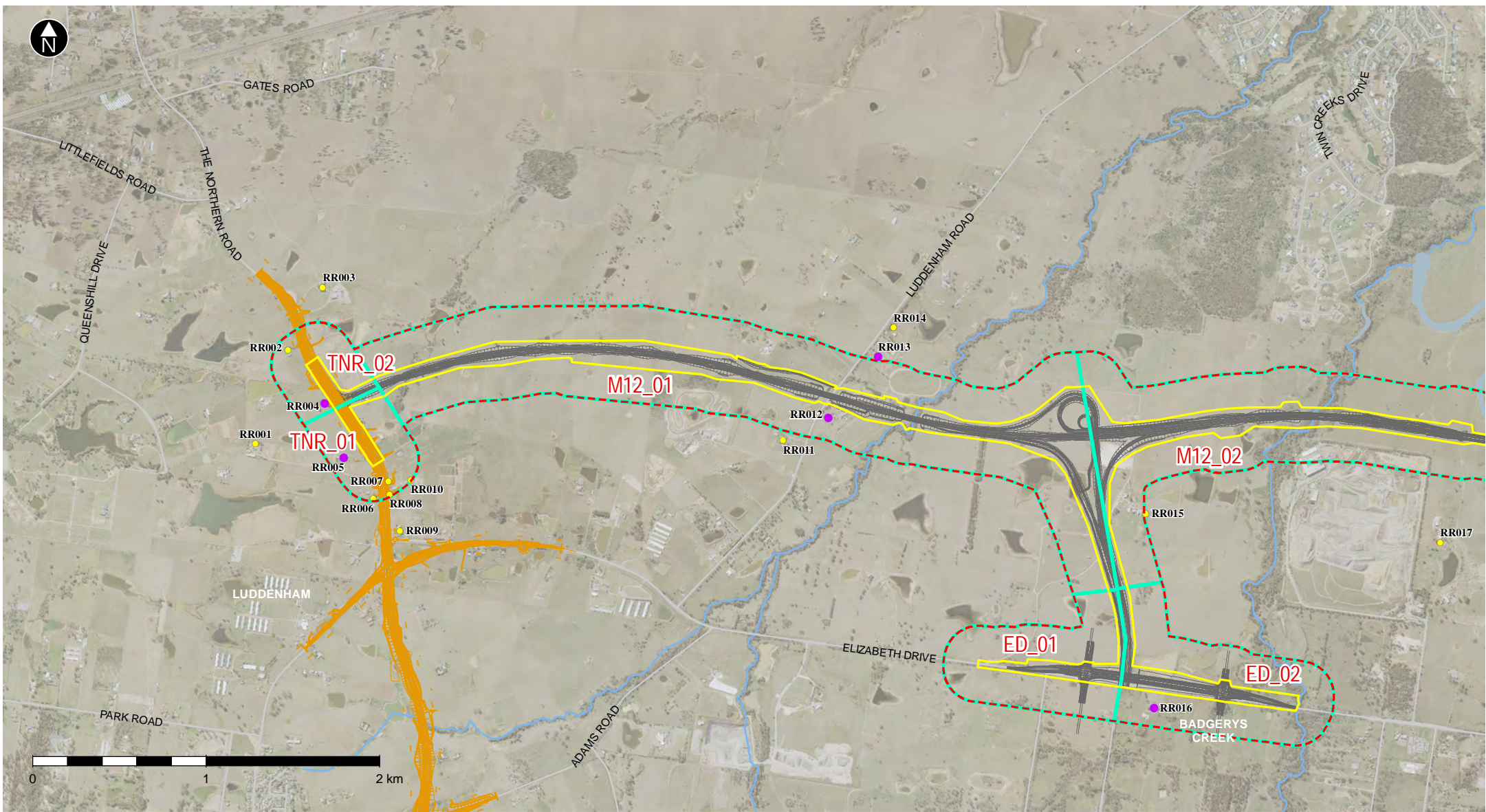


Figure 3-2 Amended operational air quality study area and nearby sensitive receivers



- The amended project
- The amended project operational footprint
- Amended study area (operation)
- Operational segments
- Receivers**
- Residential
 - Nearest receivers

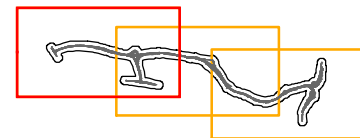
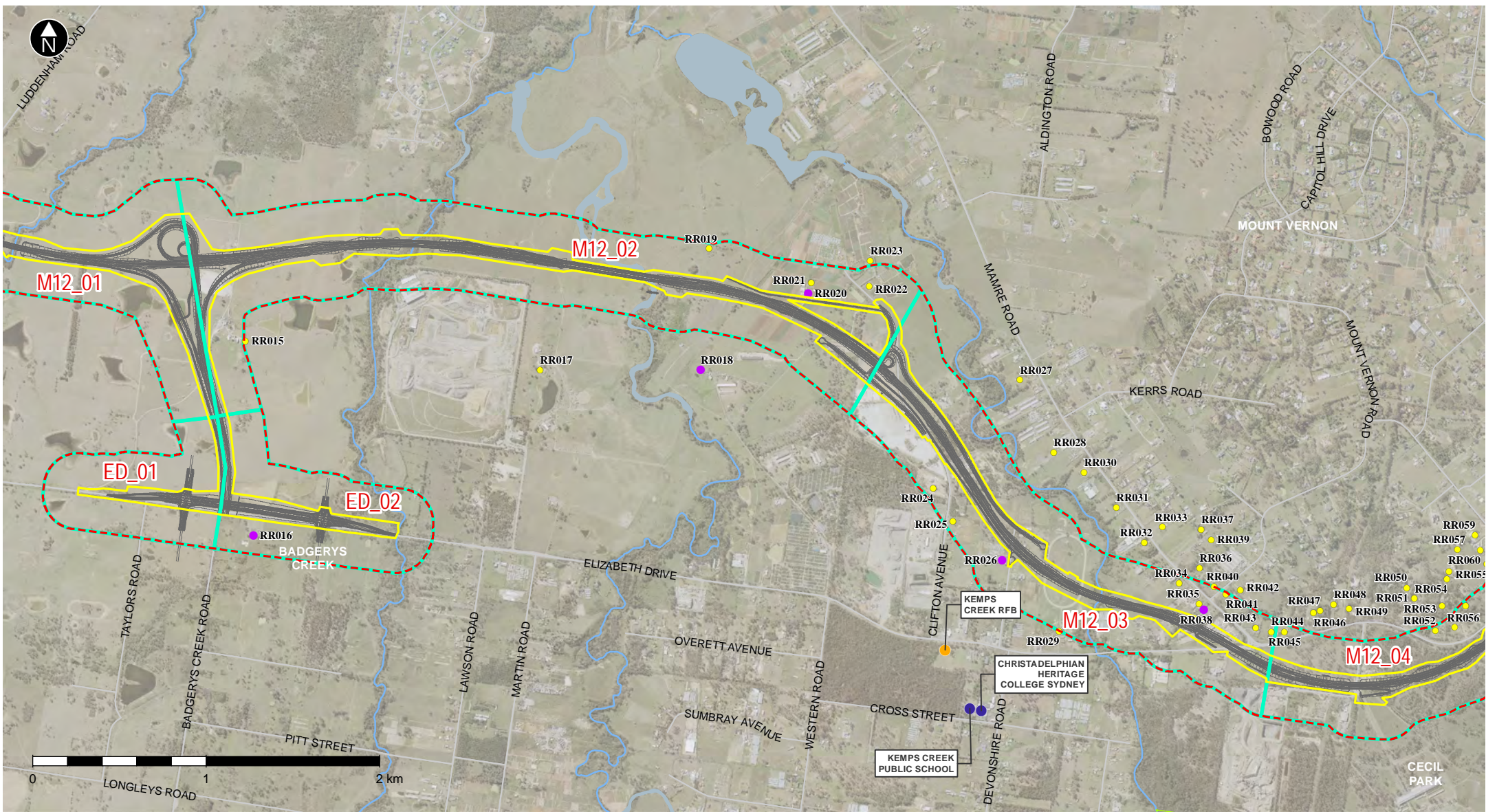
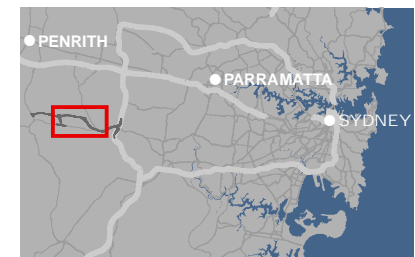
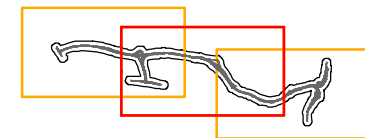


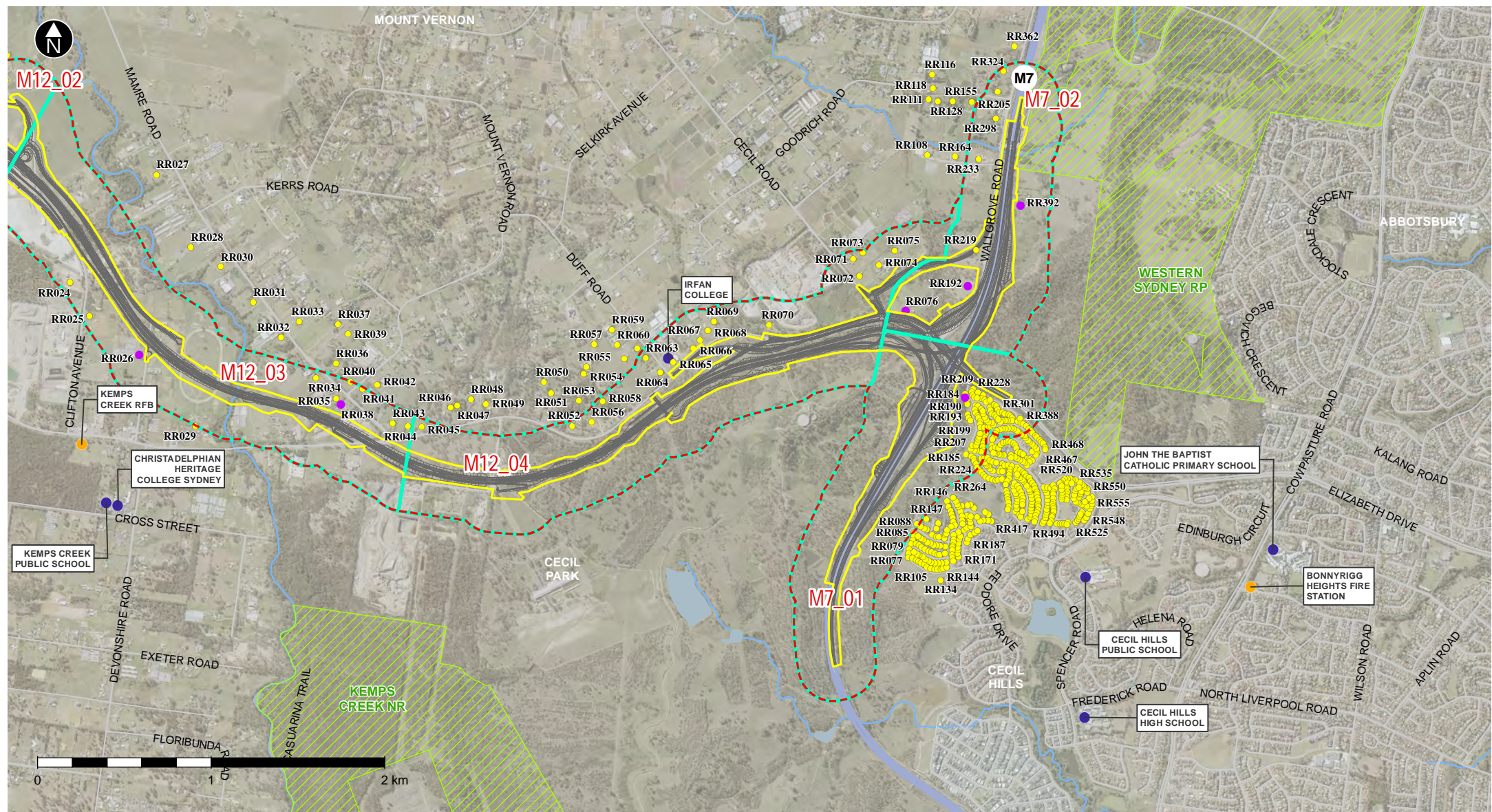
Figure 3-2 Amended operational air quality study area and nearby sensitive receivers



- | | |
|--|--|
| — The amended project | Receivers |
| The amended project operational footprint | ● Residential |
| Amended study area (operation) | ● Educational facility |
| Operational segments | ● Emergency services |
| NPWS estate / reserves | ● Nearest receivers |

Figure 3-2 Amended operational air quality study area and nearby sensitive receivers





- Receivers**
- Residential
 - Educational facility
 - Emergency services
 - Nearest receivers
- The amended project
- The amended project operational footprint
- Amended study area (operation)
- Operational segments
- NPWS estate / reserves

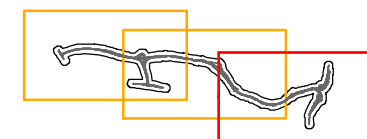


Figure 3-2 Amended operational air quality study area and nearby sensitive receivers

4. Assessment of potential impacts

This section provides an assessment of the potential air quality impacts that may result due to the construction and operation of the amended project. These impacts are discussed in relation to the air quality impacts documented in the EIS (see Section 8.2.4 of the EIS). The assessment of potential impacts described in this section relates to both options unless stated otherwise.

4.1 Construction impacts

Section 8.2.4 of the EIS outlines how 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. The assessment involves the following steps:

- Step 1 Screening review to identify whether there are receivers nearby which have the potential to be impacted by the works and whether a more detailed assessment is required
- Step 2 Risk assessment:
 - 2A: evaluating the potential magnitude of the works
 - 2B determining receiver sensitivities to dust soiling, human health and ecological dust impacts
 - 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 assessed in the EIS (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. These results are discussed in Section 8.2.4 of the EIS.

However, there were changes to Step 2B sensitivity ratings along assessment segments M12_01 and M12_4 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 trackout 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 4-1**. Where the potential impact is changed from that described in Table 8-26 of the EIS, the impact is described in **bold** text.

As AF 10 lies outside the assessment segments described in the EIS, an additional segment has been added to address risks associated with AF10 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 1-2**), and it was determined that the next IAQM steps of assessment would be required for the facility. Given that the land where AF10 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 trackout (i.e. emissions associated with construction-related traffic) movements given the high number of traffic movements expected to be generated at the site per day. Sensitivity ratings (Step 2B) of 'low', 'medium' and 'high' were determined for dust soiling, human health and ecological dust impacts respectively using guidance described in Table 8-20 to Table 8-23 of the EIS.

As described in **Table 4-1**, the highest unmitigated risk rating (Step 2C) around AF10 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 AF10). This remains consistent with the highest risk rating identified in the EIS.

Table 4-1 Unmitigated construction dust risk values for the amended project

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 Airport entrance/exit (including connections)	Demolition	Low risk	Low risk	Medium risk	Medium risk	Medium risk	Medium risk
	Earthworks	Low risk	Medium risk (increased)	Medium risk	High risk (increased)	High risk	High risk
	Construction	Low risk	Medium risk (increased)	Medium risk	High risk (increased)	High risk	High risk
	Trackout	Low risk	Medium risk (increased)	Medium risk	High risk (increased)	High risk	High risk
M12_02 – M12 Motorway between Western Sydney 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
	Trackout	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
	Trackout	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
	Trackout	Medium risk	Medium risk	Medium risk	High risk (increased)	High risk	High risk
Ancillary facility 10 (AF10)	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
	Trackout	N/A	Low	N/A	Medium	N/A	Medium

The environmental management measures described 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 (AF10). 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 in the EIS. These included exhaust emission from the combustion of fossil fuels, odours arising from uncovered contaminated and/or hazardous materials, and airborne hazardous materials (eg asbestos and fungal spores). Potential impacts from construction plant and equipment exhaust emissions were assessed in the EIS as not being expected owing to the expected intensity of construction activities, setback distances from surrounding sensitive receivers, and the linear nature of the project. This conclusion is expected to remain unchanged for the amended project. The potential for odour and impacts from airborne hazardous materials during demolition activities and excavation/handling of contaminated soils and areas of illegal dumping remain unchanged.

The measures listed in Section 8.2.6 of the EIS to manage these other air quality-related matters remain suitable for the amended project.

4.2 Operational impacts

Using TRAQ with the amended project alignment and traffic inputs applied (see **Appendix A**) changes in air quality were predicted for the amended project. Outcomes were compared with the conclusions determined in Section 8.2.4 of the EIS to identify any changes. In summary, it was found that amended project would not result in any significant changes to the local operational air quality outcomes compared with the project as described in the EIS. Results for each pollutant are described in **Sections 4.2.1 to 4.2.5** below.

4.2.1 Particulate matter as PM₁₀

M12 Motorway:

- No change in outcomes (ie instances of exceedances of the EPA's impact assessment criteria) are predicted for the amended project compared with the project as described in the EIS. Worst-case (ie the option of the amended project that would generate the greatest concentration) 24-hour averaged PM₁₀ concentrations were predicted to increase by up to 5.4 µg/m³ (in 2036) at the most-affected surrounding sensitive receiver compared with existing conditions. As displayed below in **Figure 4-1 to Figure 4-3**, this increase is slightly higher than the predicted level in the EIS (up to 3.8 µg/m³). Still, total concentrations (ie background plus road contributions) were predicted to remain below the EPA's impact assessment criterion of 50 µg/m³.
- Annually averaged PM₁₀ contributions from the amended project of up to 2 µg/m³ were predicted at the most-affected surrounding sensitive receiver. As displayed below in **Figure 4-4 to Figure 4-6**, this is comparable with the highest contribution determined in the EIS (1.5 µg/m³). Total PM₁₀ concentrations were predicted to remain below the EPA's 25 µg/m³ impact assessment criteria.

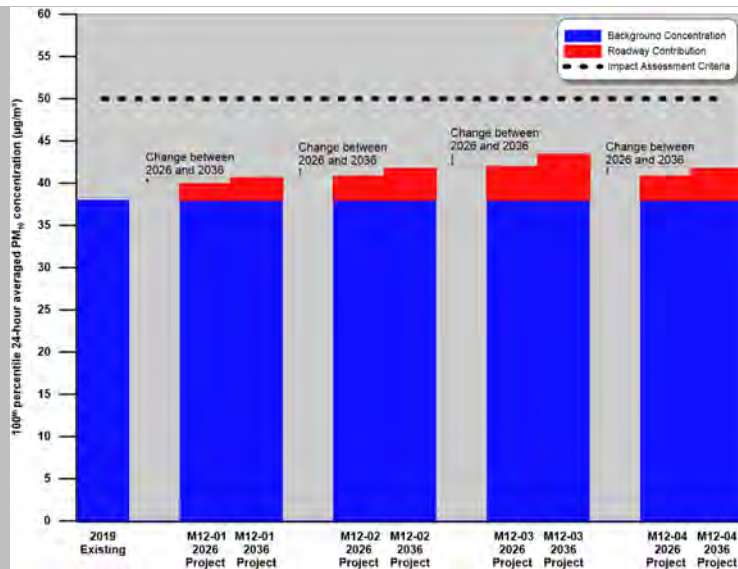


Figure 4-1 Predicted total 100th percentile, 24-hour averaged PM₁₀ concentrations at most-affected sensitive receivers, M12, Amended project with ED connection

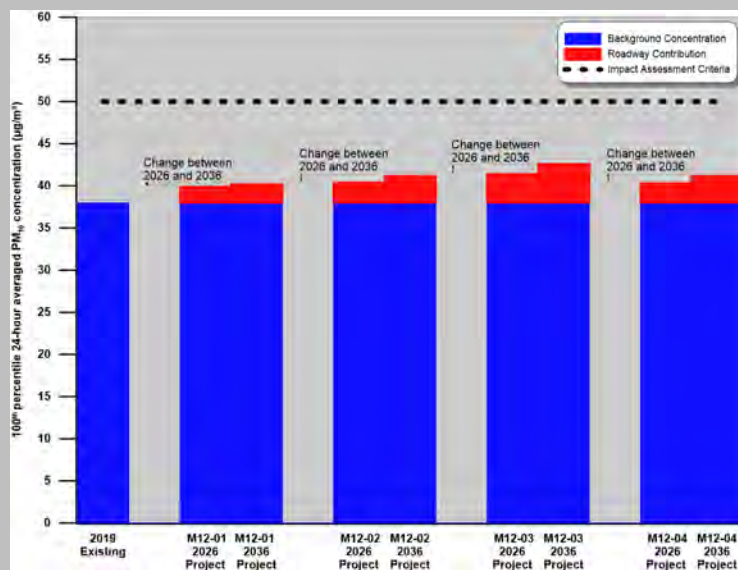


Figure 4-2 Predicted total 100th percentile, 24-hour averaged PM₁₀ concentrations at most-affected sensitive receivers, M12, Amended project without ED connection

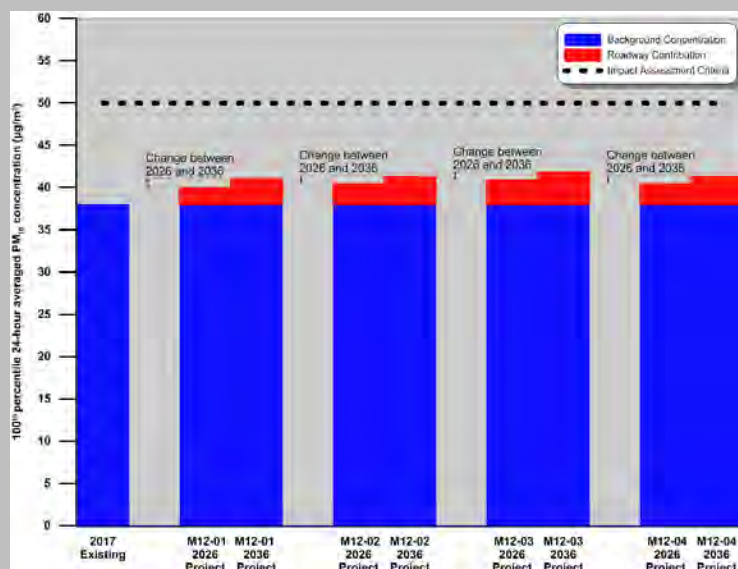


Figure 4-3 Predicted total 100th percentile, annually averaged PM₁₀ concentrations at most-affected sensitive receivers, M12, EIS

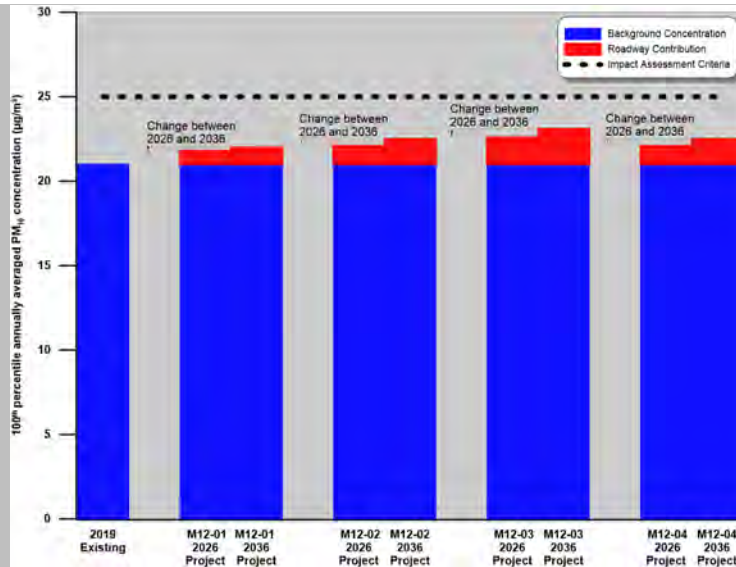


Figure 4-4 Predicted total 100th percentile, annually averaged PM₁₀ concentrations at most-affected sensitive receivers, M12, Amended project with ED connection

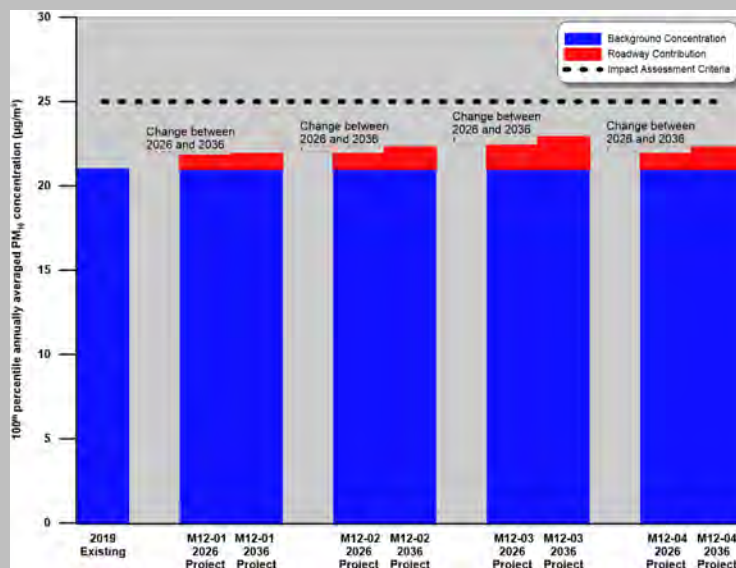


Figure 4-5 Predicted total 100th percentile, annually averaged PM₁₀ concentrations at most-affected sensitive receivers, M12, Amended project without ED connection

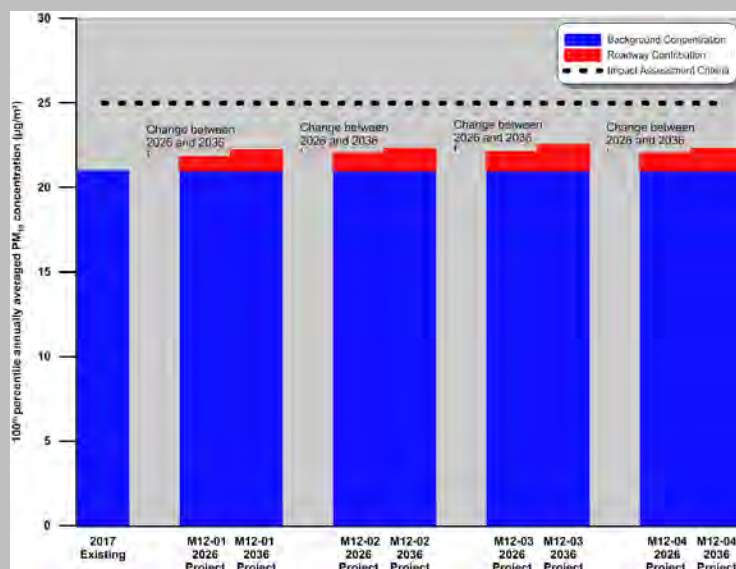


Figure 4-6 Predicted total 100th percentile, annually averaged PM₁₀ concentrations at most-affected sensitive receivers, M12, EIS

The Northern Road:

- No change in outcomes (ie instances of exceedances of the EPA's impact assessment criteria) is predicted for the amended project compared with the project as described in the EIS. 24-hour averaged PM₁₀ concentrations were predicted to increase by up to 4.1 µg/m³ at the most-affected surrounding sensitive receiver (in 2036) as a result of the project compared with existing conditions. As displayed in **Figure 4-7** to **Figure 4-9** this is comparable with the EIS where the highest increase compared with existing conditions was 4.3 µg/m³. Worst-case changes between respective 2026 and 2036 project and no project options remained consistent with what was described in the EIS, with changes of less than 2 µg/m³ also being predicted. Total concentrations were predicted to remain below the EPA's 50 µg/m³ impact assessment criteria.
- As shown in **Figure 4-10** to **Figure 4-12** below annually averaged PM₁₀ contributions from the amended project were comparable with the values described in the EIS. As shown, total annually averaged PM₁₀ concentrations at receivers within the operational study area around The Northern Road were predicted to remain below the EPA's 25 µg/m³ impact assessment criteria.

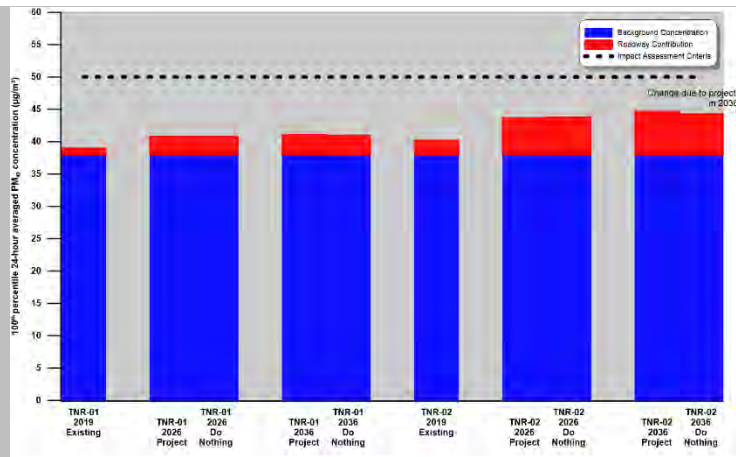


Figure 4-7 Predicted total 100th percentile, 24-hour averaged PM₁₀ concentrations at most-affected sensitive receivers, TNR, Amended project with ED connection

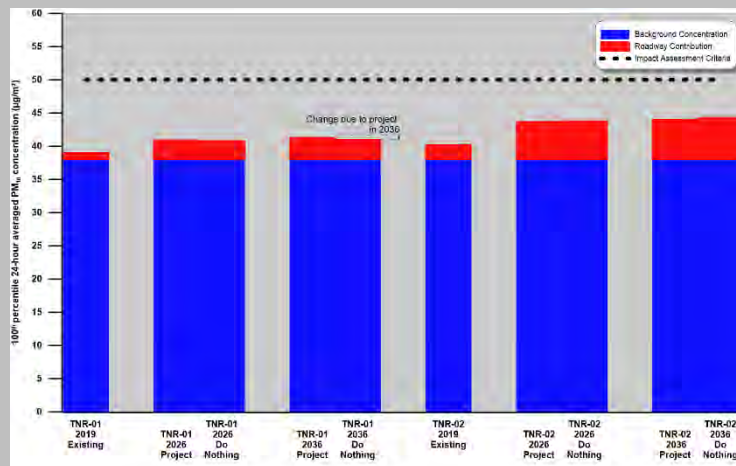


Figure 4-8 Predicted total 100th percentile, 24-hour averaged PM₁₀ concentrations at most-affected sensitive receivers, TNR, Amended project without ED connection

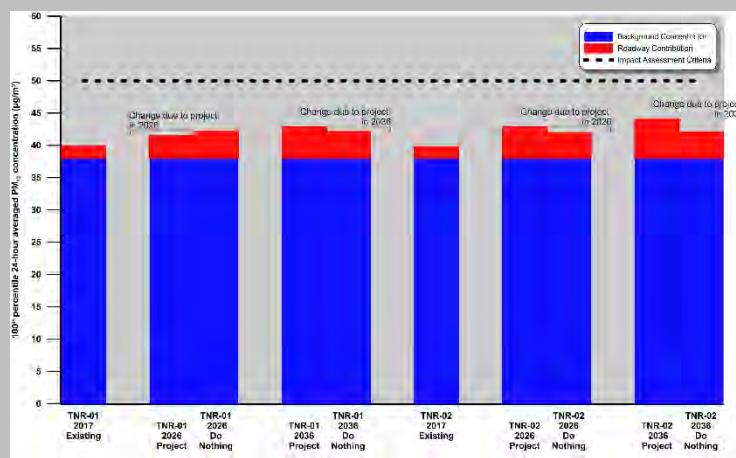


Figure 4-9 Predicted total 100th percentile, 24-hour averaged PM₁₀ concentrations at most-affected sensitive receivers, TNR, EIS

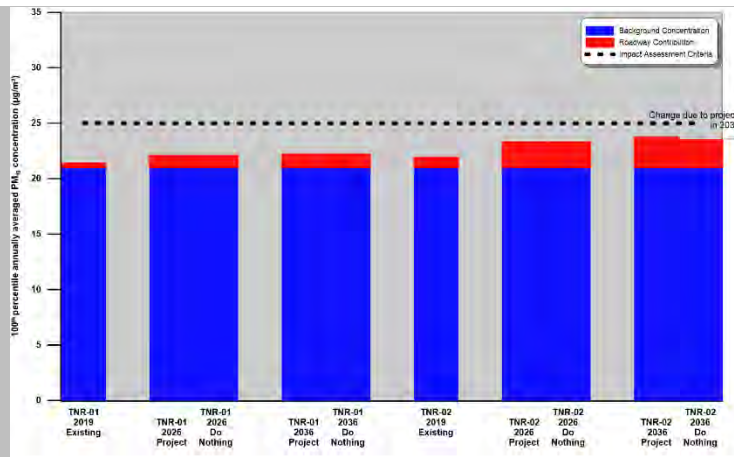


Figure 4-10 Predicted total 100th percentile, annually averaged PM₁₀ concentrations at most-affected sensitive receivers, TNR, Amended project with ED connection

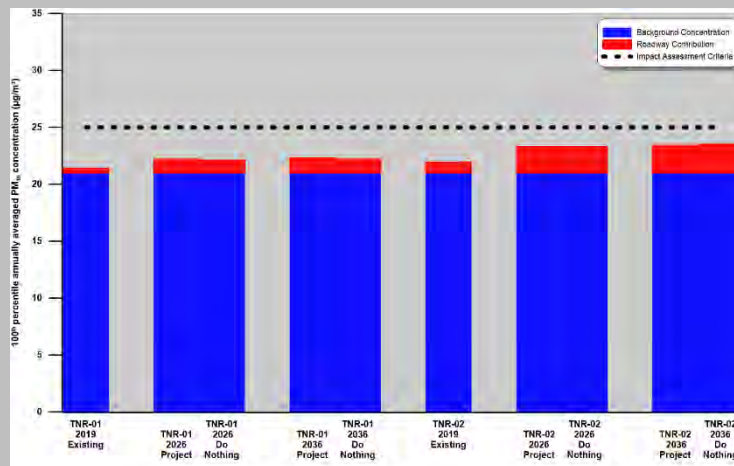


Figure 4-11 Predicted total 100th percentile, annually averaged PM₁₀ concentrations at most-affected sensitive receivers, TNR, Amended project without ED connection

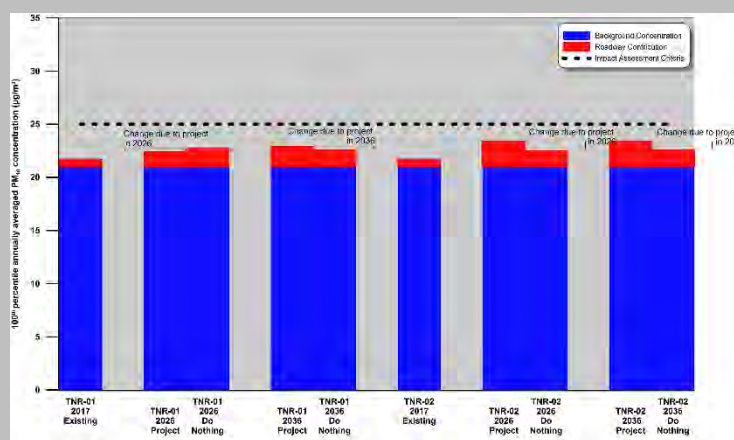


Figure 4-12 Predicted total 100th percentile, annually averaged PM₁₀ concentrations at most-affected sensitive receivers, TNR, EIS

M7 Motorway:

- No change in outcomes (ie instances of exceedances of the EPA's impact assessment criteria) is predicted for the amended project compared with the project as described in the EIS. As displayed in **Figure 4-13** to **Figure 4-15**, the relative worst-case 24-hour averaged PM₁₀ concentrations for the amended project compared with the equivalent 2026 and 2036 'no project' scenarios were higher by 0.9 µg/m³ than the worst-case relative project and no project comparisons described in the EIS. This was a result of changes to project and no project traffic forecasts that were applied for the amended project. The resulting total concentrations from the amended project remained below the EPA's impact assessment criterion (50 µg/m³).
- As shown in **Figure 4-16** to **Figure 4-18** below, relative annually averaged PM₁₀ contributions (ie difference between respective 2026 and 2036 project and no project contributions) from the amended project also increased compared with the values described in the EIS. For the amended project, the highest relative project to no project contribution was around 0.6 µg/m³ higher, compared with marginal decreases (up to 0.5 µg/m³) for project options described in the EIS. Again, this change is a result of the traffic forecasts applied in the amendment assessment. Still, **Figure 4-16** to **Figure 4-18** show how total annually averaged PM₁₀ concentrations at receivers within the operational study area around the M7 were predicted to remain below the EPA's 25 µg/m³ impact assessment criteria.

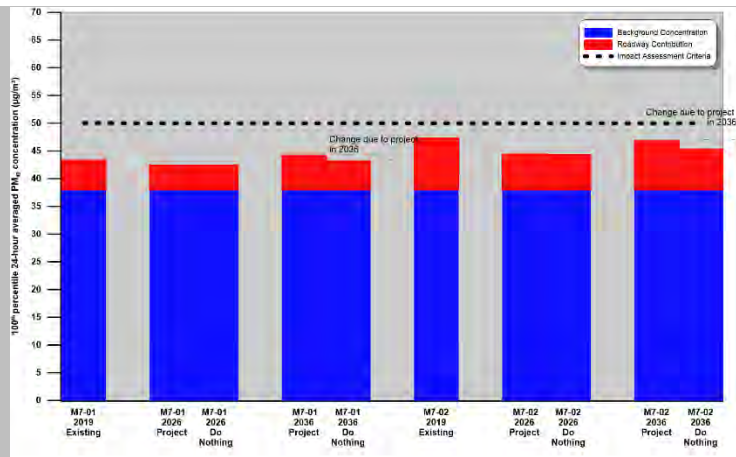


Figure 4-13 Predicted total 100th percentile, 24-hour averaged PM₁₀ concentrations at most-affected sensitive receivers, M7, Amended project with ED connection

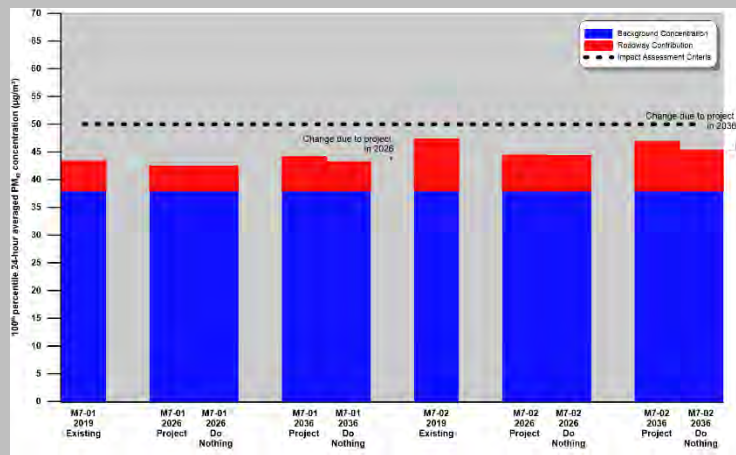


Figure 4-14 Predicted total 100th percentile, 24-hour averaged PM₁₀ concentrations at most-affected sensitive receivers, M7, Amended project without ED connection

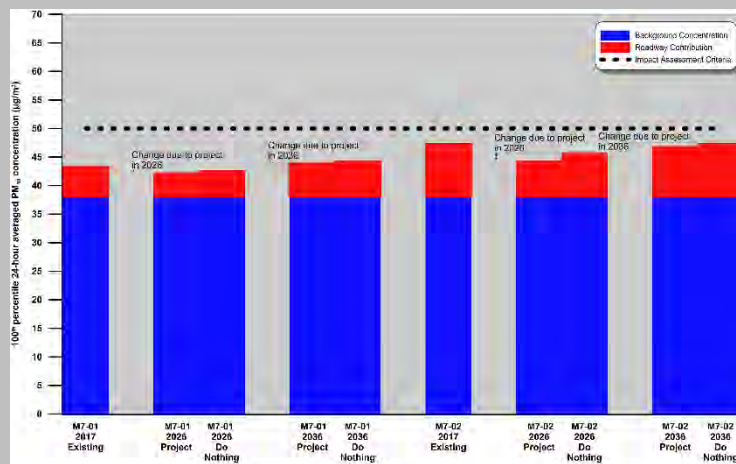


Figure 4-15 Predicted total 100th percentile, 24-hour averaged PM₁₀ concentrations at most-affected sensitive receivers, M7, EIS

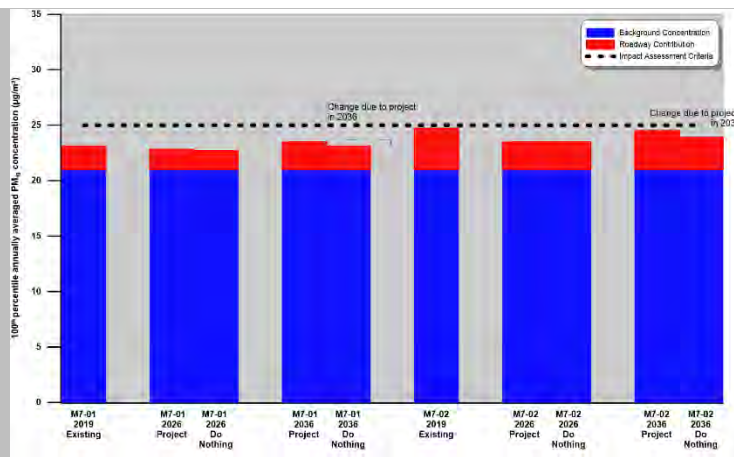


Figure 4-16 Predicted total 100th percentile, annually averaged PM₁₀ concentrations at most-affected sensitive receivers, M7, Amended project with ED connection

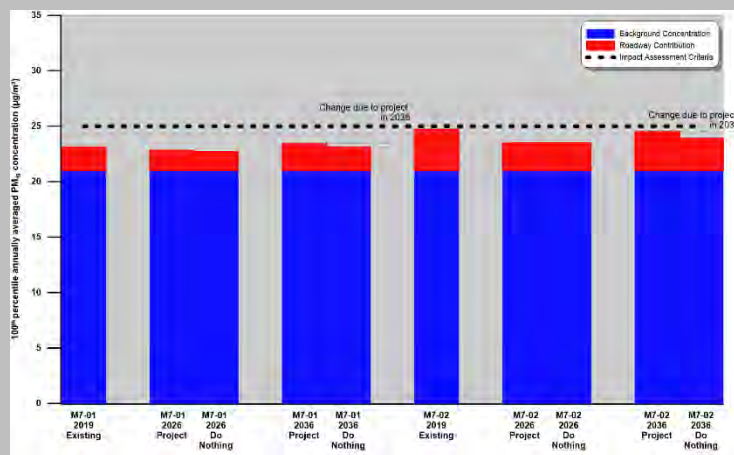


Figure 4-17 Predicted total 100th percentile, annually averaged PM₁₀ concentrations at most-affected sensitive receivers, M7, Amended project without ED connection

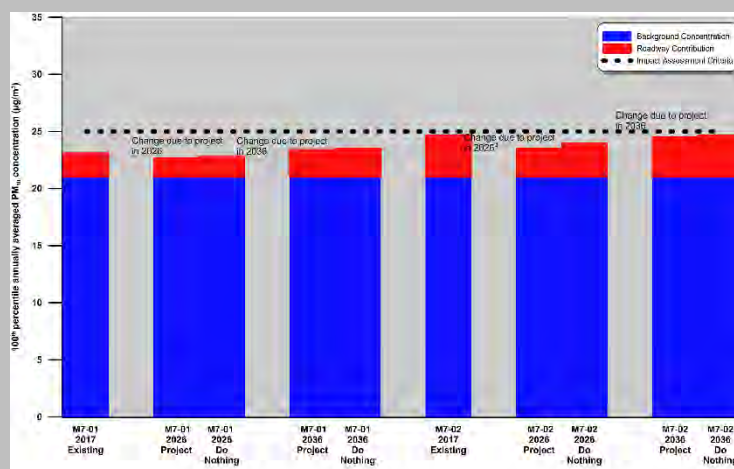


Figure 4-18 Predicted total 100th percentile, annually averaged PM₁₀ concentrations at most-affected sensitive receivers, M7, EIS

Elizabeth Drive:

- No change in outcomes (ie instances of exceedances of the EPA's impact assessment criteria) is predicted for the amended project compared with the project as described in the EIS. Worst-case 24-hour relative increases between project and no-project options up to $0.4 \mu\text{g}/\text{m}^3$ were predicted for the amended project. Decreases between project and no project options were described in the EIS. This change is a result of the updated traffic inputs incorporating new land use considerations for both amended project and no project assessment scenarios (outlined above in **Section 2.1**) As displayed below in **Figure 4-19** to **Figure 4-21** total 24-hour PM_{10} concentrations were predicted to remain well below the EPA's $50 \mu\text{g}/\text{m}^3$ impact assessment criterion, as was determined in the EIS.
- As shown in **Figure 4-22** to **Figure 4-24** below, worst-case annually averaged PM_{10} contribution increases from the amended project compared with the relevant no project options was $0.1 \mu\text{g}/\text{m}^3$. As for 24-hour averaged PM_{10} , decreases between project and no project options were determined in the EIS, with this change being a result of the updated traffic forecast inputs applied for the amended project. As displayed, total annually averaged PM_{10} concentrations at receivers within the operational study area around ED were predicted to remain below the EPA's $25 \mu\text{g}/\text{m}^3$ impact assessment criteria, as was the case in the EIS.

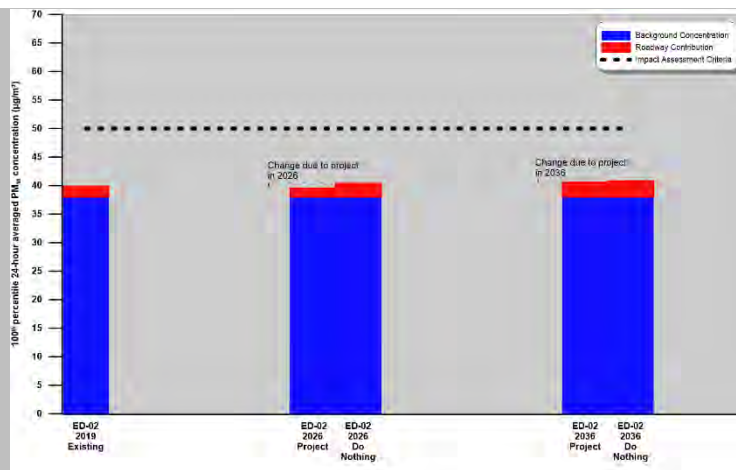


Figure 4-19 Predicted total 100th percentile, 24-hour averaged PM₁₀ concentrations at most-affected sensitive receivers, ED, Amended project with ED connection

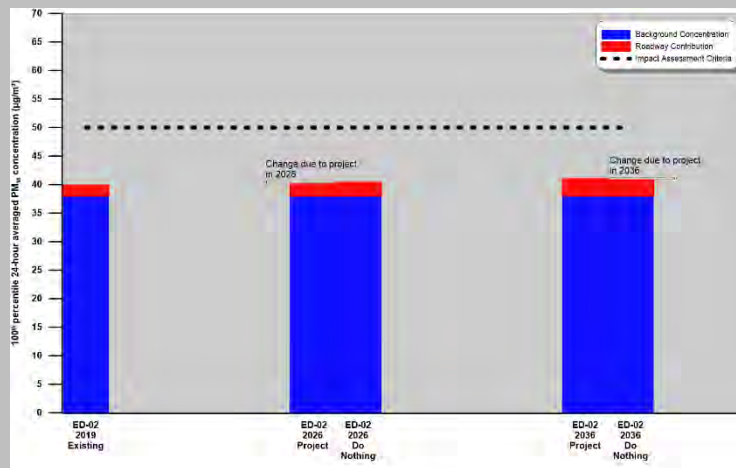


Figure 4-20 Predicted total 100th percentile, 24-hour averaged PM₁₀ concentrations at most-affected sensitive receivers, ED, Amended project without ED connection

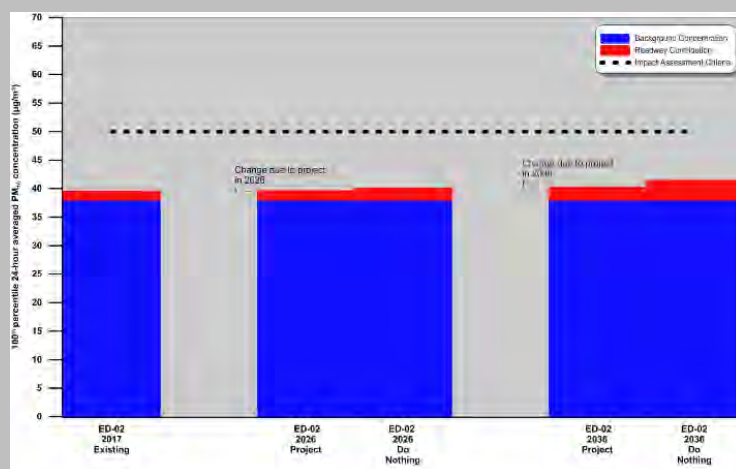


Figure 4-21 Predicted total 100th percentile, 24-hour averaged PM₁₀ concentrations at most-affected sensitive receivers, ED, EIS

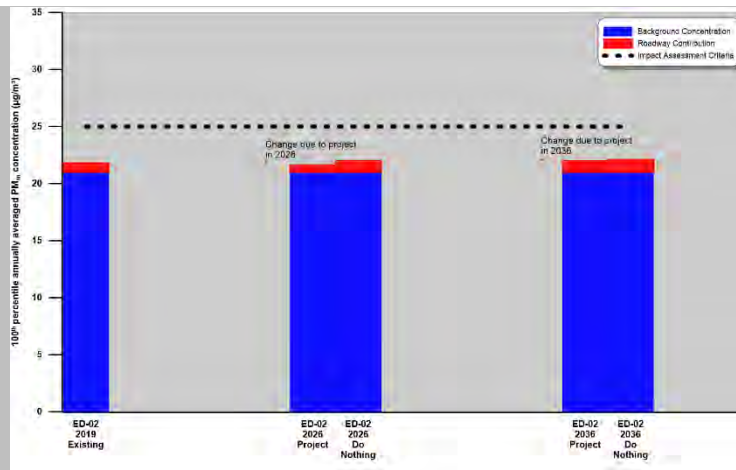


Figure 4-22 Predicted total 100th percentile, annually averaged PM₁₀ concentrations at most-affected sensitive receivers, ED, Amended project with ED connection

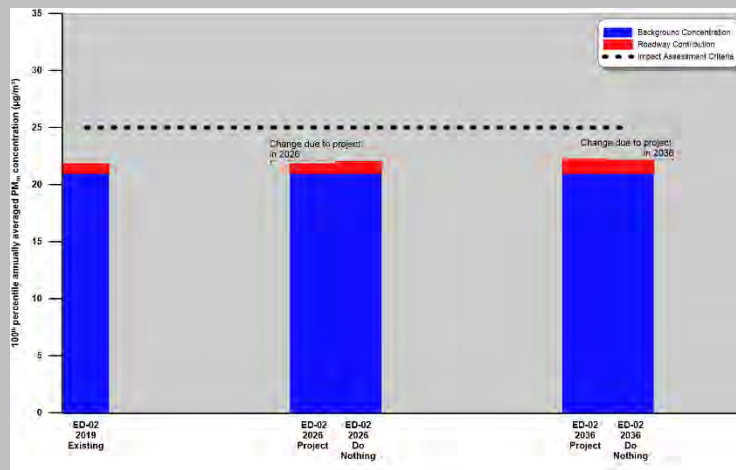


Figure 4-23 Predicted total 100th percentile, annually averaged PM₁₀ concentrations at most-affected sensitive receivers, ED, Amended project without ED connection

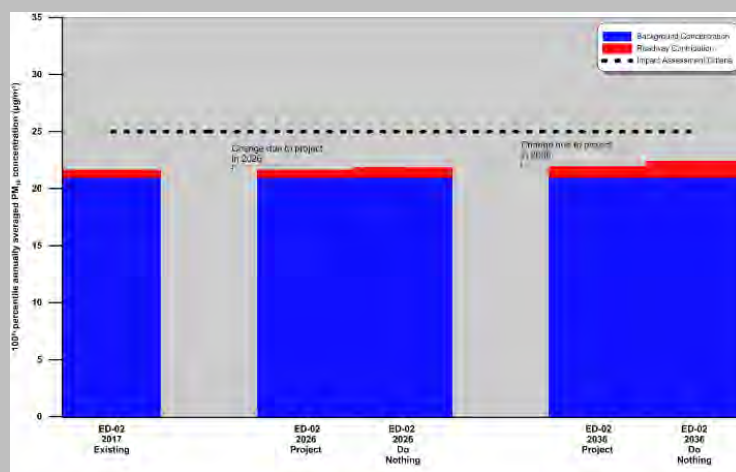


Figure 4-24 Predicted total 100th percentile, annually averaged PM₁₀ concentrations at most-affected sensitive receivers, ED, EIS

4.2.2 Particulate matter as PM_{2.5}

M12 Motorway:

- Worst-case (ie the higher of the amended project with and without the Elizabeth Drive connection) 24-hour averaged PM_{2.5} concentrations were predicted to increase by up to 5.4 µg/m³ (in 2036) at the most-affected surrounding sensitive receiver compared with existing conditions. As displayed below in **Figure 4-25** to **Figure 4-27**, this increase is slightly higher than the predicted level in the EIS (up to 3.8 µg/m³). Still, total concentrations (ie background plus road contributions) were predicted to remain below the EPA's impact assessment criterion of 25 µg/m³.
- Annually averaged PM_{2.5} contributions from the amended project of up to 2 µg/m³ were predicted at the most-affected surrounding sensitive receiver when compared to existing concentrations. Noting that local annually averaged PM_{2.5} concentrations were already measured at the EPA's 8 µg/m³ impact assessment criterion, the review undertaken in the EIS was repeated and it was similarly determined that there were no receivers where increases greater than 2 µg/m³ compared with existing concentrations were predicted. This is consistent with the findings described in the EIS. Project contributions and totals are shown below in **Figure 4-28** and **Figure 4-29**, with the values reported in the EIS shown in **Figure 4-30**.

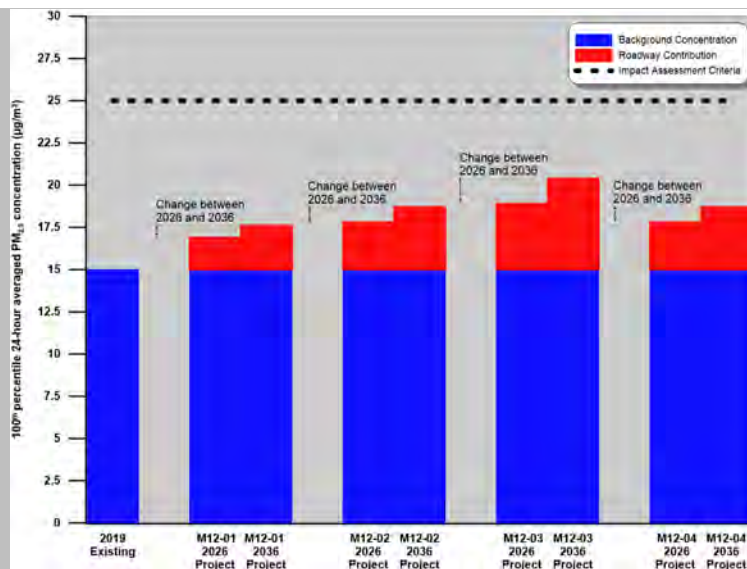


Figure 4-25 Predicted total 100th percentile, 24-hour averaged $PM_{2.5}$ concentrations at most-affected sensitive receivers, M12, Amended project with ED connection

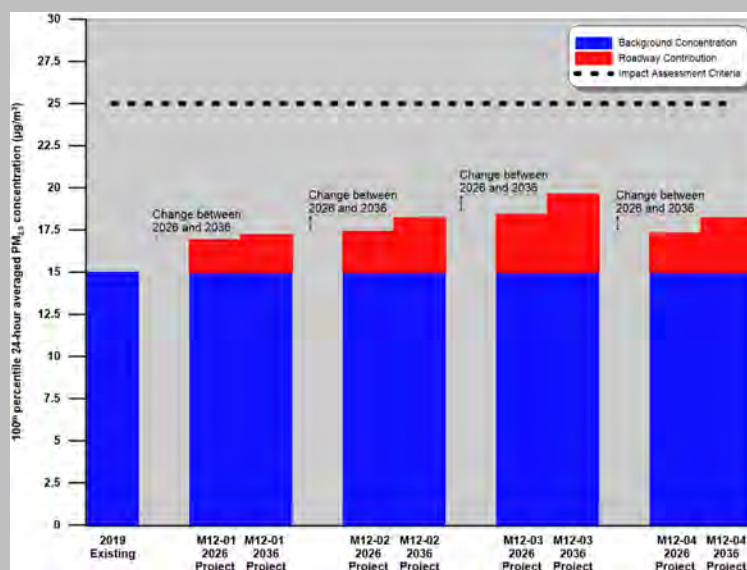


Figure 4-26 Predicted total 100th percentile, 24-hour averaged $PM_{2.5}$ concentrations at most-affected sensitive receivers, M12, Amended project without ED connection

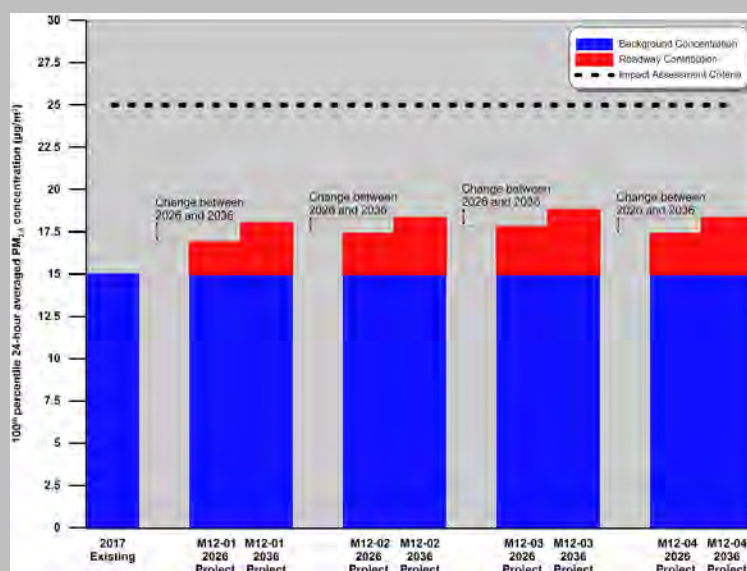


Figure 4-27 Predicted total 100th percentile, 24-hour averaged $PM_{2.5}$ concentrations at most-affected sensitive receivers, M12, EIS

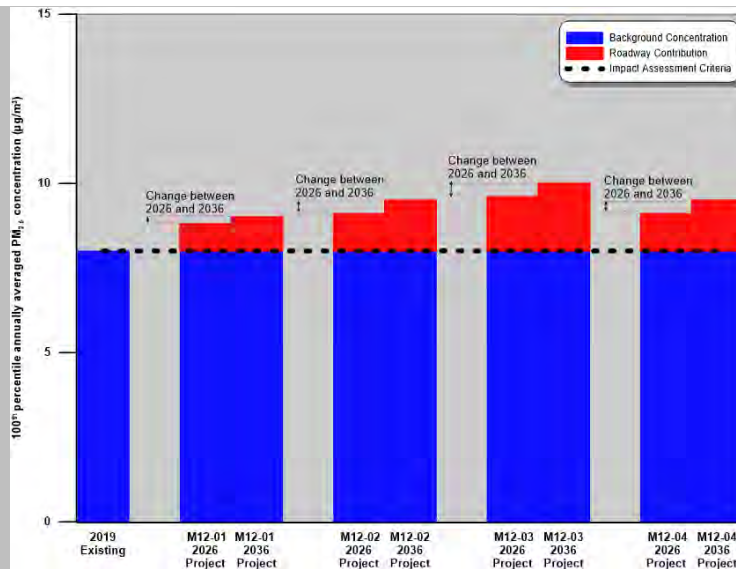


Figure 4-28 Predicted total 100th percentile, annually averaged $PM_{2.5}$ concentrations at most-affected sensitive receivers, M12, Amended project with ED connection

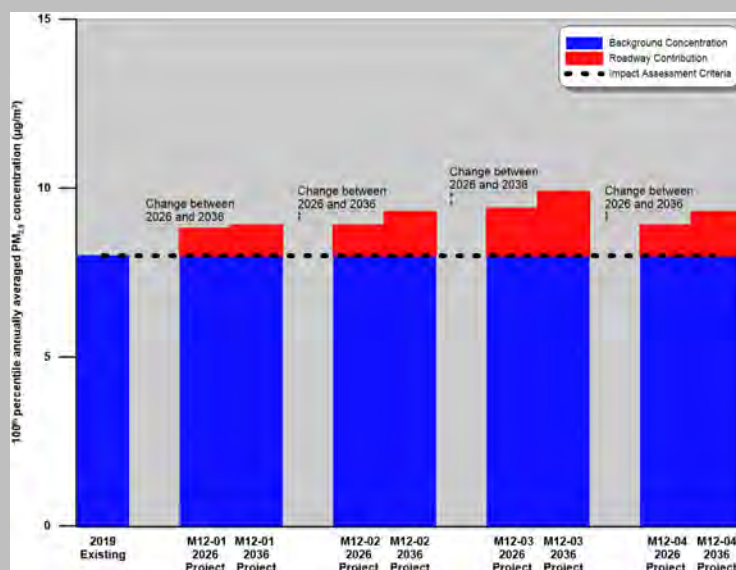


Figure 4-29 Predicted total 100th percentile, annually averaged $PM_{2.5}$ concentrations at most-affected sensitive receivers, M12, Amended project without ED connection

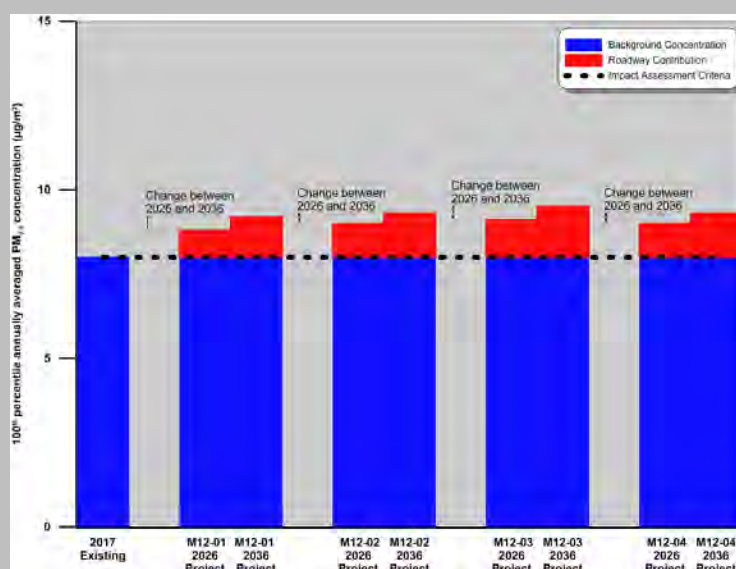


Figure 4-30 Predicted total 100th percentile, annually averaged $PM_{2.5}$ concentrations at most-affected sensitive receivers, M12, EIS

The Northern Road:

- No change in outcomes (ie instances of exceedances of the EPA's impact assessment criteria) is predicted for the amended project compared with the project as described in the EIS. 24-hour averaged PM_{2.5} concentrations were predicted to increase by up to 4.5 µg/m³ at the most-affected surrounding sensitive receiver (in 2036) as a result of the project compared with existing conditions. As displayed in **Figure 4-31** to **Figure 4-33** this is comparable with the EIS where the highest increase compared with existing conditions was 4.3 µg/m³.
- Worst-case annually averaged PM_{2.5} contributions from the amended project remained comparable with the results described in the EIS. For the amended project, worst-case total (road contribution plus background) concentration was 10.7 µg/m³. In the EIS, highest worst-case total value was 10.4 µg/m³, noting that local annually averaged PM_{2.5} concentrations were already measured at the EPA's 8 µg/m³ impact assessment criterion. For the amended project there were no additional receivers where PM_{2.5} contributions of more than 2 µg/m³ were predicted, when compared to the EIS. Project contributions and totals are shown below in **Figure 4-34** and **Figure 4-35**, with the values reported in the EIS shown in **Figure 4-36**.

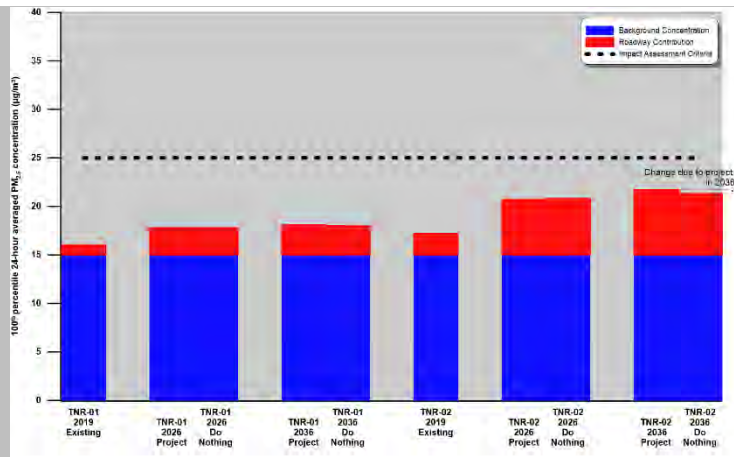


Figure 4-31 Predicted total 100th percentile, 24-hour averaged $PM_{2.5}$ concentrations at most-affected sensitive receivers, TNR, Amended project with ED connection

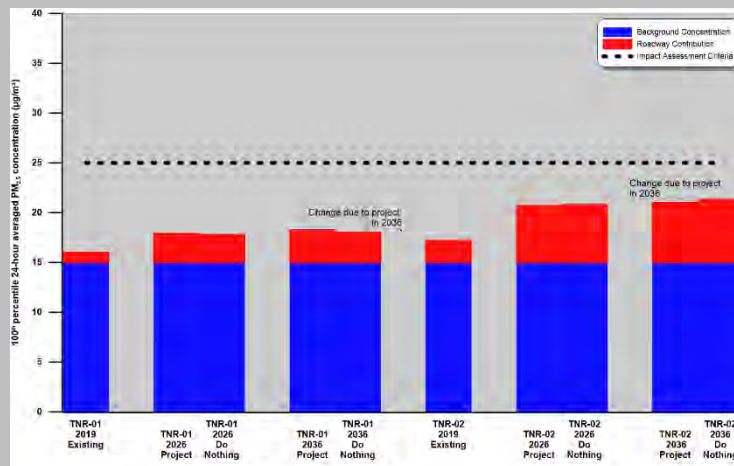


Figure 4-32 Predicted total 100th percentile, 24-hour averaged $PM_{2.5}$ concentrations at most-affected sensitive receivers, TNR, Amended project without ED connection

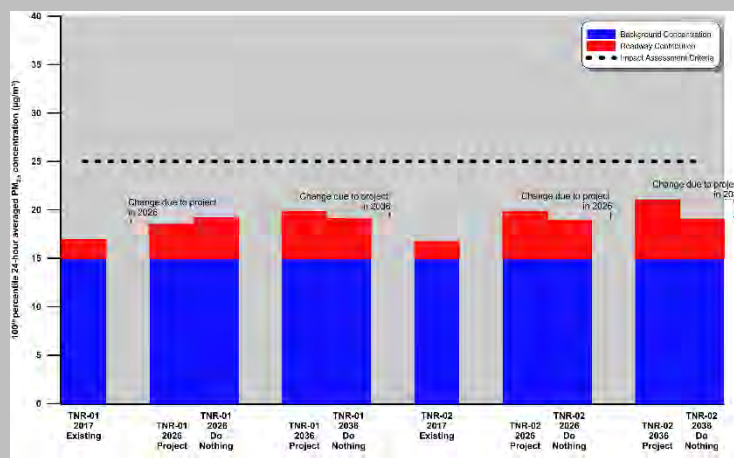


Figure 4-33 Predicted total 100th percentile, 24-hour averaged $PM_{2.5}$ concentrations at most-affected sensitive receivers, TNR, EIS

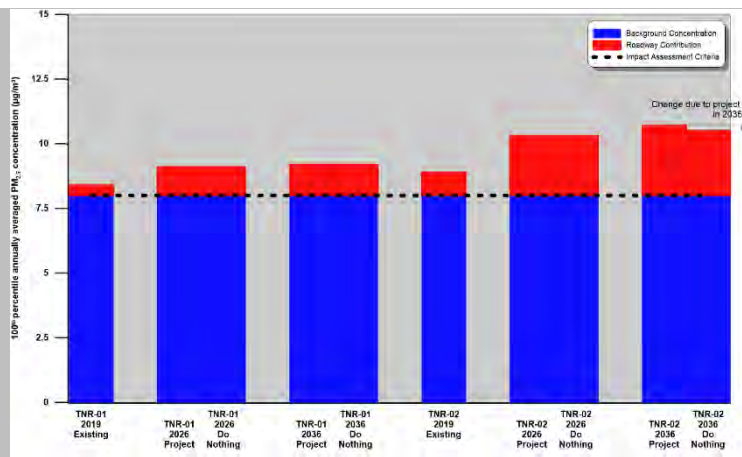


Figure 4-34 Predicted total 100th percentile, annually averaged PM_{2.5} concentrations at most-affected sensitive receivers, TNR, Amended project with ED connection

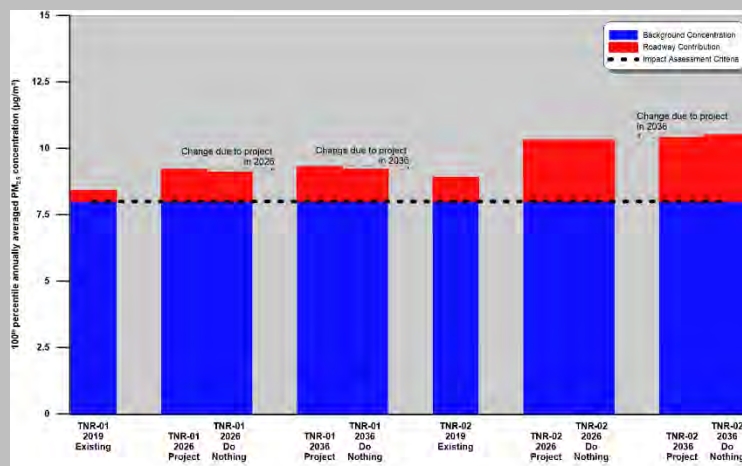


Figure 4-35 Predicted total 100th percentile, annually averaged PM_{2.5} concentrations at most-affected sensitive receivers, TNR, Amended project without ED connection

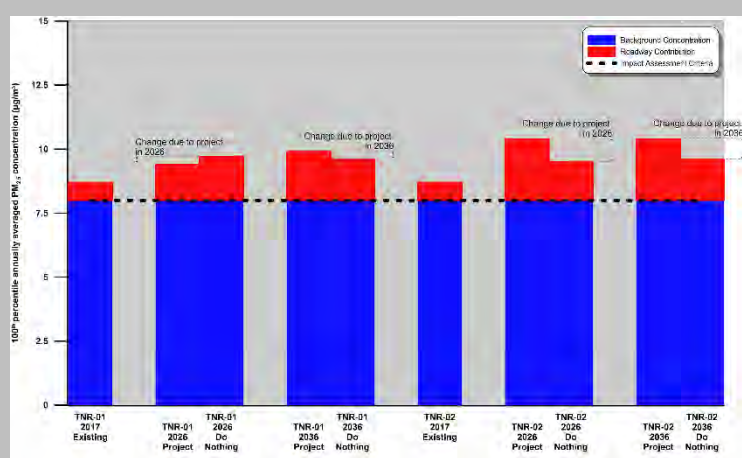


Figure 4-36 Predicted total 100th percentile, annually averaged PM_{2.5} concentrations at most-affected sensitive receivers, TNR, EIS

M7 Motorway:

- No significant change in outcomes (ie instances of exceedances of the EPA's impact assessment criteria) is predicted for the amended project compared with the project as described in the EIS. As displayed in **Figure 4-37** to **Figure 4-39**, 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 $0.9 \mu\text{g}/\text{m}^3$ higher than the values described in the EIS. This was a result of changes to project and no project traffic forecasts that were applied for the amended project. Still, the resulting total concentrations from the amended project remained below the EPA's impact assessment criterion ($25 \mu\text{g}/\text{m}^3$).
- Regarding annually averaged $\text{PM}_{2.5}$, there was no change predicted in the number of receivers that would experience roadway contributions of more than $2 \mu\text{g}/\text{m}^3$ between 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 where roadway contributions would increase from the 1 to $2 \mu\text{g}/\text{m}^3$ category to the greater than $2 \mu\text{g}/\text{m}^3$ category compared with the 2036 no project option. For the amended project, worst-case total (road contribution plus background) concentration was $11.5 \mu\text{g}/\text{m}^3$. In the EIS, highest worst-case total value was also $11.5 \mu\text{g}/\text{m}^3$, noting that local annually averaged $\text{PM}_{2.5}$ concentrations were already measured at the EPA's $8 \mu\text{g}/\text{m}^3$ impact assessment criterion. In respect of Table 8-28 of the EIS, the total number of receivers in the study area around The Northern Road and the M7 Motorway predicted to experience contributions of more than $2 \mu\text{g}/\text{m}^3$ as a result of the amended project would remain 61. Project contributions and totals are shown below in **Figure 4-37** and **Figure 4-38**, with the values reported in the EIS shown in **Figure 4-39**.

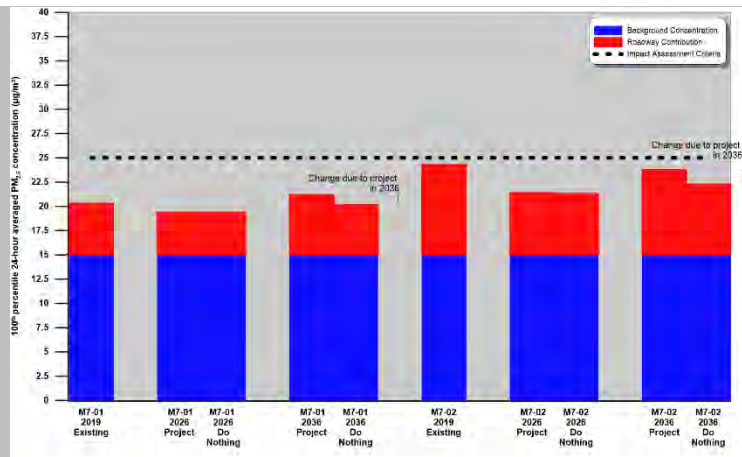


Figure 4-37 Predicted total 100th percentile, 24-hour averaged $PM_{2.5}$ concentrations at most-affected sensitive receivers, M7, Amended project with ED connection

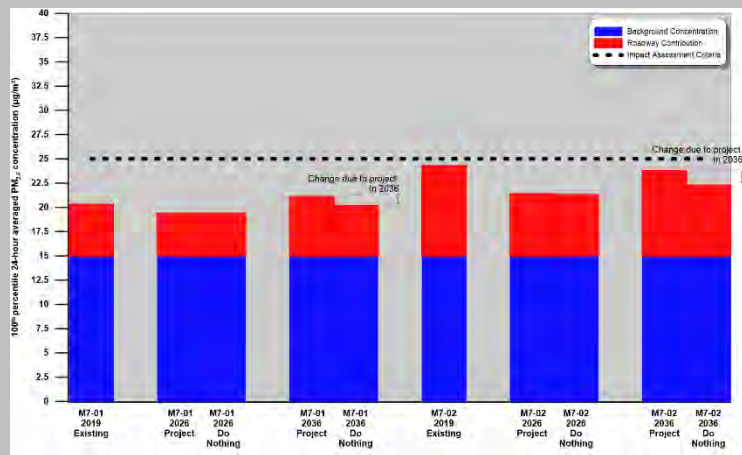


Figure 4-38 Predicted total 100th percentile, 24-hour averaged $PM_{2.5}$ concentrations at most-affected sensitive receivers, M7, Amended project without ED connection

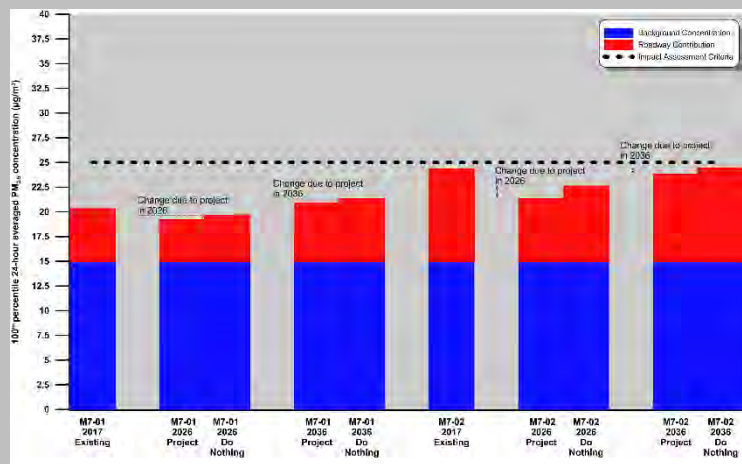


Figure 4-39 Predicted total 100th percentile, 24-hour averaged $PM_{2.5}$ concentrations at most-affected sensitive receivers, M7, EIS

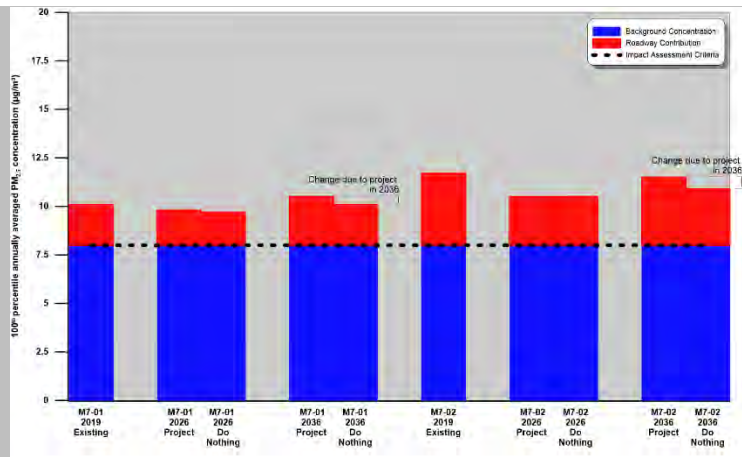


Figure 4-40 Predicted total 100th percentile, annually averaged PM_{2.5} concentrations at most-affected sensitive receivers, M7, Amended project with ED connection

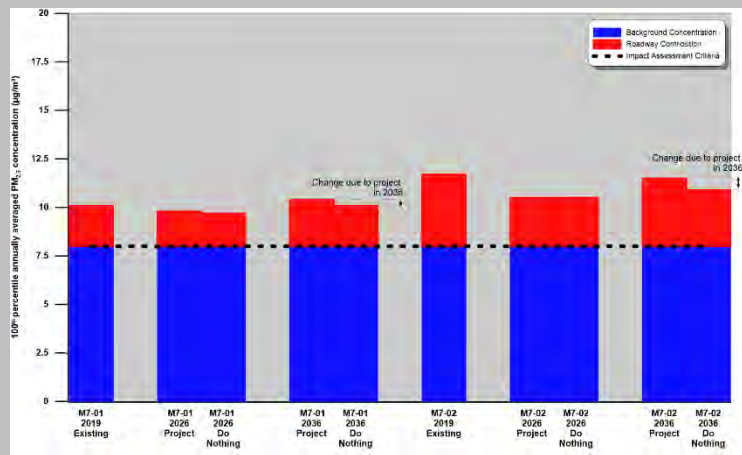


Figure 4-41 Predicted total 100th percentile, annually averaged PM_{2.5} concentrations at most-affected sensitive receivers, M7, Amended project without ED connection

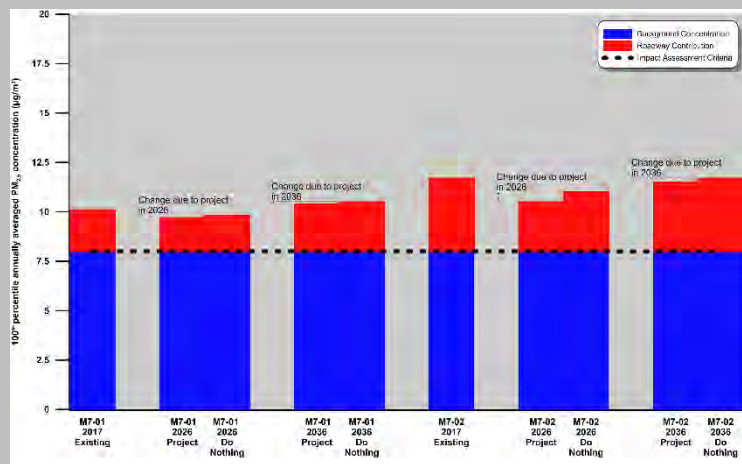


Figure 4-42 Predicted total 100th percentile, annually averaged PM_{2.5} concentrations at most-affected sensitive receivers, M7, EIS

Elizabeth Drive:

- As displayed below in **Figure 4-43** to **Figure 4-45** there was no change in outcomes (ie instances of exceedances of the EPA's impact assessment criteria) predicted for the amended project compared with the project as described in the EIS. For the amended project, total 24-hour PM_{2.5} concentrations were predicted to remain below the EPA's 25 µg/m³ impact assessment criterion, as was determined in the EIS.
- Regarding annually averaged PM_{2.5}, roadway contributions at the worst-affected receiver for both assessment scenarios (with and without ED connection) were predicted to remain below 2 µg/m³. This is shown below in **Figure 4-46** and **Figure 4-47**, with the results for the EIS shown in **Figure 4-48**. As shown, this remains consistent with the outcomes of the EIS. From these figures it is clear that annually averaged PM_{2.5} contributions at the most-affected receiver increased marginally (contributions up to 1.2 µg/m³ compared with 0.9 µg/m³ in the EIS). This change arises as a result of the updated traffic forecasts for Elizabeth Drive for the amended project.

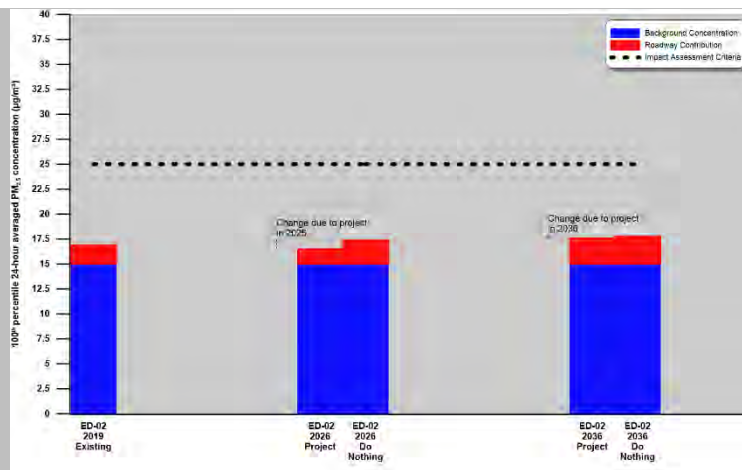


Figure 4-43 Predicted total 100th percentile, 24-hour averaged $PM_{2.5}$ concentrations at most-affected sensitive receivers, ED, Amended project with ED connection

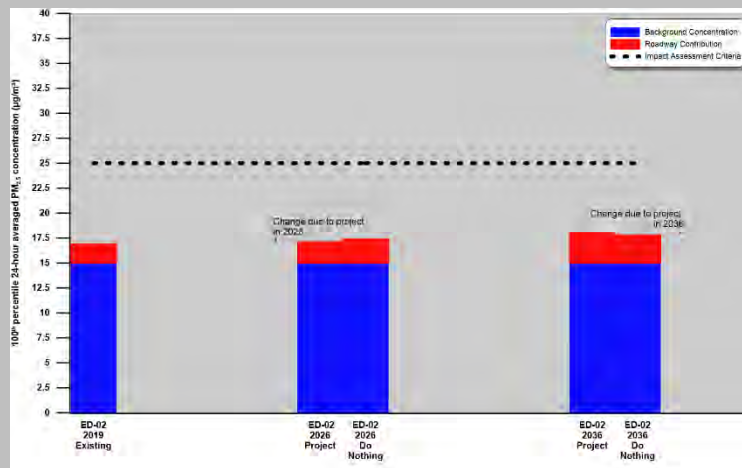


Figure 4-44 Predicted total 100th percentile, 24-hour averaged $PM_{2.5}$ concentrations at most-affected sensitive receivers, ED, Amended project without ED connection

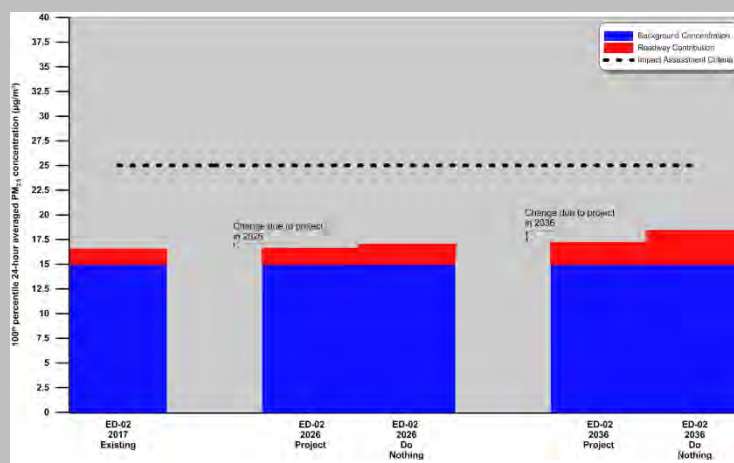


Figure 4-45 Predicted total 100th percentile, 24-hour averaged $PM_{2.5}$ concentrations at most-affected sensitive receivers, ED, EIS

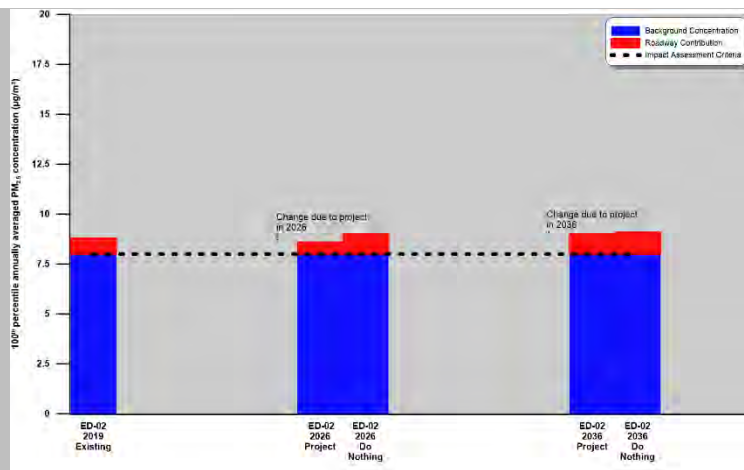


Figure 4-46 Predicted total 100th percentile, annually averaged PM_{2.5} concentrations at most-affected sensitive receivers, ED, Amended project with ED connection

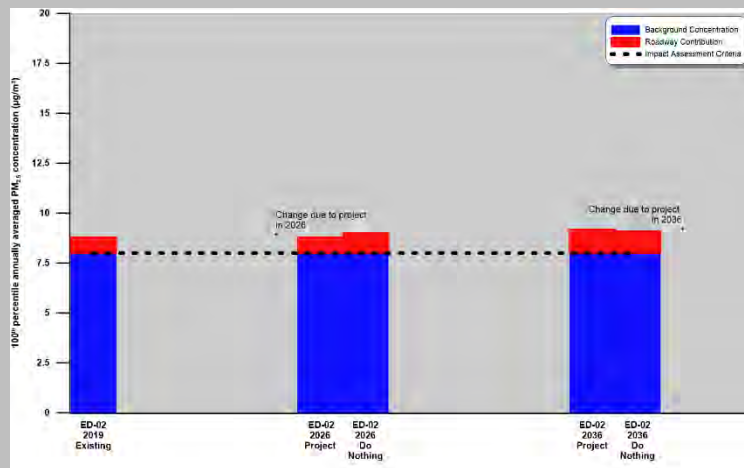


Figure 4-47 Predicted total 100th percentile, annually averaged PM_{2.5} concentrations at most-affected sensitive receivers, ED, Amended project without ED connection

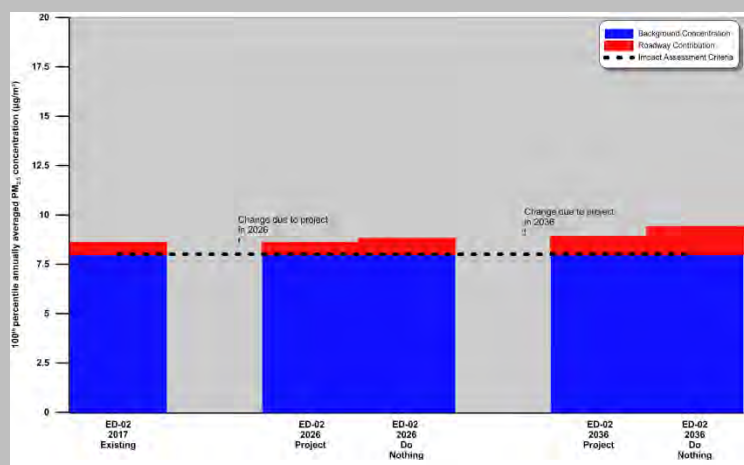


Figure 4-48 Predicted total 100th percentile, annually averaged PM_{2.5} concentrations at most-affected sensitive receivers, ED, EIS

4.2.3 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 1 mg/m³ at the most-affected sensitive receivers, as was predicted in the EIS. The resulting total concentrations remained well below the EPA's 1-hour and 8-hour impact assessment criteria of 10 mg/m³ and 30 mg/m³ respectively.

4.2.4 Nitrogen dioxide (NO₂)

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 NO₂ contributions from the amended project were 26 µg/m³ and 5 µg/m³ at the most-affected sensitive receivers. These values are 4 µg/m³ and 1 µg/m³ higher than the respective 1-hour and annually averaged worst-case contributions predicted in the EIS (of 22 µg/m³ and 4 µg/m³). 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 NO₂ concentrations were predicted to remain well below the EPA's respective 246 µg/m³ and 62 µg/m³ impact assessment criteria.

4.2.5 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 was similarly less than 1 µg/m³, which is consistent with the concentrations predicted in the EIS. This was also the case for the existing scenario. Again, this was well below the EPA's 29 µg/m³ impact assessment criterion.

4.2.6 Regional air quality

Changes to regional air quality as a result of the project were assessed in Section 8.2.4 of the EIS. Noting how 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 (with the updated traffic forecast inputs applied) were determined to be largely comparable (refer to **Section 4.2** above) with the EIS, it was determined that emissions from the project would not lead to concentration contributions at levels that would adversely affect measured air quality conditions at the nearest Bringelly and Liverpool DPIE (Environment, Science and Energy) air quality monitoring stations. Considering this, it was concluded that it was unlikely that the amended project would have a measurable effect on background regional air quality, which is consistent with the conclusion for the project as described in the EIS.

4.3 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 insofar as regional cumulative impacts. Regarding the cumulative air quality impacts during operations, 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 (refer to **Section 4.2** above); and that contributions from other nearby road projects have already been incorporated into the impact assessment (see Section 8.2.5 of the EIS for further details); cumulative operational air quality impacts associated with the amended project are also expected to remain consistent with that was concluded in the EIS.

5. Revised environmental management measures

Air quality 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 environmental management measures described in Section 8.2.6 of the EIS. The amended project would not require any additional or revised environmental management measures.

6. Conclusion

An assessment of the amended project against the project as described in the EIS was undertaken to determine whether there would be any changes to potential air quality impacts and environmental management measures.

Potential changes in dust impacts during construction of the amended project (including the new AF10) was assessed using the same semi-quantitative method developed by the UK IAQM as applied for the EIS. Using this method, it was determined that the highest level of construction dust risk rating under the various categories for the amended project was still 'high', as had been determined in the EIS. Considering this, the environmental management measures identified in the EIS remain applicable. It was also determined that level of risk and environmental management measures related to other air quality-related matters during construction would remain unchanged.

Changes to local air quality, including changes to PM₁₀, PM_{2.5}, CO, NO₂ and VOCs during the operation of the amended project were evaluated using TRAQ. Updated layout and traffic inputs were applied in the model and the predictions were compared against those in the EIS to identify any changes. Using this approach, it was determined that there would be no material change in local air quality outcomes for the amended project from what was determined for the project as described in the EIS. It was also concluded that there would be no change to regional air quality as a result of the operation of the amended project, as had been determined for the project as described in the EIS.

It is concluded that the amended project would not lead to unacceptable air quality impacts (based on reference to relevant air quality criteria), and that more detailed assessment would not be required. This conclusion is based on the determination of potential impacts to air quality during both construction and operational stages, including potential cumulative impacts, of both options 1 and 2 of the amended project.

It was also determined that cumulative air quality impacts for the amended project would be likely to remain unchanged from those described in Section 8.2.5 of the EIS.

7. References

Approved Methods for the Modelling and Assessment of Air Pollutants in NSW, (NSW EPA, 2016)

Guidance on the assessment of dust from demolition and construction Version 1.1, (UK Institute of Air Quality Management [UK IAQM], 2014)

Appendix A: Updated Traffic Values

Table 7-1 Change In Traffic Values, with Elizabeth Drive Connection

		Traffic Values in Original EIS							Amended Traffic Values							Change						
Road segment	Direction	No. Lanes	Peak hourly speed (km/h)	Average 24-hour speed (km/h)	Total traffic volume per day (24-hour)	Maximum one-hour traffic volume	Percentage of light vehicles in daily traffic	Percentage of heavy vehicles in daily traffic	No. Lanes	Peak hourly speed (km/h)	Average 24-hour speed (km/h)	Total traffic volume per day (24-hour)	Maximum one-hour traffic volume	Percentage of light vehicles in daily traffic	Percentage of heavy vehicles in daily traffic	No. Lanes	Peak hourly speed (km/h)	Average 24-hour speed (km/h)	Total traffic volume per day (24-hour)	Maximum one-hour traffic volume	Percentage of light vehicles in daily traffic	Percentage of heavy vehicles in daily traffic
Existing																						
TNR_01	NB	2	70	80	7,960	799	96.00	4.00	2	69.82	80	7,960	798.8	95.52	4.48	0	0	0	0	0	0	0
	SB	2	65	80	7,637	735	96.00	4.00	2	64.98	80	7,637	735.4	96.00	4.00	0	0	0	0	0	0	0
TNR_02	NB	2	70	80	7,957	795	96.00	4.00	2	70.24	80	7,957	794.8	95.64	4.36	0	0	0	0	0	0	0
	SB	3	74	80	7,650	735	96.00	4.00	3	74.13	80	7,650	734.8	95.96	4.04	0	0	0	0	0	0	0
M7_01	NB	2	90	100	29,131	2,769	74.00	26.00	2	89.9	100	29,131	2,769	73.82	26.18	0	0	0	0	0	0	0
	SB	2	90	100	27,572	2,916	76.00	24.00	2	90.09	100	27,572	2,916	76.43	23.57	0	0	0	0	0	0	0
M7_02	NB	2	87	100	28,750	2,799	73.00	27.00	2	86.92	100	28,750	2,799	73.17	26.83	0	0	0	0	0	0	0
	SB	2	91	100	30,318	3,314	78.00	22.00	2	90.61	100	30,318	3,314	78.15	21.85	0	0	0	0	0	0	0
ED_01	EB	1	73	80	4,030	574	93.00	7.00	1	73.12	80	4,030	573.8	93.37	6.63	0	0	0	0	0	0	0
	WB	1	72	80	4,363	570	89.00	11.00	1	71.59	80	4,363	569.8	88.65	11.35	0	0	0	0	0	0	0
ED_02	EB	1	67	80	6,207	905	91.00	9.00	1	66.77	80	6,207	905.2	90.63	9.37	0	0	0	0	0	0	0
	WB	1	71	80	6,530	869	81.00	19.00	1	71.3	80	6,530	869	81.16	18.84	0	0	0	0	0	0	0

		Traffic Values in Original EIS							Amended Traffic Values							Change						
Road segment	Direction	No. Lanes	Peak hourly speed (km/h)	Average 24-hour speed (km/h)	Total traffic volume per day (24-hour)	Maximum one-hour traffic volume	Percentage of light vehicles in daily traffic	Percentage of heavy vehicles in daily traffic	No. Lanes	Peak hourly speed (km/h)	Average 24-hour speed (km/h)	Total traffic volume per day (24-hour)	Maximum one-hour traffic volume	Percentage of light vehicles in daily traffic	Percentage of heavy vehicles in daily traffic	No. Lanes	Peak hourly speed (km/h)	Average 24-hour speed (km/h)	Total traffic volume per day (24-hour)	Maximum one-hour traffic volume	Percentage of light vehicles in daily traffic	Percentage of heavy vehicles in daily traffic
No Project, 2026																						
TNR_01	NB	2	71	80	24,074	2,712	93.00	7.00	2	69	80	16,828	1,608	82.46	17.54	0	-2	0	-7246	-1104	-10.54	10.54
	SB	2	74	80	12,091	1,378	92.00	8.00	2	70	80	17,519	1,848	85.36	14.64	0	-4	0	5428	470	-6.64	6.64
TNR_02	NB	2	72	80	24,672	2,779	93.00	7.00	2	70	80	16,825	1,604	82.49	17.51	0	-2	0	-7847	-1175	-10.51	10.51
	SB	3	75	80	11,881	1,354	92.00	8.00	2	72	80	17,492	1,842	85.34	14.66	-1	-3	0	5611	488	-6.66	6.66
M7_01	NB	2	78	100	41,033	3,965	83.00	17.00	2	80	100	33,378	3,154	81.35	18.65	0	2	0	-7655	-811	-1.65	1.65
	SB	2	84	100	38,383	4,281	85.00	15.00	2	78	100	29,420	3,207	84.35	15.65	0	-6	0	-8963	-1074	-0.65	0.65
M7_02	NB	2	73	100	39,943	3,900	84.00	16.00	2	66	100	31,512	3,023	81.03	18.97	0	-7	0	-8431	-877	-2.97	2.97
	SB	2	84	100	38,549	4,277	87.00	13.00	2	79	100	32,316	3,518	84.29	15.71	0	-5	0	-6233	-759	-2.71	2.71
ED_01	EB	1	69	80	9,974	1,326	98.00	2.00	1	65	80	9,640	1,198	77.43	22.57	0	-4	0	-334	-128	-20.57	20.57
	WB	1	69	80	14,050	1,743	93.00	7.00	1	67	80	9,409	1,046	84.35	15.65	0	-2	0	-4641	-697	-8.65	8.65
ED_02	EB	1	68	80	11,347	1,372	95.00	5.00	1	64	80	11,045	1,145	82.04	17.96	0	-4	0	-302	-227	-12.96	12.96
	WB	1	65	80	15,233	1,723	87.00	13.00	1	64	80	9,963	1,004	83.48	16.52	0	-1	0	-5270	-719	-3.52	3.52
Project, 2026																						
M12_01	EB	2	90	100	12,346	1,252	88.00	12.00	2	87	100	7,959	1,181	73.52	26.48	0	-3	0	-4387	-71	-14	14
	WB	2	93	100	10,393	1,295	83.00	17.00	2	79	100	13,735	2,040	91.12	8.88	0	-14	0	3342	745	8	-8
M12_02	EB	2	91	100	20,004	1,942	92.00	8.00	2	87	100	11,218	1,344	77.90	22.10	0	-4	0	-8786	-598	-14	14

		Traffic Values in Original EIS							Amended Traffic Values							Change						
Road segment	Direction	No. Lanes	Peak hourly speed (km/h)	Average 24-hour speed (km/h)	Total traffic volume per day (24-hour)	Maximum one-hour traffic volume	Percentage of light vehicles in daily traffic	Percentage of heavy vehicles in daily traffic	No. Lanes	Peak hourly speed (km/h)	Average 24-hour speed (km/h)	Total traffic volume per day (24-hour)	Maximum one-hour traffic volume	Percentage of light vehicles in daily traffic	Percentage of heavy vehicles in daily traffic	No. Lanes	Peak hourly speed (km/h)	Average 24-hour speed (km/h)	Total traffic volume per day (24-hour)	Maximum one-hour traffic volume	Percentage of light vehicles in daily traffic	Percentage of heavy vehicles in daily traffic
	WB	2	92	100	13,750	1,612	86.00	14.00	2	80	100	17,855	2,338	88.04	11.96	0	-12	0	4105	726	2	-2
M12_03	EB	2	91	100	20,361	1,968	92.00	8.00	2	87	100	11,216	1,343	77.91	22.09	0	-4	0	-9145	-625	-14	14
	WB	2	93	100	13,097	1,530	86.00	14.00	2	82	100	17,814	2,324	87.95	12.05	0	-11	0	4717	794	2	-2
M12_04	EB	2	91	100	20,545	1,994	92.00	8.00	2	85	100	11,222	1,343	77.92	22.08	0	-6	0	-9323	-651	-14	14
	WB	2	93	100	12,820	1,495	86.00	14.00	2	82	100	17,805	2,320	87.91	12.09	0	-11	0	4985	825	2	-2
TNR_01	NB	2	72	80	18,492	2,140	95.00	5.00	2	68	80	15,550	1,766	79.74	20.26	0	-4	0	-2942	-374	-15	15
	SB	2	70	80	11,357	1,160	90.00	10.00	2	31	80	16,096	1,842	86.83	13.17	0	-39	0	4739	682	-3	3
TNR_02	NB	2	73	80	23,535	2,693	91.00	9.00	2	69	80	20,258	2,048	84.70	15.30	0	-4	0	-3277	-645	-6	6
	SB	3	75	80	17,072	2,006	90.00	10.00	2	71	80	16,880	1,597	82.47	17.53	-1	-4	0	-192	-409	-8	8
M7_01	NB	2	81	100	44,061	4,265	84.00	16.00	2	62	100	35,564	3,439	82.07	17.93	0	-19	0	-8497	-826	-2	2
	SB	2	85	100	45,201	4,814	86.00	14.00	2	68	100	29,817	3,015	82.90	17.10	0	-17	0	-15384	-1799	-3	3
M7_02	NB	2	83	100	44,050	4,240	88.00	12.00	2	58	100	30,759	3,106	80.16	19.84	0	-25	0	-13291	-1134	-8	8
	SB	2	89	100	36,849	4,176	88.00	12.00	2	82	100	34,766	3,972	85.24	14.76	0	-7	0	-2083	-204	-3	3
ED_01	EB	1	70	80	6,896	918	97.00	3.00	1	68	80	4,656	522	79.03	20.97	0	-2	0	-2240	-396	-18	18
	WB	1	72	80	6,725	904	93.00	7.00	1	71	80	4,603	447.6	81.53	18.47	0	-1	0	-2122	-456	-11	11
ED_02	EB	1	70	80	8,050	1,016	94.00	6.00	1	66	80	6,981	732	81.69	18.31	0	-4	0	-1069	-284	-12	12
	WB	1	67	80	9,977	1,125	86.00	14.00	1	65	80	4,948	497	83.55	16.45	0	-2	0	-5029	-628	-2	2

		Traffic Values in Original EIS							Amended Traffic Values							Change						
Road segment	Direction	No. Lanes	Peak hourly speed (km/h)	Average 24-hour speed (km/h)	Total traffic volume per day (24-hour)	Maximum one-hour traffic volume	Percentage of light vehicles in daily traffic	Percentage of heavy vehicles in daily traffic	No. Lanes	Peak hourly speed (km/h)	Average 24-hour speed (km/h)	Total traffic volume per day (24-hour)	Maximum one-hour traffic volume	Percentage of light vehicles in daily traffic	Percentage of heavy vehicles in daily traffic	No. Lanes	Peak hourly speed (km/h)	Average 24-hour speed (km/h)	Total traffic volume per day (24-hour)	Maximum one-hour traffic volume	Percentage of light vehicles in daily traffic	Percentage of heavy vehicles in daily traffic
No Project, 2036																						
TNR_01	NB	2	69	80	29,708	3,239	98.00	2.00	2	66	80	22,141	2,103	82.46	17.54	0	-3	0	-7567	-1136	-16	16
	SB	2	73	80	17,142	2,033	96.00	4.00	2	65	80	21,304	2,056	83.92	16.08	0	-8	0	4162	23	-12	12
TNR_02	NB	2	71	80	30,439	3,321	98.00	2.00	2	67	80	22,282	2,101	82.56	17.44	0	-4	0	-8157	-1220	-15	15
	SB	3	74	80	16,824	1,995	96.00	4.00	2	72	80	21,368	2,061	83.91	16.09	-1	-2	0	4544	66	-12	12
M7_01	NB	2	19.11	100	62,490	6,265	84.00	16.00	2	39	100	45,776	4,451	80.99	19.01	0	20	0	-16714	-1814	-3	3
	SB	2	79.6	100	60,469	6,707	85.00	15.00	2	72	100	43,809	4,943	84.93	15.07	0	-7	0	-16660	-1764	0	0
M7_02	NB	2	82.89	100	60,193	5,878	83.00	17.00	2	51	100	42,019	4,106	80.84	19.16	0	-32	0	-18174	-1772	-2	2
	SB	2	79.29	100	52,790	5,905	85.00	15.00	2	59	100	45,757	5,025	84.39	15.61	0	-20	0	-7033	-880	-1	1
ED_01	EB	1	71.95	80	23,919	2,872	97.00	3.00	1	64	80	11,128	1,559	75.09	24.91	0	-8	0	-12791	-1313	-22	22
	WB	1	73.43	80	23,770	3,154	96.00	4.00	1	66	80	10,305	1,369	88.13	11.87	0	-7	0	-13465	-1785	-8	8
ED_02	EB	1	67.33	80	32,824	3,277	96.00	4.00	1	64	80	15,290	1,614	81.89	18.11	0	-3	0	-17534	-1663	-14	14
	WB	1	69.22	80	32,689	3,499	94.00	6.00	1	63	80	10,231	1,062	83.83	16.17	0	-6	0	-22458	-2437	-10	10
Project, 2036																						
M12_01	EB	2	87	100	26,142	2,617	92.00	8.00	2	81	100	13,820	1,969	74.34	25.66	0	-6	0	-12322	-648	-18	18
	WB	2	91	100	18,114	2,305	87.00	13.00	2	66	100	18,038	2,564	90.02	9.98	0	-25	0	-76	259	3	-3
M12_02	EB	2	88	100	34,541	3,666	94.00	6.00	2	78	100	20,885	2,369	78.88	21.12	0	-10	0	-13656	-1297	-15	15

		Traffic Values in Original EIS							Amended Traffic Values							Change						
Road segment	Direction	No. Lanes	Peak hourly speed (km/h)	Average 24-hour speed (km/h)	Total traffic volume per day (24-hour)	Maximum one-hour traffic volume	Percentage of light vehicles in daily traffic	Percentage of heavy vehicles in daily traffic	No. Lanes	Peak hourly speed (km/h)	Average 24-hour speed (km/h)	Total traffic volume per day (24-hour)	Maximum one-hour traffic volume	Percentage of light vehicles in daily traffic	Percentage of heavy vehicles in daily traffic	No. Lanes	Peak hourly speed (km/h)	Average 24-hour speed (km/h)	Total traffic volume per day (24-hour)	Maximum one-hour traffic volume	Percentage of light vehicles in daily traffic	Percentage of heavy vehicles in daily traffic
	WB	2	89	100	27,363	3,055	92.00	8.00	2	72	100	25,761	3,032	85.64	14.36	0	-17	0	-1602	-23	-6	6
M12_03	EB	2	88	100	35,175	3,748	94.00	6.00	2	77	100	19,650	2,374	79.40	20.60	0	-11	0	-15525	-1374	-15	15
	WB	2	90	100	26,190	2,938	92.00	8.00	2	75	100	23,772	3,080	85.22	14.78	0	-15	0	-2418	142	-7	7
M12_04	EB	2	85	100	35,535	3,781	94.00	6.00	2	79	100	20,662	2,346	78.87	21.13	0	-6	0	-14873	-1435	-15	15
	WB	2	92	100	25,646	2,873	92.00	8.00	2	74	100	26,060	3,068	85.64	14.36	0	-18	0	414	195	-6	6
TNR_01	NB	2	67	80	32,248	3,537	97.00	3.00	2	64	80	16,355	2,119	80.85	19.15	0	-3	0	-15893	-1418	-16	16
	SB	2	68	80	19,220	2,221	94.00	6.00	2	55	80	17,267	2,475	88.51	11.49	0	-13	0	-1953	254	-5	5
TNR_02	NB	2	72	80	28,144	3,032	94.00	6.00	2	68	80	23,191	2,365	84.81	15.19	0	-4	0	-4953	-667	-9	9
	SB	3	74	80	21,420	2,362	93.00	7.00	2	71	80	21,041	2,181	81.30	18.70	-1	-3	0	-379	-181	-12	12
M7_01	NB	3	72	100	66,364	6,566	84.00	16.00	3	71	100	50,199	4,732	81.52	18.48	0	-1	0	-16165	-1834	-2	2
	SB	3	85	100	68,717	7,478	87.00	13.00	3	75	100	46,018	5,037	84.28	15.72	0	-10	0	-22699	-2441	-3	3
M7_02	NB	3	84	100	63,887	6,370	86.00	14.00	3	62	100	44,626	4,599	80.06	19.94	0	-22	0	-19261	-1771	-6	6
	SB	3	89	100	50,009	5,586	87.00	13.00	3	82	100	50,767	5,754	84.98	15.02	0	-7	0	758	168	-2	2
ED_01	EB	1	74	80	13,923	1,398	97.00	3.00	1	64	80	7,134	919	76.26	23.74	0	-10	0	-6789	-479	-21	21
	WB	1	76	80	13,217	1,813	91.00	9.00	1	70	80	5,300	694	87.82	12.18	0	-6	0	-7917	-1119	-3	3
ED_02	EB	1	71	80	18,223	1,946	95.00	5.00	1	61	80	11,927	1,259	81.53	18.47	0	-10	0	-6296	-687	-13	13
	WB	1	70	80	16,494	1,748	89.00	11.00	1	63	80	10,602	1,086	83.60	16.40	0	-7	0	-5892	-662	-5	5

Table 7-2 Change In Traffic Values, without Elizabeth Drive Connection

		Traffic Values in Original EIS							Amended Traffic Values							Change						
Road segment	Direction	No. Lanes	Peak hourly speed (km/h)	Average 24-hour speed (km/h)	Total traffic volume per day (24-hour)	Maximum one-hour traffic volume	Percentage of light vehicles in daily traffic	Percentage of heavy vehicles in daily traffic	No. Lanes	Peak hourly speed (km/h)	Average 24-hour speed (km/h)	Total traffic volume per day (24-hour)	Maximum one-hour traffic volume	Percentage of light vehicles in daily traffic	Percentage of heavy vehicles in daily traffic	No. Lanes	Peak hourly speed (km/h)	Average 24-hour speed (km/h)	Total traffic volume per day (24-hour)	Maximum one-hour traffic volume	Percentage of light vehicles in daily traffic	Percentage of heavy vehicles in daily traffic
Existing																						
TNR_01	NB	2	70	80	7,960	799	96.00	4.00	2	69.82	80	7,960	798.8	95.52	4.48	0	0	0	0	0	0	0
	SB	2	65	80	7,637	735	96.00	4.00	2	64.98	80	7,637	735.4	96.00	4.00	0	0	0	0	0	0	0
TNR_02	NB	2	70	80	7,957	795	96.00	4.00	2	70.24	80	7,957	794.8	95.64	4.36	0	0	0	0	0	0	0
	SB	3	74	80	7,650	735	96.00	4.00	3	74.13	80	7,650	734.8	95.96	4.04	0	0	0	0	0	0	0
M7_01	NB	2	90	100	29,131	2,769	74.00	26.00	2	89.9	100	29,131	2,769	73.82	26.18	0	0	0	0	0	0	0
	SB	2	90	100	27,572	2,916	76.00	24.00	2	90.09	100	27,572	2,916	76.43	23.57	0	0	0	0	0	0	0
M7_02	NB	2	87	100	28,750	2,799	73.00	27.00	2	86.92	100	28,750	2,799	73.17	26.83	0	0	0	0	0	0	0
	SB	2	91	100	30,318	3,314	78.00	22.00	2	90.61	100	30,318	3,314	78.15	21.85	0	0	0	0	0	0	0
ED_01	EB	1	73	80	4,030	574	93.00	7.00	1	73.12	80	4,030	573.8	93.37	6.63	0	0	0	0	0	0	0
	WB	1	72	80	4,363	570	89.00	11.00	1	71.59	80	4,363	569.8	88.65	11.35	0	0	0	0	0	0	0
ED_02	EB	1	67	80	6,207	905	91.00	9.00	1	66.77	80	6,207	905.2	90.63	9.37	0	0	0	0	0	0	0
	WB	1	71	80	6,530	869	81.00	19.00	1	71.3	80	6,530	869	81.16	18.84	0	0	0	0	0	0	0
No Project, 2026																						
TNR_01	NB	2	71	80	24,074	2,712	93.00	7.00	2	69	80	16,828	1,608	82.46	17.54	0	-2	0	-7246	-1104	-10.54	10.54
	SB	2	74	80	12,091	1,378	92.00	8.00	2	70	80	17,519	1,848	85.36	14.64	0	-4	0	5428	470	-6.64	6.64

		Traffic Values in Original EIS							Amended Traffic Values							Change						
Road segment	Direction	No. Lanes	Peak hourly speed (km/h)	Average 24-hour speed (km/h)	Total traffic volume per day (24-hour)	Maximum one-hour traffic volume	Percentage of light vehicles in daily traffic	Percentage of heavy vehicles in daily traffic	No. Lanes	Peak hourly speed (km/h)	Average 24-hour speed (km/h)	Total traffic volume per day (24-hour)	Maximum one-hour traffic volume	Percentage of light vehicles in daily traffic	Percentage of heavy vehicles in daily traffic	No. Lanes	Peak hourly speed (km/h)	Average 24-hour speed (km/h)	Total traffic volume per day (24-hour)	Maximum one-hour traffic volume	Percentage of light vehicles in daily traffic	Percentage of heavy vehicles in daily traffic
TNR_02	NB	2	72	80	24,672	2,779	93.00	7.00	2	70	80	16,825	1,604	82.49	17.51	0	-2	0	-7847	-1175	-10.51	10.51
	SB	3	75	80	11,881	1,354	92.00	8.00	2	72	80	17,492	1,842	85.34	14.66	-1	-3	0	5611	488	-6.66	6.66
M7_01	NB	2	78	100	41,033	3,965	83.00	17.00	2	80	100	33,378	3,154	81.35	18.65	0	2	0	-7655	-811	-1.65	1.65
	SB	2	84	100	38,383	4,281	85.00	15.00	2	78	100	29,420	3,207	84.35	15.65	0	-6	0	-8963	-1074	-0.65	0.65
M7_02	NB	2	73	100	39,943	3,900	84.00	16.00	2	66	100	31,512	3,023	81.03	18.97	0	-7	0	-8431	-877	-2.97	2.97
	SB	2	84	100	38,549	4,277	87.00	13.00	2	79	100	32,316	3,518	84.29	15.71	0	-5	0	-6233	-759	-2.71	2.71
ED_01	EB	1	69	80	9,974	1,326	98.00	2.00	1	65	80	9,640	1,198	77.43	22.57	0	-4	0	-334	-128	-20.57	20.57
	WB	1	69	80	14,050	1,743	93.00	7.00	1	67	80	9,409	1,046	84.35	15.65	0	-2	0	-4641	-697	-8.65	8.65
ED_02	EB	1	68	80	11,347	1,372	95.00	5.00	1	64	80	11,045	1,145	82.04	17.96	0	-4	0	-302	-227	-12.96	12.96
	WB	1	65	80	15,233	1,723	87.00	13.00	1	64	80	9,963	1,004	83.48	16.52	0	-1	0	-5270	-719	-3.52	3.52
Project, 2026																						
M12_01	EB	2	90	100	12,346	1,252	88.00	12.00	2	87	100	7,379	1,086	73.66	26.34	0	-3	0	-4967	-166	-14	14
	WB	2	93	100	10,393	1,295	83.00	17.00	2	81	100	14,474	2,172	91.36	8.64	0	-12	0	4081	877	8	-8
M12_02	EB	2	91	100	20,004	1,942	92.00	8.00	2	88	100	7,677	1,033	75.50	24.50	0	-3	0	-12327	-909	-17	17
	WB	2	92	100	13,750	1,612	86.00	14.00	2	83	100	14,918	2,030	88.96	11.04	0	-9	0	1168	418	3	-3
M12_03	EB	2	91	100	20,361	1,968	92.00	8.00	2	88	100	7,676	1,033	75.50	24.50	0	-3	0	-12685	-935	-16	16
	WB	2	93	100	13,097	1,530	86.00	14.00	2	85	100	14,915	2,021	88.84	11.16	0	-8	0	1818	491	3	-3

		Traffic Values in Original EIS							Amended Traffic Values							Change						
Road segment	Direction	No. Lanes	Peak hourly speed (km/h)	Average 24-hour speed (km/h)	Total traffic volume per day (24-hour)	Maximum one-hour traffic volume	Percentage of light vehicles in daily traffic	Percentage of heavy vehicles in daily traffic	No. Lanes	Peak hourly speed (km/h)	Average 24-hour speed (km/h)	Total traffic volume per day (24-hour)	Maximum one-hour traffic volume	Percentage of light vehicles in daily traffic	Percentage of heavy vehicles in daily traffic	No. Lanes	Peak hourly speed (km/h)	Average 24-hour speed (km/h)	Total traffic volume per day (24-hour)	Maximum one-hour traffic volume	Percentage of light vehicles in daily traffic	Percentage of heavy vehicles in daily traffic
M12_04	EB	2	91	100	20,545	1,994	92.00	8.00	2	87	100	7,665	1,029	75.55	24.45	0	-4	0	-12880	-965	-16	16
	WB	2	93	100	12,820	1,495	86.00	14.00	2	83	100	14,998	2,033	88.84	11.16	0	-10	0	2178	538	3	-3
TNR_01	NB	2	72	80	18,492	2,140	95.00	5.00	2	68	80	15,317	1,717	79.93	20.07	0	-4	0	-3175	-423	-15	15
	SB	2	70	80	11,357	1,160	90.00	10.00	2	48	80	18,323	2,193	87.74	12.26	0	-22	0	6966	1033	-2	2
TNR_02	NB	2	73	80	23,535	2,693	91.00	9.00	2	69	80	20,376	2,064	84.73	15.27	0	-4	0	-3159	-629	-6	6
	SB	3	75	80	17,072	2,006	90.00	10.00	2	72	80	17,047	1,597	82.61	17.39	-1	-3	0	-25	-409	-7	7
M7_01	NB	2	81	100	44,061	4,265	84.00	16.00	2	62	100	35,559	3,438	82.07	17.93	0	-19	0	-8502	-827	-2	2
	SB	2	85	100	45,201	4,814	86.00	14.00	2	67	100	29,692	3,012	82.96	17.04	0	-18	0	-15509	-1802	-3	3
M7_02	NB	2	83	100	44,050	4,240	88.00	12.00	2	58	100	30,770	3,103	80.19	19.81	0	-25	0	-13280	-1137	-8	8
	SB	2	89	100	36,849	4,176	88.00	12.00	2	82	100	34,766	3,972	85.24	14.76	0	-8	0	-2083	-204	-3	3
ED_01	EB	1	70	80	6,896	918	97.00	3.00	1	66	80	7,423	754.6	80.76	19.24	0	-4	0	527	-163	-16	16
	WB	1	72	80	6,725	904	93.00	7.00	1	70	80	6,214	601.8	81.63	18.37	0	-2	0	-511	-302	-11	11
ED_02	EB	1	70	80	8,050	1,016	94.00	6.00	1	64	80	10,248	1,044	82.25	17.75	0	-6	0	2198	28	-12	12
	WB	1	67	80	9,977	1,125	86.00	14.00	1	62	80	7,501	753	83.44	16.56	0	-5	0	-2476	-372	-3	3
No Project, 2036																						
TNR_01	NB	2	69	80	29,708	3,239	98.00	2.00	2	66	80	22,141	2,103	82.46	17.54	0	-3	0	-7567	-1136	-16	16
	SB	2	73	80	17,142	2,033	96.00	4.00	2	65	80	21,304	2,056	83.92	16.08	0	-8	0	4162	23	-12	12

		Traffic Values in Original EIS							Amended Traffic Values							Change						
Road segment	Direction	No. Lanes	Peak hourly speed (km/h)	Average 24-hour speed (km/h)	Total traffic volume per day (24-hour)	Maximum one-hour traffic volume	Percentage of light vehicles in daily traffic	Percentage of heavy vehicles in daily traffic	No. Lanes	Peak hourly speed (km/h)	Average 24-hour speed (km/h)	Total traffic volume per day (24-hour)	Maximum one-hour traffic volume	Percentage of light vehicles in daily traffic	Percentage of heavy vehicles in daily traffic	No. Lanes	Peak hourly speed (km/h)	Average 24-hour speed (km/h)	Total traffic volume per day (24-hour)	Maximum one-hour traffic volume	Percentage of light vehicles in daily traffic	Percentage of heavy vehicles in daily traffic
TNR_02	NB	2	71	80	30,439	3,321	98.00	2.00	2	67	80	22,282	2,101	82.56	17.44	0	-4	0	-8157	-1220	-15	15
	SB	3	74	80	16,824	1,995	96.00	4.00	2	72	80	21,368	2,061	83.91	16.09	-1	-2	0	4544	66	-12	12
M7_01	NB	2	19.11	100	62,490	6,265	84.00	16.00	2	39	100	45,776	4,451	80.99	19.01	0	20	0	-16714	-1814	-3	3
	SB	2	79.6	100	60,469	6,707	85.00	15.00	2	72	100	43,809	4,943	84.93	15.07	0	-7	0	-16660	-1764	0	0
M7_02	NB	2	82.89	100	60,193	5,878	83.00	17.00	2	51	100	42,019	4,106	80.84	19.16	0	-32	0	-18174	-1772	-2	2
	SB	2	79.29	100	52,790	5,905	85.00	15.00	2	59	100	45,757	5,025	84.39	15.61	0	-20	0	-7033	-880	-1	1
ED_01	EB	1	71.95	80	23,919	2,872	97.00	3.00	1	64	80	11,128	1,559	75.09	24.91	0	-8	0	-12791	-1313	-22	22
	WB	1	73.43	80	23,770	3,154	96.00	4.00	1	66	80	10,305	1,369	88.13	11.87	0	-7	0	-13465	-1785	-8	8
ED_02	EB	1	67.33	80	32,824	3,277	96.00	4.00	1	64	80	15,290	1,614	81.89	18.11	0	-3	0	-17534	-1663	-14	14
	WB	1	69.22	80	32,689	3,499	94.00	6.00	1	63	80	10,231	1,062	83.83	16.17	0	-6	0	-22458	-2437	-10	10
Project, 2036																						
M12_01	EB	2	87	100	26,142	2,617	92.00	8.00	2	82	100	11,413	1,582	74.82	25.18	0	-5	0	-14729	-1035	-17	17
	WB	2	91	100	18,114	2,305	87.00	13.00	2	73	100	16,679	2,369	90.01	9.99	0	-18	0	-1435	64	3	-3
M12_02	EB	2	88	100	34,541	3,666	94.00	6.00	2	81	100	17,503	1,892	79.63	20.37	0	-7	0	-17038	-1774	-14	14
	WB	2	89	100	27,363	3,055	92.00	8.00	2	77	100	21,766	2,623	86.13	13.87	0	-12	0	-5597	-432	-6	6
M12_03	EB	2	88	100	35,175	3,748	94.00	6.00	2	80	100	17,408	1,898	79.48	20.52	0	-8	0	-17767	-1850	-15	15
	WB	2	90	100	26,190	2,938	92.00	8.00	2	79	100	21,599	2,596	86.06	13.94	0	-11	0	-4591	-342	-6	6

		Traffic Values in Original EIS							Amended Traffic Values							Change						
Road segment	Direction	No. Lanes	Peak hourly speed (km/h)	Average 24-hour speed (km/h)	Total traffic volume per day (24-hour)	Maximum one-hour traffic volume	Percentage of light vehicles in daily traffic	Percentage of heavy vehicles in daily traffic	No. Lanes	Peak hourly speed (km/h)	Average 24-hour speed (km/h)	Total traffic volume per day (24-hour)	Maximum one-hour traffic volume	Percentage of light vehicles in daily traffic	Percentage of heavy vehicles in daily traffic	No. Lanes	Peak hourly speed (km/h)	Average 24-hour speed (km/h)	Total traffic volume per day (24-hour)	Maximum one-hour traffic volume	Percentage of light vehicles in daily traffic	Percentage of heavy vehicles in daily traffic
M12_04	EB	2	85	100	35,535	3,781	94.00	6.00	2	80	100	17,228	1,891	79.37	20.63	0	-5	0	-18307	-1890	-15	15
	WB	2	92	100	25,646	2,873	92.00	8.00	2	77	100	21,494	2,572	85.96	14.04	0	-15	0	-4152	-301	-6	6
TNR_01	NB	2	67	80	32,248	3,537	97.00	3.00	2	35	80	19,506	1,970	81.47	18.53	0	-32	0	-12742	-1567	-16	16
	SB	2	68	80	19,220	2,221	94.00	6.00	2	29	80	19,424	2,703	91.18	8.82	0	-39	0	204	482	-3	3
TNR_02	NB	2	72	80	28,144	3,032	94.00	6.00	2	69	80	21,675	2,161	84.45	15.55	0	-3	0	-6469	-871	-10	10
	SB	3	74	80	21,420	2,362	93.00	7.00	2	60	80	18,507	1,706	83.20	16.80	-1	-14	0	-2913	-656	-10	10
M7_01	NB	3	72	100	66,364	6,566	84.00	16.00	3	71	100	50,202	4,731	81.52	18.48	0	-1	0	-16162	-1835	-2	2
	SB	3	85	100	68,717	7,478	87.00	13.00	3	76	100	44,306	4,776	83.99	16.01	0	-9	0	-24411	-2702	-3	3
M7_02	NB	3	84	100	63,887	6,370	86.00	14.00	3	64	100	44,144	4,558	80.02	19.98	0	-20	0	-19743	-1812	-6	6
	SB	3	89	100	50,009	5,586	87.00	13.00	3	83	100	50,769	5,754	84.98	15.02	0	-6	0	760	168	-2	2
ED_01	EB	1	74	80	13,923	1,398	97.00	3.00	1	65	80	9,916	990	80.91	19.09	0	-10	0	-4007	-408	-16	16
	WB	1	76	80	13,217	1,813	91.00	9.00	1	67	80	8,244	1,087	87.99	12.01	0	-9	0	-4973	-726	-3	3
ED_02	EB	1	71	80	18,223	1,946	95.00	5.00	1	61	80	13,364	1,459	81.16	18.84	0	-10	0	-4859	-487	-14	14
	WB	1	70	80	16,494	1,748	89.00	11.00	1	62	80	13,428	1,346	82.68	17.32	0	-8	0	-3066	-402	-6	6