

4.0 Proposed modification

This chapter describes the proposed modification to the approved project, and the works the proposed modification would enable. The description of the proposed modification is based on the current level of design and would be subject to further refinements as part of detailed design development and construction planning. Uncertainties in the proposed modification are summarised in **Chapter 9** (Synthesis of the Modification Report and conclusion).

4.1 Overview of the proposed modification

The approved project, with the implementation of the proposed modification, would permit the addition of a trafficable lane in both directions from Prestons to Oakhurst/Glendenning, excluding at the Westlink M7/M4 Motorway (Light Horse) Interchange.

The proposed modification would include the following key features (collectively referred to as 'the proposed modification'), also shown in Figure 4-1 to Figure 4-5:

- Widening of the motorway into the existing median for a length of about 26 kilometres along the Westlink M7, from about 140 metres south of the Kurrajong Road overhead bridge at Prestons (southern end) to the Richmond Road interchange in Oakhurst/Glendenning (northern end), excluding at the Westlink M7/M4 Motorway (Light Horse) Interchange
- Widening the exit from the Westlink M7 northbound onto the M4 Motorway westbound from one lane to two lanes
- Widening of 43 existing northbound and southbound bridges on the Westlink M7 at 23 locations within the centre median, and on the outside of the bridges on the approach to the M4 Motorway from Old Wallgrove Road
- Upgrades, additions and modifications to noise walls
- Utility works and upgrades to drainage
- Intelligent Transport System (ITS) installations, adjustments and relocations to cover the new lane configurations.

The following activities would be required to facilitate construction of the proposed modification:

- Establishment of 'zone' construction ancillary facilities within and adjacent to Westlink M7 for stockpiling, construction support at bridge and median widening locations, project offices and compounds, as well as 'site' ancillary facilities within the existing motorway alignment (refer **Section 4.3.3** for further detail)
- Vegetation clearing within the median/widening areas and within construction ancillary facilities (including for construction access)
- Demolition of existing structures and infrastructure within the widening areas
- Provision of temporary water management infrastructure including the maintenance of stormwater drainage and establishment of waterway crossings and diversions
- Utility works within Westlink M7 and adjoining roads, particularly around existing motorway bridge sub-structures
- Earthworks for bridge and road widening within the existing median, and placement and compaction of fill material likely to result in a net amount of spoil material
- Bridge widening including establishment of sub-structures such as piles, abutments, piers and headstocks and super-structures including beams, girders, decks and barriers
- Pavement widening works within the road median
- Finishing works including asphaltting the carriageway surface, line marking, signage, permanent barriers and median infill, installation of communications infrastructure and landscaping treatments.

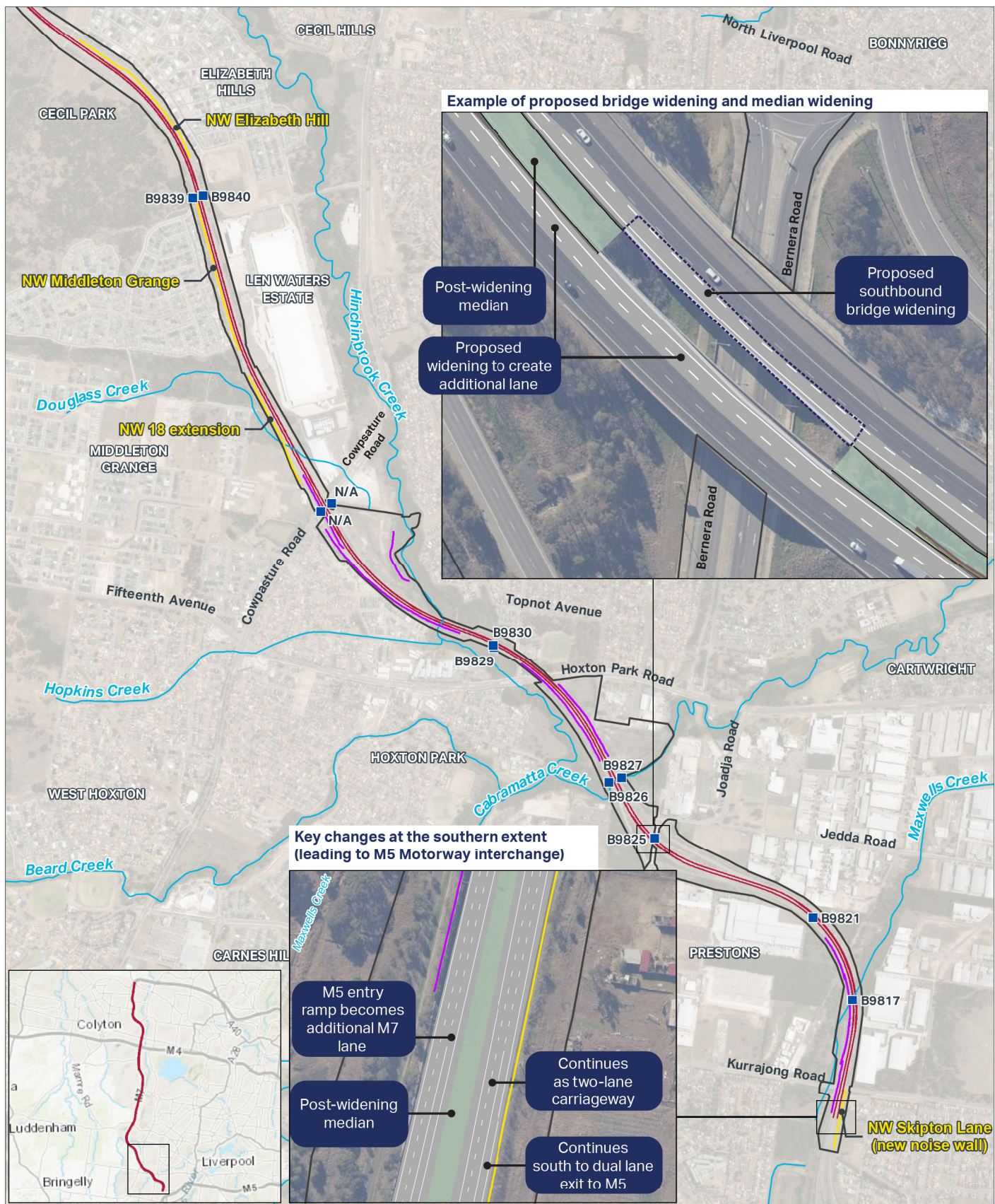


FIGURE 4-1: KEY FEATURES (SHEET 1 OF 5)



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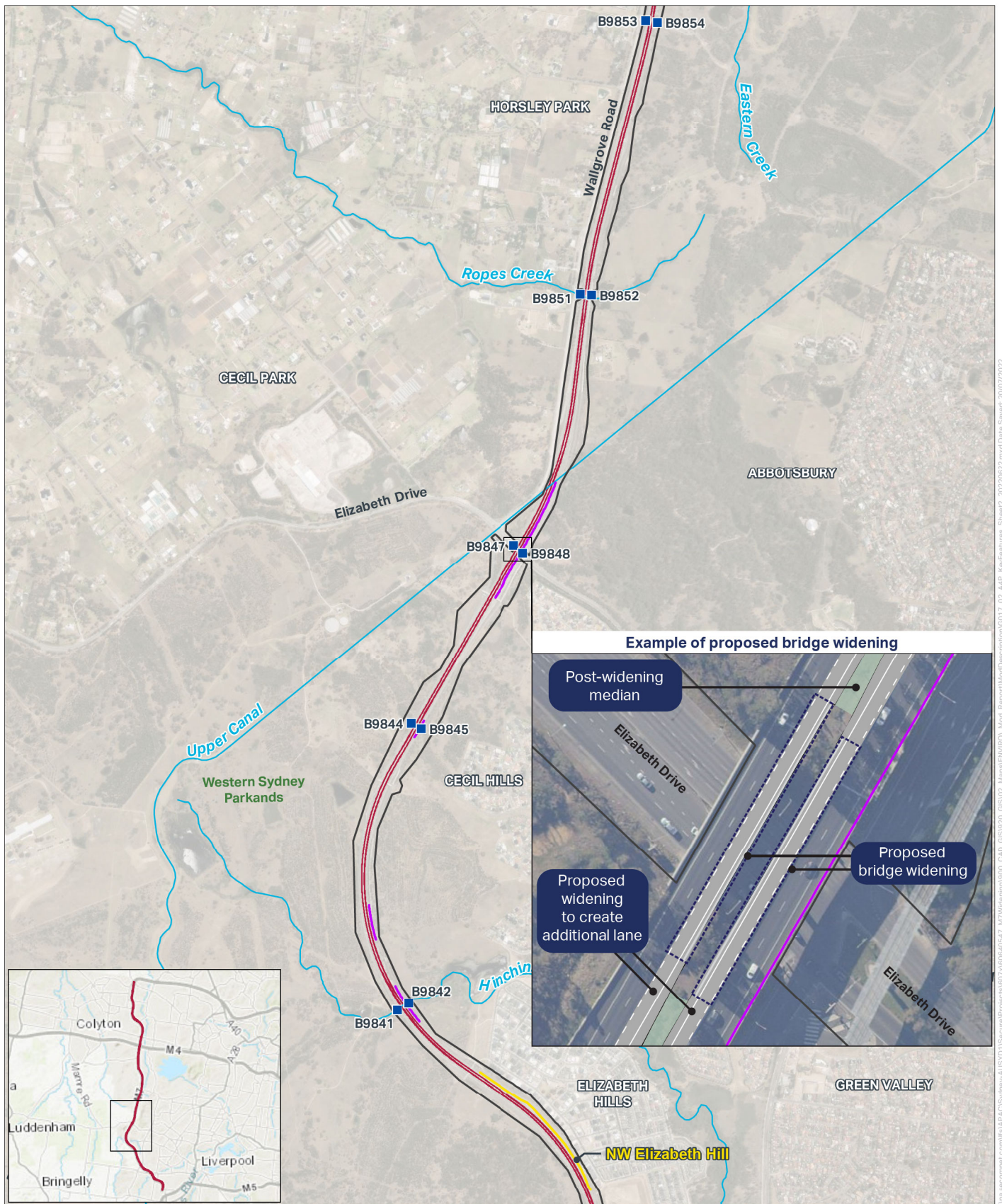


FIGURE 4-2: KEY FEATURES (SHEET 2 OF 5)



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Legend

- Proposed widening
- Operational footprint
- Watercourse
- Existing noise wall
- New noise wall/increase wall height (NW####)
- Transport for NSW bridge number B9#### proposed to be widened

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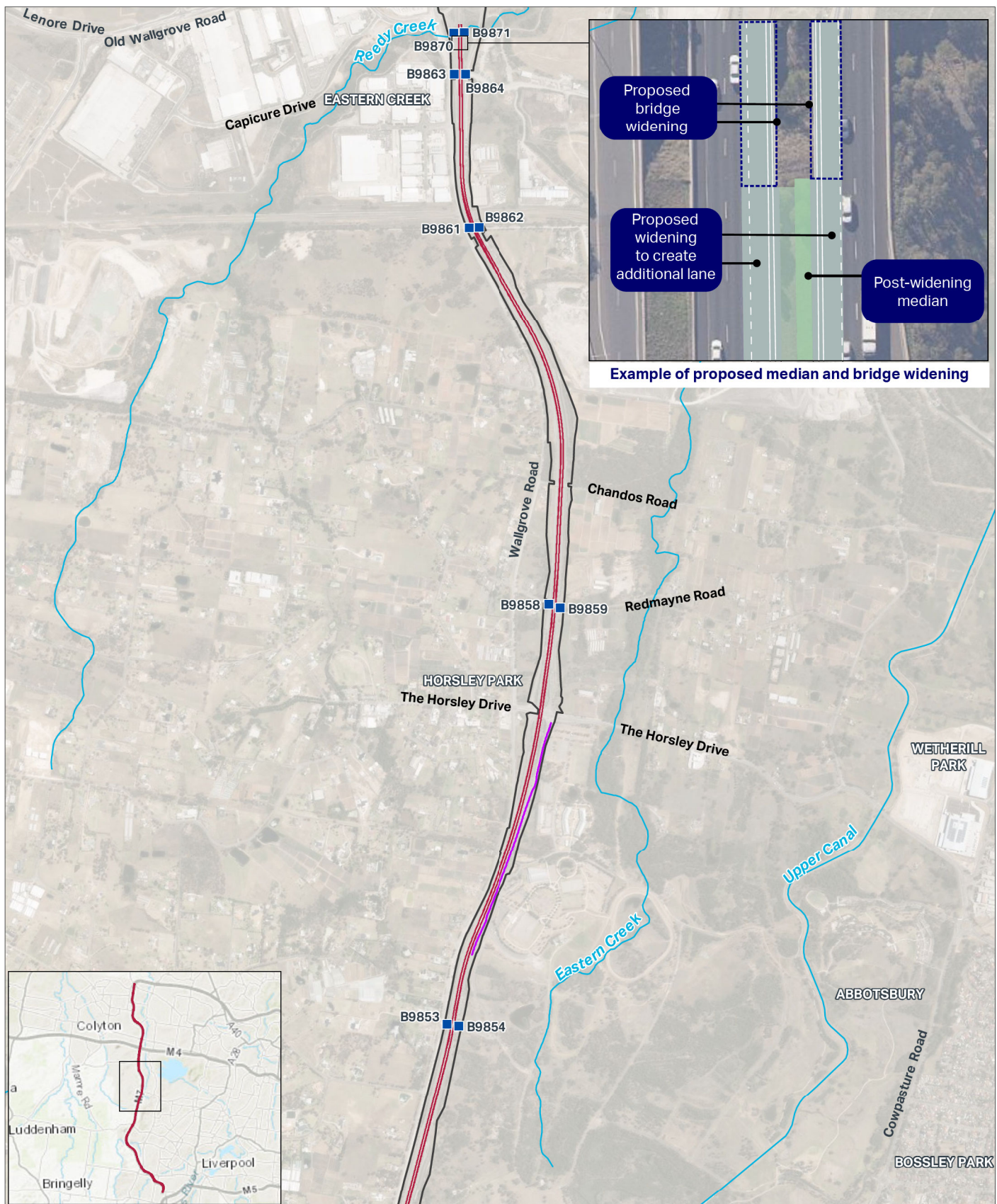


FIGURE 4-3: KEY FEATURES (SHEET 3 OF 5)



AECOM

Legend

- █ Proposed widening
- Operational footprint
- Watercourse
- Existing noise wall
- Transport for NSW bridge number B9#### proposed to be widened

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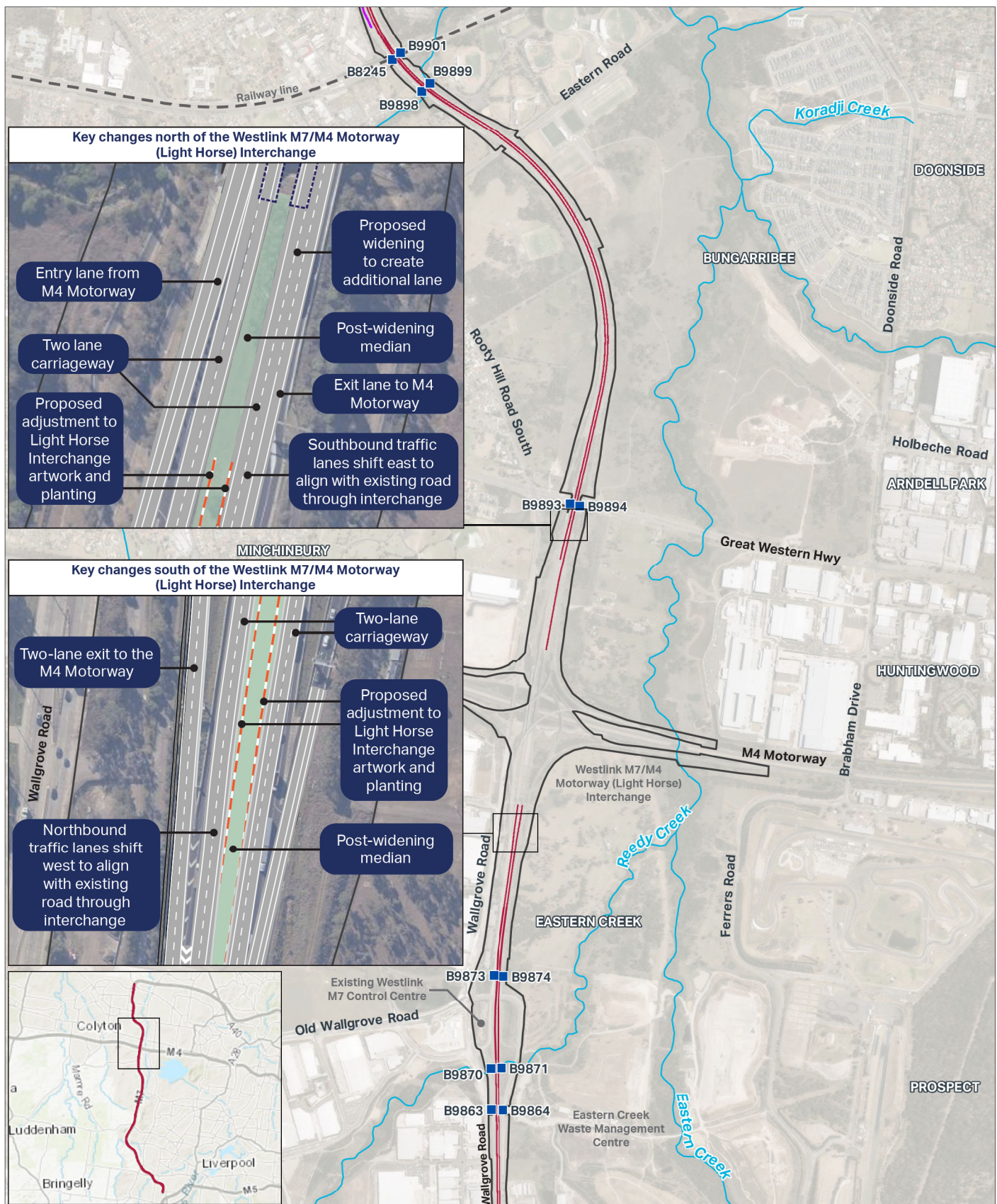


FIGURE 4-4: KEY FEATURES (SHEET 4 OF 5)



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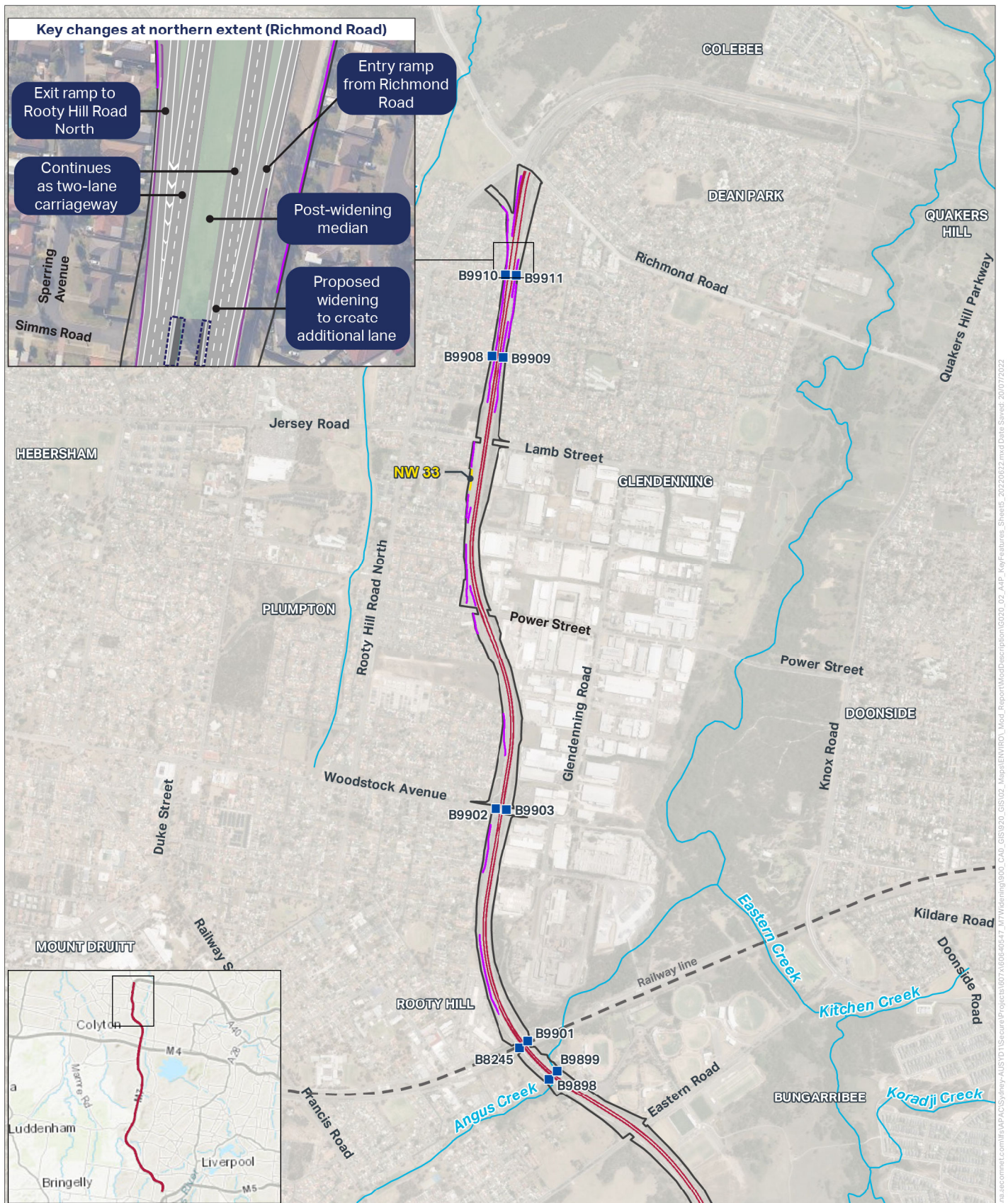


FIGURE 4-5: KEY FEATURES (SHEET 5 OF 5)



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Legend

- Proposed widening
- Operational footprint
- Watercourse
- Existing noise wall
- New noise wall/increase wall height (NW####)
- Transport for NSW bridge number B9#### proposed to be widened

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4.2 Operational features

The operational footprint of the proposed modification would be contained within the existing Westlink M7 lease area and includes areas required for both operation and maintenance.

Existing key operational features impacted by the proposed modification would include:

- Main road alignment, including median and bridge areas
- Interchanges, tie-ins and entry/exit ramps
- Fill embankments and cuttings
- Culverts and drainage structures
- Water quality control measures, including basins
- Landscaping
- Artwork at the Westlink M7/M4 Motorway (Light Horse) Interchange
- Maintenance access
- Security fencing
- Noise walls
- Shared path
- Other associated elements required during operation (for example, ITS, utilities and variable message signs (VMS)).

The total operational footprint of the proposed modification is about 330 hectares and is shown in Figure 4-1 to Figure 4-5. The overall area required for operation and maintenance of the Westlink M7 is not anticipated to change as part of the proposed modification.

The construction footprint, which is the total area required to construct the proposed modification, is described in **Section 4.3.1**.

4.2.1 Design criteria

Transport is committed to providing high quality, safe and efficient infrastructure and has adopted recognised standards and criteria to guide the development of the proposed modification.

The geometric design criteria for the design of the proposed modification are listed in Table 4-1. These were based on the criteria used for the original Westlink M7 design, and have taken into account the design guidelines in Austroads *Guide to Road Design* (Ausroads, 2021).

Table 4-1 Design criteria for road operation under proposed modification

Criteria	Standard
Design speed	110 kilometres per hour
Posted speed	100 kilometres per hour
Design vehicle	35.4 metre B-Triple
Lane width	Minimum 3.5 metres
Lane widening on horizontal curves	Lane widths would generally be 3.5 metres, as per the existing Westlink M7. In some sections, lane widening would be applied to Lane 2 (middle lane), of about 200-millimetre on curves with radii of 800 metres or less, in order to accommodate B-Triple vehicles
Nearside shoulder	Minimum 2.5 metres (including to face of barrier)
Offside shoulder	Minimum 1 metre

Criteria	Standard
Vertical clearance	5.5 metre minimum for shared path bridges 5.3 metre minimum for other structures
Horizontal curves	As per the existing Westlink M7
Vertical curves	As per the existing Westlink M7
Normal crossfall	3 per cent
Pavement design life	40 years (consistent with existing pavement)

4.2.2 Alignment and interchanges

The existing Westlink M7 would be widened within the existing median, to provide an additional lane in each direction (excluding through the Westlink M7/M4 Motorway (Light Horse) Interchange). Most of the existing bridges along the Westlink M7 would need to be widened to accommodate the additional lane in each direction.

In addition to increasing the number of lanes on the Westlink M7, the proposed modification would also result in the following key changes at the southern and northern extents of the operational footprint:

- Southern (M5 Motorway) connection (refer Figure 4-1):
 - Travelling northbound, the entry ramp from the M5 Motorway becomes the rightmost lane on the Westlink M7, while the leftmost lane terminates. The proposed modification would provide three lanes from where the M5 Motorway ramp enters the Westlink M7
 - Travelling southbound, the existing three lanes would continue to the dual lane exit to the M5 Motorway, after which the Westlink M7 would continue as a two-lane carriageway (as per current configuration)
- Northern (Richmond Road) connection (refer Figure 4-5):
 - Travelling northbound, the left lane would become the exit ramp, after which the remaining two lanes would shift laterally to tie into the existing two-lane carriageway
 - Travelling southbound, the existing southbound lanes would shift laterally toward the median and the entry ramp from Richmond Road would become the left lane.

Old Wallgrove Road to Westlink M7/M4 Motorway (Light Horse) Interchange

The proposed modification does not involve widening the Westlink M7/M4 Motorway (Light Horse) Interchange, however the following works would be undertaken to reduce congestion, particularly in the AM and PM peak periods.

Northbound carriageway:

- The northbound carriageway would be a three-lane approach from the south due to the widening within the median
- The entry ramp from Old Wallgrove Road would remain as it is currently
- At the approach to the Westlink M7/M4 Motorway (Light Horse) Interchange and M4 Motorway exit ramp, the left lane would become an exit lane toward the M4 Motorway, while a second exit lane would be available from the middle lane, creating a dual-lane exit toward the M4 Motorway
- From the exit to the M4 Motorway, the middle lane on the Westlink M7 would become the left lane and the northbound carriageway would become a two-lane carriageway
- Both the right lane and left lane would shift laterally to the west to align to the existing road through the Westlink M7/M4 Motorway (Light Horse) Interchange prior to reaching the first bridge that passes over an unnamed access road
- The northbound carriageway would continue as two lanes north of the M4 Motorway exit through the entirety of the Westlink M7/M4 Motorway (Light Horse) Interchange. North of the bridges over

the M4 Motorway, the widening into the central median would resume. At this point, the left and right lane would shift laterally to the east, with the new lane within the median becoming the right lane, and the former right lane becoming the left lane/eventual middle lane

- The entry ramp from the M4 Motorway would join the northbound carriageway and become the left lane of the now three-lane carriageway
- North of the entry ramp three lanes would be provided through to the Richmond Road bridge.

Southbound carriageway:

- The southbound carriageway would be a three-lane approach from the north due to the widening within the median
- On the approach to the M4 Motorway exit, currently an exit lane extends from the left lane of the southern carriageway. This configuration would remain the same
- The middle lane would then become the left lane as the southern carriageway proceeds south as a two-lane carriageway through the Westlink M7/M4 Motorway (Light Horse) Interchange
- The right lane created through widening the road into the median and the left lane would shift laterally to the east to align to the existing southern carriageway alignment through the Westlink M7/M4 Motorway (Light Horse) Interchange
- Widening into the median would continue after the Westlink M7/M4 Motorway (Light Horse) Interchange with the entry ramp from the M4 Motorway forming the left lane. At this point, the Westlink M7 southbound carriageway would continue as three lanes until the M5 Motorway.

The impacted areas at this interchange are shown in Figure 4-6 and Figure 4-7.

M12 Motorway/Elizabeth Drive Interchange

The approved M12 Motorway would connect the Westlink M7 to the approved Western Sydney International Airport. The M12 Motorway would extend west from the Westlink M7 at Elizabeth Drive, Cecil Park. The M12 Motorway project was approved in April 2021 by the Minister for Planning and Public Spaces under the EP&A Act. Construction of the M12 Motorway is expected to begin in 2022 and conclude in 2025 (with commissioning potentially occurring into 2026).

The design of the proposed modification has considered the interface with the M12 Motorway/Elizabeth Drive interchange. Subject to construction planning, it is proposed that the Westlink M7 interchange works for the M12 Motorway be constructed at the same time as the proposed modification as there are potential social and environmental benefits in delivering the intersection of these key arterial roads in an integrated manner that minimises disruption during construction and operation (refer to **Section 4.3.14** for further detail).

4.2.3 Road grade and lane widths

The road cross-section features for the proposed modification are detailed in Table 4-2. Existing lane widths would generally be retained, except where minor adjustments are required to accommodate B-Triple vehicles (refer to Table 4-1 for further detail). The centre median would be reduced by about 7 metres due to the widening into the median as part of the proposed modification.

Table 4-2 Road cross-section features (existing and proposed)

Road location	Existing	Proposed
Nearside shoulder	2.5 metres	2.5 metres
Lanes	2 x 3.5 metre-wide lanes	3 x 3.5 metre-wide lanes
Offside shoulder	1 metre	1 metre
Median width	17 metres (average)	10 metres (average)

The existing horizontal and vertical alignments would be retained as part of the proposed modification and would tie into the existing alignment of the Westlink M7.

4.2.4 Pavement works

The proposed modification would include the following pavement works:

- Widening of the carriageway into the median to provide the new lanes
- Modified entry and exit ramps
- Intersections and interchanges
- Widening of bridges to provide additional new lanes
- Tie-ins with arterial and local roads
- Tie-ins with property access roads
- Tie-ins with shared user paths and footpaths
- Tie-ins with median islands.

The existing pavement on the Westlink M7 contains an open graded asphalt wearing course. Pavement treatments would generally be designed to match the existing pavement type. In some locations, different types of pavement construction may be needed to suit underlying ground conditions. The choice of pavement type would be based on material availability, local experience, any noise mitigation requirements and whole of life cost. Pavements would be designed to minimise material wastage and would include re-using or recycling pavement where practicable.

4.2.5 Bridge works

A total of 43 bridges (including northbound and southbound bridges) would require widening across 23 locations. The widening of bridges would occur towards the median. No widening of bridges would occur at the Westlink M7/M4 Motorway (Light Horse) Interchange.

The bridge widening locations are described in Table 4-3 and shown in Figure 4-1 to Figure 4-5. The widening required to each bridge for the proposed modification would vary between 3 to 4 metres. The construction process for bridge widening work is outlined in **Section 4.3.9**, and would typically include establishment of new sub-structures (such as piers) and super-structures (such as decks and barriers).

The design for each bridge widening location would match with the existing bridge type. Existing ground access to creek lines and the shared path below the bridges would be reinstated following construction.

Table 4-3 Proposed bridge widening locations (from south to north)

Transport bridge number	Bridge over location description	Direction(s)
B9817	Maxwells Creek 1	Northbound
B9821	Maxwells Creek 2	Northbound
B9825	Bernera Road	Southbound
B9826; B9827	Cabramatta Creek	Northbound; Southbound
B9829; B9830	Hoxton Park Road/Wilson Road/Hinchinbrook Creek	Northbound; Southbound
N/A	Cowpasture Road	Northbound; Southbound
B9839; B9840	Aviation Road – over shared path and waterway	Northbound; Southbound
B9841; B9842	Hinchinbrook Creek	Northbound; Southbound
B9844; B9845	Unnamed creek at Cecil Hills and future access road	Northbound; Southbound
B9847; B9848	Elizabeth Drive	Northbound; Southbound
B9851; B9852	Villiers Road/Ropes Creek	Northbound; Southbound
B9853; B9854	Saxony Road	Northbound; Southbound
B9858; B9859	Redmayne Road	Northbound; Southbound

Transport bridge number	Bridge over location description	Direction(s)
B9861; B9862	Entry road 738-780 Wallgrove Road, Horsley Park [Austral Bricks]	Northbound; Southbound
B9863; B9864	Entry road Eastern Creek Waste Management Centre [SUEZ]	Northbound; Southbound
B9870; B9871	Reedy Creek	Northbound; Southbound
B9873; B9874	Reedy Creek tributary	Northbound; Southbound
B9893; B9894	Great Western Highway	Northbound; Southbound
B9898; B9899	Angus Creek	Northbound; Southbound
B8245; B9901	Main Western Railway Line (at Rooty Hill)	Northbound; Southbound
B9902; B9903	Woodstock Avenue	Northbound; Southbound
B9908; B9909	Shared path at Florence Street	Northbound; Southbound
B9910; B9911	Shared path at Simms Road	Northbound; Southbound

4.2.6 Drainage and stormwater management

The following changes and considerations are relevant to the proposed modification:

- The existing Westlink M7 drainage system was typically designed to accommodate additional runoff from a future widening (increase in the impervious surface area) into the median. Increasing the capacity of key elements of the drainage system would generally not be required to accommodate the proposed modification, except in some instances which is described further below.
- Widening into the median would reduce the overall median width and require the installation of road barriers. Where road barriers are proposed to be provided, drainage pits around the barriers, or drainage slots within the barriers, would be required. Inlets of drainage pits within the median would be modified to suit the raised level of the median.
- Upgrades would be required to the drainage along the outer road shoulder to accommodate additional surface water runoff associated with the new impervious areas from the widened carriageway. This would include changes to existing pits to improve inlet capacity and/or installation of additional new pits as well as increasing drainage pipe sizes in some locations.
- Bridge drainage would be impacted by the increased width of pavement. Existing drains and pipes on most of the widened bridges would need to be upgraded to accommodate the change in flows from the widened bridge structures. Runoff captured from the widened bridge deck would be captured in stormwater systems which discharge to water quality control and spill containment infrastructure, and typically any new or modified bridge drainage would be connected to the inground pavement drainage system.

Water quality and on-site detention basins

The existing water quality and detention basins (and spill containment infrastructure) were designed to accommodate a future widening into the median, however changes would be required to some basins to increase their capacity. For example, this would be required where the new pavement diverts runoff from the median to the shoulder resulting in catchment area being delivered to a different basin, or where the increased impervious catchment area exceeds the original design allowance for impervious catchment. The original design of the basins typically used earth bunds to form the basin walls, and in most basin locations the existing design uses all the available space within the Westlink M7 land. There is typically inadequate space to increase the volume of basins using earth bunds, and concrete basin walls or similar structural solutions would be required to provide additional volume within the available space. Drainage basin upgrades required would be confirmed during detailed design.

Flood mitigation infrastructure

The bridge waterway and transverse drainage structures along the existing Westlink M7 were designed to provide a 1% Annual Exceedance Probability (AEP) level of flood immunity to its carriageways. The level of flood immunity to the Westlink M7 would be maintained under post-proposed modification conditions.

Transverse drainage and flooding would not be impacted, except where the new bridge piers are in waterways or flood affected areas. The proposed new bridge abutments and piers have typically been aligned with existing abutments and piers to reduce the risk of potential adverse flood impacts.

Furthermore, the design of permanent works associated with the proposed modification has, and would continue to be, designed to minimise adverse flood related impacts on surrounding development and infrastructure. Assessment of flooding impacts associated with the proposed modification is provided in **Section 7.4** (Hydrology and flooding).

Waterway adjustments

The establishment of additional bridge piers would result in permanent waterway adjustments at the following bridge widening locations which cross over waterways:

- B9817 at Maxwells Creek (1)
- B9821 at Maxwells Creek (2)
- B9826; B9827 at Cabramatta Creek
- B9829; B9830 at Hinchinbrook Creek
- B9839; B9840 at waterway near Aviation Road
- B9841; B9842 at Hinchinbrook Creek
- B9844; B9845 at an unnamed creek at Cecil Hills
- B9851; B9852 at Ropes Creek
- B9870; B9871 at Reedy Creek
- B9873; B9874 at a tributary of Reedy Creek
- B9898; B9899 at Angus Creek.

These locations are shown on Figure 4-1 to Figure 4-5.

The additional bridge piers to be established would be constructed to sit parallel to the existing bridge piers. The exact nature and scale of potential creek adjustments would be confirmed during detailed design when the topography of each creek bed is surveyed in each bridge widening location.

The permanent waterway adjustments would be designed to have a similar waterway capacity to the existing channels in a way that mimics natural flow conditions. Changes to creek beds would be carried out in accordance with the *Policy and Guidelines for Fish Habitat Conservation and Management* (NSW Department of Primary Industries, 2013). The impacted waterways would be rehabilitated following construction in accordance with the landscape plans for the proposed modification.

The potential ecological impacts associated with waterway adjustments are assessed in **Section 7.6** (Biodiversity). Key considerations in relation to the *Fisheries Management Act 1994* are outlined in **Chapter 5** (Statutory context).

4.2.7 Noise mitigation

Noise walls

In order to mitigate operational noise traffic impacts, changes and additions to noise walls would be required, as is reasonable and feasible so as to achieve applicable operational noise level criteria at relevant, affected sensitive receivers, as detailed in **Section 7.2** (Noise and vibration) and **Appendix E** (Noise and vibration assessment). New and adjusted noise walls proposed are summarised in Table 4-4, and their indicative locations are shown on Figure 4-1 to Figure 4-5.

Table 4-4 New and adjusted noise walls proposed

Noise wall name	Existing or new noise wall
NW 18 extension	Existing noise wall to be extended
NW 33	Existing noise wall to be extended
NW Elizabeth Hills	Existing non-Westlink M7 noise wall to be duplicated and extended (i.e. new Westlink M7 noise wall to be installed adjacent to it)
NW Middleton Grange	Existing non-Westlink M7 noise wall to be duplicated and extended (i.e. new Westlink M7 noise wall to be installed adjacent to it)
NW Skipton Lane	New noise wall

At-receiver treatments

The preferred approach to mitigating operational traffic noise impacts from the proposed modification is with noise walls. However even after the installation of noise walls, some sensitive receivers would be exposed to operational traffic noise levels above applicable noise criteria and would be considered for at-property treatment.

The noise assessment has identified around 250 properties would potentially be eligible for at-property treatment consideration, this includes:

- Properties in Horsley Park, noting that these properties may potentially already have at-property treatment
- Properties at housing estates in Middleton Grange and Elizabeth Hills, noting that these properties may potentially already have at-property treatment
- Single receivers behind existing noise walls.

Although the noise wall assessment undertaken for the proposed modification identified 250 properties for at-property mitigation, in accordance with the *State Environmental Planning Policy (Transport and Infrastructure) 2021* (and specifically the former *State Environmental Planning Policy (Infrastructure) 2007*) the requirement for noise mitigation treatment at properties built after 2007 (i.e. post the commencement of operation of the Westlink M7) is the responsibility of the developer of those properties. As such, and as many of the newer properties adjacent to the Westlink M7 and built since 2007 would have already received at-property treatment, it is unlikely that all of the 250 properties identified would be considered for mitigation as part of the proposed modification.

4.2.8 Active transport changes

A shared path currently exists adjacent to the Westlink M7. Sections of the shared path would be temporarily impacted by construction activities and reinstated afterwards.

In general, no operational changes are proposed to the location and overall alignment of the shared path as part of the proposed modification. The only exception is at the M4 Motorway interchange where the proposed modification would create a dual lane exit to the M4 Motorway on the northbound carriageway. Currently, cyclists can access the Westlink M7 mainline from the shared path and cross the northbound exit ramp to the M4 Motorway as it is a single-lane exit. This would cease under the proposed modification.

To address potential safety risks to cyclists, the proposed modification would prohibit cycling on the Westlink M7 mainline between the M5 Motorway and Richmond Road. The restriction would improve cyclist safety associated with inadequate lighting in the area at night and travelling with high-speed vehicular traffic on the motorway, which has resulted in past fatal and critical cycling incidents. Instead, cyclists would be able to travel on the shared path that runs parallel to the M7. The shared path is connected with the local road network and illuminated 24/7, providing a safe alternative route to cyclists.

4.2.9 Public transport changes

No public transport facilities are proposed along the Westlink M7 as part of the proposed modification.

The proposed modification would not require any changes to existing public transport routes intersecting with the Westlink M7. Buses would continue to be able to access and use the Westlink M7 where bus routes intersect with the motorway.

As described in **Chapter 3** (Need for the modification and strategic context), current transport strategies do not identify the Westlink M7 as a strategic public transport route. However, the design of the proposed modification would not preclude use of the motorway for public transport facilities (e.g. on the new traffic lanes) in the future should there be a change to strategic transport policies.

4.2.10 Fencing

Existing controlled access fencing is provided along the Westlink M7. The purpose of the fencing is to separate the motorway from surrounding roads and nearby private properties to prevent unauthorised access to the motorway.

In general, no changes would be required to existing controlled access fencing along the Westlink M7 as part of the proposed modification. Should any new controlled access fencing be required or need to be replaced following construction, the design of the new or replaced controlled access fence would integrate with the existing fencing present along the motorway.

4.2.11 Cuttings and embankments

Existing embankments at the bridge widening locations would require temporary re-profiling in some locations to establish the additional bridge sub-structures (piles). This would generally include removal of part of the embankment. Embankments impacted during construction would be re-instated and stabilised to a similar condition following construction.

Where space is limited or there is a need to reduce land disturbance or vegetation clearing, retaining walls would be constructed in place of earthworks batters to minimise the area of ground disturbance. Existing retaining walls would also require reconstruction or relocation in some locations (subject to detailed design) and would generally be reinstated to their existing condition.

4.2.12 Utilities

There would be no change in operational management of utilities for the Westlink M7 such as supply of water, electricity, telecommunications and wastewater.

Utilities impacted during construction would be adjusted or protected during the works to maintain access and serviceability once the proposed modification is operational. This is described further in **Section 4.3.8**.

4.2.13 Roadside furniture, line marking and lighting

Roadside furniture, line marking and lighting infrastructure that would be installed or modified as part of the proposed modification is discussed below.

Road safety barriers

A new median barrier would be installed next to the additional lanes to match the existing design. A wire rope barrier would be installed along most of the median except at bridge approaches and departures, and other places where wire rope is not appropriate.

Work on the slow lane road shoulder would only be undertaken where necessary to modify drainage and at the dual-lane exit to M4 Motorway on the northbound carriageway. Any changes required to barriers on the road shoulder would be consistent with the existing barriers provided.

Median cross-overs and stopping bays

Median cross-overs would be reinstated at existing locations following construction.

Stopping bays would not be affected.

Road signs

Existing road signs in the median and road shoulders would require relocation and/or adjustment where directly impacted by the proposed modification. Adjustments to existing signs would include replacement of existing signs or new signs on existing signposts and gantries. Additional signs on new signposts would also be installed.

Line and pavement markings

The full width of the carriageways in each direction would be re-sheeted. All line and pavement marking would be reinstated. New line and pavement markings would also be installed to give drivers enough advance warning of lane changes once the proposed modification is operational.

Road lighting

The Westlink M7 has road lighting at interchanges next to the outside lane and generally, lighting poles would not be directly impacted by the proposed modification.

Widening of the bridge structures crossing over roads would impact street lighting within the affected roads, and similar impacts could occur to shared path lighting where extended bridge structures cross the shared path. Changes to road lighting in these locations would be undertaken in accordance with road lighting standards.

4.2.14 Operational ancillary facilities and traffic management

To support operation of the proposed modification, the tolling gantries just north of the M5 Motorway, would need to be fitted with equipment to accommodate three lanes in each direction. Minor adjustment to the location of toll gantries would be required at the interchange with the M5 Motorway (at the Westlink M7 northbound exit ramp). The tolling gantry at the northbound exit to M4 Motorway would be replaced by a gantry suitable to the dual-lane exit.

Other operational ancillary facilities would generally be reinstated in their existing arrangements following the construction period. There would also be ITS installations to cover the new lane configurations, including toll gantry adjustments, relocation of variable speed limit signs (VSLs) and variable message signs (VMS).

The Westlink M7 Operations Management and Control System (OMCS) would be updated to reflect the operational changes to the Westlink M7, including new traffic loops to cover the new lanes.

4.2.15 Landscaping and urban design

A landscape and urban design strategy would be implemented which considers both the existing urban design strategy and changes to be made under proposed modification (refer to **Section 7.10** (Landscape character, visual amenity and urban design) for further detail). The existing vegetation within the median as well as the bridge abutments and piers would be required to be removed during construction (see **Section 4.3.5**). Vegetation would be replanted in the remaining area, generally with indigenous species that are low maintenance, hardy to the local conditions, and take into account road safety requirements.

Sections of the existing Australian Light Horse Sculpture Parade (listed on the NSW War Memorial Register, a database of war memorials in NSW) and associated fig trees at the Westlink M7/M4 Motorway (Light Horse) Interchange would be impacted by the proposed widening. Detailed options for the removed fig trees and sections of the memorial are being explored in consultation with key stakeholders, and a reinstatement plan will be prepared. The final modification option and reinstatement plan would seek to maintain the integrity and significance of the memorial as whole and would be developed in consultation with the artist, NSW Returned Services League (RSL) and NSW Office of Veteran Affairs (refer to **Chapter 6** (Consultation)). The indicative impact on the memorial is provided in Figure 4-6 and Figure 4-7.

Landscape and visual impacts of the proposed modification, including in relation to the memorial, are assessed in **Section 7.10** (Landscape character, visual amenity and urban design).

Final design of modified artwork to be developed in consultation with key stakeholders

Interchange Drive

Wallgrove Road

Indicative encroachment of operational footprint of around 3m into median

Indicative encroachment of operational footprint of around 3m into median

Indicative encroachment of operational footprint of around 4.5m into median

Indicative encroachment of operational footprint of around 4m into median

Indicative encroachment of operational footprint of around 3m into median

Indicative encroachment of operational footprint of around 3m into median





Operational road carriageway footprint (up to back of verge)

- ### General alignment of artwork poles

- - Potentially impacted by proposed widening
- - Areas of the artwork which would not be impacted by the widening

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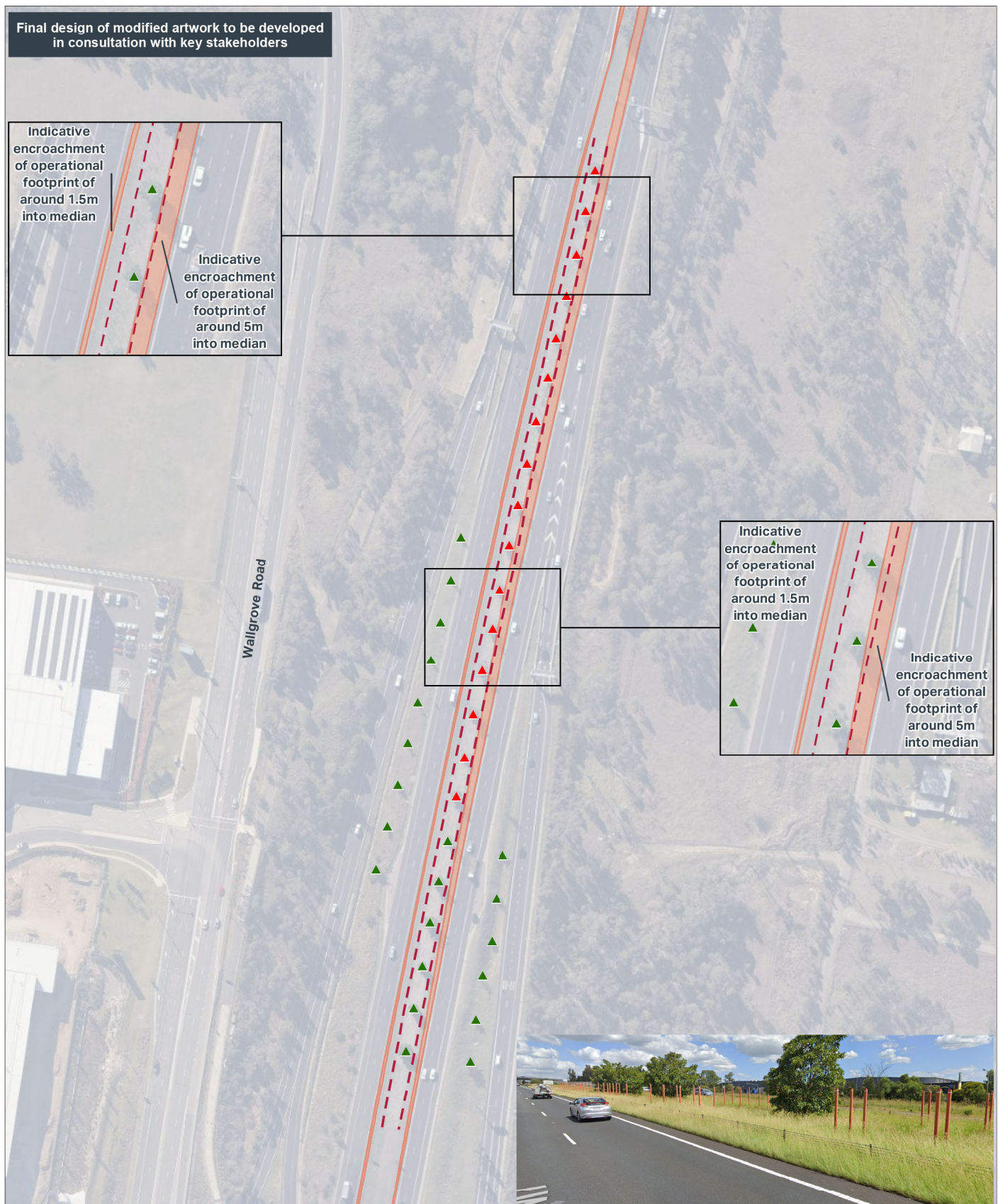


FIGURE 4-7: IMPACTED AREAS OF THE AUSTRALIAN LIGHT HORSE SCULPTURE PARADE (NORTH OF M4 MOTORWAY INTERCHANGE)

Legend

Operational road carriageway footprint (up to back of verge)

▲ Tree not impacted by proposed widening

▲ Tree impacted by proposed widening

General alignment of artwork poles

- - Potentially impacted by proposed widening

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4.2.16 Property access, adjustments and acquisition

Property access

Potential impacts to property access would be limited, and temporary during the construction phase of the proposed modification.

Existing property access arrangements would be maintained following construction. Any property accesses impacted during construction would be reinstated to a similar condition.

Access to all existing and proposed infrastructure for maintenance purposes would be maintained or alternative maintenance access arrangements developed as required.

Property acquisition and leasing

No permanent property acquisition would be required for the proposed modification. Eleven parcels of land would be subject to temporary lease for use as construction ancillary facilities as described in **Section 4.3.12**.

Property adjustments

Permanent property adjustments for the proposed modification would be limited to additional noise mitigation measures as noted in **Section 4.2.7**, and described in **Section 7.2** (Noise and vibration).

4.3 Construction

The detail of the design and construction approach presented is indicative and subject to detailed design and construction planning. The construction strategy presented and assessed for the proposed modification aims to provide an assessment of probable construction methodologies, while retaining flexibility for the construction contractor(s) to refine the construction methodology and detailed design following their appointment.

Construction planning would consider specific work methods and scheduling to manage community and environmental issues including noise, access, amenity and general disruption, and ensure concurrence with Work Health and Safety legislation. Construction planning would also seek to minimise impacts to the Westlink M7 during peak traffic periods, where feasible and reasonable. Equipment and plant requirements would be confirmed during detailed design and during the development of the construction methodology by the construction contractor(s). Management and mitigation measures to address environmental impacts during construction would be incorporated into the Construction Environmental Management Plan (CEMP) for the proposed modification, and are included in **Appendix B** (Compilation of mitigation measures).

Any changes to the proposed modification during detailed design and construction planning would remain generally consistent with this modification report, any changes arising from a Response to Submissions Report, and Conditions of Approval (if the modification is approved). Changes would be subject to further assessment and consultation, if required under the EP&A Act.

4.3.1 Construction footprint

The 'construction footprint' is the total area required to construct the proposed modification. The construction footprint includes those areas required for roadworks, bridge works, noise wall works, access for construction vehicles and plant, drainage infrastructure, temporary sediment basins/controls, utilities and services adjustments, temporary stockpiles, property adjustments and temporary construction ancillary facilities (including construction laydown areas).

The construction footprint was established to minimise environmental impacts while providing sufficient room to allow the proposed modification to be constructed. The total construction footprint (including construction ancillary facilities) is about 145 hectares and is shown in Figure 4-8 to Figure 4-12.

The construction footprint is subject to detailed design and construction planning. Some factors that could affect the final construction footprint include the location and size of water quality basins, the construction methodology, and access arrangements made with directly affected landowners.

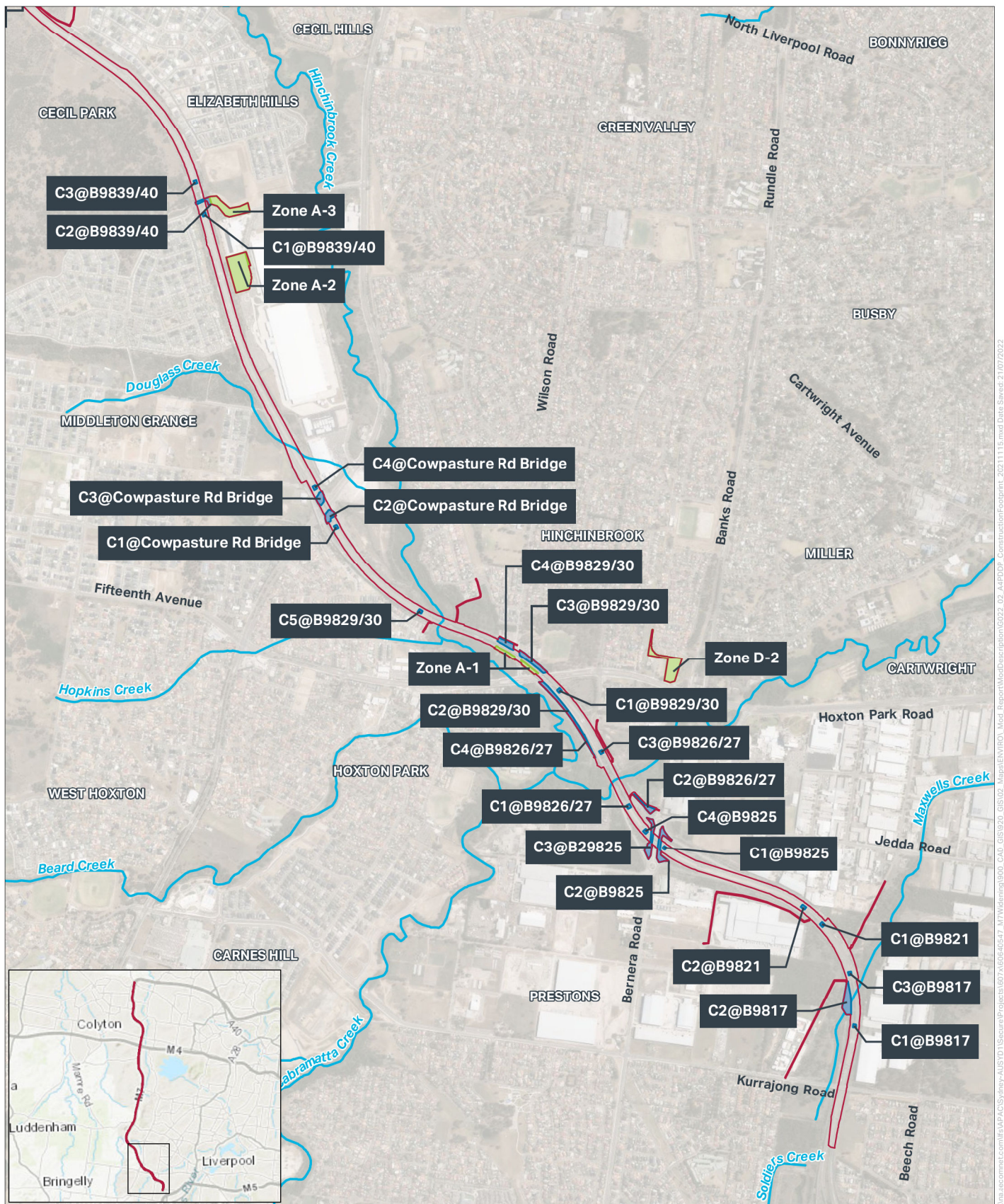


FIGURE 4-8: CONSTRUCTION FOOTPRINT FOR THE PROPOSED MODIFICATION (SHEET 1 OF 5)



AECOM

Legend

Construction footprint

Construction Ancillary Facilities

Site construction ancillary facility

Zone construction ancillary facility

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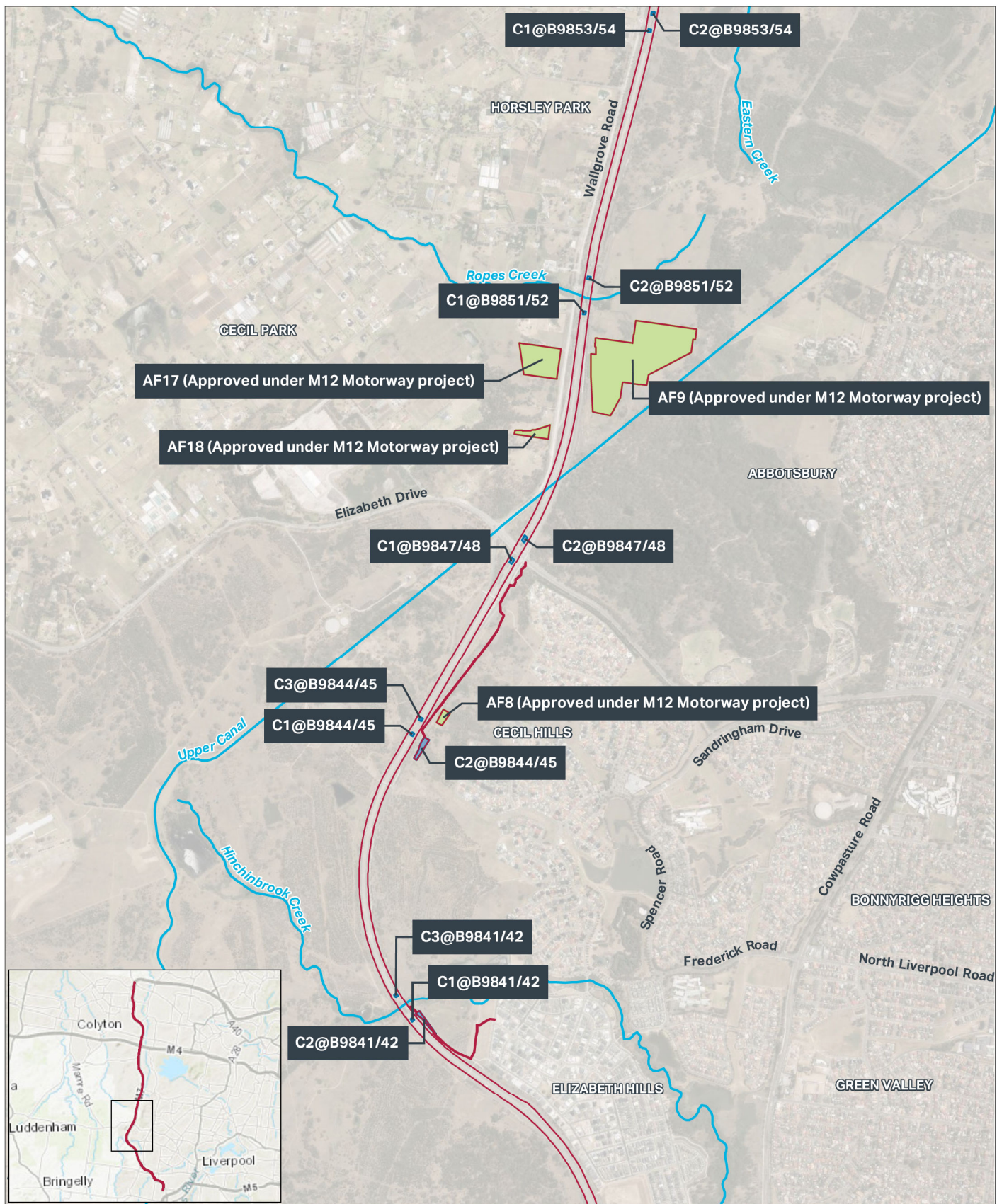


FIGURE 4-9: CONSTRUCTION FOOTPRINT FOR THE PROPOSED MODIFICATION (SHEET 2 OF 5)



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Legend

Construction footprint

Construction Ancillary Facilities

Site construction ancillary facility

Zone construction ancillary facility

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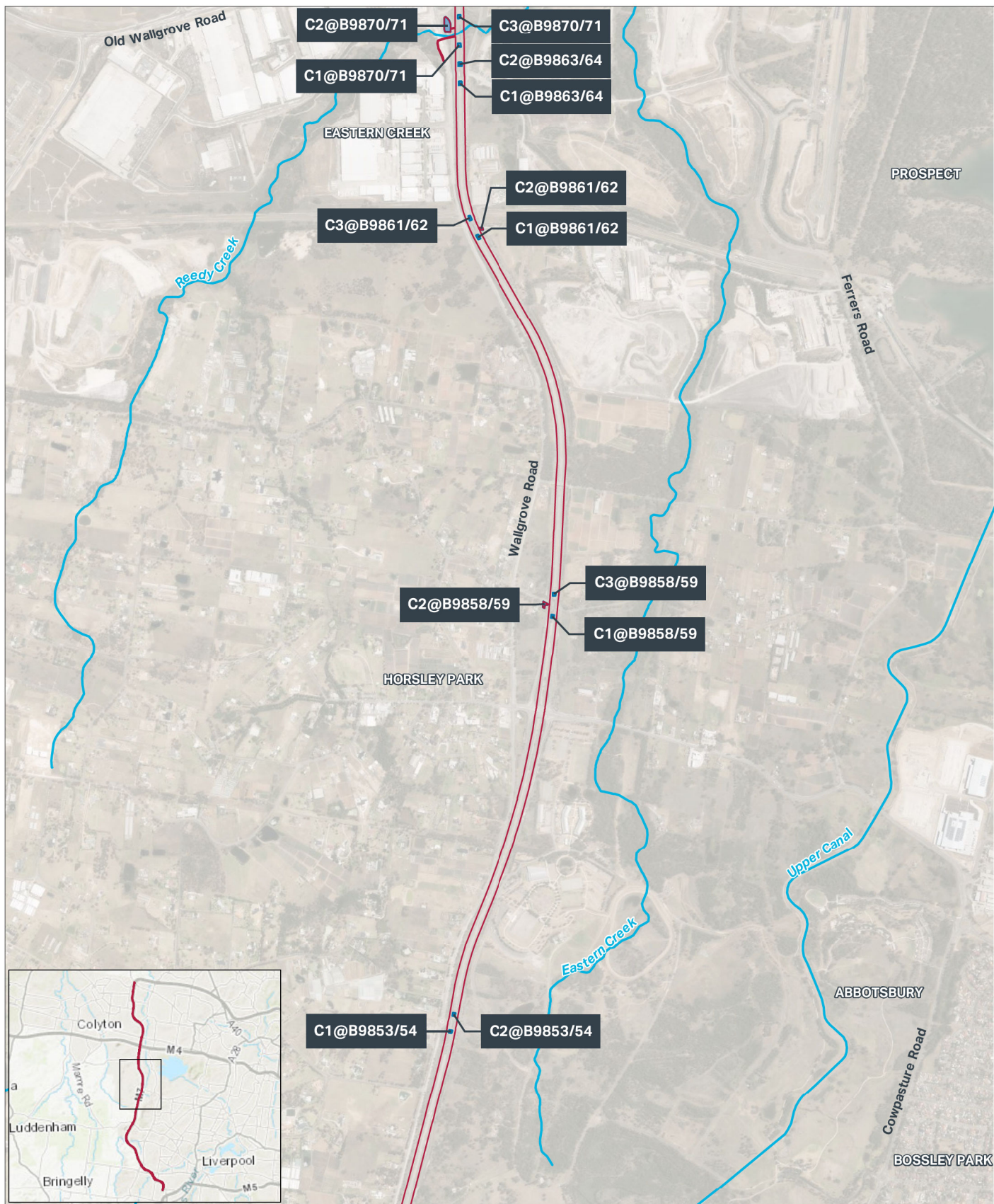


FIGURE 4-10: CONSTRUCTION FOOTPRINT FOR THE PROPOSED MODIFICATION (SHEET 3 OF 5)



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Legend

- Construction footprint
- Construction Ancillary Facilities**
- Site construction ancillary facility

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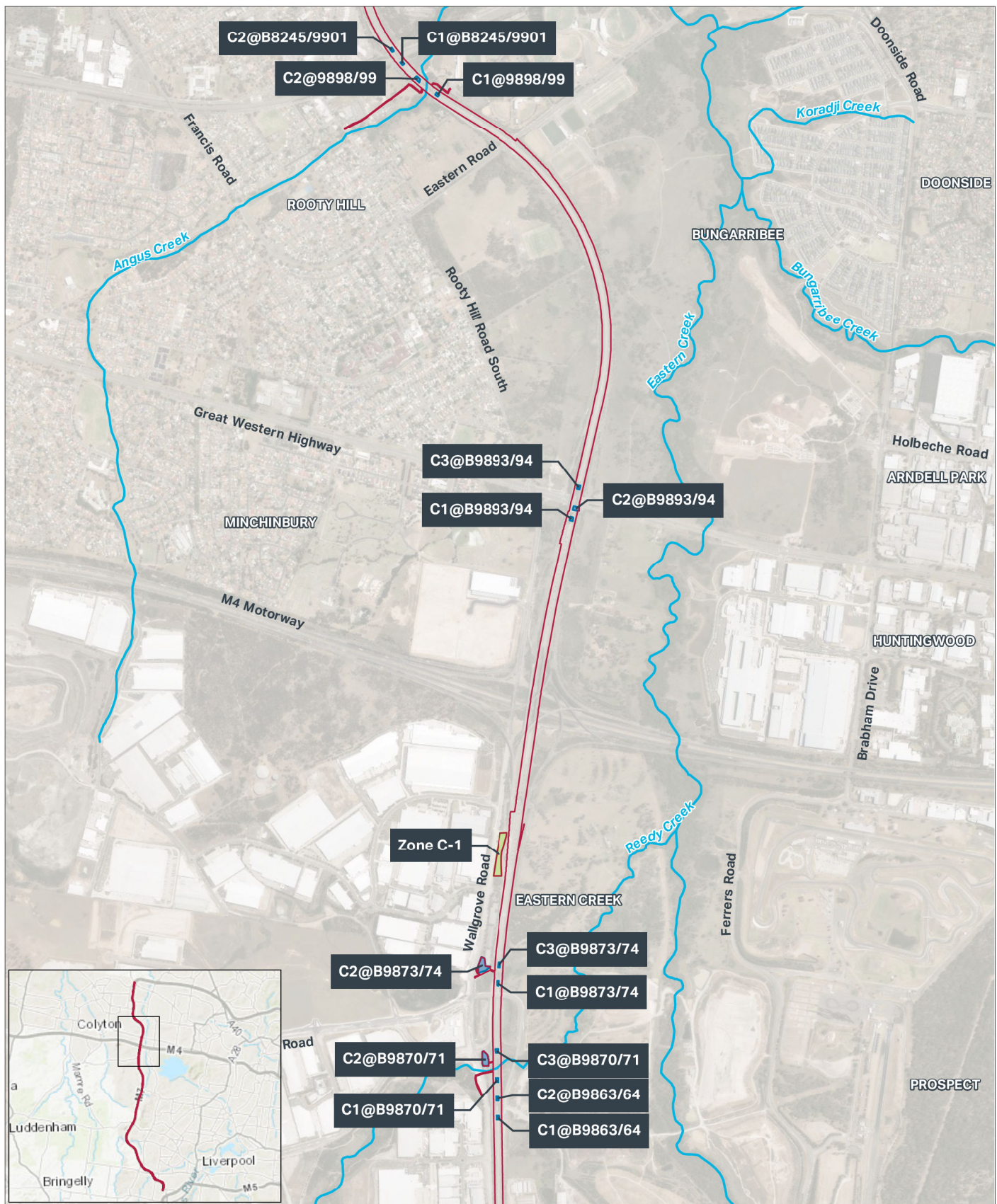


FIGURE 4-11: CONSTRUCTION FOOTPRINT FOR THE PROPOSED MODIFICATION (SHEET 4 OF 5)



AECOM

Legend

Construction footprint

Construction Ancillary Facilities

Site construction ancillary facility

Zone construction ancillary facility

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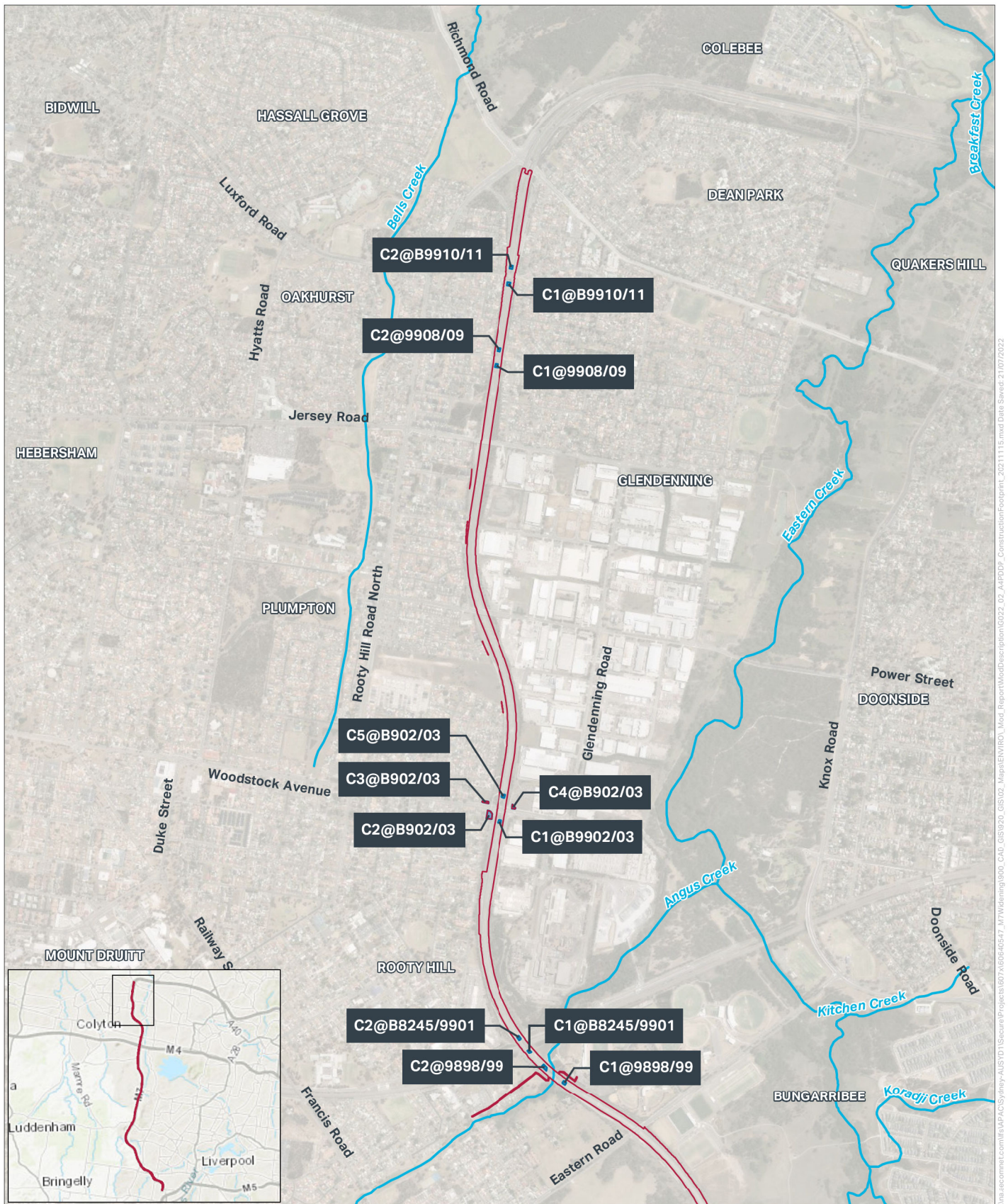


FIGURE 4-12: CONSTRUCTION FOOTPRINT FOR THE PROPOSED MODIFICATION (SHEET 5 OF 5)



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Legend

- Construction footprint
- Construction Ancillary Facilities**
- Site construction ancillary facility

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4.3.2 Overview of construction activities

Construction of the proposed modification would generally include the activities described in Table 4-5 and detailed further in the following sections.

It is expected that many of these construction activities would occur at the same time and consecutively across different locations within the construction footprint.

Table 4-5 Key construction activities

Component	Typical activities
Site establishment and enabling works	• Site investigations (environmental and utilities as required) • Installation of site offices, crib rooms and amenities • Vegetation clearing and removal • Traffic management measures • Potential temporary diversions to property access • Installation of safety and environmental controls • Installation of site fencing and hoarding • Establishment of temporary noise attenuation measures • Temporary removal of some areas of the Australian Light Horse Sculpture Parade (to be stored and reinstated elsewhere within the memorial following construction) • Establishment of construction ancillary facilities and access • Supply of utilities to construction ancillary facilities as required • Establishment of temporary pedestrian and cyclist diversions as required • Temporary adjustments to controlled access fencing along the Westlink M7 • Demolition of existing buildings and structures, where required. This may also be undertaken in subsequent construction stages, subject to detailed construction planning
Utility works	• Site investigations to identify and mark up utilities requiring relocation and protection • Utility relocation and protection
Earthworks	• Topsoil stripping • Excavation of cut areas and placement to fill areas (where feasible), and trucking of spoil offsite • Construction of required retaining structures • Establishment and stabilisation of new ground levels
Bridge works	• Establishment of temporary waterway crossings/diversions • Piling and construction of piers and abutments • Installation of girders/beams • Construction of bridge decks, slabs and associated barriers
Drainage works	• Construction of new pits and pipes where required along road carriageway • Connection of new drainage to existing network • Adjustments to existing drainage infrastructure to tie into new drainage infrastructure • Demolition and removal of redundant drainage
Pavement works	• Placement of selected material zone and pavement layers • Installation of road pavement surfacing • Construction of pavement drainage

Component	Typical activities
Finishing works	• Line markings on new road surfaces • Erection of directional and other signage and other roadside furniture • Earthworks at disturbed areas to establish the finished landform • Landscape reinstatement, including plantings • Completion of work on the Australian Light Horse Sculpture Parade • Construction of new noise walls and adjustments to existing noise walls • Reinstatement of cyclist and pedestrian facilities, property access and fencing • Site demobilisation and rehabilitation

4.3.3 Construction ancillary facilities

Construction ancillary facilities would be required at different locations across the construction footprint to support the construction of the proposed modification.

The construction ancillary facilities would generally comprise:

- Temporary buildings including offices and meeting rooms, amenities and first aid facilities
- Hardstand parking areas with sufficient space to accommodate the numbers of construction workers expected at any site
- Materials laydown, storage and handling areas, including stockpiling areas, and purpose-built temporary structures as required and appropriately bunded storage for hazardous and non-hazardous substances
- Secure perimeter fencing, including visual screening of construction ancillary facilities where necessary
- Bridge construction support areas
- Workshops with appropriate safety and environmental controls for servicing plant and equipment.

Where temporary lease of a property for this purpose includes buildings or sheds, those buildings may be reused as site offices or compound facilities.

Some areas of land would need to be leased for construction ancillary facilities and accesses. This land would be restored to its existing condition upon completion of construction, or as otherwise agreed with the relevant landowner.

Construction ancillary facilities would be progressively restored when no longer required, to minimise potential for dust generation, erosion and sedimentation, and visual impacts.

The following considerations were used to guide the selection of the construction ancillary facilities:

- Located more than 50 metres from a waterway, except for the bridge sites in riparian areas
- Located within or adjacent to land where construction work is being carried out
- Presence of readily available access to the road network
- Minimise the need for heavy vehicles to travel through residential areas
- Located on relatively level land, to minimise the need for earthworks to create a useable area
- Located at least 200 metres from nearest residences where possible
- Require minimal vegetation clearing
- Avoid and minimise impact on heritage items (including areas of archaeological sensitivity)
- Avoid unreasonably affecting the land use of adjacent properties

- Located in areas above the one in 20-year Average Recurrence Interval (ARI) flood level, unless a contingency plan to manage flooding hazards is prepared and implemented (subject to detailed design and construction planning).

Given the relative lack of available land next to the existing carriageway within the Westlink M7 lease area, larger construction ancillary facilities would be located on leased vacant land, farmland, parkland, commercial office space or industrial land near the Westlink M7. It is proposed to use some construction ancillary sites approved under the M12 Motorway project which are located near the Westlink M7 at Cecil Hills. These construction ancillary facilities are referenced as AF8, AF17, AF18 and Zone B (approved under the M12 Motorway project as 'AF9').

Construction ancillary facilities would include 'zone' and 'site' construction areas:

- Zone construction ancillary facilities would likely serve as construction management offices for site-based personnel, and may also provide ablutions, induction areas, material laydown and storage, car parking and shuttle bus pick up. Shuttle buses would be considered on an as needed basis based on staffing numbers to convey workers from the construction ancillary facilities to the construction sites, given most of the work would be within the median area. The zone construction ancillary facilities proposed are described in Table 4-6.
- Site construction ancillary facilities would be provided at each of the work fronts to provide ablutions, material laydown and storage areas and carparking for example. It is anticipated that these would be established within the median along the road widening and bridge construction areas. Larger site construction ancillary facilities would also be required at surrounding road level for the larger multi-span bridge widening works.

A project management head office would be established with central facilities for construction, space for clients, designers, construction contractor staff and independent verifiers.

The proposed haulage routes to and between construction ancillary facilities is detailed in **Section 4.3.17**.

The scope of establishment works at each construction ancillary facility would typically include most (or all) of the following:

- Survey of the area
- Identification and protection of utilities
- Vegetation clearing for site access and set up area
- Establishment of environmental controls
- Ground preparation (earthworks and establishment of hardstand surfaces) for site access and set up area
- Establishment of temporary waterway crossings and/or diversions (where access areas cross creeks)
- Installation of wheel wash facilities or rumble strips
- Installation of security fencing, screening and information signs
- Establishment of temporary buildings, fences, equipment and materials
- Connection of temporary services, if available
- Protection or temporary detour of the existing shared path, where construction would impact or occur near the shared path.

The carriageway median work sites would be cleared as part of the construction work requirements from the edge of existing pavement northbound to edge of existing pavement southbound. The bridge work sites would be cleared as required by the bridge design and area required for site access routes and laydowns, office facilities, car parking and the general working area.

'Zone' construction ancillary facilities would require utilities such as power, water, sewer and communications services to operate. These areas would connect into existing utilities if they are available nearby and it is practical for them to be used. Where this is not possible, direct connection would be supplied by the following (all of which require regular maintenance and servicing):

- Portable generators
- Relocatable potable water tanks
- Portable toilet facilities and
- Mobile communication devices.

The final type, use, location and number of construction ancillary facilities would be determined by the construction contractor and identified in a site establishment management plan and/or CEMP.

Table 4-6 Location and description of proposed 'zone' construction ancillary facilities

Ancillary facility identifier	Location	Type of work	Access	Approximate Area (m ²)
AF18 Site approved under M12 Motorway project	87-95 Wallgrove Road, Cecil Park [M12 Motorway project area]	Zone construction ancillary facility	From State road (Wallgrove Road)	1,200
AF17 Site approved under M12 Motorway project	125-151 Wallgrove Road, Cecil Park [M12 Motorway project area]	Zone construction ancillary facility	From State road (Wallgrove Road)	4,500
Zone A-1	Road level below the Hoxton Park Road Viaduct, with access from Wilson Road (Westlink M7 chainage Ch-4500)	Zone construction ancillary facility	From local road (Wilson Road)	4,000
Zone A-2	Road level at western side of Blackbird Close [Lots 402 and 403 DP114190] (Westlink M7 chainage Ch-6400)	Zone construction ancillary facility	From local roads (Aviation Road and Blackbird Close) and from State road (Cowpasture Road)	16,000
Zone A-3	Road level at Aviation Road [includes road reserve at Aviation Road and Lot 101 DP 1158385] (Westlink M7 chainage Ch-6700)	Zone construction ancillary facility	From local road (Aviation Road) and from State road (Cowpasture Road)	5,000
Zone B Site approved under M12 Motorway project as 'AF9'	Western Sydney Parklands [Lot 12 DP 1021940] (east of M7, north of M12 off 112-128 Wallgrove Road) (Westlink M7 chainage Ch-11500)	Zone construction ancillary facility	From State road (Wallgrove Road)	14,000

Ancillary facility identifier	Location	Type of work	Access	Approximate Area (m ²)
Zone C-1	Road level near intersection of Wonderland Drive and Wallgrove Road (Westlink M7 chainage Ch-19000)	Zone construction ancillary facility	From State road (Wallgrove Road) and M7 shared path	6,000
Zone D-2	345 Hoxton Park Road, Hinchinbrook [Lot 1 DP 626941]	Zone construction ancillary facility	From State road (Hoxton Park Road)	9,000

Precast elements

Given the limited amount of space, a dedicated precast yard would not be established within the construction footprint. Concrete elements ('Super T' structures, planks, box culvert sections, etc.) would be precast off site at established precast yards facilities and transported to site for installation.

Steel fabrication laydown yard

Several of the larger span bridge widenings would use large steel components (box girders, etc.). The construction contractor would need to undertake some steel fabrication works near the construction footprint to minimise the size of components being transported to site. This would require the installation of workshops and storage containers.

Steel fabrication and laydown yards would be located on leased vacant or industrial land (outside of the Westlink M7 lease area), given the lack of available space within the Westlink M7 lease area.

Laydown areas would be required for delivery and storage of oversized steel components that would be transported to site. These sites would be situated in a flat area accessible by oversized trucks within close proximity to the works and would be located away from residential areas.

4.3.4 Site establishment and pre-construction activities

Site establishment works anticipated are listed in Table 4-5 and described further in this section. Details on the proposed construction ancillary facilities are provided in **Section 4.3.3**.

There would be some mobilisation and site establishment activities before the main construction activities begin. The purpose of these activities would be to prepare the site, gather additional information, install environmental controls where necessary, and enable a more efficient construction program. These activities would fall into two categories for assessment and approval purposes, which are described below.

Pre-construction activities excluded from the proposed modification

The approved project is considered to be State Significant Infrastructure (SSI) under the EP&A Act (refer to **Chapter 5** (Statutory context) for further detail). Typically, SSI declarations catalogue a list of works that are excluded from the definition of the project and can be carried out as exempt development or through Part 5, Division 5.1 of the EP&A Act assessment process. These works are therefore not bound to the Conditions of Approval. Such works may include surveys, test drilling, test excavations, geotechnical or contamination investigations or other tests, utility location identification or surveys, sampling or investigation for the purposes of the design or assessment of the proposed modification.

Pre-construction activities controlled by the approval

Some pre-construction activities that are not able to be carried out as exempt development or through Part 5, Division 5.1 of the EP&A Act assessment process may still take place before the formal approval of a CEMP by the Secretary of the Department of Planning and Environment, and before the main construction work begins.

These pre-construction activities would be carried out in accordance with the standard NSW Conditions of Approval for SSI projects and would be managed by either separate environmental management plans, site establishment management plans or environmental work method statements depending on the scope of the activity.

Pre-construction activities controlled by the approval for the proposed modification would generally include:

- Installation of construction and advisory signs
- Installation of environmental controls
- Adjustment, relocation and protection of public utilities and services
- Site establishment activities, such as:
 - Construction ancillary facilities, including minor clearing, access tracks, minor earthworks, installation of office accommodation, utilities and other facilities
 - Construction site fencing, signage and lighting
 - Construction site access points, traffic management measures, alternative public access routes and diversions, including any minor road modifications
 - Offices in existing buildings
- Stockpiling of fill that may be available before construction starts
- Removal of waste and remediation of contaminated land for site preparation (where required)
- Activities prior to vegetation clearing:
 - Pre-clearing surveys
 - Marking out 'no go' zones and protection measures
 - Identifying fauna habitat trees and fauna release areas through pre-clearing surveys
 - Establishing temporary drainage and sedimentation and erosion control measures
- Precondition surveys of existing assets and adjacent properties.

4.3.5 Vegetation clearing

The existing vegetation within the median and bridge widening footprint would be required to be removed as part of the proposed modification. Some vegetation would also need to be removed from the construction ancillary facility sites and at the locations of noise wall construction. Further detail on the vegetation proposed to be removed and the potential biodiversity impacts associated with this is provided in **Section 7.6** (Biodiversity) and **Appendix H** (Biodiversity Development Assessment Report).

4.3.6 Earthworks

Earthworks would be required to facilitate the proposed modification. Earthworks would occur in relation to:

- Topsoil stripping
- Bulk excavation/cutting work and placement and compaction of fill
- Construction of retaining walls
- Embankment works
- Preparation of site and access for construction of bridge widening works
- Preparation of site and access for construction of all pavement widening works in the median
- Installation of road drainage infrastructure.

Generally, earthworks would be undertaken using common civil earthwork methods. Excavated material would be placed into trucks, which would either remove and dispose of the material or stockpile the material for future use. Material excavated during earthworks would be re-used in construction where possible. Potential spoil for re-use would be confirmed during detailed design, however, is expected to be limited.

Fill material would be deposited from trucks to the location it is required and then spread with a grader and/or excavator and compacted using vibratory rollers or similar. During earthworks, water trucks would apply water to assist the compaction of the material and to control dust emissions.

Table 4-7 outlines the estimated types and volumes of materials that would be managed during construction and provides the recommended management approach for each material.

Table 4-7 Estimated earthworks quantities required for the proposed modification

Type of material	Estimated quantity (cubic metres)	Management approach
Total fill material required	30,000	Where possible, source on site from cuts required for the construction of the proposed modification. Alternatively, use imported material, to be sourced locally where practical.
Total cut material to be excavated	204,000	It is anticipated that the majority of excavated material would be exported off site, given that minimal fill material would be required. There is potential for some reuse of excavated material within the site as general fill either within the same section of work or elsewhere along the construction footprint. Excavated material would generally be removed via construction gates at pavement widening areas, and transported via the Westlink M7. Where material cannot be reused on site, it would be managed in the following order of priority: 1. Transfer to other Transport projects for reuse in accordance with the NSW EPA's excavated public road resource recovery order and exemption 2. Transfer to approved Transport stockpile sites for reuse on a future project if a specific project was identified and statutory/regulatory requirements under the <i>Protection of the Environment Operations Act 1997</i> are met 3. Transport off-site for reuse by a third party in accordance with relevant NSW EPA resource recovery order and exemption or to a NSW EPA licensed waste recovery facility 4. Dispose at licenced materials recycling or waste disposal facility. Where excavated material is deemed unsuitable for reuse or emplacement due to contamination, it would be taken to a waste facility licensed to accept the waste.
Total net material to be exported	174,000	As above, it is anticipated that the majority of excavated material would be exported off site, given that minimal fill material would be required.
Topsoil imported	25,000	Where possible, topsoil stripped would be reused on site. Any material to be removed from site would be managed in accordance with the waste management measures.
Select material zone import	122,000	Import material, locally sourced where practicable.

It is possible that asbestos containing material (ACM) may be encountered during earthworks. Where this occurs, a potential management approach may be to contain the material on site and encapsulate it under the road pavement in high fill areas. Alternately, the preferred management approach may be to remove the material for disposal offsite. The preferred management approach, and the need for encapsulation and identification of suitable encapsulation areas would be further investigated during detailed design and construction. The potential for encountering ACM and possible management measures are discussed further in **Section 7.11** (Soils and contamination) and **Appendix L** (Contamination assessment).

4.3.7 Demolition

The construction of the proposed modification would require the demolition and removal of existing structures and infrastructure located within the construction footprint. This would include:

- Bridge barriers and supports impacted by the proposed modification
- Existing pavement and roadway impacted by the proposed modification
- Median barrier treatments
- Retaining walls
- Road signs
- Existing noise walls and barriers
- Existing utilities requiring relocation
- Existing drainage infrastructure requiring relocation
- Fencing treatments.

Demolition waste would be taken to an appropriate licenced facility for recycling or reuse as appropriate. Waste management for the proposed modification is discussed further in **Section 7.16** (Waste).

4.3.8 Utility works

There are a number of minor and major utility services crossing the Westlink M7. Most of the utilities cross within surrounding roads, either in those crossing under the Westlink M7 or on bridges crossing above the motorway. Many of the existing motorway bridges would be widened to accommodate the additional traffic lanes and utilities would need to be adjusted as part of the bridge widening works.

There are also utility services which cross the Westlink M7 between surrounding local roads. Existing utility services crossing the motorway corridor between these roads have typically been adjusted or protected for the full width of the motorway formation during the original Westlink M7 construction works, and in the majority of cases would not be directly impacted by the pavement widening and drainage works in the median.

Westlink M7 motorway services connecting to variable speed limit signage and other infrastructure in the median would be impacted by the pavement widening, drainage works and relocation of infrastructure which they supply. The impacted Westlink M7 services would be protected or relocated as required.

Potential utilities requiring adjustment to accommodate the proposed modification are outlined in Table 4-8. As the extent of impact would be confirmed during detailed design and construction planning. The construction contractor would review and confirm the need for utility adjustments.

The following significant utilities would require specific consideration during construction planning:

- Overhead electrical transmission lines at sites including Cabramatta Creek, Hoxton Park Road, and Villers Road bridges
- The Warragamba to Prospect Water pipe lanes may require significant protection measures and working restrictions (e.g. no vibratory compaction)
- WaterNSW Upper Canal, which runs north–south within an easement and crosses under Westlink M7

- Westlink M7 ITS
- Existing stormwater box culvert near Woodstock Avenue/Westlink M7 overbridges
- Existing stormwater box culvert near Great Western Highway/Westlink M7 overbridges
- Jemena Eastern Gas Pipeline and Wilton to Horsley Gas Trunk Main, crossing beneath Elizabeth Drive on western side of Westlink M7.

Consultation with the relevant utility providers would be undertaken to confirm the presence of utilities and refine potential utility adjustments and utility protection measures (with a view to avoiding impacts if possible, and protecting or adjusting if required). The final construction methodology would consider any special measures required to avoid impacts on these services during construction, where possible.

Table 4-8 Utilities likely to require adjustment or protection for the proposed modification

Asset owner	Asset type	Location
Endeavour Energy	High and low voltage transmission and distribution lines Street lighting	11 kV Endeavour Energy overhead connections and low voltage local connections. 33 kV Endeavour Energy major transmission line on Elizabeth Drive. 132 kV Endeavour Energy overhead transmission line crossing Elizabeth Drive perpendicular to its alignment. Endeavour Energy East Wallgrove Switching Station located beneath Westlink M7 bridges. Street lighting on local and State roads interfacing Westlink M7.
Jemena	Trunk mains and pipelines	Eastern Gas Pipeline in Western Sydney Parklands, crossing Elizabeth Drive and running parallel to Wallgrove Road Wilton – Horsley trunk main in Western Sydney Parklands, crossing Elizabeth Drive and the Westlink M7. Great Western Highway trunk mains, crossing the Westlink M7 in two locations north of Great Western Highway.
Optus	Optic fibre and coaxial cables and several mobile phone towers	Roads interfacing with Westlink M7 bridges.
Sydney Water	Pipelines and mains	Roads interfacing with Westlink M7 bridges.
Water NSW	Upper Canal and large diameter water pipelines	Upper Canal in a tunnel below Western Sydney Parklands and the Westlink M7, and a Sydney Water reservoir in Western Sydney Parklands.
	Large diameter water pipelines	Large diameter water pipelines conveying water from Warragamba Dam to Prospect water filtration plant cross the Westlink M7 at Eastern Creek.
Telstra	Optic fibre and coaxial cables and several mobile phone towers	Roads interfacing with Westlink M7 bridges.
Transgrid	Transmission and distribution lines	330 kV TransGrid transmission line crossing the proposed M12 Motorway in Western Sydney Parklands.
Uecomm	Optic fibre and coaxial cables and several mobile phone towers	Roads interfacing with Westlink M7 bridges.

Asset owner	Asset type	Location
Westlink M7	ITS communications power supply	Westlink M7 shared path and median Westlink M7 ITS backbone is located within the Westlink M7 shared path
	Underground power supply (street lighting)	Westlink M7 road corridor
Council	Stormwater drainage	Surrounding roads interfacing with Westlink M7 bridges.
Transport	Stormwater drainage	State roads interfacing with Westlink M7 bridges.
	Traffic signals	State roads interfacing with Westlink M7 bridges.
	Communications infrastructure	State roads interfacing with Westlink M7 bridges.
Sydney Trains	Rail bridge crossing	Crosses with Westlink M7 near Rooty Hill Station.

4.3.9 Bridge widening construction

The bridges proposed to be widened are described in **Section 4.2.5** and shown on Figure 4-1 to Figure 4-5. Site-specific opportunities and constraints identified during detailed design may require alternative construction techniques. Widening of bridge structures would generally involve the following main stages:

- Site preparation, including establishment of site access and laydown areas, utility works and creek adjustments (temporary diversions and/or crossings)
- Construction of sub-structures, including piles, abutments, piers and headstocks
- Construction of super-structures, including beams, girders, decks and barriers.

The design and construction of the bridge widening locations would consider the requirements of the *Policy and Guidelines for Fish Habitat Conservation and Management* (NSW Department of Primary Industries, 2013).

Construction at each bridge widening location would be undertaken from both the local road or ground level (primarily for the sub-structures) and from the Westlink M7 (primarily for the super-structures).

Construction of the sub-structures near existing roads would require temporary lane closures and traffic detours. Full road closures over extended periods would not be required, however closures over short periods would be required to facilitate critical construction activities that cannot otherwise be practically carried out.

Construction of the super-structures would require temporary lane closures and traffic detours on the Westlink M7. Traffic detours would only be required at night time. Temporary road closures over short periods would be required to facilitate critical construction activities that cannot otherwise be practically carried out. Full road closures over extended periods would not be required.

Temporary closure of sections of the Westlink M7 shared path would also be required near bridge widening locations with detours in place during construction. Further detail on impacts to the shared path and traffic management measures is provided in **Section 4.2.8** and **Section 7.1** (Traffic and transport).

Site preparation

The establishment of temporary access roads, access paths, pile and crane pads would be required in preparation for the bridge widening construction. This would generally consist of placement of layers of crushed rock or recycled concrete.

Several bridge widening locations would require temporary waterway diversions and/or waterway crossings (see **Section 4.3.10**) during construction including but not limited to:

- Maxwells Creek Bridge 1 (B9817)
- Maxwells Creek Bridge 2 (B9821)

- Cabramatta Creek Bridge (B9825/B9826)
- Hoxton Park Road Bridge (B9829/B9830)
- Aviation Road (B9839/B9840)
- Hinchinbrook Creek (B9841/B9842)
- Villiers Road (B9851/B9852)
- Reedy Creek (B9870/B9871)
- Reedy Creek Tributary Bridge (B9873/B9874)
- Angus Creek (B9898/B9899).

Rail possession would be required in one location during construction where the existing Westlink M7 bridge intersects with the Main Western Railway Line near Rooty Hill Station (B8245/B9901)).

Sub-structures

Bridge foundations and sub-structures (including piles, piers and abutments) would be constructed using standard bridge building techniques. Construction of sub-structures near existing waterways would require temporary waterway diversions and crossings which are described above and in **Section 4.3.10**.

Super-structures

Precast elements of the bridges would be prepared off site at dedicated casting yards and transported to the construction areas along the Westlink M7. A crane(s) would be used to lift the beams and girders into place directly onto the abutments and pier headstocks once the sub-structure is constructed. Temporary bracing would be required between the girders in some locations. Alternatively, a launching gantry or other lifting equipment would be used to place precast elements. The bridge deck and barriers would typically be constructed from reinforced concrete. In some cases, precast units would be used for the barriers. Concrete bridge decks would require temporary formwork to be installed before pouring. The formwork would typically be supported directly from the bridge girders. Pouring would require traffic management including reduced traffic speeds and/or temporary short-term lane closures, where required.

4.3.10 Water management infrastructure

Maintenance of stormwater drainage and temporary water controls

The proposed modification would require the construction of new road drainage infrastructure and alterations to existing drainage infrastructure as described in **Section 4.2.6**. Where required, temporary diversion channels and bunds would be constructed to enable the installation of road drainage infrastructure. Appropriate controls would be implemented for the diversion channels and bunds to minimise the potential for scouring. After the infrastructure is installed, the drainage lines would be reinstated, and the temporary channels removed.

It is not proposed to undertake any temporary changes to stormwater basins during construction.

Temporary waterway crossings

Temporary crossings would be required at waterways for temporary access routes within the construction footprint and to support some bridge widenings. The crossings would likely comprise a temporary causeway with a culvert/s or pipe/s installed to allow water flow beneath the temporary access formation.

An example of a typical temporary waterway crossing is provided in Figure 4-13.

Temporary waterway crossings would be designed in accordance with the requirements of the *Policy and Guidelines for Fish Habitat Conservation and Management* (NSW Department of Primary Industries, 2013). The crossings would maintain low flow conditions of the waterbody and be checked by a qualified person to confirm no adverse flooding impacts would occur during design flood events.

At the completion of construction, the crossings would be removed in full, and the area rehabilitated.

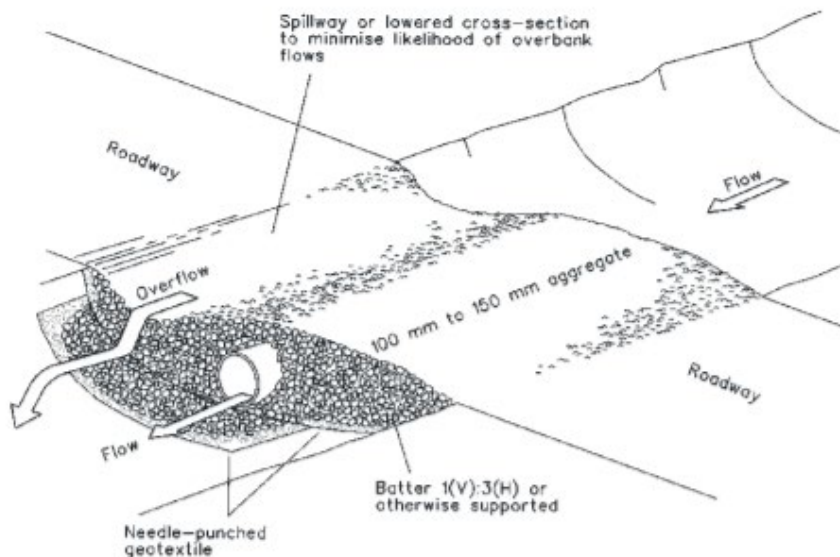


Figure 4-13 Example of a temporary waterway crossing (indicative only)

Temporary waterway adjustments

The need, extent and design of any temporary waterway adjustments would be confirmed during detailed design, considering the potential environmental benefits of minimising any changes to the natural course of the waterway. Temporary waterway adjustments could include diversions, waterway crossings (as described in the section above) or partial reclamation.

Temporary waterway adjustments could be required in relation to the following activities near waterways:

- Establishing works platforms and piling pads for bridge works
- Piles and column construction for bridge works
- Drainage infrastructure works
- Set up of environmental controls
- Earthworks and clearing
- Installing temporary waterway crossings.

Temporary waterway adjustments would accommodate a similar capacity to the existing waterway to prevent potential flooding and erosion to the construction area and surrounding properties. Impacted waterways would be restored and rehabilitated following the completion of the construction works.

Temporary waterway diversions would either be constructed with open channels (where access over the waterway is not required) or by using manufactured structures such as concrete or steel pipes, box culverts or combinations of both (where access over the creek is required for the works).

Erosion and sediment controls

Erosion and sediment controls would be implemented to minimise sediment laden run-off from entering drainage lines and waterways during construction. Standard erosion and sediment control measures would be used with consideration to the guidelines in the publication *Managing Urban Stormwater: Soils and Construction Volumes 1 and 2d* (the Blue Book).

Exposed areas of bare ground would be minimised, particularly in areas susceptible to flooding or within 50 metres of waterways. Where possible, sediment-laden run-off collected on-site during construction would be re-used for dust suppression.

Due to the limited amount of space within the existing road corridor of the Westlink M7, it may not be practical to install temporary sedimentation basins within the construction footprint, therefore alternative detention and treatment measures would be used based on the size and context of the work catchment area and extent of exposed soils.

Proposed erosion and sediment control measures would generally be implemented in the construction footprint, including at construction ancillary facilities. These would include (but not be limited to) the following:

- Sweeping of road areas adjacent to vehicle entry and exit points near construction areas
- Use of localised water basins/sumps in the median for collection of site water
- Minimising the tracking of material on and off the site
- Use of temporary spray seals and covers over prepared surfaces to minimise dust and soil erosion
- Use of localised point control measures at existing stormwater pits
- Use of interception swales and drainage blankets/filter socks to reduce flow speeds and collect silt
- Use of wheel wash or rumble strips at vehicle exit points
- Use of silt fences, temporary diversions and bunding controls next to bridge and creek sites.

4.3.11 Pavement widening works

Widened road area pavement would be constructed to similar pavement types to the existing roadway and to meet applicable Transport safety and design standards/guidelines. The existing Westlink M7 was constructed from rigid pavements, the widened areas would match this.

Construction of those surfaces would typically involve the following process:

- Undertake utility relocations and protection, top soil stripping, removal of barrier structures, stormwater and ITS adjustments and earthworks
- Excavate the new pavement area to foundation level, and treating foundation to meet design requirements
- Place selected material (usually crushed rock, recycled concrete, natural gravels or suitable soils)
- Place concrete base on the selected material (a granular sub-base or concrete sub-base)
- The base or sub-base to be constructed using concrete pavers, or be formed onsite with fixed forms set at the requirement pavement levels
- A bitumen seal would then be sprayed onto that layer and aggregate would be spread and rolled on top of the sprayed bitumen to create a waterproof seal
- Hot asphalt would be laid on top of the aggregate to the required thickness and be compacted and allowed to cool.

Westlink M7 speed restrictions for construction vehicle movements would apply at access points. Westlink M7 lane closures would be required as the paving machine would extend into the deflection zone behind the traffic barriers (i.e. the area next to the traffic lane barrier that should be kept free from features that would be potentially hazardous to wayward vehicles). Refer to **Section 4.3.17** for further detail on traffic management during construction.

New pavement would be marked in accordance with Transport requirements to delineate travel lanes, traffic merges and vehicle movements permitted at intersections. Pavement on the shared path would be marked in accordance with Transport requirements and the *NSW Bicycle Guidelines* (RTA, 2005a).

4.3.12 Temporary works

Work platforms

Work platforms would be required at bridge widening locations to provide a working area for bridge pier and abutment construction including piling. Platforms may also be required along the length of the bridge to provide a stable platform for the crane when erecting bridge components.

The exact number and location of the working platforms would depend on the construction contractor's preferred construction method and equipment for the bridge works and may differ depending on the bridge type and bridge length. . The number and location of work platforms required would be identified through detailed design.

Hard-stand areas

Hard-stand areas would be required at the construction ancillary facilities described in **Section 4.3.3**. These hardstand areas would be required to accommodate vehicle and plant movement, stockpiling, construction staff parking and construction machinery laydown. Hardstand areas would also be required to store some construction material (including steel reinforcement), and chemicals and fuel within bunded areas.

Temporary leases

Temporary leases for construction would be negotiated in accordance with the requirements of the site access schedule. The number and location of leases would be confirmed during detailed design and in consultation with property owners.

A summary of sites that would subject to temporary lease arrangements during construction are described in Table 4-9.

Table 4-9 Potential properties subject to temporary leases during construction of the proposed modification

Facilities	Lot and DP	Location	Current land use
Zone A-2	Lots 402 and 403 DP 1141990	20-30 Blackbird Close, Len Waters Estate	Industrial (vacant lot adjacent to manufacturers and distribution centres)
Zone A-3	Lot 101 DP 1158385	Aviation Road, Elizabeth Hills	Vacant reserve land for drainage
AF8 (Approved as part of M12 Motorway project)	Lot 3 DP 1087825	Western Sydney Parklands (east of Westlink M7, south of Elizabeth Drive), Cecil Hills	Western Sydney Parklands – recreational
AF17 (Approved as part of M12 Motorway project)	Lot 24 DP 1152887	125-151 Wallgrove Road, Cecil Park	Rural/ recreational land within Western Sydney Parklands
AF18 (Approved as part of M12 Motorway project)	Lot 26B DP 387529	87-95 Wallgrove Road, Cecil Park	Rural/ recreational land within Western Sydney Parklands
Zone B (Approved as part of M12 Motorway project as 'AF9')	Lots 11 to 14 DP 1021940	112-128 Wallgrove Road, Cecil Park	Rural/ recreational land within Western Sydney Parklands
Zone D-2	Lot 1 DP 626941	345 Hoxton Park Road, Hinchinbrook	Vacant land

4.3.13 Finishing works

Following completion of roadway construction and bridge widening, finishing works would be undertaken. This would include asphaltting the carriageway surface, line marking, signage, permanent barriers and median infill, adjustments to noise walls, installation of communications infrastructure and landscaping treatments. Finishing works would also include reinstatement of cyclist and pedestrian facilities and rehabilitation of construction access roads and ancillary facilities.

The finishing works would generally extend across multiple pavement widening and bridge widening areas. The works would be programmed to allow for sections of the carriageway to be progressively opened to the final, three-lane configuration.

The road features included as part of the finishing works are outlined in **Section 4.1**.

4.3.14 M12 Motorway integration

The approved M12 Motorway would connect the Westlink M7 to the approved Western Sydney International Airport. The M12 Motorway would extend west from the Westlink M7, at a new interchange near Elizabeth Drive at Cecil Park.

Subject to construction planning, it is proposed that the Westlink M7 interchange works for the M12 Motorway be constructed at the same time. Widening the Westlink M7 concurrently with the new interchange for the M12 Motorway would provide significant advantages compared to delivering these works separately, for example:

- A consistent approach can be applied to the detailed design of the interface works
- The combined construction footprint of the M12 Motorway works and the proposed modification would provide more construction flexibility and space during construction
- The M12 Motorway interchange construction ancillary facilities would be able to be shared for both works to minimise the need for extra construction ancillary facilities which would reduce potential environmental impacts
- Avoiding conflicting requirements for access, traffic lane closures and nightworks
- The M12 Motorway interchange works allow for additional access to the Westlink M7, including verge access from Villiers Road and 'No Name' Bridge No.1
- The M12 Motorway interchange works require extensive fill areas, potentially allowing material excavated from the proposed modification to be reused on site rather than exported off site for long term stockpiling or for disposal (subject to further investigation and construction planning). This would allow for more efficient cut to fill operations as materials excavated on site can be taken to the M12 Motorway interchange site rather than relying on tip sites to be available at night
- Construction works can be planned to minimise the combined traffic impacts of M12 Motorway interchange and the proposed modification
- Incident response can be more efficiently managed with a single design and construct contractor.

Construction of the approved M12 Motorway, including its interchange with Westlink M7, would be subject to the relevant conditions of approval for that project.

4.3.15 Construction workforce

The size and arrangement of the construction workforce would vary over the construction period depending on the activities carried out and the staging strategy. There would be several different work crews active during construction of the proposed modification at any one time.

The main workforce would comprise a range of professional staff, supervisors and sub-contractors. The majority of the workforce could be sourced from the local area and would include a wide range of subcontractors and suppliers.

Any recruitment of construction personnel by the construction contractor would consider opportunities for Aboriginal employment in accordance with NSW Government policy on *Aboriginal participation in construction* (NSW Government, 2021).

The estimated total workforce to be employed would be about 1,600 personnel over the peak construction period which would be split across several locations. The workforce excludes part-time, offsite workers and delivery truck drivers.

Estimated parking spaces are addressed by construction ancillary facility type, along with estimated vehicle movements, in Table 4-11.

4.3.16 Construction work hours

Construction of the proposed modification would be undertaken during standard and out of hours periods.

To address worker safety requirements and to minimise traffic disruptions, most of the works that require traffic disruptions would be required to be undertaken outside of standard construction hours. The *Interim Construction Noise Guidelines* (DECC, 2009) state that public infrastructure works are one of the five categories of works that may need to be carried out outside the recommended standard hours.

Standard construction hours

Standard construction hours are:

- Monday to Friday 7am to 6pm
- Saturday 8am to 1pm
- No work on Sundays or public holidays.

Where reasonable and feasible, construction would be carried out during standard working hours, however construction would largely be undertaken outside of standard construction hours (generally at night) due to the interface with an operational motorway.

Extended construction hours

Transport is seeking approval for standard construction hours plus additional time at the start and end of each day (Monday to Friday) and Saturday afternoon, referred to as 'extended construction hours'. Extended construction hours are proposed across the construction footprint and the construction contractor would carry out targeted consultation with affected residents before work starts, as part of the CEMP and community involvement framework. Extended construction hours would include an extra hour at the start and end of each day Monday to Friday and an extra four hours on a Saturday as follows:

- Monday to Friday 6am to 7pm
- Saturday 8am to 5pm
- No work on Sundays or public holidays.

Extended construction hours are required for:

- Shortening the overall construction period, minimising the length of the disruption to the public
- Allowing for key activities to be undertaken outside of the peak periods with higher traffic volumes, thus minimising potential to impact the traffic flow on the existing Westlink M7 and surrounding roads
- Safety of workers during set up and dis-establishment of work elements.

Out of hours work

In addition to extended construction hours for the safety of the public and the workers, and for reducing impact to the high traffic volumes on the Westlink M7, Transport are proposing out of hours work that are outside of those hours noted above.

There is a significant amount of works that would necessitate the closure of a carriageway, requiring off-motorway detours or contraflow traffic arrangements. Offline detouring and contraflow traffic arrangement would have a significant impact on network capacity, and as such would be limited to periods of low traffic volumes, where practicable.

Works required to be undertaken as out of hours work (generally at night) would include but not limited to:

- Bridge and pavement widening works
- Road tie-in works
- Traffic management, set-up and traffic switches
- Installation of traffic signs (where the installation is in proximity to traffic)
- Asphalt works and line marking

- Use of construction ancillary facilities to support out of hours works.

Out of hours work would be in the public interest as it would be expected to:

- Shorten the overall construction period. This would minimise disruption to the surrounding communities and road network and minimise any adverse impacts on local and regional businesses during construction
- Reduce the public's exposure to changed traffic conditions during construction where the proposed modification interfaces with local roads and the existing motorway network, reducing the extent and duration of delays and potentially improving safety
- Support the safety of construction workers and the general public by minimising the risk of working in proximity to live traffic, road and shared path users
- Minimise impacts on traffic flow and congestion, for example by limiting lane and carriageway closures and other temporary traffic impacts to periods of low traffic volumes (generally at night)
- Flexibility in working hours between various construction ancillary facilities would assist to minimise impacts on traffic resulting from construction vehicles entering sites during peak periods. Appropriate communication with potentially affected community and stakeholders would be made.

Out of hours construction activities would be supported by out of hours operation of construction ancillary facilities. The exact timing of out of hours work would depend on construction activities, construction techniques and constraints imposed by the affected communities or the relevant authorities (utility authorities or road/motorway operators) and would be subject to the requirements of the construction contractor.

Where out of hours works is required, works would be subject to an Environment Protection Licence (EPL) and/or relevant guidance, mitigation and management measures set out in the *Construction Noise and Vibration Guidelines* (Roads and Maritime Services, 2016b). The guideline provides a process for identification of mitigation measures for residual impacts including but not limited to respite periods and coordination of out of hours works.

Scheduling of out of hours work would be undertaken with consideration to the *Interim Construction Noise Guideline* (Environment Protection Authority, 2009) and the *Construction Noise and Vibration Guidelines* (Roads and Maritime Services, 2016b). It is proposed that construction occur up to seven nights a week (across different sections of the construction footprint) with most nights requiring lane or carriageway closures in each direction.

Construction planning would seek to minimise consecutive nights of work in the same location, where possible. Works requiring lane closures would generally be undertaken during periods of low traffic volumes

An assessment of the potential noise impacts resulting from out of works work (including extended construction hours) is presented in **Section 7.2** (Noise). The assessment identifies the management measures that would be implemented to minimise these impacts.

4.3.17 Traffic management and access

Traffic management

Temporary road network changes are required to facilitate the construction of the proposed modification and the requirements of construction traffic and personnel. These would include but not be limited to:

- Reduction in speed limits along the Westlink M7 from 100 kilometres per hour to 80 kilometres per hour, generally in the areas subject to and within the vicinity of the proposed modification (and lower speed limits outside of peak hours where feasible and reasonable)
- Temporary traffic diversions and lane closures to allow for construction along the existing road alignment
- Temporary closure of Westlink M7 carriageways with off motorway detours or contraflow arrangements

- Under existing and diverted arrangements, all traffic lanes in each direction would generally be maintained with some short-term lane closures (outside of peak hours where feasible and reasonable) subject to road occupancy licences
- Two lanes in each direction on the Westlink M7 would be maintained during peak traffic periods.

Fixed term road network modifications would include the following:

- Changes to the intersection of the Westlink M7 and Elizabeth Drive
- Delivery and integration of the approved M12 Motorway into the Westlink M7.

The existing Westlink M7 traffic management system would be used extensively to manage traffic during construction, including temporary reductions in speed, lane closures and carriageway closures. This system may need to be augmented to suit the needs of construction traffic management. There would also be a need to integrate the construction traffic management with the existing operational traffic management, especially for incident management. This would require the construction contractor's traffic management personnel to work collaboratively with the Westlink M7 operators at the Motorway Control Centre.

A Construction Traffic and Access Management Plan would be included in the CEMP to manage traffic impacts during construction. The requirements for the traffic management plans are provided in the traffic and transport section (see **Section 7.1** (Traffic and transport)). In preparing these plans, consideration has and would be given to:

- Minimising impacts on existing traffic network (including the Westlink M7, adjacent roads and detour roads) capacity and performance during peak periods
- Maximising off-line/off-road work areas to allow for as much work as possible to occur during standard construction hours
- Minimising delays to motorists using this part of the arterial road network
- Undertaking the works efficiently to minimise the duration of traffic impacts along the existing Westlink M7
- Maintaining access to public and private properties impacted by construction of the proposed modification
- Maintaining the safety of motorists, cyclists, pedestrians, members of the public and construction personnel.

The construction of pier and abutment widening structures at bridge widening locations would have various impacts on adjacent roads including temporary lane closures and full road closures.

Whilst full road closures over extended periods of time would not be required, temporary road or lane closures over short periods would be required to facilitate critical construction activities and would require detours. This would occur at the following locations:

- Hoxton Park Road and Wilson Road
- Cowpasture Road
- Elizabeth Drive
- Access Road to Austral Bricks
- Access Road to Suez
- Great Western Highway
- Woodstock Avenue.

The above list is indicative and does not include for traffic management of other works including site establishment, utility adjustments, detention basin modifications and noise wall installation.

Temporary off-motorway detour routes

Temporary off-motorway detour routes would be required for limited periods to support the bridge widening construction along Westlink M7. Detour routes on local and State roads would occur between the following Westlink M7 interchange locations:

- M5 Motorway and Bernera Road
- Bernera Road and Cowpasture Road
- Cowpasture Road and Elizabeth Drive
- Elizabeth Drive – East and West
- Elizabeth Drive and The Horsley Drive
- The Horsley Drive and Old Wallgrove Road
- Old Wallgrove Road and Great Western Highway
- Power Street and Old Wallgrove Road
- Power Street and Woodstock Ave
- Woodstock Ave and Richmond Road.

Establishment of traffic detours would generally involve placement of signage to redirect road users. A Construction Traffic and Access Management Plan would be implemented to manage potential impacts during construction (see **Section 7.1** (Traffic and transport) for further details).

Construction site access

Construction access would primarily be from the existing road network adjacent to the Westlink M7 and the Westlink M7 itself. Access would also be sought off-road through private land in some locations (in consultation and agreement with the relevant property owners) and via the existing Westlink M7 shared path.

Construction site access arrangements at each construction ancillary site location are described in Table 4-6.

The following roads would be used to access construction ancillary sites:

- | | |
|---------------------------|----------------------------------|
| • Westlink M7 | • Yarato Road |
| • Jedda Road | • Hoxton Park Road |
| • Ash Road | • Wilson Road |
| • Bernera Road | • Westlink M7 entry / exit ramps |
| • Westlink M7 shared path | • Dobroyd Drive |
| • Aviation Road | • Regentville Drive |
| • Cowpasture Road | • M12 Haul Road |
| • Elizabeth Drive | • Great Western Highway |
| • Wallgrove Road | Woodstock Ave |
| • Rooty Hill Road South | |

Access would be required to private access roads near construction ancillary facilities such as the SUEZ waste management facility access road and the Austral Brick premises.

These roads would be used or crossed for:

- Transporting materials to work areas
- Hauling materials from one work area to another
- Providing access for the delivery of all construction materials

- Providing access for the workforce to the various locations, particularly to the construction laydown areas and project site office.

Haulage routes

Haulage of construction materials to and from the project footprint would primarily be via the Westlink M7. Where it is not possible to access the construction sites directly from the Westlink M7, construction vehicles would access the construction site via roads in the adjoining residential/industrial areas. Some haulage would also take place within the construction footprint, generally within the central median.

Where the construction program allows, movements would be scheduled to avoid peak traffic periods. Scheduling of construction traffic movements would be detailed in the Construction Traffic and Access Management Plan as part of the CEMP.

A summary of the key haulage routes associated with importing materials (including bulk earthworks materials, selected material zone materials and concrete for pavements) is provided in Table 4-10. Construction site access arrangements at each construction ancillary site location are described in Table 4-6.

Figures of the indicative haulage routes are provided in **Appendix D** (Traffic and transport technical assessment).

Table 4-10 Indicative haulage arrangements at key locations along the construction footprint

Haulage routes	Construction ancillary facilities which would utilise this route
Westlink M7	• C2@B9817 • C1@B9821; C2@B9821 • C1@B9825; C4@B9825 • C1@B9826/27; C3@B9826/27 • C1@B9829/30; C5@B9829/30 • C1@Cowpasture Rd Bridge; C4@Cowpasture Rd Bridge • C1@B9839/40; C1@B9839/40 • C1@B9841/42 • C3@B9841/42 • C1@B9844/45 • C1@B9847/48; C2@B9847/48 • C1@B9851/52; C2@B9851/52 • C1@B9853/54; C2@B9853/54 • C1@B9858/59; C2@B9858/59 • C1@B9861/62; C3@B9861/62 • C1@B9863/64; C2@B9863/64 • C1@B9870/71; C3@B9870/71 • C1@B9873/74; C3@B9873/74 • C1@B9893/94; C3@B9893/94 • C1@B9898/99; C2@B9898/99 • C1@B8245/9901; C2@B8245/9901 • C1@B9902/03; C5@B9902/03 • C1@B9908/09; C2@B9908/09 • C1@B9910/11; C2@B9910/11
Westlink M7 shared path, Ash Road, Jedda Road	• C2@B9817
Bernera Road	• C2@B9825; C3@B9825
Westlink M7 shared path, Bernera Road	• C2@B9826/27
Yarato Road, Hoxton Park Road	• C4@B9826/27 • C2@B9829/30
Hoxton Park Road	• C3@B9829/30

Haulage routes	Construction ancillary facilities which would utilise this route
Westlink M7 shared path, Wilson Road	C4@B9829/30
Westlink M7 on/off ramp (at Cowpasture Road interchange)	- C2@Cowpasture Rd Bridge; - C3@Cowpasture Rd Bridge
Aviation Road, Cowpasture Road	- C2@B9839/40 - Zone A-3
Westlink M7 shared path, Dobroyd Drive, Regentville Drive, Aviation Road, Cowpasture Road	C2@B9841/42
M12 haul road (approved for M12 Motorway project), Elizabeth Drive	- C2@B9844/45 - AF8 – site approved under M12 Motorway project - Zone B
Redmayne Road, Wallgrove Road	C2@B9858/59
Westlink M7 off ramp (at interchange with Wallgrove Road)	C2@B9870/71
Westlink M7 shared path, Wallgrove Road	- C2@B9873/74 - Zone C-1
Access road to Austral Bricks site, Wallgrove Road	C2@B9861/62
Access road to existing SUEZ waste management site, Wallgrove Road	C2@B9863/64; C1@B9863/64
Westlink M7 shared path, Great Western Highway	C2@B9893/94
Woodstock Avenue	- C2@B9902/03; C3@B9902/03; - C4@B9902/03
Construction zone, Wilson Road	Zone A-1
Hoxton Park Airport access road, Aviation Road, Cowpasture Road	Zone A-2
Mavis Street, Rooty Hill Road South	Bridge widening over rail bridge

Estimated construction traffic numbers

Estimated construction vehicle numbers at each construction ancillary site type during construction is in Table 4-11. The numbers outlined would be typical for median construction and bridge abutment and pier construction including road widening, noting that there would be higher frequencies of movements during specific construction activities.

Construction is expected to result in about 4,400 light vehicles and 1,300 heavy vehicle movements per day, during peak construction periods.

The haulage and delivery of materials may occur during extended construction hours, and the delivery of oversized structural elements requiring police or other escorts may occur out of work hours. Vehicle movements would occur throughout construction of the proposed modification, and moderate fluctuations in traffic volumes would be likely in response to the construction program and key activities in each location. Traffic and transport impacts are discussed in **Section 7.1** (Traffic and transport).

Light vehicle construction access (for example, staff and smaller deliveries) would also contribute to traffic on the surrounding road network. Construction traffic would also be generated by deliveries of general materials, deliveries of oversize loads and subcontractor support vehicles. The contribution of light vehicles to traffic on roads during construction is assessed in **Section 7.1** (Traffic and transport).

The proposed heavy vehicle numbers are based on an assessment of bulk earthwork quantities required in each work zone and an assumed productivity rate (i.e. how much material can be moved each day based on the number and size of trucks and work crews).

The estimates are based on an overall construction period of about three years. The numbers are estimates only and may vary based on several factors including detailed design, the locations of the source material, site conditions during construction and suitability of materials for reuse on site.

Table 4-11 Overview of estimated vehicle movements at ancillary facilities (by type)

Facility type and estimated vehicle movements per site	No. of Sites	Assumptions
Site construction ancillary facilities		
Facilities for motorway widening works, abutment construction and bridge construction support Light vehicles: - Up to 40 vehicle movements per hour - Up to 320 vehicle movements per day Heavy vehicles: - Up to 10 vehicle movements per hour - Up to 160 vehicle movements per day	47	- Use: major civil work compound / laydown / parking - Duration: 36 months - Parking: 15-25 spaces (some parking required on surrounding roads) - Most of the civil works staff and workforce would park at construction zone ancillary facilities - Mostly night works pavement construction, asphaltting, tie-ins, traffic barriers, traffic switching and miscellaneous works - A large concrete pour at night - Up to about 5,000 cubic metres of spoil would be disposed
Facilities for bridge piling and pier construction support (3-5 span) Light vehicles: - Up to 30 vehicle movements per hour - Up to 180 vehicle movements per day Heavy vehicles: - Up to 2 vehicle movements per hour - Up to 50 vehicle movements per day	12	
Facilities for bridge piling and pier construction support (6-8 span) Light vehicles: - Up to 40 vehicle movements per hour - Up to 300 vehicle movements per day Heavy vehicles: - Up to 10 vehicle movements per hour - Up to 80 vehicle movements per day	8	
Zone construction ancillary facilities		
Light vehicles: - Up to 70 vehicle movements per hour 490 vehicle movements per day Heavy vehicles: - Up to 20 vehicle movements per hour 120 vehicle movements per day	9	- Most civil works staff and workforce would park at zone construction ancillary facilities - Use: major civil work compound / laydown / parking - Duration: 36 months - Parking: 20-30 spaces - Mostly night works pavement construction, asphaltting, tie-ins, traffic barriers, traffic switching and miscellaneous works - All vehicles are assumed to access site from local roads

Facility type and estimated vehicle movements per site	No. of Sites	Assumptions
Project management head office		
Light vehicles: - Up to 110 vehicle movements per hour 490 vehicle movements per day Heavy vehicles: - Up to 2 vehicle movement per hour 12 vehicle movements per day	1	- Use: Central Project Office, assumed to be in existing office complex within proximity of the project works - Duration: duration of construction - Parking: 25-35 spaces (some parking required on local roads) - Most civil works staff and workforce would be located at the other construction ancillary facilities

* The vehicle movements stated are for all movements (in and out) over the access point to the site.

Impacts on shared path

Construction of the proposed modification would require temporary detours from the existing Westlink M7 shared path. Detours would be required to support the following work:

- To allow for access to construction ancillary facilities and work zones to facilitate bridge widening work
- To allow for the construction of noise walls along the Westlink M7.

Detour routes on local and State roads would occur between the following shared path locations:

- Path entry points off Bernera Road and Kurrajong Road
- Path entry points off Bernera Road and Ash Road
- Path entry points off Wilson Road and Jedda Road
- Path entry points off Stante Close and Yarato Road
- Path entry points off Elizabeth Drive and Cowpasture Road
- Path entry points at the intersection of Wallgrove Road and Wonderland Drive, and Old Wallgrove Road
- Path entry points off Simms Road and Florence Street
- Path entry points off Florence Street and Lamb Street
- Path entry points off Lamb Street and Power Street
- Path entry points off Power Street and Station Street
- Path entry points off Elizabeth Drive and Cowpasture Road.

Sections of the Westlink M7 shared path from which pedestrians and cyclists are detoured would be upgraded to accommodate construction vehicle access to construction ancillary facilities. This would involve either offline construction of construction access paths (where space permits) or reinforcement of the existing pavement to accommodate construction traffic. Adjustments to utilities such as ITS and conduits within the shared path alignment would also be required to enable construction access (refer to **Section 4.3.8** for further detail on utility works).

Establishment of shared path detours would generally involve placement of signage to redirect pedestrians and cyclists. Potential impacts to pedestrian and cyclist access associated with the shared path would be managed by mitigation measures and is assessed in **Section 7.1** (Traffic and transport). Pedestrian and cyclist management and mitigation measures would be incorporated into the CEMP prepared by the construction contractor in consultation with stakeholders, councils and Transport.

The timing, extent and duration of shared path detours would be confirmed once the construction contractor has been appointed and would be influenced by the final construction methodology as well as feedback from stakeholders, councils and Transport.

4.3.18 Construction plant and equipment

The following plant and equipment listed is an indicative list of equipment that would be used during the construction phase of the proposed modification. The final list of plant and equipment required for each construction activity would ultimately depend on the construction methods adopted by the construction contractor.

- Vacuum sucker trucks
- Water carts / trucks
- Backhoes
- Small excavators (less than 20 tonne) with hammer attachments
- Excavators (20-45 tonne) with hydraulic hammer (excavator mounted)
- Tipper trucks
- Articulated haulers (Moxy)
- Semi-trailers
- Floats
- Hi-ab trucks
- Franna cranes
- Telehandlers
- Small mobile cranes
- Large mobile cranes (for example, 450 tonne)
- Generators to power site plant
- Kibbles for removal of excavated materials
- 40t Piling rigs
- Rollers (10-16 tonne)
- Plate compactors
- Wheel (front) loaders
- Skid steer loaders
- Scraper and graders
- Pavement profilers
- Asphalt milling machines
- Asphalt pavers
- Concrete pavers
- Daymaker portable lights
- Generators
- Air compressors
- Air tools
- Elevated work platforms
- Concrete/pavement saws
- Power/hand tools
- Pneumatic jack hammers
- Line marking equipment
- Utes and light vehicles
- Concrete agitator trucks
- Concrete pumps
- Concrete vibrators
- Concrete drills
- Dozers.

4.3.19 Construction resources and waste management

A range of materials and pre-cast elements would be used to build the proposed modification. These include but are not limited to those described in Table 4-12.

Table 4-12 Materials for construction of proposed modification

Material	Description
Steel	Steel elements would include reinforcement, girders, trusses, sign supports, gantries, bridge girders and fencing. Structural steel and reinforcing steel for structures would be sourced by the construction contractor depending on volumes, quality and performance requirements.
Bitumen	Bitumen would be used for use in asphalt for road surfacing.

Material	Description
Pavement materials including road base and sub-case	Road base and sub-base would be required for the widened road and bridges.
Fill material	General fill and selected material would be used for earthworks (refer to Section 4.3.6 for further detail)
Sand / soils / aggregate	Sand/soils would be used for landscaping works. Aggregate would be required for concrete and asphalt
Rock, aggregate	Rock would be used for drainage blankets, bridging layers, gabion walls, scour protection and pavement. Gravels would be sourced from local quarries where possible. Crushing of rock would take place at the source and not at the construction work zone.
Cement / Concrete	Concrete would be required for pavements, bridge widenings and road surface sub-base. It is expected that concrete would be delivered to the construction footprint in agitator trucks from local concrete batching plants. Pre-cast concrete would be used for girders, pipes, pits, wall segments and roadside barriers would be delivered to site.
Wood, aluminium	Wood and aluminium would be used in various materials and components
Geotextiles and linings	Geotextile and other lining material would be used for drainage, soil and erosion control and other coverings
Materials for utility works	Several utilities and services may be impacted by the construction of the proposed modification; some may need to be realigned. The extent of impact and associated construction material cannot be confirmed until the detailed design is finalised but is anticipated to include plastic, metal and/or concrete pits and pipes and cabling.
Mechanical and electrical materials	Various materials would be required for mechanical and electrical servicing of plant, vehicles and equipment, and works to electrical infrastructure along the motorway.
Water	Water would be used during construction for a range of purposes including but not limited to dust suppression, earthworks compaction, wheel washing, machinery, asphalt batching, curing structures and operation of ancillary construction facility amenities (toilets, sinks, showers, and drinking). Construction water sources would be confirmed during detailed design but are likely to include a combination of potable mains supply and recycled water, drawn from sources internal and external to the construction footprint. Water consumption would be influenced by weather conditions. Over the construction period, it is estimated about 280 million litres of water would be used to construct the proposed modification.
Fuel	Fuel consumption would occur continuously during construction for the operation of equipment and vehicles. Over the construction period, it is estimated about eight million litres of fuel would be used to construct the proposed modification.

Material	Description
Electricity	Electricity consumption during construction would vary, and would depend on the contractor's proposed site use, facilities, staffing numbers and equipment. Electricity needs on the site would be relatively low and are envisaged to include lighting, air-conditioning and office equipment. Connecting the offices to the local power grid would be sufficient for these purposes. Generators may be necessary for emergency power supply and at some ancillary facilities where connection to the local power supply is not readily available.

As described in **Section 4.3.3**, zone construction ancillary facilities would require utilities such as power, water, sewer and communications services in order to operate. These areas would connect into existing utilities if they are available nearby and it is practical for them to be used. Where this is not possible, direct connection would be supplied by the following (all of which require regular maintenance and servicing):

- Portable generators
- Relocatable potable water tanks
- Portable toilet facilities
- Mobile communication devices.

Spoil and waste disposal

Various waste streams would be generated during construction including:

- Excavated material, including rock, gravel, clay, sand and fill material (including selected material and topsoil)
- Demolition waste, including building materials, bridge removal materials, vegetation, kerbs and road surfaces
- Vegetation waste from the removal of trees, shrubs and groundcovers
- Packaging materials, including crates, pallets, cartons, plastics and wrapping materials
- Liquid wastes
- Construction materials
- General waste from construction sites, including office wastes, scrap materials and biodegradable waste.

Potential waste types expected to be generated by the construction of the proposed modification and the proposed measures for the management of waste are provided in **Section 7.16** (Waste).

4.3.20 Construction program

An indicative program of works for the proposed modification is provided in Table 4-13. The construction program shows construction activities commencing in 2023 and continuing through to 2025.

The construction duration is driven primarily by the requirement to complete bridge widening works for select bridges to provide access to some of the pavement widening areas.

The construction program may increase due to the following:

- Significant utility relocation or protection (full extent currently unknown)
- Environmental limitations on access to bridge sites
- Unexpected finds (for example contamination, heritage)
- Restrictive night works conditions

- Stakeholder interfaces and approvals
- Resource limitations (for example pile rigs or prefabricated steel)
- Land access issues or negotiations
- Extreme weather conditions (for example flood events, bush fires, pandemic-related construction restrictions and resource impacts).

Table 4-13 Indicative program of works for construction of the proposed modification

Key stage	Year		
	2023	2024	2025
Site establishment	X		
Utility works	X	X	
Bridge works	X	X	
Pavement works	X	X	X
Finishing works			X

Construction would occur along multiple locations within the Westlink M7 at the same time to complete the construction in a timely manner and reduce the length of disruption to road users and surrounding communities.

The construction program for the M12 Motorway interface has been considered in the development of this program. As described in **Section 4.3.14**, it is proposed to undertake the widening as part of the proposed modification at this interchange at the same time as the M12 Motorway project works to minimise disruption and potential construction fatigue associated with consecutive construction, as well as achieve efficiencies during construction.

4.4 Operational management

Operation of the proposed modification would include the ongoing use and maintenance of the Westlink M7 by the Westlink M7 Concessionaire (WSO Co.). This would include required pavement upgrades undertaken in line with Transport standard road maintenance policies.

Traffic, locational, directional, warning and variable message signs would be incorporated on surface roads at approaches to intersections and interchanges in line with the existing Westlink M7 (refer to **Section 4.2.14** for further detail). Directional signage would be installed in accordance with Austroads and the Transport standards, with a focus on providing clear and unambiguous direction to motorists. Indicatively variable message signs would be mounted on gantries along roads and would be used to advise motorists of traffic conditions. In addition, integrated speed and lane-use signs would be installed and would display the regulatory speed limit and wayfinding information relevant for the proposed modification.

4.5 Conditions of Approval

The proposed modification would require the Conditions of Approval (CoA) to be amended and augmented as some of the proposed changes would not be consistent with the existing project approval. **Chapter 8** (Conditions of approval) provides a review of the relevant conditions in relation to the modification and describes the changes that are proposed.