Transport for NSW

Heathcote Road Upgrade

Soil Emplacement and Tree Removal

Addendum Review of Environmental Factors

March 2025

NSW GOVERNMENT

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Acknowledgement of Country

Transport for NSW acknowledges the traditional custodians of the land on which we work and live.

We pay our respects to Elders past and present and celebrate the diversity of Aboriginal people and their ongoing cultures and connections to the lands and waters of NSW.

Many of the transport routes we use today – from rail lines, to roads, to water crossings – follow the traditional Songlines, trade routes and ceremonial paths in Country that our nation's First Peoples followed for tens of thousands of years.

Transport for NSW is committed to honouring Aboriginal peoples' cultural and spiritual connections to the land, waters and seas and their rich contribution to society.

Heathcote Road Upgrade, Infantry Parade to The Avenue

Addendum Review of Environmental Factors

Transport for NSW | March 2025

Prepared by SMEC Australia and Transport for NSW.

Executive summary

Background

Heathcote Road is a major two-lane arterial road that runs between Liverpool and Heathcote, connecting Sydney's southern suburbs to the motorway network, including the M5 and M7, in the south-west of the city. It is also a key link for commuters who drive, walk or cycle to Holsworthy Train Station and the Holsworthy Army Barracks.

The NSW Government in 2016 proposed to upgrade the 2.2 kilometre (km) section of Heathcote Road between Infantry Parade, Holsworthy and The Avenue at Voyager Point from two lanes to four lanes (The Project). The Project is being progressed by Transport for NSW (Transport). The Project aims to help reduce congestion, improve road safety and provide more reliable journeys for all road users.

A Review of Environmental Factors (REF) was prepared in 2016 that assessed the environmental impacts of the Project (Project REF), with minor works and addendum REFs subsequently prepared to consider proposed changes to the Project. These assessments are referenced throughout this addendum REF as 'Approved Project Documentation', and comprise the Project REF (2016), Submissions Report (2016), Addendum 1 REF (2019), Addendum 2 REF (2021), MWREF (2022) and Addendum 3 REF (2022).

The proposed modifications

Transport proposes two modifications to the Project that are considered within this addendum REF. The first proposed modification is the expansion of three existing road batters along Heathcote Road, all within one area, referred to as the 'fill emplacement modification'. The second proposed modification is the removal of one tree at Infantry Parade (intersection with Heathcote Road) to allow for the progression of existing design elements, referred to as the 'tree removal modification'. These modifications will be referred to as the 'proposed modifications' throughout this addendum REF.

Fill emplacement modification

Transport has proposed to expand three existing road batters using site won fill at the three proposed fill emplacement sites. The expansion (widening) of the existing batters provides a wider verge to improve road safety, traffic continuity and maintenance access benefits. The re-use of site won material at these batters would avoid the need for its disposal offsite as waste, and separate importation of material to otherwise achieve the benefits noted. These proposed fill emplacement sites are all located within one area directly off the eastern boundary of Heathcote Road, between MacArthur Drive and Alec Campbell Drive.

The three fill emplacements sites are:

- **Fill Emplacement Site 1:** Designed to expand the existing road batter at this site to accommodate **364m^3** worth of site won fill.
- **Fill Emplacement Site 2:** Designed to expand the existing road batter at this site to accommodate **2,209m^3** worth of site won fill.
- **Fill Emplacement Site 3:** Designed to expand the existing road batter at this site to accommodate **367m^3** worth of site won fill.

All three fill embankment sites fall within the previously assessed study area of the Approved Project Documentation (Project Study Area). Within this Project Study Area, Addendum 1 REF (2019) mapped an approved vegetation clearing boundary (2019 VCB). The fill emplacement sites fall within the 2019 VCB as follows:

- **Fill Emplacement Sites 1 and 3:** Fall within the 2019 VCB. As such these sites do not require further flora and fauna impact assessment for any associated vegetation clearing within this addendum REF.
- **Fill Emplacement Site 2:** Falls outside the 2019 VCB. As such requires further flora and fauna impact assessment for up to **0.016ha** of new vegetation clearing. This is detailed further within this addendum REF.

Tree removal modification

The Project design includes a new pram ramp, an altered shared path and the relocation of an existing street light. These designs are to be located near the corner of Infantry Parade and Heathcote Road and have been previously assessed under the Approved Project Documentation, specifically within the Project REF (2016).

A conflict has since been identified with the location of one tree (Infantry Parade Tree) and these design elements, preventing implementation of the design. As such the second proposed modification addressed within this addendum REF involves the removal the Infantry Parade Tree, to enable the construction of these design elements.

The Infantry Parade Tree falls within the previously assessed Project Study Area but falls outside of the 2019 VCB. Therefore, further flora and fauna impact assessment is required for the associated removal of the Infantry Parade Tree, which is addressed within this addendum REF.

Need for the proposed modification

Chapter 2 of the Project REF addresses the strategic need for the Project, the Project objectives and the options that were considered. The proposed modifications described and assessed in this addendum REF are consistent with the strategic need for the Project.

The proposed modifications have been identified through design review and as the Project has progressed. The proposed modifications are needed to:

Access and safety benefits – The proposed fill emplacements expand the existing batters forming a wider road verge. This would improve both the emergency breakdown area and maintenance access while still enabling continued traffic movements along Heathcote Road. It would also provide an additional level area reducing the risk of an errant vehicle veering down the embankment.

Avoid Offsite disposal of waste – The proposed fill emplacement modification provides three sites, in one general area, for the emplacement of site won fill. This fill wouldl comprise of soil material generated by the road upgrade works, resulting in the extension of the existing road batter along Heathcote Road. Emplacement of this material avoids the need for its disposal offsite as waste to a landfill and provides a beneficial re-use of the material.

Allow the implementation of design elements for the safety and access of the community – An existing tree at the corner of Infantry Parade and Heathcote Road is preventing the implementation of design elements that are required to provide pedestrian safety via footpath lighting and improved access. As such the proposed tree removal modification involves the removal of this tree to enable these elements to be progressed as designed.

Proposal objectives

Section 2.3 of the Project REF identifies the objectives and development criteria that apply to the proposed modifications. There are no additional criteria specific to the proposed modifications.

Options considered

The proposed modifications involve minor construction related changes that have arisen during the design review and construction stage.

For the proposed modifications, Transport identified and investigated two options:

- **'Do nothing' option** – This option involves carrying out the Project as described in the Approved Project Documentation, without the proposed modifications changes.

  The 'do nothing' option does not address the identified need described above and would therefore only be preferred in circumstances where the costs and environmental impact of proceeding were assessed as outweighing the identified benefits. That was not the case and therefore the 'do nothing' option was not pursued further.

- **Option 1** – This option involves implementing the changes that form the proposed modifications, being the fill emplacement modification and the tree removal modification as outlined above.

Transport identified Option 1 as the preferred option, as it would addresses constructability requirements as a greater benefit when compared to the 'do nothing' option. While Option 1 would involve the removal of vegetation, it provides an avenue for the re-use of site won material in a sustainable manner and enables the implementation of design elements that provide safety and access benefits to the community.

Statutory and planning framework

The proposed modification is categorised as development for the purpose of a road and/or road infrastructure facilities and is being carried out by or on behalf of a public authority. Under section 2.109 of State Environmental Planning Policy (Transport and Infrastructure) 2021 (T&I SEPP) the proposed modification is permissible without consent. The proposed modification is not State Significant Infrastructure or State Significant Development. The proposed modification can be assessed under Division 5.1 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). Consent from Council is not required.

A referral to the Australian Government Department of Climate Change, Energy, the Environment and Water (DCCEEW) for Matters of National Environmental Significance (MNES) under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) is not required.

Community and stakeholder consultation

Consultation strategy

The consultation strategy for the project remains consistent with that of the Project REF. The scope of the proposed modifications do not trigger the requirements for public display under clause 171(4) of the Environmental Planning and Assessment Regulation 2021 (EP&A Regulation). As per clause 171(4)(c) of the EP&A Regulation, public display of this addendum REF was not considered necessary by Transport given that targeted consultation has occurred, and further consultation will occur as required.

No additional consultation has occurred specific to these proposed modifications.

Ongoing or future consultation

Consultation with the Department of Defence (DoD) is ongoing and as required. Transport currently has an existing lease agreement with DoD for the Heathcote Road Upgrade Project.

All works associated with the proposed modifications would be contained within the road corridor and would not enter DoD land or affect DoD infrastructure. As such no alteration of the current Access License between Transport and DoD is anticipated. This would need to be monitored as the Project progresses.

Ongoing or future consultation would be consistent with that of the Project REF.

Environmental impacts

The proposed modifications described in this addendum REF has been reviewed in the context of the receiving environment to identify any additional issues for assessment. Where there is a new issue or change in issue that is greater than negligible, this is considered by this addendum REF. Where there is no additional issue or change in issue considered by the Approved Project Documentation that is not greater than negligible to minor these are not assessed. As such, the proposed modification would result in some additional potential environmental impacts. These additional impacts are discussed below.

Biodiversity

The proposed modifications described in this addendum REF would have a minor impact on biodiversity resulting from the construction of the fill emplacement sites with associated removal of vegetation, plus the removal of an individual tree at Infantry Parade.

Fill emplacement modification: Fill Emplacement Site 2 would require the clearing of a small area of Plant Community Type (PCT) 3448 – Castlereagh Ironbark Forest (approximately 0.016ha, including 14 mature trees)

which is associated with ecological communities listed under both state and federal legislation. No significant impact to PCT 3448, or any threatened flora or fauna was assessed as likely to occur.

Tree removal modification: One large tree, identified as a locally indigenous species, *Eucalyptus tereticornis*, is to be removed. It has a small hollow that is unlikely to be used for nesting by birds or bats. The tree is not identified on State Vegetation mapping.

Biodiversity offsets: The offset thresholds were tested against the total direct impacts of the proposed modifications, and it was determined that the modifications do not increase the area of moderate-condition vegetation of PCT 3448. The additional impacted area of good-condition vegetation of this PCT is 0.0034 hectares, which does not alter the credit requirement calculations.

The proposed modifications remain consistent with the assessment of this aspect and its impact as outlined in the Approved Project Documentation. No significant impact to threatened species, populations or ecological communities under the *Biodiversity Conservation Act 2016* (BC Act) or EPBC Act are anticipated to occur due to the proposed modifications.

Soils and geology

The proposed modifications described in this addendum REF would have a minor or negligible impact on soils and geology.

Fill emplacement modification: The fill emplacement sites are to expand existing batters on Heathcote Road. These fill emplacement sites would utilise soil generated from the Project. Whilst the potential for the soil to contain contaminants (such as metals or acid sulfate soils) is low, the fill material would require stockpiling, sampling and assessment, prior to handling and transportation to the emplacement area. The handling and stockpiling of excavated soils associated with the Project is not a new issue specific to this modification.

Tree removal modification: The earthworks balance associated with the tree removal modification would be negligible.

Landscape Character and Visual

The proposed modifications described in this addendum REF would have a minor impact on landscape character and visual amenity, given the level of the existing Heathcote Road and associated batter. The minor impact would primarily be associated with the loss of vegetation. The extended batters (fill emplacement modification) would be revegetated as part of the works, that would mitigate the landscape and visual impact over time. While an initial change, the removal of the single tree at Infantry Parade would be part of the broader construction activity at this site in a road landscape, and the community access benefits would provide an ongoing positive outcome.

Cumulative Impacts

The proposed modification is not expected to materially change the assessment of cumulative impacts provided in the Project REF. Cumulative impacts are associated with the loss of vegetation at both proposed modification locations, negligible impact on construction traffic, and carbon emissions associated with use of plant and equipment.

Minimising impacts attributable to the proposed modification would address any potential cumulative effects.

Justification and conclusion

Justification

The proposed modifications are the result of further design development by Transport and is required to provide for the re-use of site won material in a sustainable manner and enable the unimpeded implementation of design elements that provide safety and access benefits to the community.

While there would be some additional environmental impacts as a consequence of the proposed modifications, including removal of additional native trees, exotic grasses and weed removal, and the emplacement of fill collected from across the Project, these impacts have been avoided or minimised wherever possible through design and the site-specific safeguards summarised in this addendum REF.

The benefits of the proposed modifications are considered to outweigh the temporary adverse impacts and risks.

Conclusion

This addendum REF has examined and taken into account to the fullest extent possible all matters affecting or likely to affect the environment by reason of the proposed modifications. A number of potential environmental impacts from the proposed modifications have been avoided or reduced during the design development and options assessment. The proposed modifications as described in the addendum REF best meet the project objectives and would have minor impacts on biodiversity. Safeguards and management measures as detailed in this addendum REF would ameliorate or minimise these expected impacts. On balance, the proposed modifications are considered justified, and the following conclusions are made.

The proposed modifications would not result in a change to the findings of the Project REF and other Approved Project Documentation and would be unlikely to cause a significant impact on the environment. Therefore, it is not necessary for an environmental impact statement to be prepared and approval to be sought from the Minister for Planning under Division 5.2 of the EP&A Act. A Biodiversity Development Assessment Report or Species Impact Statement is not required. The proposed modifications are subject to assessment under Division 5.1 of the EP&A Act. Consent from Council is not required.

Furthermore, the proposed modifications would not likely cause a significant impact on matters of national environmental significance or the environment of Commonwealth land within the meaning of the EPBC Act.. This addendum REF has been prepared to meet the requirements of the EPBC Act strategic assessment approval for Transport for NSW Division 5.1 road activities. A referral to the Australian Government DCCEEW is not required.

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1. Introduction

Heathcote Road is a major arterial road that runs between Liverpool and Heathcote, connecting Sydney's southern suburbs to the motorway network, including the M5 and M7, in the south-west of the city. It is also a key link for commuters who drive, walk or cycle to Holsworthy Train Station and the Holsworthy Army Barracks.

The existing road between Infantry Parade and The Avenue is generally a two-lane road and contains three bridges across Williams Creek, the T8 Airport railway line and Harris Creek. Congestion is often experienced along these sections of the road, particularly near the Macarthur Drive roundabout.

As such the NSW Government in 2016 proposed to upgrade the 2.2 kilometre (km) section of Heathcote Road between Infantry Parade, Holsworthy and The Avenue at Voyager Point from two lanes to four lanes (The Project). The Project is being progressed by Transport for NSW (Transport). The Project aims to help reduce congestion, improve road safety and provide more reliable journeys for all road users. A Review of Environmental Factors (REF) was prepared in 2016 that assessed the environmental impacts of the Project, with minor works and addendum REFs subsequently prepared to consider proposed changes to the Project (refer to Section 1.1.1 for details).

1.1 Proposed modifications overview

Transport proposes two modifications to the Project that are considered within this addendum REF. The first proposed modification is the expansion of three existing road batters, all within one area along Heathcote Road, referred to as the 'Fill emplacement modification'. The second proposed modification is the removal of one tree at Infantry Parade to allow for the progression of existing design element, referred to as the 'Tree removal modification'. These modifications will be referred to as the 'proposed modifications' throughout this addendum REF.

The locations of the proposed modifications are shown in Figure 1-1 with detailed locations being presented for the fill emplacement modification site in Figure 1-2 and the tree removal modification site in Figure 1-3.

Fill emplacement modification

Transport has proposed to expand three existing road batters using site won fill at the three proposed fill emplacement sites. The expansion (widening) of the existing batters provides a wider verge to enhance both the emergency breakdown area and maintenance access while still enabling continued traffic movement, and providing road safety benefit with the additional area reducing the risk of errant vehicle veering down the embankment. The re-use of site won material at these batters would avoid the need for its disposal offsite as waste, and the separate importation of material to otherwise achieve the benefits noted. These proposed fill emplacement sites are all located within one area directly off Heathcote Road on its eastern boundary, between MacArthur Drive and Alec Campbell Drive.

The three fill emplacements sites are:

- **Fill Emplacement Site 1:** Designed to expand the existing road batter at this site to accommodate **364m^3** worth of site won fill.
- **Fill Emplacement Site 2:** Designed to expand the existing road batter at this site to accommodate **2,209m^3** worth of site won fill.
- **Fill Emplacement Site 3:** Designed to expand the existing road batter at this site to accommodate **367m^3** worth of site won fill.

All three fill embankment sites fall within the previously assessed study area of the Approved Project Documentation (Project Study Area). Within this Project Study Area, Addendum 1 REF (2019) mapped an approved vegetation clearing boundary (2019 VCB). The fill emplacement sites fall within the 2019 VCB as follows:

- **Fill Emplacement Sites 1 and 3:** Fall within the 2019 VCB. As such do not require further flora and fauna impact assessment for any associated vegetation clearing within this addendum REF.

- **Fill Emplacement Site 2:** Falls outside the 2019 VCB (refer to Figure 1-2). As such requires further flora and fauna impact assessment for any up to **0.016ha** of new vegetation clearing. This is detailed further within Section 6.2 of this addendum REF.

Tree removal modification

The Project design includes a new pram ramp, an altered shared path and the relocation of an existing street light. These designs are to be located near the corner of Infantry Parade and Heathcote Road and have been previously assessed under the Approved Project Documentation, specifically within the Project REF (2016) (refer to Section 1.1.1).

A conflict has since been identified with the location of one tree (Infantry Parade Tree) and these design elements, preventing the designs implementation. As such the second proposed modification addressed within this addendum REF involves the removal the Infantry Parade Tree, to enable the construction of these design elements.

The Infantry Parade Tree falls within the previously assessed Project Study Area but falls outside of the 2019 VCB. Therefore, further flora and fauna impact assessment is required for the associated removal of the Infantry Parade Tree, addressed within Section 6.2 of this addendum REF.

Refer to Section 3 further detail regarding the proposed modifications.

1.1.1 Approved Project Documentation

Pervious environmental assessments have been conducted for the Project and are referenced throughout this addendum REF as 'Approved Project Documentation'. These documents comprise of the Project REF, Submissions Report, Addendum 1 REF, Addendum 2 REF, MWREF and Addendum 3 REF (Approved Project Documentation) as detailed below:

Project REF (2016)

A Review of Environmental Factors (REF) was prepared for the Project in October 2016 (Project REF). The Project REF covered the initial proposed scope, including widening the two-lane road to a four-lane divided road over two kilometres, duplicating and replacing several road bridges, and partially removing a pedestrian bridge. It also included constructing a shared-use path, upgrading intersections with traffic lights, and converting a roundabout into a signalised intersection. Additional work includes relocating utilities, installing drainage, lighting, signage, safety barriers, and other necessary infrastructure.

Upon completion, the Project REF was placed on public display between Monday 24 October 2016 and Monday 14 November 2016 for community and stakeholder comment. A submissions report dated January 2017 was prepared to respond to issues raised (Submissions Report). The Project REF was determined on 17 January 2017.

Addendum 1 REF (2019)

In 2019, an addendum to the Project REF (Addendum 1 REF) was prepared to address changes to the approved scope of work for the Project, including changes to the Project boundary and 2.08 hectares (ha) of additional vegetation clearing to accommodate all elements of the detailed design. The Addendum 1 REF was determined on 20 September 2019.

Addendum 2 REF (2021)

In 2021, an addendum to the Project REF (Addendum 2 REF) was prepared to address changes to the approved scope of work for the Project, including clearing of 0.057ha of vegetation to enable construction of a Utility Bridge. The Addendum 2 REF was determined on 12 November 2021.

Minor Works REF (2022)

In 2022 a minor works review of environmental factors (MWREF) was prepared to address changes to approved scope of works for the Project, including changes to the Project boundary to install one additional temporary power pole. The MWREF was determined on 28 March 2022.

Addendum 3 REF (2022)

In August 2022 an addendum to the Project REF (Addendum 3 REF) was prepared to address changes to the approved scope of work for the Heathcote Road Upgrade including to extend the existing construction compound to increase stockpiling space and parking spaces. This required an additional 0.23ha of area beyond the project boundary. The Addendum 3 REF was determined in August 2022.

1.1.2 Current Addendum 4 REF (2025)

Subsequent to the work considered and assessed in the Approved Project Documentation above, Transport have proposed further modification and refinement to the Project. As such this addendum REF (Addendum 4 REF) has been proposed by Transport to fill in the information gaps associated with and assess the environmental impact of the proposed modifications as described in Section 1.1 and Chapter 3 of this addendum REF.

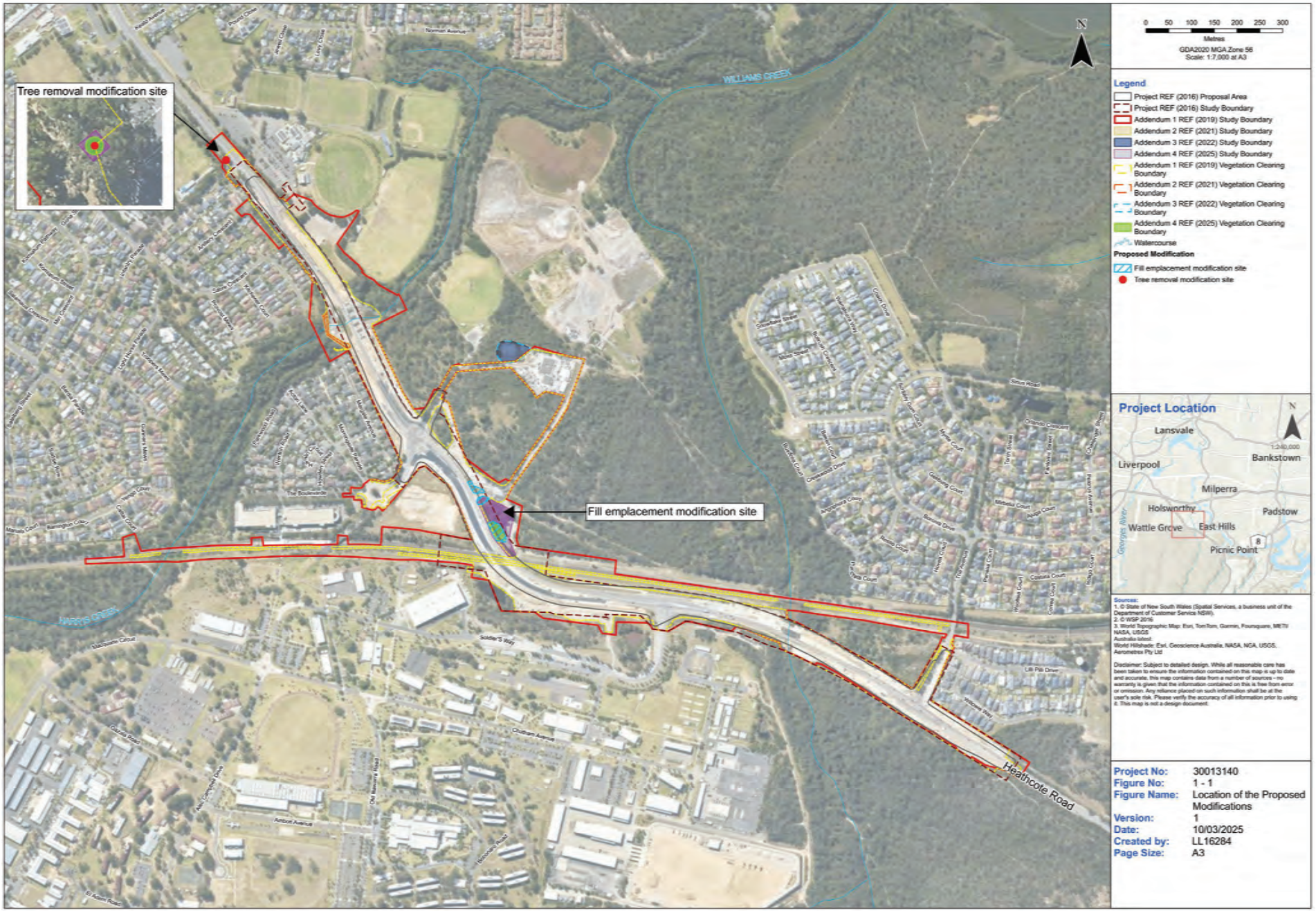


Figure 1-1: Location of the Proposed Modifications

Figure 1-2: Fill emplacement modification site


Heathcote Road
0
10
20
Metres
GDA2020 MGA Zone 56
Scale: 1:500 at A3
Legend
Project REF (2016) Proposal Area
Project REF (2016) Study Boundary
Addendum 1 REF (2019) Study Boundary
Addendum 4 REF (2025) Study Boundary
Addendum 1 REF (2019) Vegetation Clearing Boundary
Addendum 4 REF (2025) Vegetation Clearing Boundary
Proposed Modification
Tree removal modification site
Project Location
Project No: 30013140
Figure No: 1 - 3
Figure Name: Tree removal modification site
Version: 1
Date: 10/03/2025
Created by: LL16284
Page Size: A3

1.1.3 Site Context

The proposed modifications are located within Holsworthy, NSW, 2173, in the Liverpool Local Government Area (LGA). The fill emplacement modification includes multiple sites within one area directly off Heathcote Road on its eastern boundary, between MacArthur Drive and Alec Campbell Drive. The tree removal modification is located at the corner of Infantry Parade and Heathcote Road.

Lot (Cadastre)

The fill emplacement modification falls within one area on the southwestern border of Lot 122 DP1194515 and north of Lot 5 DP1069174. All three fill emplacement modification sites are contained within the road corridor. Land to the east of the road corridor, not affected by this proposed modification, is part of the Department of Defence (DoD) estate of Holsworthy Barracks (refer to Figure 1-4 below).

The tree removal modification is located wholly within the road corridor on the western side of Heathcote Road at the intersection with Infantry Parade. It is at the northeast border of Lot 50 DP1114933 (refer to Figure 1-5).

Figure 1-4: Fill emplacement modification - Lot (Cadastre) Mapping

Figure 1-5: Tree removal modification - Lot (Cadastre) Mapping

Land Zoning

Both proposed modifications fall within land zoned as SP2 Infrastructure (Classified Road) and E1 Local Centre and under the Liverpool Local Environmental Plan 2008 (Liverpool LEP 2008) (refer to Figure 1-6 and Figure 1-7 below).

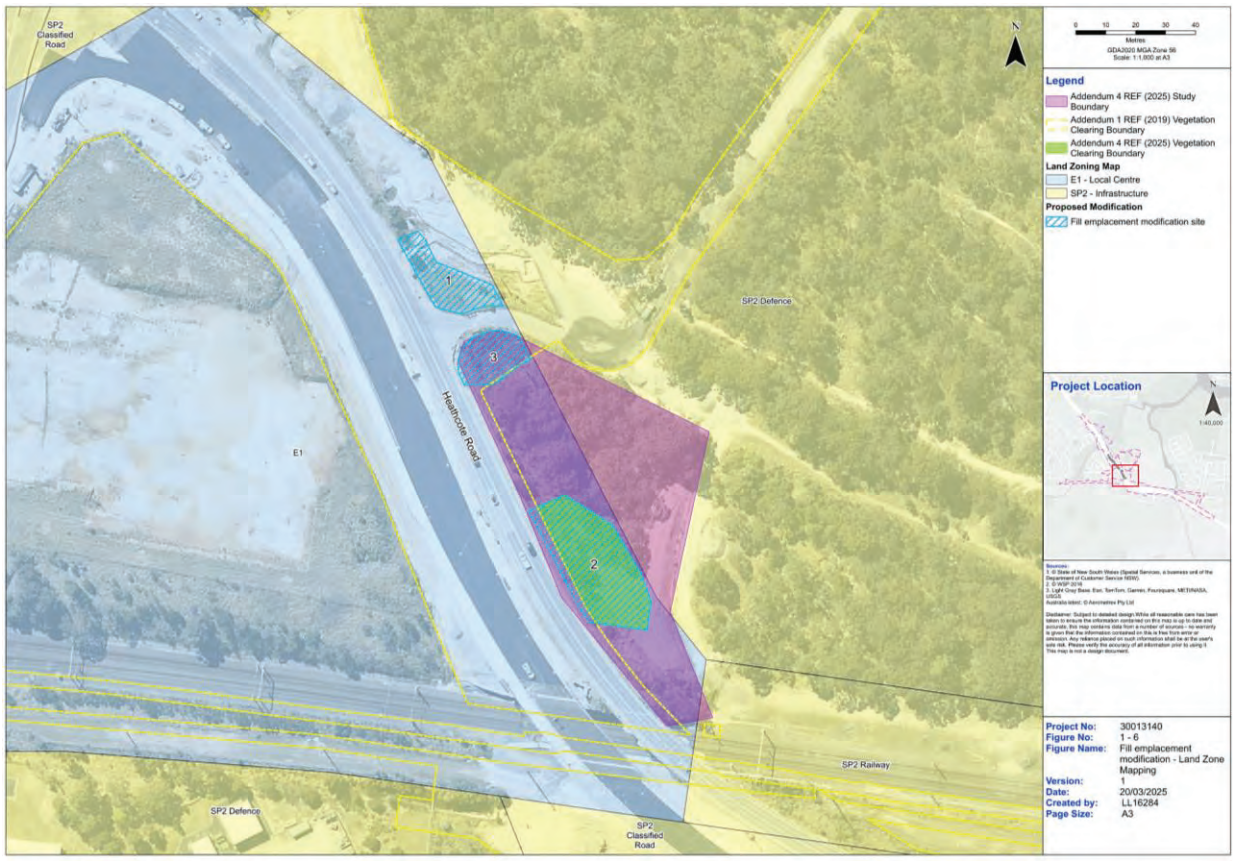


Figure 1-6: Fill emplacement modification - land use zones

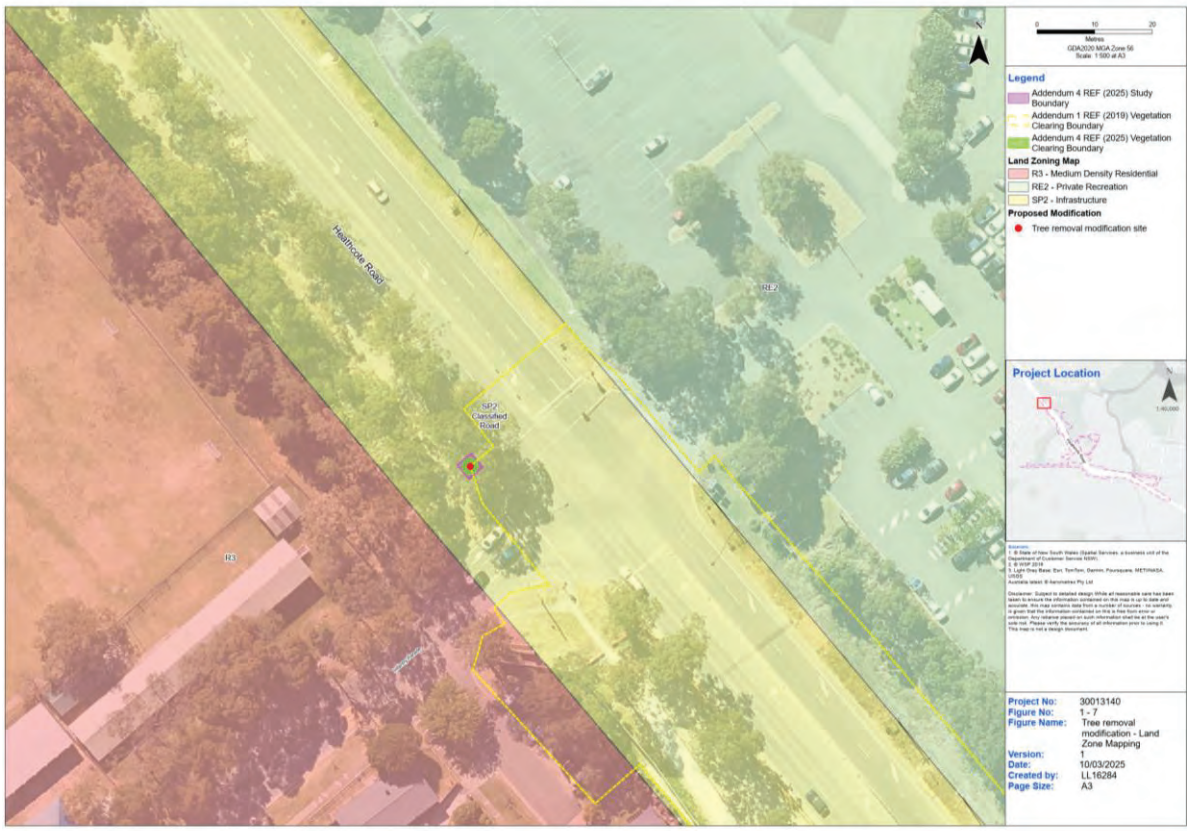


Figure 1-7: Tree removal modification – land use zones

Biodiversity Values

Biodiversity values were identified within and immediately adjacent to the proposed modifications (refer to Figure 1-8 and Figure 1-9). Refer to Section 6.2 for further detail on the existing biodiversity.

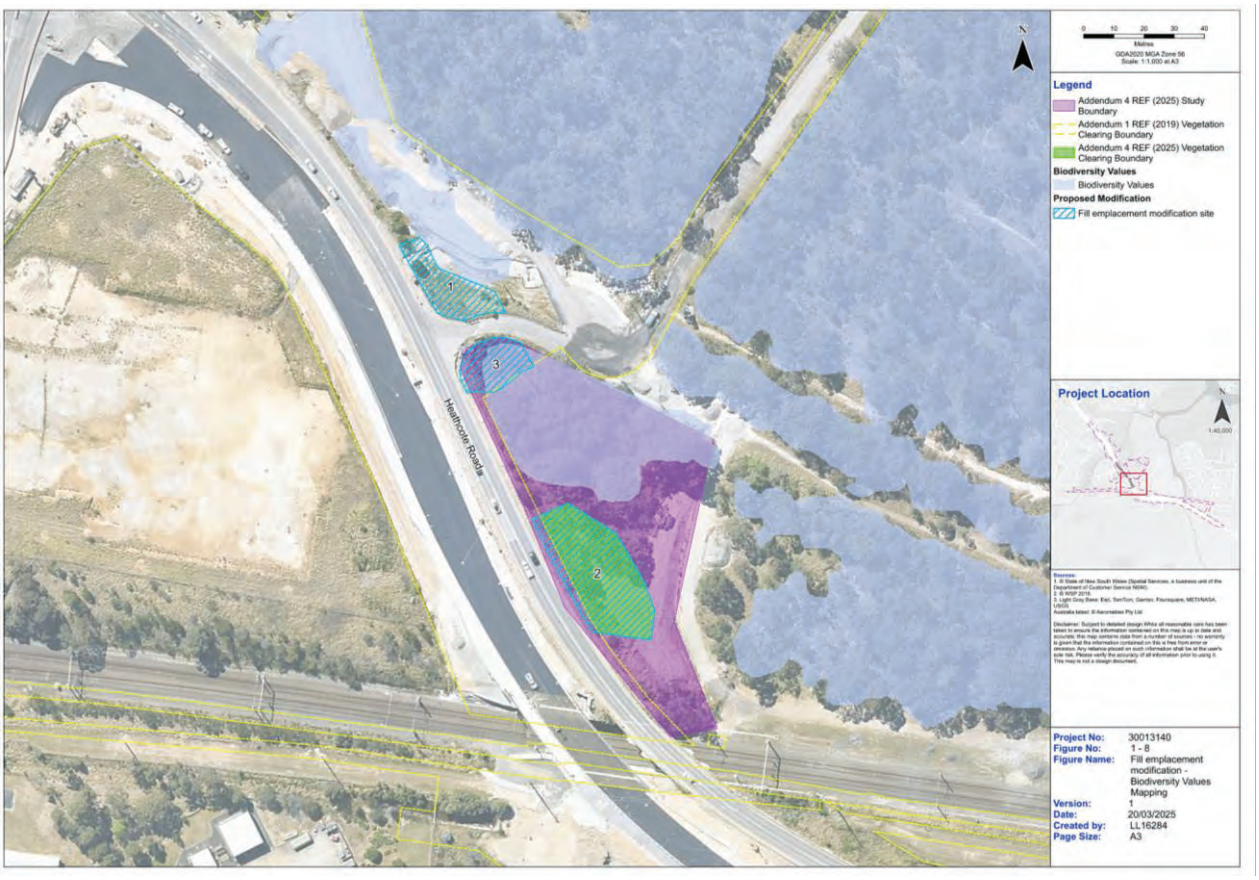


Figure 1-8: Fill emplacement modification - Biodiversity Values Mapping

Figure 1-9: Tree removal modification - Biodiversity Values Mapping

Non-Aboriginal Heritage

A search of the Liverpool LEP 2008, NSW State Heritage Register and Australian Heritage Database was undertaken on 07/02/2025 (refer to Figure 1-10 and Figure 1-11). No additional non-Aboriginal heritage sites or items were listed within or immediately adjacent to the proposed modification.

Figure 1-10: Fill emplacement modification - Non-Aboriginal Heritage Mapping

Figure 1-11: Tree removal modification - Non-Aboriginal Heritage Mapping

Aboriginal Heritage

A search of the Aboriginal Heritage Information Management System (AHIMS) (NSW) was undertaken on 07 February 2025. No additional Aboriginal heritage objects, sites or potential archaeological deposits were listed within or immediately adjacent to the proposed modification (refer Appendix F).

1.2 Purpose of the report

This addendum REF has been prepared by SMEC Australia Pty Ltd (SMEC) on behalf of Transport. For the purposes of these works, Transport is the proponent and the determining authority under Division 5.1 of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

This addendum REF is to be read in conjunction with the Approved Project Documentation. The purpose of this addendum REF is to describe the proposed modifications, to document and assess the likely impacts of the proposed modifications on the environment, and to detail mitigation and management measures to be implemented.

The description of the proposed modifications and assessment of associated environmental impacts has been undertaken in context of clause 171 of the Environmental Planning and Assessment Regulation 2021 (EP&A Regulation), *Guidelines for Division 5.1 assessments* (DPE, 2022), *Roads and Road Related Facilities EIS Guideline* (DUAP, 1996), the *Biodiversity Conservation Act 2016* (BC Act) and its preceding Acts, the *Fisheries Management Act 1994* (FM Act), and the Australian Government's *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

In doing so, the addendum REF helps to fulfil the requirements of:

- Section 5.5 of the EP&A Act including that Transport examine and take into account to the fullest extent possible, all matters affecting or likely to affect the environment by reason of the activity
- The strategic assessment approval granted by the Australian Government under the EPBC Act in September 2015, with respect to the impacts of Transport's road activities on nationally listed threatened species, ecological communities and migratory species.

The findings of the addendum REF would be considered when assessing:

- Whether the proposed modification is likely to result in a significant impact on the environment and therefore the necessity for an environmental impact statement to be prepared and approval to be sought from the Minister for Planning under Division 5.2 of the EP&A Act
- The significance of any impact on threatened species as defined by the BC Act and/or FM Act, in section 1.7 of the EP&A Act and therefore the requirement for a Species Impact Statement (SIS) or a Biodiversity Development Assessment Report (BDAR)
- The significance of any impact on nationally listed biodiversity matters under the EPBC Act, including whether there is a real possibility that the activity may threaten long-term survival of these matters, and whether offsets are required and able to be secured
- The potential for the proposed modification to significantly impact any other matters of national environmental significance or Commonwealth land and therefore the need to make a referral to the Australian Government Department of Climate Change, Energy, the Environment and Water (DCCEEW) for a decision by the Australian Government Minister for the Environment on whether assessment and approval is required under the EPBC Act.

2. Need and options considered

2.1 Strategic need for the proposed modification

Chapter 2 of the Project REF addresses the strategic need for the Project, the Project objectives and the options that were considered. The proposed modifications described and assessed in this addendum REF are consistent with the strategic need for the Project.

The proposed modifications have been identified through design review and as the Project has progressed. The proposed modifications are needed to:

Access and safety benefits – The proposed fill emplacements would expand the existing batters forming a wider road verge. This would enhance both the emergency breakdown area and maintenance access while still enabling continued traffic movements along Heathcote Road. It will also provide an additional level area reducing the risk of an errant vehicle veering down the embankment.

Avoid Offsite disposal of waste – The proposed fill emplacement modification would provide three sites, in one general area, for the emplacement of site won fill. This fill would comprise of soil material generated by the road upgrade works, resulting in the extension of existing road batter along Heathcote Road. The re-use of site won material at these batters would avoid the need for its disposal offsite as waste, and importation of material to achieve the safety benefits noted.

Allow the implementation of design elements for the safety and access of the community – An existing tree at corner of Infantry Parade and Heathcote Road is preventing the implementation of design elements that are required to provide pedestrian safety via footpath lighting and improved access. As such the proposed tree removal modification involves the removal of this tree to enable these elements to be progressed as designed.

2.2 Proposal objectives and development criteria

Section 2.3 of the Project REF identifies the objectives and development criteria that apply to the proposed modifications. There are no additional criteria specific to the proposed modifications.

2.3 Alternatives and options considered

2.3.1 Methodology for assessment of options

The proposed modifications involve minor construction related changes that have arisen during the design review and construction stage.

In this context, the process of option evaluation had two broad stages:

- Identify the 'do nothing' option.
- Identification of options for a proposed modification that address the issues and strategic need.
- Evaluation of options including the 'do nothing' and proposed modification (Option 1) with reference to the respective impacts and benefits.

2.3.2 Identified options

As noted above, for the proposed modifications, Transport identified and investigated two options:

- **'Do nothing' option** – This option involves carrying out the Project as described in the Approved Project Documentation, without the changes summarised in Section 1.1 and described in detail in Chapter 3 of this addendum REF.
- **Option 1** – This option involves implementing the changes that form the proposed modifications including the changes summarised in Section 1.1 and described in detail in Chapter 3 of this addendum REF, being the construction of three fill emplacement sites and the removal of one tree at Infantry Parade.

2.3.3 Analysis of options

'Do Nothing' option

The 'do nothing' option would involve no additional work outside the scope of the Approved Project Documentation. The 'do nothing' option does not address the identified need in Section 2.1 and would therefore only be preferred in circumstances where the costs and environmental impact of proceeding were assessed as outweighing identified benefits. That was not the case and therefore the 'do nothing' option was not pursued further.

Option 1

Fill emplacement modification

The construction of three fill emplacement sites would allow site won material (that falls within NSW resource recovery orders and exemptions guidelines) to be re-used within the Project site by extending the existing batter that is within the road corridor. This would help reduce the overall generation of site waste by forgoing the need for external disposal and ultimately help reduce pressure on local landfills.

Tree removal modification

As currently designed, the design elements of a new pram ramp, an altered shared path and the relocation of an existing street light are in conflict with the Infantry Parade Tree. Two potential design solutions to the tree / design element conflict at Infantry Parade / Heathcote Road were identified:

- The first design solution considered the realignment of the footpath to avoid the tree, with connection to the landing, however the street light issue remained requiring further redesign and potential subsequent conflicts or design issues. This solution was discounted from further consideration.
- The second design solution involved the removal of the tree and was proposed as the most effective and efficient solution, retaining the current design elements while providing safety and access benefits to the community. This is the approach adopted for Option 1.

2.4 Preferred option

Transport has identified Option 1 as the preferred option, as it would addresses constructability requirements at a total greater benefit when compared to the 'do nothing' option.

While Option 1 would involve the removal of vegetation, it provides an avenue for the re-use of site won material in a sustainable manner and enables the implementation of design elements that provide safety and access benefits to the community.

The preferred option is to therefore implement all the elements of the proposed modifications as summarised in Section 1.1 and described in detail in Chapter 3 below.

3. Description of the proposed modification

3.1 The proposed modification

Transport proposes two modifications to the Project that are addressed by this addendum REF. The first proposed modification is the expansion of three existing road batters all within one area, to be refer to as the 'fill emplacement modification', along Heathcote Road. The second proposed modification is the removal of a tree at Infantry Parade to allow for the progression of existing design element, to be refer to as the 'tree removal modification'.

Key features of these proposed modifications are:

1. Fill emplacement modification

Transport have proposed to expand three existing road batters using site won fill as proposed fill emplacement sites. The expansion (widening) of the existing batters provides a wider verge to enhance both the emergency breakdown area and maintenance access while enabling continued through traffic movement, and providing road safety benefit with the additional area reducing the risk of errant vehicle veering down the embankment area. The re-use of site won material at these batters would avoid the need for its disposal offsite as waste, and separate importation of material to otherwise achieve the benefits noted. The site won fill is to be assessed for re-use onsite including potential contaminants (if any) and managed appropriately, which may require temporary stockpiling at a previously identified location prior to its transport to and emplacement at one of the batters.

The three fill emplacements sites are (refer to Figure 3-1):

- **Fill Emplacement Site 1:** Designed to expand the existing road batter at this site to accommodate **364m^3** worth of site won fill, and would include vegetation clearing already assessed in the Approved Project Documentation.
- **Fill Emplacement Site 2:** Designed to expand the existing road batter at this site to accommodate **2,209m^3** worth of site won fill, and would include up to **0.016ha** of new vegetation clearing that is assessed in Section 6.2 of this addendum REF.
- **Fill Emplacement Site 3:** Designed to expand the existing road batter at this site to accommodate **367m^3** worth of site won fill, and would include vegetation clearing already assessed in the Approved Project Documentation.

2. Tree removal modification

The Project design includes a new pram ramp, an altered shared path and the relocation of an existing street light. A conflict has since been identified with the location of one tree (Infantry Parade Tree) and these design elements, preventing the designs' implementation.

As such the second proposed modification involves the removal the Infantry Parade Tree, to enable the construction of these design elements (refer to **Error! Reference source not found.**).

As the Infantry Parade Tree falls outside of the 2019 VCB, further flora and fauna impact assessment is required for its removal, detailed within Section 6.2 of this addendum REF.

Figure 3-1: Key features of the fill emplacement sites.

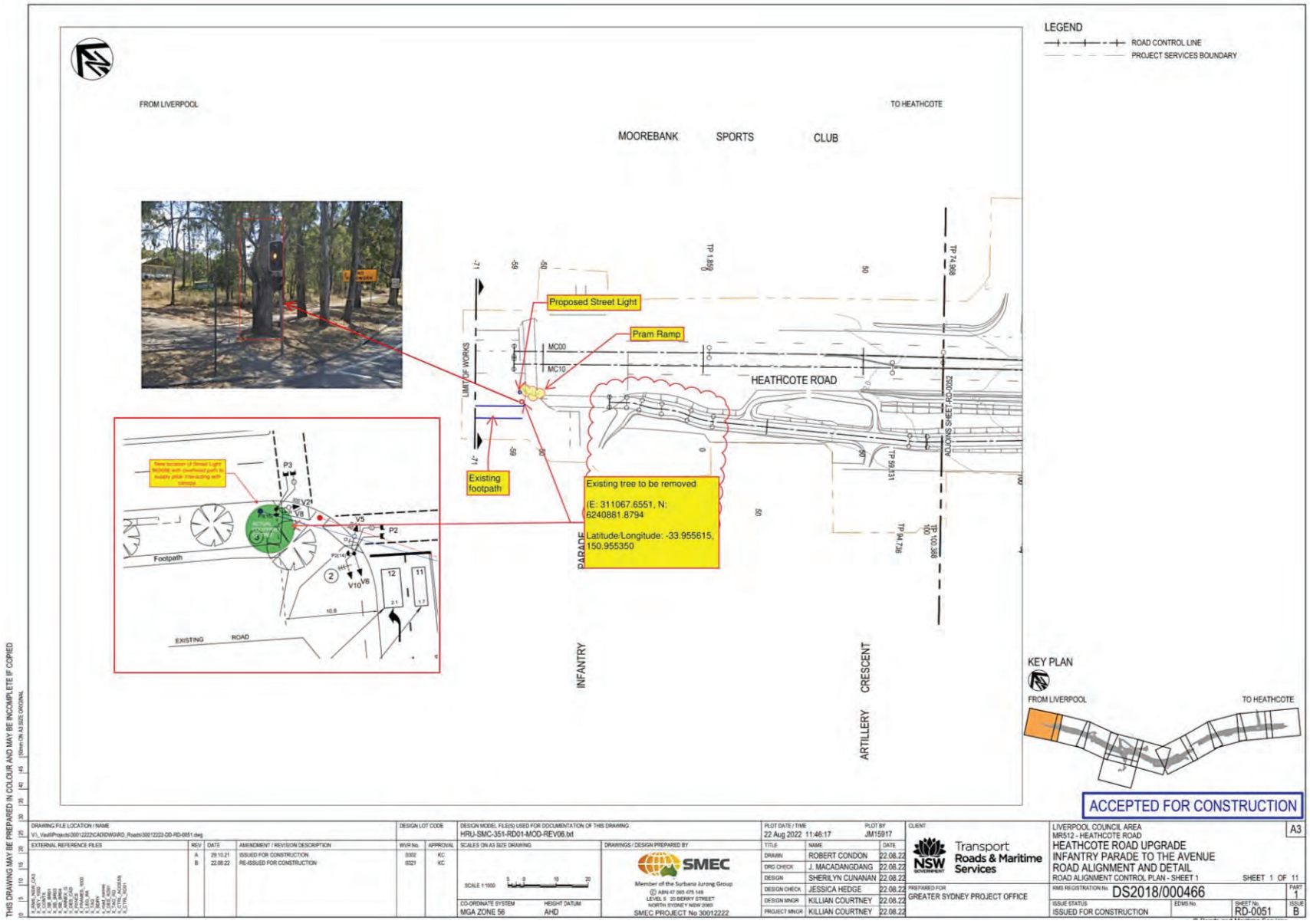


Figure 3-2: Key features of the Infantry Parade tree removal

3.2 Design

3.2.1 Design criteria

The design criteria remain as described in Section 3.2.2 of the Project REF.

3.2.2 Engineering constraints

The engineering constraints remain as described in Section 3.2.3 of the Project REF.

3.2.3 Main features of the modification

Fill emplacement modification

Key features of the proposed fill emplacement modification would include earthworks to prepare the area for stockpiling of site won fill, then forming up the extension to the existing batter with the fill material, at the three fill locations referred to as Fill Emplacement Sites 1, 2 and 3 (refer to Figure 3-1 above).

The alternation to the existing batters would be as follows:

Emplacement Site 1: Compared to the existing batters, the new fill batters would have an increase in depth of 0.4m and an increase in width of approx. 5.9m. The grade of 2H:1V will be retained. The pipe outlet J01/01 is to be extended to suit the new fill levels.

Emplacement Site 2: Compared to the existing batters, the new fill batters would have no significant change in the batter depth however it is extended by approximately 10.4m. The grade of the new fill batter is 2H:1V while the existing batter has a grade of 1.869H:1V. No design drainage nor additional drainage is being provided at this location.

Emplacement Site 3: Compared to the existing batters, the new fill batters would have no significant change in the batter depth however it is extended by approximately 5.8m. The grade of the new fill batter is 2H:1V while the existing batter has a grade of 2.626H:1V. No design drainage nor additional drainage is being provided at this location.

Tree removal modification

The key feature of the proposed tree removal modification is that the tree base is to be removed at or below ground level to enable the of a new pram ramp, an altered shared path and the relocation of an existing street light (refer to **Error! Reference source not found.** above).

3.3 Construction activities

3.3.1 Work methodology

The Project

The construction methodology is described in Section 3.4 of the Project REF and in the previous addendum REF's as applicable. Section 3.4 of the Project REF includes the work methodology, staging, construction hours and duration, plus plant and equipment required to complete the Project. There would be no change to the work methodology presented in the Approved Project Documentation.

Proposed Modifications

The expected methodology for the proposed modifications would be in accordance with Table 3-7 of the Project REF, in particular:

- Setup environmental, safety and traffic management controls.
- Pre-clearance surveys and obtaining any permits or licences in advance.

- Site demarcation, exclusion fencing and barrier establishment, identification and protection of sensitive areas (i.e. habitat zones, trees).
- Existing site stockpile areas to be used for emplacement of the fill and stabilised access to work zones across the proposed modifications footprint.

3.3.2 Construction hours and duration

The construction hours and duration of works remain as identified in Section 3.4.2 of the Project REF, which are:

- Monday to Friday: 7am to 6pm.
- Saturday: 8am to 1pm.
- Sunday and Public Holidays: no work.

These construction hours are in compliance with the standard construction hours given in the Environment Protection Licence (EPL) 21505 issued for the project – refer to Section 4.2.3. **Error! Reference source not found.**Section L6 of EPL 21505 addresses hours of operation for construction works, including standard construction hours, high noise impact activities and works, exemptions to standard construction hours for low noise impact works, and other matters relating to work outside of the standard construction hours.

3.3.3 Plant and equipment

Plant and equipment required for the construction of the proposed modifications would be consistent with Section 3.4.4 of the Project REF.

The plant and equipment for the proposed modifications may include:

- Excavator (up to 25T).
- Bobcat.
- Rollers.
- Watercart.
- Tipper truck.
- General light vehicles.
- Chainsaws and mulchers.

3.3.4 Earthworks

There would be a no change to the earthworks balance as the fill emplacement is to accommodate fill surplus to other placement sites or re-use opportunities within the project, and the management approach would be generally consistent with Section 3.4.5 of the Project REF. The earthworks balance associated with the tree removal would be negligible. For dust control measures use of the existing water cart would be utilised for the proposed modifications work sites.

3.3.5 Source and quantity of materials

There would be no change to material quantities associated with the proposed modifications and material volumes would still be generally consistent with Section 3.4.5 of the Project REF.

The fill emplacement modification is for the emplacement of fill that has been excavated from within the Project area and would not import or export materials.

3.3.6 Traffic management and access

Traffic management, access, construction vehicle volumes and haulage routes would be consistent with Section 3.4.5 of the Project REF, and the previous addendum REF's. Access would be via existing tracks used for the Project.

3.4 Ancillary facilities

Ancillary facility use would be consistent with those identified in Section 3.5 of the Project REF, and previous addendum REF's. Site won fill, if requiring temporary stockpiling, is anticipated to be stockpiled at previously identified and assessed stockpile locations (as per Approved Project Documentation) nominated by Transport prior to transportation to the fill emplacement sites. As such new or changes to the identified ancillary facilities are required for the proposed modifications.

3.5 Public utility adjustment

The proposed modifications will not require any additional public utility adjustment beyond that noted in Section 3.6 of the Project REF.

Specifically, the designed location of the street light that is retained as a result of the Infantry Parade Tree removal modification has been previously assessed with the Project REF.

3.6 Property acquisition

The proposed modifications do not require any additional property acquisition beyond that noted in Section 3.7 of the Project REF, Section 3.6 of the Addendum 1 REF, and Section 3.6 of the Addendum 2 REF. All the proposed modification work is to be contained within the Heathcote Road corridor, and does not encroach on the DoD estate.

Transport currently has an existing lease agreement with DoD for the Heathcote Road Upgrade Project.

All other aspects of the proposed modifications are expected to be retained wholly within the road corridor that is under the responsibility of Transport.

4. Statutory and planning framework

4.1 Environmental Planning and Assessment Act 1979

The EP&A Act establishes the system of environmental planning and assessment in NSW. These proposed modifications are subject to the environmental impact assessment and planning approval requirements of Division 5.1 of the EP&A Act. Division 5.1 of the EP&A Act specifies the environmental impact assessment requirements for activities undertaken by public authorities, such as Transport, which do not require development consent under Part 4 of the Act.

In accordance with Section 5.5 of the EP&A Act, Transport as the proponent and determining authority, must examine and take into account to the fullest extent possible all matters affecting or likely to affect the environment by reason of the proposed modifications. Section 171 of the EP&A Regulation defines the factors which must be considered when determining if an activity assessed under Division 5.1 of the EP&A Act has or is likely to have a significant impact on the environment.

Section 6 of this addendum REF provides an environmental impact assessment of these proposed modifications in accordance with Section 171 and Section 8.1 of this addendum REF specifically responds to the factors for consideration under Section 171(2).

4.1.1 State Environmental Planning Policies

State Environmental Planning Policy (Transport and Infrastructure) 2021 (T&I SEPP)

Chapter 2 of the T&I SEPP aims to facilitate the effective delivery of infrastructure across the state, including for roads and road infrastructure facilities. Section 2.109 of the T&I SEPP makes development for the purposes of a road or road infrastructure facilities permissible without consent when undertaken by a public authority, including construction works associated with this. Section 2.3(3) of the T&I SEPP provides that various activities associated with construction works are also permissible without consent, including clearing of vegetation.

As the proposed modifications are appropriately characterised as development for the purposes of a road or road infrastructure facilities and is to be carried out by or on behalf of Transport, it can be progress under the provisions of the T&I SEPP and assessed under Division 5.1 of the EP&A Act. Development consent from council is not required.

The proposed modifications are not located on land reserved under the *National Parks and Wildlife Act 1974* and do not require development consent or approval under State Environmental Planning Policy (Resilience and Hazards) 2021 Chapter 2 Coastal Management, State Environmental Planning Policy (Precincts — Western Parkland City) 2021 or State Environmental Planning Policy (Planning Systems) 2021 Chapter 2 – State and regional development. Therefore, the proposed modifications can progress as development without consent as there are no other legal provisions that would affect the planning pathway.

4.1.2 Local Environmental Plan

Liverpool Local Environmental Plan 2008

Section 4.1.3 of the Project REF identified relevant zoning under Liverpool LEP 2008 and considered the consistency of the Project with zoning objectives. The proposed modifications would not include an additional land use zone and the assessment of consistency with zoning objectives provided in Section 4.1.3 of the Project REF remains relevant to the proposed modifications.

The land use zonings of the proposed modifications (locations) are SP2 Infrastructure (Classified Road) and E1 Local Centre as shown in Table 4-1. The requirements of the zoning are also summarised Table 4-1.

The E1 Local Centre zone correlates with the B2 Local Centre zone location identified in the Project REF.

Table 4-1: Applicable land use zones

Zone: SP2 Infrastructure (Classified Road)	
Objectives of zone	• To provide for infrastructure and related uses. • To prevent development that is not compatible with or that may detract from the provision of infrastructure. • To reserve land for the provision of infrastructure.
Permitted without consent	Nil
Permitted with consent	Aquaculture; The purpose shown on the Land Zoning Map, including any development that is ordinarily incidental or ancillary to development for that purpose; Environmental protection works; Roads.
Prohibited	Any development not specified in item 2 or 3
Zone: E1 Local Centre	
Objectives of zone	• To provide a range of retail, business and community uses that serve the needs of people who live in, work in or visit the area. • To encourage investment in local commercial development that generates employment opportunities and economic growth. • To enable residential development that contributes to a vibrant and active local centre and is consistent with the Council's strategic planning for residential development in the area. • To encourage business, retail, community and other non-residential land uses on the ground floor of buildings. • To facilitate a high standard of urban design and a unique character that contributes to achieving a sense of place for the local community. • To maximise public transport patronage and encourage walking and cycling.
Permitted without consent	Home based child care, home occupation.
Permitted with consent	Community facilities, Environmental facilities, Environmental protection works, Recreational areas, Roads.
Prohibited	Any development not specified as permitted without consent or permitted with consent.

The proposed modifications are not inconsistent with the objectives of either zone. The fill emplacement modification itself is not a permissible land use under the SP2 Infrastructure zone or the E1 Local Centre zone, although works for roads are permissible with consent in both zones and the emplacement is ancillary to the road upgrade project. The tree removal modification is part of the road upgrade works and is permitted with consent in the zone of SP2 Infrastructure Classified Road. However, as discussed above, the modification works are permissible without consent from Council under the T&I SEPP.

4.2 Other relevant NSW legislation

4.2.1 Biosecurity Act 2015

The Project REF considered the provisions of the *Noxious Weeds Act 1993*, which has now been repealed and replaced by the *Biosecurity Act 2015*. Under the *Biosecurity Act 2015*, which came into effect on 1 July 2017, 'all plants are regulated with a general biosecurity duty to prevent, eliminate or minimise any biosecurity risk they may pose. Any person who deals with any plant, who knows (or ought to know) of any biosecurity risk, has a duty to ensure the risk is prevented, eliminated or minimised, so far as is reasonably practicable'.

Potential impacts from weeds from the proposed modifications are considered in Section 6.2 and were considered in the Project REF.

4.2.2 Biodiversity Conservation Act 2016

The *Biodiversity Conservation Act 2016* (BC Act) provides for the protection of plants and animals and their habitat, and especially for the identification and listing of threatened species and ecological communities. The BC Act also sets out provisions relating to biodiversity assessment, offsets and reporting.

The proposed modifications would require vegetation clearing and other landscape modification. Potential impacts of the proposed modification are considered in Section 6.2. The Flora and Fauna Assessment Technical Memorandum (Appendix E) further considers the application of the BC Act.

It is noted that the now repealed *Threatened Species Conservation Act 1995* was applicable for the Project REF, and also for the other subsequent Addendum REFs using the provisions of the Biodiversity Conservation (Savings and Transitional) Regulation 2017. However, as those provisions are no longer applicable, the BC Act has been addressed for this Addendum REF.

4.2.3 Protection of the Environment Operations Act 1997

The *Protection of the Environment Operations Act 1997* (POEO Act) is administered by the NSW Environment Protection Authority (EPA). It provides an integrated system of licenses to set out protection of the environment policies and to adopt more innovative approaches to reduce pollution in the environment, having regard to the need to maintain ecologically sustainable development.

The approved Project constitutes a scheduled activity (main road construction of more than three kilometres in length and >50,000 tonnes in a metropolitan area as per Schedule 1) under the POEO Act and therefore requires an EPL. The proposed modifications would not alter this requirement. The EPL issued for the Project (EPL 21505) is for road construction and provides restrictions on working hours, noise levels, air and water quality impacts, and waste management. Maps are associated with, and define the area covered by the EPL.

The (mapped) area covered by EPL 21505 for the Project are confirmed as to encompass the location of the new emplacement sites (refer to Figure 4-1). The provisions of the EPL apply to the proposed modification works. The various construction and operational management measures (see Section 7.2) would be used to prevent and minimise pollution and waste generation, consistent with the objectives of this Act and its supporting regulations.

In accordance with Part 5.7 of the POEO Act, Transport would notify the EPA of any pollution incidents that occur onsite.

Figure 4-1: Boundary of EPL 21505 encompasses emplacement sites

4.2.4 Contaminated Land Management Act 1997

The Contaminated Land Management Act 1997 (CLM Act) establishes a process for investigating and, where appropriate, remediating land that is considered to pose a significant risk to human health or the environment. The CLM Act requires Transport to immediately notify the EPA if it is suspected that the work has resulted in ground contamination or encountered existing ground contamination.

Consideration of the provisions and requirements of the CLM Act are provided in the assessment of soils and geology in Section 6.3.

4.2.5 National Parks and Wildlife Act 1974

Under the *National Parks and Wildlife Act 1974* (NP&W Act), all Aboriginal objects and places are protected, irrespective of their level of significance or matters of land tenure. The Act establishes strict liability offences for harming or desecrating Aboriginal objects and Aboriginal places (this type of offence may apply even if a person is unaware that they are harming an Aboriginal object). All persons are therefore responsible for taking reasonable precautions and exercising their due diligence to ensure that their actions would not harm Aboriginal objects. A person who exercises their due diligence has a defence against prosecution if they later unknowingly harm an object.

The *Due Diligence Code of Practice for the Protection of Aboriginal Objects in New South Wales* (DECCW, 2010) provides guidance on how to identify activities that may harm an Aboriginal object or place, and to determine whether they should apply for consent to harm an Aboriginal object or place in the form of an Aboriginal Heritage Impact Permit under Section 90A of the Act. The National Parks and Wildlife Regulation 2019 removes the need to follow the due diligence process if the proponent is carrying out an activity that is specifically defined as a 'low impact activity.'

An Aboriginal Heritage Information Management System (AHIMS) search undertaken on 7 February 2025 identified no Aboriginal Heritage objects or places in the vicinity of the modifications sites (refer to Appendix F). The proposed modifications occur in a previously disturbed and modified area of the road corridor. The

emplacement area is associated with an existing batter for Heathcote Road and the tree at the Infantry Parade intersection is planted and minimal surface disturbance is anticipated. The Aboriginal heritage assessment undertaken as part of the Project REF did not identify any Aboriginal cultural heritage values in the vicinity of the modification sites and mitigation measures within that Project REF will apply to this addendum REF work. The proposed modifications are therefore not expected to harm any Aboriginal object or declared Aboriginal place protected under the NP&W Act. Refer to Section 6.1 for further details.

4.3 Commonwealth legislation

4.3.1 Environment Protection and Biodiversity Conservation Act 1999

Under the EPBC Act a referral is required to the Australian Government for *proposed 'actions that have the potential to significantly impact on matters of national environmental significance or the environment of Commonwealth land'*. These are considered in Chapter 6 and Appendix B of this addendum REF. There are nine Matters of National Environmental Significance (MNES), and works on Commonwealth land, that are protected by the EPBC Act.

An updated EPBC Protected Matters Search was undertaken on 7 February 2025 with a search buffer of 2 km (refer to

Appendix D). This found that the following MNES are known or predicted to occur within the proposed modification sites:

- 8 Threatened Ecological Communities (TEC).
- 58 Threatened Species.
- 13 listed Migratory Species.

The assessment of the Project's impact on MNES and the environment of Commonwealth land was undertaken in the flora and fauna technical memorandum (refer to Appendix E) and summarised within Section 6.2 of this addendum REF. It was found that the project is unlikely to have a significant impact on these relevant MNES.

Furthermore, heritage assessments were conducted and described in Sections 6.1 of this REF. They concluded that the project is unlikely to have a significant impact on the relevant heritage MNES.

As such, a referral is not required for proposed road actions that may affect nationally listed threatened species, endangered ecological communities and migratory species. This is because requirements for considering impacts to these biodiversity matters are the subject of a strategic assessment approval granted under the EPBC Act by the Australian Government in September 2015.

The assessment of the proposed modifications impact on MNES and on Commonwealth land found that there would be no change to the findings of the Approved Project Documentation and would be unlikely to cause a significant impact on MNES or Commonwealth land. A referral to the DCCEEW (Cwth) is not required.

4.4 Confirmation of statutory position

The proposed modifications are categorised as development for the purpose of a road and/or road infrastructure facilities and are being carried out by or on behalf of a public authority. Under section 2.109 of T&I SEPP the proposed modifications are permissible without consent. The proposed modifications are not State Significant Infrastructure or State Significant Development. The proposed modifications can be assessed under Division 5.1 of the EP&A Act. Consent from council is not required.

A referral to the DCCEEW (Commonwealth) under the EPBC Act is not required.

5. Consultation

5.1 Consultation strategy

The consultation strategy for the project remains consistent with that described in Section 5.1 of the Project REF.

The proposed modifications do not trigger any consultation requirements under Division 1, Part 2.2, of the T&I SEPP.

The scope of the proposed modifications do not trigger the requirements for public display under clause 171(4) of the EP&A Regulation. As per clause 171(4)(c) of the EP&A Regulation, public display of this addendum REF was not considered necessary by Transport given that targeted consultation has occurred, and further consultation would occur as required.

No additional consultation has occurred specific to these proposed modifications.

5.2 Ongoing or future consultation

Consultation with the DoD is ongoing and as required.

Transport currently has an existing lease agreement with DoD for the Heathcote Road upgrade project. The works associated with the proposed modifications would be contained in the road corridor and would not enter DoD land or affect DoD infrastructure. As such no alteration of the current Access License between Transport and DoD is required.

Ongoing or future consultation would be consistent with Section 5.6 of the Project REF.

6. Environmental assessment

This section of the addendum REF provides a detailed description of the potential environmental impacts associated with the construction and operation of the proposed modifications. All aspects of the environment potentially impacted upon by the proposed modification are considered. This includes consideration of the guidelines *Roads and Related Facilities EIS Guideline* (DUAP, 1996) and *Is an EIS required?* (DUAP, 1999) the factors specified in section 171 of the EP&A Regulation. The factors specified in section 171(2) of the EP&A Regulation are considered in Section 8.1.

Site-specific safeguards and management measures are provided to avoid, minimise, mitigate or manage the identified potential impacts.

6.1 Issue identification

The proposed modifications described in this addendum REF have been reviewed in the context of the receiving environment to identify any additional issues for assessment. Where there is a new issue or change in issue that is greater than negligible, this is considered by this addendum REF. Where there is no additional issue or change in issue considered by the Approved Project Documentation that is not greater than negligible to minor these are not assessed. This review process is documented in Table 6-1 of this addendum REF.

Table 6-1: Issues summary review for this addendum REF

Environmental factors (section in Project REF)	Assessed in this addendum REF	Proposed modification/reason
Biodiversity	Yes Refer to Section 6.2	The proposed modifications described in this addendum REF would have a minor impact on Biodiversity resulting from the construction of the fill emplacement sites, associated removal of vegetation and the removal of a tree. Fill emplacement modification: Fill Emplacement Site 2 would require the clearing of a small area of Plant Community Type (PCT) 3448 which is associated with ecological communities listed under both the BC Act and the EPBC Act. No significant impact to PCT 3448, or any threatened flora or fauna is assessed as likely. Tree removal modification: one large tree, identified as a locally indigenous species, *Eucalyptus tereticornis*, is to be removed. It has a small hollow that is unlikely to be used for nesting by birds or bats. The tree is not identified on state vegetation mapping. The tree is one of a row of planted street trees. The impacts of the proposed modification works are described further in Section 6.2, and a copy of the Flora and Fauna Technical Memorandum (on which the section is drawn) is provided at Appendix E.
Surface water and flooding	No	The proposed modifications described in this addendum REF would have a negligible impact on surface water and flooding. The proposed modifications would be consistent with the assessment of this aspect and impact by the Approved Project Documentation. Safeguards and mitigation measures contained in the Approved Project Documentation would adequately manage potential or actual impacts. Fill emplacement modification: Erosion and sediment control measures required for the Project would be applied to this area to manage surface water and runoff in construction. As noted in Section 6.3, contaminated fill would not be used in the emplacement sites, hence the risk of contaminating surface waters is negligible. Revegetation of the emplacement sites would, as it establishes, stabilise the surface and reduce surface runoff.

Environmental factors (section in Project REF)	Assessed in this addendum REF	Proposed modification/reason
		Tree removal modification: Surface water implications would be limited due to the scale of works. Erosion and sediment control measures to be implement for the project would be applied to these works.
Groundwater	No	The proposed modifications described in this addendum REF would have a negligible impact on groundwater. The proposed modifications would be consistent with the assessment in the Project REF. Safeguards and mitigation measures contained in the Approved Project Documentation would adequately manage potential or actual impacts. Fill emplacement modification: As noted in Section 6.3, contaminated fill would not be used in the emplacement sites, hence the risk of contaminating groundwater is negligible. Tree removal modification: Ground water implications would be nil to negligible due to the scale of works.
Soils and geology soils	Yes Refer to Section 6.3	The proposed modifications described in this addendum REF would have a minor impact on soils and geology. Fill emplacement modification: The fill emplacement sites are to be located on existing batters to Heathcote Road. These fill sites would re-use soil generated from the Project and extend the existing batter. While the potential for the soil to contain contaminants (such as metals or acid sulfate soils) is low, the fill material would require stockpiling, sampling and assessment, prior to handling and transportation to the emplacement area. The handling and stockpiling of excavated soils associated with the Project is not a new issue specific to this modification. Tree removal modification: The earthworks balance associated with the tree removal modification would be negligible. The impacts of the proposed modification works are described further in Section 6.3.
Traffic and transport	No	The proposed modifications described in this addendum REF would have a negligible impact on traffic and transport. The proposed modifications would be consistent with the assessment of this aspect and impact by the Approved Project Documentation. Safeguards and mitigation measures contained in the Approved Project Documentation would adequately manage potential or actual impacts. Fill emplacement modification: Access by construction vehicles to this site would be by existing roadways and tracks. Vehicle plant and equipment movement within the site would not affect public traffic movements on Heathcote Road. There would be some construction vehicles attending the emplacement area off Heathcote Road, as part of the broader construction traffic movements and would be limited in the overall project traffic generation. Tree removal modification: Access by construction vehicles to this site would be by existing roadway. The scale of this work would require very limited traffic and access requirements would be in conjunction with other construction works at this location.
Noise and vibration	No	The proposed modifications described in this addendum REF would have a negligible impact on noise and vibration. The proposed modifications would be consistent with the assessment of this aspect and impact by the Approved Project Documentation. Safeguards and mitigation measures contained in the Approved Project Documentation would adequately manage potential or actual impacts.

Environmental factors (section in Project REF)	Assessed in this addendum REF	Proposed modification/reason
		Fill emplacement modification: The location of these works are not in proximity to sensitive receivers or heritage items and therefore no impacts specific to these works are anticipated. Tree removal modification: The location of this component is in proximity to residences; however the tree removal would be of short duration and undertaken during standard construction hours.
Aboriginal heritage	No	The proposed modifications described in this addendum REF are not expected to impact Aboriginal heritage objects, sites or potential archaeological deposits, as confirmed via an AHIMS search undertaken on 07/02/2025. The AHIMS search did not identify any Aboriginal heritage objects, sites or potential archaeological deposits within or immediately adjacent to the proposed modifications (refer Appendix F). The proposed modifications would be consistent with the assessment of this aspect and impact by the Approved Project Documentation. Safeguards and mitigation measures contained in the Approved Project Documentation would adequately manage potential or actual impacts. Both work areas for the emplacement area and the tree removal are in the previously disturbed and modified road corridor. The main works would be at or above ground level.
Non-Aboriginal heritage	No	The proposed modifications described in this addendum REF are not expected to impact non-Aboriginal heritage objects or places. A search of the Liverpool LEP, NSW State Heritage Register and Australian Heritage Database was undertaken on 07/02/2025 (refer to Figure 1-10). No non-Aboriginal heritage sites or items were listed within or immediately adjacent to the proposed modifications that were not considered in the Approved Project documentation. The proposed modifications would be consistent with the assessment of this aspect and impact by the Approved Project Documentation. Safeguards and mitigation measures contained in the Approved Project Documentation would adequately manage potential or actual impacts.
Landscape character and visual	Yes Refer to Section 6.4	The proposed modifications described in this addendum REF would have a minor impact on landscape character and visual amenity. Fill emplacement modification: The modification includes fill emplacement sites that would extend the existing Heathcote Road batter. While some visual impact would occur, notably through the removal of vegetation and the altered final landscape, it would remain negligible and be of limited visibility to passing motorists. The revegetation of the emplacement area would mitigate this impact, particularly in time as the vegetation establishes and grows. Tree removal modification: The removal of a single tree would have an immediate visual impact but would lessen in time. The new pedestrian infrastructure would have limited visual impact and form part of the urban environment. Other trees retained in the area would contribute to the streetscape. The proposed modifications remain consistent with the assessment of this aspect and its impact as outlined in the Approved Project Documentation. The impacts of the proposed modification works are described further in Section 6.4.

Environmental factors (section in Project REF)	Assessed in this addendum REF	Proposed modification/reason
Socio-economic	No	The proposed modifications described in this addendum REF would have a nil impact on socio-economic matters. The proposed modifications would be consistent with the assessment of this aspect and impact by the Approved Project Documentation. Safeguards and mitigation measures contained in the Approved Project Documentation would adequately manage potential or actual impacts. Neither the emplacement sites nor the tree removal at Infantry Parade are anticipated to have a more than negligible impact on socio economic factors other than as identified under other environmental matters.
Other impacts	No	The proposed modifications described in this addendum REF would have negligible other impacts. The proposed modifications would be consistent with the assessment of this aspect and impact by the Approved Project Documentation. Safeguards and mitigation measures contained in the Approved Project Documentation would adequately manage potential or actual impacts.
Cumulative impacts	Yes Refer to Section 6.5	The proposed modifications described in this addendum REF would have a minor cumulative impact and has been discussed in further detail at Section 6.5 of this Addenda REF. The proposed modifications would be consistent with the assessment of this aspect and impact by the Approved Project Documentation and this addendum REF. Safeguards and mitigation measures contained in the Approved Project Documentation would adequately manage potential or actual impacts.

6.2 Biodiversity

A flora and fauna technical memorandum (FFA tech memo) (Appendix E) has been prepared to assess the impact of the proposed modifications to the Project, particularly in relation to species and communities listed under the NSW *Biodiversity Conservation Act 2016* (BC Act) and Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

6.2.1 Methodology

Desktop assessment

A desktop review was carried out of the following reports:

- Heathcote Road Upgrade, Infantry Parade to The Avenue, REF (WSP, 2016)
- Heathcote Road Upgrade, Infantry Parade to The Avenue, addendum REF (Hills, 2019) including Biodiversity Assessment Report (SMEC, 2019)
- A search of the Atlas of NSW Wildlife maintained by the NSW Department of Planning, Industry and Environment (DPIE February 2025) (10 km buffer search area around project site boundary)
- A Protected Matters Search Tool search provided under the EPBC Act (Feb 2021) (10km buffer from the project site boundary)
- Updated vegetation mapping (November 2024) - NSW Statewide Vegetation Type Mapping, Version C2.0.M2.1.

Field Survey

A field survey of the study area (comprising each modification site) was carried out on the 11 February 2025 by a Senior Ecologist from SMEC. Where native vegetation was identified, the vegetation type relative to listed

threatened ecological communities was determined. Targeted fauna surveys in line with the guidelines were not performed.

The field survey was carried out based on the nature of direct or likely indirect impacts, likely biodiversity habitat and mapped vegetation. All areas impacted by the proposed design were ground-truthed.

Previous database searches within the Project REF were up to nine years-old so they were re-run and updated for the proposed modifications study areas. The likelihood of occurrence table was revised for the biodiversity study area and details of those species which have been recorded previously or are predicted to occur in the locality of the proposal were included. The FFA tech memo includes additional species or those with changed information. New records of species not previously recorded in the locality since Addendum 1 REF (2019) and the listing of new species were both reasons for additional candidate species.

The likelihood of occurrence table (in the FFA tech memo) was developed pre-survey, with refinements made following the survey effort and ground-truthed habitat assessment.

Survey Limitations

As per the approved scope, targeted flora and fauna surveys in line with relevant threatened species survey guidelines were not performed given constraints on the survey seasons for some species.

6.2.2 Existing environment – Fill Emplacement Site 2

Plant Community Types

NSW State Type Vegetation mapping show the study area as supporting PCT 3448 -Castlereagh Ironbark Forest (refer to Figure 6-1 below). PCT 3972 Sydney Creekflat Wetland was also indicated on the NSW State Type Vegetation Mapping, however the field survey did not find any evidence of PCT 3972 and the study area does not contain a marked watercourse under the *Water Management Act 2000* (NSW).

- PCT 3448 - Castlereagh Ironbark Forest - This vegetation community is classified as Endangered under the BC Act and Critically Endangered under the EPBC Act. It is a dry sclerophyll open forest dominated by *Eucalyptus fibrosa* (Broad-leaved Ironbark), with a dense mid-stratum of *Melaleuca decora* and *Acacia falcata*. The understorey includes a mix of shrubs such as *Bursaria spinosa* and *Daviesia ulicifolia*, along with grasses (*Entolasia stricta, Aristida vagans, Microlaena stipoides*) and forbs (*Dianella revoluta, Opercularia diphylla*). The community is estimated to have experienced approximately 93% clearing, with remaining patches in good to low condition.

Further detail is included in Appendix E.

Figure 6-1: Plant community type mapping

The southern portion of the vegetation is indicated as being in low condition. This area consists primarily of a stand of *Angophora bakeri*, with an understorey dominated by exotic species, particularly a dense thicket of *Rubus fruticosus* (Blackberry). Species recorded in this area are listed in Appendix F.

The remaining portion of native vegetation is in good condition, with a well-established canopy and shrub layer, and a ground cover comprising at least 30% native species. The vegetation integrity of this patch was previously assessed in the original BAR (Quadrat 3), where it was classified as Good-Moderate (Good) condition. Minimal direct impact is expected, with minor vegetation loss near the north-western edge of the fill emplacement modification site. This includes the removal of one mature Eucalyptus tree and some shrub species.

Non-Native Vegetation

Most of the study area was represented by cleared or disturbed areas, and exotic weeds and grassland.

The batter below Heathcote Road is predominantly exotic grassland composed mainly of African lovegrass (*Eragrostis curvula*) and Rhodes grass (*Chloris gayana*). The batter also includes scattered small trees and shrubs, including mostly fast colonising wattles (*Acacia decurrens, A. falcata*) and small leaved privet (*Ligustrum sinense*). The existing batter is not mapped as part of the Castlereagh Ironbark Forest community and the species with the non-native areas are recorded in Appendix FE.

Threatened ecological communities

BC Act - All areas of PCT 3448 in the study area (0.016ha) conforms to the Endangered Ecological Community (EEC) Shale Gravel Transition Forest in the Sydney Basin Bioregion. The NSW final determination states that "Disturbed Shale Gravel Transition Forest remnants are considered to form part of the community including where the vegetation would respond to assisted natural regeneration, such as where the natural soil and associated seedbank is still at least partially intact." Therefore, even the low-quality portion of PCT 3448 has been included as part of the EEC.

EPBC Act - The area of good condition PCT 3448 in the northern section of the study area, is also eligible to be considered the EPBC listed, Critically Endangered Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest. This patch was previously subject to plot-based assessment and allocated to the EPBC Act listed community in the BAR. The EPBC Act listing advice contains stricter condition classes than the BC Act.

Patches larger than 5 hectares with at least 30% perennial understory vegetation made up of native species meet the conditions of the nationally listed community.

Refer to Figure 6-2 for EEC.

Threatened species

Areas of suitable habitat for threatened species were considered broadly using the methods outlined in the Addendum 1 REF (2019) and the associated BAR (SMEC 2019).

Field assessments focused on identifying key habitat features, including tree hollows and stags, which may support species identified in the likelihood of occurrence table. Additionally, incidental observations of threatened flora and fauna were recorded. No tree hollows or stags were identified within the biodiversity study area, and no incidental observations of threatened species were made during the survey.

The primary habitat in the study area consisted of native trees and shrubs, while the ground layer within the clearing boundary was predominantly non-native. This area contained limited fallen timber and sparse litter cover, providing suboptimal conditions for the Cumberland Plain Land Snail (*Meridolum corneovirens*). The shrub layer included *Bursaria spinosa*, a thorny shrub that can offer suitable shelter for small bird species. No streams or creeks capable of supporting frogs or amphibians were present, and the geological characteristics of the site did not include rocks or stones that could provide refuge for fauna.

The Project REF identified two isolated occurrences of *Hibbertia puberula* subsp. *puberula*, a species listed as Endangered under the BC Act. The recorded locations of these individuals are outside the proposed clearing area (refer to Figure 6-2). However, the addendum survey was conducted outside the optimal flowering period for species identification, and a comprehensive survey of the entire study area was not performed. A small, narrow-leaved Hibbertia resembling *H. puberula* was observed at one of the WSP-recorded points but was later identified as *Hibbertia pedunculata*. Areas of PCT 3448 in good condition, within the study area, are suitable habitat for *H. puberela.*

Given the limited size of the disturbance footprint and previous surveys conducted by WSP, impacts on non-cryptic threatened flora species, such as trees and shrubs, are considered unlikely.

No threatened fauna or flora species were noted within the study area during the field surveys. Fauna species previously identified or presumed present in suitable habitat (SMEC 2019), are assumed to be present in suitable contiguous habitat mapped during the field surveys and any additional candidate threatened species recorded in the locality were considered during habitat assessment and likelihood of occurrence assessment. Refer to Figure 6-2 for threatened species.

Figure 6-2: TECs and threatened species

6.2.3 Existing environment – Infantry Parade Tree

The single tree identified for removal at the Infantry Parade intersection is identified as a locally indigenous forest red-gum (*Eucalyptus tereticornis*), but not represented as native vegetation on the State Vegetation Mapping. It is one of a row of street trees along Heathcote Road in the narrow verge between the footpath and roadway. It is a large tree, with an 80cm diameter at breast height. It contains one small potential hollow at least 8m above ground level, however this hollow does not appear to be deep, only approximately 50mm across, and so is not likely to provide a good nesting site for birds or bats.

6.2.4 Potential impacts

Construction

Fill emplacement modification

The fill emplacement site 2 would result in the clearing of approximately 0.016 hectares (160m^2) of native vegetation. All of this vegetation is identified as PCT 3448, further broken down into:

- Good condition: approximately 0.0034 hectares
- Low condition: approximately 0.0121hectares

This vegetation represents the threatened ecological communities:

- BC Act listed Endangered Shale Gravel Transition Forest in the Sydney Basin Bioregion (0.016ha, all PCT 3448).
- EPBC Act listed Critically Endangered Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest (0.0034 ha, only PCT 3448 in good condition.)

As 14 mature trees would be removed that may not be offset under Transport's Guideline for Biodiversity Offsets area clearing thresholds, these have been noted in Table 6-2.

Table 6-2: Locally native trees for removal – Emplacement sites

Environmental factors (section in Project REF)	Assessed in this addendum REF	Size class	Hollows
Low condition PCT 3448	12	Medium (20-50cm)	No
Good condition PCT 3448	1	Medium (20-50cm)	No

Indirect impacts could include:

- Encroachment of disturbance into neighbouring vegetation.
- Sediment run off or nutrients from the expanded batters (emplaced material sites.
- Spread of weeds.
- Noise, dust and light during construction.

Tree removal modification

The tree removal modification at the corner of Infantry Parade and Heathcote Road would result in the removal of a single tree (refer to Table 6-3). The tree is one of a row of street trees along Heathcote Road near Holsworthy Public School. The trees are not represented as native vegetation on the State vegetation mapping. The tree is a locally indigenous Forest Red-gum (*Eucalyptus tereticornis),* growing in the narrow verge between the footpath and the road. It is a large tree with an 80 cm diameter at breast height (DBH). One small potential hollow was observed at least 8 metres from the ground. It did not appear be deep and is about 50 mm across, considered not deep enough to provide good nesting sites for birds or bats and is not recommended for replacement. This tree is not recommended for replacement.

Table 6-3: Locally native trees for removal – Infantry Parade

Environmental factors (section in Project REF)	Assessed in this addendum REF	Size class	Hollows
Infantry Parade	1	Large (50-100cm)	Yes – one small potential hollow of low value to fauna

Operation

Operational impacts of the proposal are expected to be minimal and restricted in nature to maintenance. Removal of weeds as part of the vegetation clearing and re-vegetation of the new batter in line with Transport policy may reduce the load of weed seed currently running off the batter and represent an improvement.

Assessments of significance of impacts

The need for assessments of significance under the BC Act and the EPBC Act were considered for those species of moderate or higher likelihoods of occurrence. It was concluded that:

- No likelihoods of occurrences increased compared to the previous assessment.
- No additional species where assigned a moderate or higher likelihood of occurrence.

- The additional impacts of the increased study area would not change the assessment of significance outcomes for the threatened flora and fauna species likely to use the site.

6.2.5 Safeguards and management measures

New safeguards and management measures to address the biodiversity impacts are identified in Table 6-4.

Table 6-4: New safeguards and mitigation measures - biodiversity

Impact	Environmental safeguards	Responsibility	Timing	Reference
Additional removal of native vegetation and habitat	Determine appropriate exclusion zones during pre-clearing surveys to minimise clearing of native vegetation. Pre-clearing surveys will be undertaken in accordance with *Guide 1: Preclearing process of the Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects* (Roads and Traffic Authority 2011).	Construction	Construction contractors Transport for NSW	Additional safeguard
	Exclusion zones will be set up at the limit of clearing in accordance with *Guide 2: Exclusion zones of the Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects* (Roads and Traffic Authority 2011).	Construction	Construction contractors Transport for NSW	Additional safeguard
	Native vegetation will be re-established in accordance with *Guide 3: Reestablishment of native vegetation of the Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects* (Roads and Traffic Authority 2011).	Construction Post-construction	Landscape designers Construction contractors Transport for NSW	Additional safeguard
Edge effects - Weed invasion	Weed species will be managed in accordance with *Guide 6: Weed management of the Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects* (Roads and Traffic Authority 2011).	Construction Post-construction	Construction contractors Transport for NSW	Additional safeguard
	Revegetation should be undertaken as soon as possible after establishment of the new batter to avoid	Construction Post-construction	Construction contractors Transport for NSW	Additional safeguard

Impact	Environmental safeguards	Responsibility	Timing	Reference
	colonisation by weed species.			
Invasion and spread of pathogens and disease	Implement hygiene procedures for the use of vehicles and the importation of materials to the project area in accordance with *Guide 7: Pathogen management of the Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects* (Roads and Traffic Authority 2011).	Construction	Construction contractors Transport for NSW	Additional safeguard

6.2.6 Biodiversity offsets

Offset thresholds

Transport is committed to offsetting impacts associated with the proposal in line with its Guideline for Biodiversity Offsets (RMS 2016) and in general accordance with the DPIE principles for the use of biodiversity offsets in NSW.

The *Guideline for Biodiversity Offsets V2.0* (RMS 2016) is understood to still be applicable as the REF was determined prior to the release of the newer 2022 Policy. Impact thresholds have been tested with the sum of direct impacts to all entities of the whole project. Offsetting and testing against offset thresholds has been considered for:

- PCT 724 Broad leaved Ironbark-Grey Box Melaleuca decora grassy open forest on clay/gravel soils of the Cumberland Plain Sydney Basin Bioregion. This has since been retired and is closely inherited to PCT 3448 under the revised NSW Eastern PCTs.
    - This modification does not increase the area of the Moderate condition vegetation of this PCT, therefore there is no change in the credit requirement calculations
    - This addendum only increases the impacted area of Good condition vegetation of this PCT by 0.0034ha. As the areas impacted are rounded to the nearest 0.01 ha for the calculations, this increased impact area does not alter the credit value.
- *Hibbertia puberula subsp. Puberula*. The habitat area for this species was calculated at 0.66ha in the 2019 Biodiversity Assessment Report (BAR). This is below the 1 ha threshold area required for offsetting under the 2016 Policy. The area to be cleared under this addendum REF, when added to (cumulative to) the 0.66ha of the 2019 BAR, would not exceed the 1ha area threshold.

Further discussion is provided in Section 6 of Appendix E.

6.3 Soils and geology

6.3.1 Methodology

The assessment of soils and geology impacts for the proposed modifications involved a review of the Approved Project Documentation, and consideration of the following documents and desktop assessments:

- Acid Sulfate Soil Management Plan – Heathcote Road Upgrade (SMEC, 2018).
- NSW Government PFAS Investigation Program – postcodes search.

6.3.2 Existing environment

Soils and geology

The proposed modifications fall within mapped Richmond Soil Landscape by the SEED online portal (DCCEEW 2025). The Richmond Soil Landscape is described as an alluvial soil landscape of quaternary terraces of the Nepean and Georges Rivers. The surface soils observed during the field visit were generally sandy clay without surface rocks.

In relation to acid sulfate soils, the proposed modifications fall within mainland areas previously assessed within the Approved Project documentation as having an extremely low probability of Acid Sulfate Soils (ASS) occurrence (Class 5).

For further detailed discussion of geology, soils and acid sulfate soil potential, Section 6.4.2 of the Project REF and the previous addendum REF's remain relevant to the proposed modifications.

Existing PFAS

A search of the NSW Government PFAS Investigation Program website was undertaken on 05 March 2025. Search results indicate that the Holsworthy Barracks and Liverpool Fire Station have been investigated for per- and poly- fluoroalkyl substances (PFAS) contamination of soils associated with historical uses of firefighting foam. The investigation has identified on-site and off-site of PFAS contamination in soils at those locations. The DoD is undertaking further testing of the extent of this contamination (EPA 2024).

Further to this PFAS has been specifically addressed within Section 6.3 of the Addendum 1 REF (2019).

Other Contamination Risk

There is a risk of other contaminants in the soil to be present based on past and existing land uses, including the transportation of those contaminants by surface waters and groundwaters, into the soils of the Project area. The Contamination Assessment that forms part of the Approved Project documentation included soil, surface water and groundwater sampling, and noted the potential for soils onsite to meet Resource Recovery Orders.

The low risk of soil contamination that may be in the material to be transported and used in the fill emplacement proposed modification, has been recognised in Section 6.4.3 and 6.4.4 of the Project REF, with Section 5.4.5 identifying the potential impacts and Section 6.4.6 providing safeguards and mitigation measures for contaminates (in soil or water).

6.3.3 Potential impacts

The assessment of potential impacts provided in section 6.4.5 of the Project REF and the pervious addendum REF's remains relevant to the proposed modification.

Construction – Fill emplacement modification

The proposed modification includes the emplacement of fill material. The fill emplacement sites would be positioned on land currently serving as a batter along Heathcote Road. As described in Section 3.2.3, the batter depth would increase from its existing level by 0.4m at Emplacement Site 1, while remaining largely unchanged at Emplacement Sites 2 and 3. The width of the batter would expand by approximately 5.9m at Site 1, 10.4m at Site 2, and 5.8m at Site 3. The slope will generally be adjusted to a consistent grade of 2H:1V, with Site 1 retaining its existing slope, Site 2 changing from 1.869H:1V to 2H:1V, and Site 3 changing from 2.626H:1V to 2H:1V. No additional drainage measures have been incorporated into the design; however, management strategies may be implemented to mitigate potential impacts.

The placement of fill at these sites would allow for the retention and reuse of excavated site won material. This approach helps minimise site waste generation, eliminates the need for external disposal, and reduces pressure on licensed landfills.

As the site won fill would be of material excavated and removed from across the Project site as part of construction works, it has the potential to contain traces of contaminates found in those locations. This may include specifically ASS affected soils and soils containing PFAS contaminated material. The Project REF identified the contaminants that may be present in (imported) fill material, but this did not include ASS or PFAS contaminants. These soils may require temporary stockpiling at previously identified and assessed stockpile locations (as per Approved Project Documentation) nominated by Transport prior to, and also transportation to, the fill emplacement sites. The fill material is to be assessed and managed appropriately, in accordance with the sampling/testing, management plans, and other requirements specified in the Project REF safeguards and management measures (refer also to the summary of safeguards and management measures in this addendum REF at Section 7.2, items C1 to C12 inclusive).

The removal of vegetation ahead of the fill emplacement would expose soils which would be at risk of erosion, consistent with other areas of the Project that are subject to vegetation clearing.

Construction – Tree removal modification

The removal of the tree would have a negligible impact on soils and would require minimal earthworks and be similar to that of other individual tree and vegetation removal as part of the project.

Operation

As per the Urban Design Plan, landscaping (revegetation) requirements would be applied to the widened batter that would stabilise this element, manage surface water flows and erosion risk, as well as provide visual benefits.

No other on-going impacts are expected as a result of the proposed modification works post construction.

6.3.4 Safeguards and management measures

New safeguards and mitigation measures to address the soils and geology impacts are identified in Table 6-5.

Table 6-5: New safeguards and mitigation measures – soils and geology

Impact	Environmental safeguards	Responsibility	Timing	Reference
Acid Sulfate Soils	Existing safeguard: An ASS Management Plan (ASSMP) is to be prepared for any excavation of material in the vicinity of Harris Creek and Williams Creek. The plan is to include methods for onsite treatment or offsite disposal of excavated ASS. The plan will make reference to the ASS investigation report findings and be in accordance with the NSW ASSMAC Guidelines (1998). To add: The ASSMP is to also address the stockpiling, transport and emplacement of this material.	Contractor	Pre-construction	Additional safeguard
Contaminated soil	The Contaminated Land Management Plan is to also address the transportation handling management and stockpiling of contaminated soil prior to its emplacement (other than PFAS or ASS).	Contractor	Pre-construction	Additional safeguard
Soil Erosion	As part of the Urban Design Plan, to ensure the landscaping of the batter	Contractor	Detailed design /	Additional safeguard

Impact	Environmental safeguards	Responsibility	Timing	Reference
	of the fill emplacement sites are provided for. Ensure the Urban Design Plan incorporates measures such as mulch to protect the batter surface and mitigate against erosion.		Pre-construction	

6.4 Landscape Character and Visual

6.4.1 Methodology

The assessment of landscape character and visual impact follows a qualitative approach, considering the existing environment, the scale and nature of the proposed modifications, and the potential changes to views experienced by road users, residents, and other stakeholders. The methodology aligns with Transport for NSW guidelines, evaluating both temporary impacts during construction and long-term visual changes once the project is complete.

6.4.2 Existing environment

Heathcote Road is a major arterial road connecting Liverpool to Heathcote, serving as a critical link between Sydney's southern suburbs and the M5 and M7 motorway network. The road corridor includes a mix of natural bushland, infrastructure elements such as footpaths, intersections with other roadways, bridges and roundabouts, and connects to urbanised areas like Holsworthy and Voyager Point.

The existing landscape character along the section between Infantry Parade and The Avenue is predominantly a two-lane road corridor and associated bridges. The area surrounding Heathcote Road includes vegetation, open road reserves, transport infrastructure (roads, railway), and urban development contributing to a semi-rural and urban interface.

Fill emplacement modification

The existing landscape character and visual appearance at the proposed fill emplacement modification site consists of existing road batter directly off Heathcote Road on its eastern boundary, between MacArthur Drive and Alec Campbell Drive. To the east of the existing batter is an area of natural bushland, encircled by footpaths, access tracks, and roadways.

Tree removal modification

The existing landscape character and visual appearance at the Infantry Parade / Heathcote Road intersection is a semi-rural and urban interface. The Infantry Parade Tree sits just off a pedestrian footpath and road crossing, at the corner of Infantry Parade and parallel to Heathcote Road, just outside of Holsworthy Highschool on its north-eastern boundary. The Infantry Parade Tree sits among a row of trees as part of the street tree plantings.

6.4.3 Potential Impacts

Construction – fill emplacement sites modification

During construction, temporary visual impacts may arise due to vegetation clearing, earthworks, and the establishment of the fill emplacement sites. The removal of vegetation may alter the landscape character, although this may have limited duration of visibility by motorists. Construction activities would involve machinery, material stockpiles and emplacement work, potentially creating a more human environment visual setting along Heathcote Road.

Construction – tree removal modification

The removal of this tree would alter the landscape character, particularly for pedestrians and cyclists using the shared paths and nearby residents. However, the construction activities for this work would likely be in conjunction with other preparatory and construction activities for the designed elements at this location and the road project broadly. This may distract from the individual impact of this tree removal.

Operation

As part of the upgrade, Heathcote Road would be widened from two lanes to four lanes, significantly altering the road corridor. Upon completion of this proposed modification as part of the broader works, the visual character of Heathcote Road would be further modified by the extension of the existing batter using site-won fill at three designated emplacement sites as well as the removal of a tree on Infantry Parade.

Overall, the on-going impacted of the proposed modification would be a negligible part of the overall visual change when considering the broader transformation of the roadway.

Fill emplacement modification: The extension of the existing batter will integrate with the road corridor, and its visual impact would be minor in comparison to the overall modifications associated with the upgrade. As per the Urban Design Plan, landscaping (vegetating) of the widened batter would help provide visual benefits, as the area recovers and the vegetation treatments establish and mature.

Tree removal modification: The loss of the tree would be an ongoing visual impact but is likely to lessen in time. The new built elements of the shared path is at ground level and a continuation of that path, and the narrow from of the streetlight, would have limited visual impact and are common, familiar, features in the urban landscape. There will be remaining trees in the streetscape in the general area.

As such the proposed modification is consistent with the assessment of landscape character and visual impact as outlined in the Approved Project Documentation.

6.4.4 Safeguards and management measures

Safeguards and mitigation measures contained in the Approved Project Documentation and detailed in Section 7.1 would adequately manage any potential minor impacts.

6.5 Cumulative impacts

6.5.1 Potential impacts

The proposed modification is not expected to materially change the assessment of cumulative impacts provided in Section 6.12 of the Project REF. It is noted that proposed modifications:

- The removal of vegetation at Fill Emplacement Site 2 (by 0.016ha) and the removal of a single tree at Infantry Parade would slightly increase to the total vegetation clearing of overall Project, but would not significantly impact on threatened species, populations or ecological communities as identified in Section 6.2.
- Would not substantially alter the volume or distribution of construction traffic on the network.
- Would involve operation of plant and equipment that would increase the carbon emissions of the Project. However, the overall impact on greenhouse gases and climate change has been assessed as negligible due to the size and scope of the proposed modification and as part of the overall Project.

Minimising impacts attributable to the proposed modification is the best way to address any potential cumulative effects and some additional measures have been proposed to address impacts.

6.5.2 Safeguards and management measures

The safeguards and management measures identified in the Approved Project Documentation are adequate to address potential cumulative impacts associated with the proposed modifications.

7. Environmental management

7.1 Environmental management plans

A number of safeguards and management measures have been identified to minimise adverse environmental impacts, which could potentially arise as a result of the proposed modification. This includes the preparation and implementation of issue specific management plans. Should the proposed modification proceed, these management measures would be addressed if required during detailed design and incorporated into Construction Environmental Management Plan (CEMP) and applied during the construction and operation of the proposed modification.

7.2 Summary of environmental safeguards and management measures

Environmental safeguards and management measures for the Project are summarised in Table 7-1. Additional safeguards and management measures identified in this addendum REF are included in bold and italicised font. The safeguards and management measures will be incorporated into the CEMP and implemented during construction and operation of the proposed modification, should it proceed. These safeguards and management measures will minimise any potential adverse impacts arising from the proposed works on the surrounding environment.

Table 7-1: Summary of safeguards and management measures

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
GEN1	General - minimise environmental impacts during construction	A CEMP will be prepared and submitted for review and endorsement of the TfNSW Environment Manager prior to commencement of the activity. As a minimum, the CEMP will address the following: • Any requirements associated with statutory approvals • Details of how the proposed modification will implement the identified safeguards outlined in the REF • Issue-specific environmental management plans • Roles and responsibilities • Communication requirements • Induction and training requirements • Procedures for monitoring and evaluating environmental performance, and for corrective action • Reporting requirements and record-keeping • Procedures for emergency and incident management • Procedures for audit and review. The endorsed CEMP will be implemented during the undertaking of the activity.	Contractor / Transport for NSW project manager	Detailed design, pre-construction	Core standard safeguard
GEN2	General - notification	All businesses, residential properties and other key stakeholders (e.g. schools, local councils) affected by the activity will be notified at least five days prior to commencement of the activity.	Contractor / Roads and Maritime project manager	Pre-construction	Core standard safeguard

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
GEN3	General environmental awareness	All personnel working on site will receive training to ensure awareness of environment protection requirements to be implemented during the proposed modification. This will include up-front site induction and regular "toolbox" style briefings. Site-specific training will be provided to personnel engaged in activities or areas of higher risk. These include: • Areas of Aboriginal heritage sensitivity • Threatened species habitat • Adjoining residential areas requiring particular noise management measures.	Contractor / Transport for NSW project manager	Detailed design, pre-construction	Core standard safeguard
B1	Biodiversity	A Flora and Fauna Management Plan will be prepared in accordance with Roads and Maritime's Biodiversity Guidelines: Protecting and Managing Biodiversity on RTA Projects (RTA, 2011) and implemented as part of the CEMP. It will include, but not be limited to: Plans showing areas to be cleared and areas to be protected including exclusion zones, protected habitat features and revegetation areas • Requirements set out in the Landscape Guideline (RTA, 2008). • Pre-clearing survey requirements. • Procedures for unexpected threatened species finds and fauna handling. • Procedures addressing relevant matters specified in the Policy and guidelines for fish habitat conservation and management. • Protocols to manage weeds and pathogens.	Contractor	Detailed design, pre-construction	Core standard Section 4.8 of QA G36 Environment Protection
B2	Biodiversity	Investigate measures to further avoid and minimise the construction footprint and native vegetation or habitat removal.	Contractor	Detailed design / preconstruction	Core standard safeguard
B3	Native vegetation removal and re-establishment	Minimise native vegetation and habitat removal through detailed design. Harris Creek and Williams Creek to retain fauna passage and connectivity to areas south of Heathcote Road to enable movement for fauna south.	Roads and Maritime / Transport	Detailed design	Additional safeguard
B4	Native vegetation removal and reestablishment	A Biodiversity Offset Strategy would be prepared during the detailed design phase to provide offsets equivalent to 145 ecosystem credits. This strategy would be prepared in accordance with the Guidelines for	Roads and Maritime / Transport	Detailed design	Additional safeguard

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
		Biodiversity Offsets (Roads and Maritime, 2011h) and the NSW BioBanking Assessment Methodology 2014.			
B5	General ecological mitigation	Ensure any fauna encountered onsite would be managed in accordance with Biodiversity Guidelines, Guide 9 (fauna handling) (Roads and Maritime, 2016b)	Contractor	Pre-construction	Additional safeguard
B6	General ecological mitigation	Ensure any fauna encountered onsite would be managed in accordance with Biodiversity Guidelines, Guide 9 (fauna handling) (Roads and Maritime, 2016b)	Contractor	Pre-construction	Additional safeguard
B7	General ecological mitigation	In addition to the requirements of Core standard safeguard B1, the Flora and Fauna Management Plan would also include: • A site walkover to confirm clearing boundaries and sensitive location before starting work • Identify, in toolbox talks, where biodiversity controls would be included.	Contractor	Pre-construction	Additional safeguard
B8	Invasive and noxious weed management	Develop a weed management plan (WMP) in accordance with Biodiversity Guidelines, Guide 6 (Roads and Maritime, 2016b) to include: • Identification of the weeds on site (confirm during ecologist preclearing inspection) • Weed management priorities and objectives • Sensitive environmental areas within or adjacent to the site • The location of weed infested areas • Weed control methods • Measures to prevent the spread of weeds, including machinery hygiene procedures and disposal requirements • A monitoring program to measure the success of weed management • Communication with local Council noxious weed representative.	Contractor	Pre-construction	Additional safeguard
B9	Risk of pathogen and pest species	If hygiene procedures are required onsite, ensure the Flora and Fauna Management Plan includes hygiene protocols to prevent the introduction and spread of such pathogens as specified in Biodiversity Guidelines: (Roads and Maritime, 2016b). Manage all pathogens (e.g.	Contractor	Pre-construction	Additional safeguard

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
		Chytrid, myrtle rust and phytophthora) in accordance with the Biodiversity Guidelines, Guide 7 (Roads and Maritime, 2016b).			
B10	Risk of pathogen and pest species	If hygiene procedures are required onsite, ensure the Flora and Fauna Management Plan includes hygiene protocols to prevent the introduction and spread of such pathogens as specified in Biodiversity Guidelines: (Roads and Maritime, 2016b). Manage all pathogens (e.g. Chytrid, myrtle rust and phytophthora) in accordance with the Biodiversity Guidelines, Guide 7 (Roads and Maritime, 2016b).	Contractor	Pre-construction	Additional safeguard
B11	Unexpected discovery of threatened species	If unexpected flora or fauna are discovered stop work immediately and implement the Roads and Maritime Unexpected Threatened Species Find Procedure in the Biodiversity Guidelines, Guide 1 (Roads and Maritime, 2016b).	Contractor	Construction	Additional safeguard
B12	Unexpected discovery of threatened species	If unexpected flora or fauna are discovered stop work immediately and implement the Roads and Maritime Unexpected Threatened Species Find Procedure in the Biodiversity Guidelines, Guide 1 (Roads and Maritime, 2016b).	Contractor	Construction	Additional safeguard
B13	Injury and mortality impact while building the proposed modification	Implement the following controls: under the Flora and Fauna Management Plan: • Manage fauna in accordance with Biodiversity Guidelines, Guide 9 (Roads and Maritime, 2016b) • Remove any habitat in accordance with Biodiversity Guidelines, Guide 4 (Roads and Maritime, 2016b)	Contractor	Construction	Additional safeguard
B14	Native vegetation removal and re-establishment threatened species habitat and habitat features	• Implement the following controls under the Flora and Fauna Management Plan: • Undertake pre-clearance checks in accordance with Biodiversity Guidelines, Guide 1 (Roads and Maritime, 2016b) • Create exclusions zones in accordance with Biodiversity Guidelines, Guide 2 (Roads and Maritime, 2016b) • Re-establish native vegetation in accordance with Biodiversity Guidelines, Guide 3 (Roads and Maritime, 2016b) • Reinstate habitat in accordance with Biodiversity Guidelines, Guide 5 and Guide 8 (Roads and Maritime, 2016b).	Contractor	Construction	Additional safeguard

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
B15	Aquatic impacts	Watercourse crossings will be designed to ensure that they meet the minimum requirements for fish passage recommended for the classes of 'fish habitat' found at the stream crossings.	Contractor	Construction	Additional safeguard
B16	Wildlife connectivity impacts	Implement connectivity controls in accordance with the Wildlife Connectivity Guidelines for Road Projects (Roads and Maritime, 2016c).	Contractor	Construction	Additional safeguard
B17	*Additional removal of native vegetation and habitat*	• *Determine appropriate exclusion zones during pre-clearing surveys to minimise clearing of native vegetation. Pre-clearing surveys will be undertaken in accordance with Guide 1: Preclearing process of the Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects (Roads and Traffic Authority 2011).* • *Exclusion zones will be set up at the limit of clearing in accordance with Guide 2: Exclusion zones of the Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects (Roads and Traffic Authority 2011).* • *Native vegetation will be re-established in accordance with Guide 3: Reestablishment of native vegetation of the Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects (Roads and Traffic Authority 2011).*	*Construction* *Post-construction*	*Landscape designers* *Construction contractors* *Transport for NSW*	*Additional safeguard*
pB18	*Edge effects - Weed invasion*	• *Weed species will be managed in accordance with Guide 6: Weed management of the Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects (Roads and Traffic Authority 2011).* • *Revegetation should be undertaken as soon as possible after establishment of the new batter to avoid colonisation by weed species.*	*Construction* *Post-construction*	*Construction contractors* *Transport for NSW*	*Additional safeguard*
B19	*Invasion and spread of pathogens and disease*	• *Implement hygiene procedures for the use of vehicles and the importation of materials to the project area in accordance with Guide 7: Pathogen management of the Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects (Roads and Traffic Authority 2011).*	*Construction*	*Construction contractors* *Transport for NSW*	*Additional safeguard*
SW1	Soil and water	A Soil and Water Management Plan (SWMP) will be prepared and implemented as part of the CEMP. The SWMP will identify all	Contractor	Detailed design, pre-construction	Additional safeguard

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
		reasonably foreseeable risks relating to soil erosion and water pollution and describe how these risks will be addressed during construction.			
SW2	Soil and water	A site specific Erosion and Sediment Control Plan/s (ESCP) will be prepared and implemented as part of the Soil and Water Management Plan. The Plan will include arrangements for managing wet weather events, including monitoring of potential high risk events (such as storms) and specific controls and follow-up measures to be applied in the event of wet weather.	Contractor	Detailed design, pre-construction	Additional safeguard
SW3	Water quality	A detailed Environmental Work Method Statement (EWMS) will be prepared and implemented for all works undertaken within waterways. The EWMS will detail measures to avoid or minimise risks from erosion and sedimentation to water quality and biodiversity. It will be prepared in accordance with relevant guidelines including, but not limited to: • RMS Biodiversity Guidelines - Protecting and managing biodiversity on RTA projects • The Blue Book: Managing Urban Stormwater (MUS): Soils and Construction, Volume 2 (Landcom, 2008).	Construction contractor	Pre-construction	Additional safeguard
SW4	Water quality	Consistent with any specific requirements of the approved SWMP and ESCP, control measures will be implemented to minimise risks associated with erosion and sedimentation and entry of materials to drainage lines and waterways. That will include, but not necessarily be limited to: • Sediment management devices, such as fencing, hay bales or sand bags • Measures to divert or capture and filter water prior to discharge, such as drainage channels and first flush and sediment basins • Scour protection and energy dissipaters at locations of high erosion risk • Installation of measures at work entry and exit points to minimise movement of material onto adjoining roads, such as rumble grids or wheel wash bays • Appropriate location and storage of construction materials, fuels and chemicals, including bunding where appropriate.	Contractor	Pre-construction	Additional safeguard

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
SW5	Water quality	The ESCP will also address the following regarding water quality: • Identification of catchment areas and the direction of on-site and offsite water flow • The likely run-off from each road sub-catchment • Separation of on-site and off-site water • The direction of run-off and drainage points during each stage of construction • Location and staging of scour protection • Process for monitoring and preparing for wet weather.	Contractor	Pre-construction	Additional safeguard
SW6	Water Quality	Instream works would be suspended following high rainfall events. Work would recommence once the work area and ground conditions are stabilised and potential for erosion and sedimentation is minimised.	Contractor	Construction	Additional safeguard
SW7	Water Quality	During concreting, cement slurry and other contaminants will be prevented from entering waterways or any drainage lines.	Contractor	Construction	Additional safeguard
SW8	Water Quality	If concreting works are required onsite, concrete washout bays located in bridge work zones would be positioned as far as reasonably practicable from waterways and be emptied on a regularly basis. Any washout of the lines or chute will be in an impervious bunded area.	Contractor	Construction	Additional safeguard
SW9	Flooding/ Hydrology	Prior to construction commencing, final flood and hydrology assessments will be undertaken to inform detail design measures to minimise risks to the environment.	Roads and Maritime/ Transport	Detailed Design/ Pre-construction	Additional safeguard
SW10	Flooding	Scour protection measures will be identified and refined during detail design.	Roads and Maritime / Transport	Detailed Design	Additional safeguard
SW11	Spills	Emergency wet and dry spill kits would be kept onsite at all times. All staff would be made aware of the location of the spill lit and trained in its use.	Contractor		Additional safeguard
SW12	Spills	All refuelling of vehicles and equipment on site would be undertaken a minimum of 50 metres away from water bodies and surface drains, wherever possible. The refuelling of vehicles would be monitored at all times and spill kits would be available within refuelling vehicles.	Contractor	Construction	Additional safeguard

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
SW13	Spills	Any fuel, oil or other liquids stored onsite would be stored in an appropriately sized impervious bunded area away from water bodies.	Contractor	Construction	Additional safeguard
SW14	***Acid Sulfate Soils***	***Existing safeguard:*** ***An ASS Management Plan (ASSMP) is to be prepared for any excavation of material in the vicinity of Harris Creek and Williams Creek. The plan is to include methods for onsite treatment or offsite disposal of excavated ASS. The plan will make reference to the ASS investigation report findings and be in accordance with the NSW ASSMAC Guidelines (1998).*** ***To add:*** ***The ASSMP is to also address the stockpiling, transport and emplacement of this material.***	***Contractor***	***Pre-construction***	***Additional safeguard***
SW15	***Contaminated soil***	***The Contaminated Land Management Plan is to also address the transportation handling management and stockpiling of contaminated soil prior to its emplacement (other than PFAS or ASS).***	***Contractor***	***Pre-construction***	***Additional safeguard***
SW16	***Soil Erosion***	***As part of the Urban Design Plan, to ensure the landscaping of the batter of the fill emplacement sites are provided for. Ensure the Urban Design Plan incorporates measures such as mulch to protect the batter surface and mitigate against erosion.***	***Contractor***	***Detailed design / Pre-construction***	***Additional safeguard***
GW1	Groundwater	Additional site investigation including the installation and subsequent monitoring of groundwater wells at approximate 500 metres intervals along the proposal alignment and near Harris and Williams Creeks would be undertaken.	Roads and Maritime / Transport	Detailed design / Preconstruction	Additional safeguard
GW2	Groundwater	A dewatering strategy and groundwater management plan for any excavations below the groundwater table to be developed, with focus on the construction of the pier foundations in Harris Creek. Any dewatering activities will be undertaken in accordance with the RTA Technical Guideline: Environmental management of construction site dewatering in a manner that prevents pollution of waters.	Roads and Maritime (Transport) / Contractor	Pre-construction / Construction	Additional safeguard
GW3	Groundwater	Shoring and water-tight requirements to be implemented for foundation excavations.	Roads and Maritime (Transport)	Detailed design / Preconstruction	Additional safeguard

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
GW4	Groundwater	Concreting methods that reduce the likelihood of groundwater ingress will be employed for construction of bridge piles and foundations. This will also reduce the likelihood of washing out the cement content.	Contractor	Construction	Additional safeguard
C1	Contaminated land	A Contaminated Land Management Plan will be prepared in accordance with the Guideline for the Management of Contamination (Roads and Maritime, 2013f) and the Contaminated Land Management Act 1997 and implemented as part of the CEMP. The plan will include, but not be limited to: • Capture and management of any surface runoff contaminated by exposure to the contaminated land • Further investigations required to determine the extent, • concentration and type of contamination, as identified in the detailed site investigation (Phase 2) • Management of the remediation and subsequent validation of the contaminated land, including any certification required • Relevant licenses and approvals to be obtained and relevant notifications to be given under the Contaminated Land Management Act 1997 • Measures to ensure the safety of site personnel and local communities during construction.	Contractor	Detailed design, pre-construction	Core standard safeguard Section 4.2 of QA G36 Environmental Management
C2	Contaminated land	If contaminated areas are encountered during construction, appropriate control measures will be implemented to manage the immediate risks of contamination. All other works that may impact on the contaminated area will cease until the nature and extent of the contamination has been confirmed and any necessary site-specific controls or further actions identified in consultation with the Roads and Maritime Environment Manager and/or EPA. Waste classification and reuse procedures will also be included in the Contaminated Land Management Plan.	Contractor	Detailed design, pre-construction	Core standard safeguard Section 4.2 of QA G36 Environmental Management
C3	Accidental spill	A site specific emergency spill plan will be developed, and include spill management measures in accordance with the Roads and Maritime Code of Practice for Water Management (RTA, 1999) and Environmental Guidelines: Preparation of pollution incident response management plans (NSW EPA 2012). The plan will address measures to	Contractor	Detailed design, pre-construction	Core standard safeguard Section 4.3 of QA G36 Environmental Management

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
		be implemented in the event of a spill, including initial response and containment, notification of emergency services and relevant authorities (including Transport for NSW and EPA officers).			
C4	Exposure of acid sulfate soils	Design of drainage lines and infrastructure to minimise the need for deep excavations. Minimise the need for extended dewatering of sediments around Environmental Guidelines: Preparation of pollution incident response	Transport for NSW	Detailed design	Additional safeguard
C5	Exposure of acid sulfate soils	ASS testing (field screening and chromium reducible sulfur suite) in soils around Harris Creek and Williams Creek to be undertaken. Other areas of the alignment as required. If ASS are identified, an ASS investigation report to be prepared that identifies areas of ASS, chemistry and liming rates for treatment. The ASS investigation to be undertaken and report verified by a suitably qualified and experienced environmental consultant.	Roads and Maritime (Transport)	Detailed design/ Preconstruction	Additional Safeguard
C6	Exposure of acid sulfate soils	An ASS Management Plan (ASSMP) is to be prepared for any excavation of material in the vicinity of Harris Creek and Williams Creek. The plan is to include methods for onsite treatment or offsite disposal of excavated ASS. The plan will make reference to the ASS investigation report findings and be in accordance with the NSW ASSMAC Guidelines (1998).	Construction Contractor	Preconstruction, construction.	Additional Safeguard
C7	Identification of contaminated land	Preliminary site sampling and where necessary a detailed (phase two) site investigation is to be undertaken along the alignment. Assessments are to be undertaken in accordance with guidance made or endorsed by the NSW EPA. The contaminated land investigations are to be undertaken and report verified by a suitably qualified and experienced environmental consultant.	Roads and Maritime (Transport)	Detailed Design, Preconstruction	Additional Safeguard
C8	Identification of contaminated land	Consult with and request information from Department of Defence to determine the presence of any known contamination issues within 100 metres of the proposed modification alignment.	Transport for NSW	Detailed design, pre-construction	Additional safeguard
C9	Handling and disposal of contaminated materials	The Contaminated Land Management Plan will also include awareness training for construction staff to include the procedures for identification, reporting and management of contaminated land.	Contractor	Pre-construction, construction	Additional safeguard

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
C10	Handling and disposal of contaminated materials	The SWMP will include measures to minimise accidental spills and associated potential impacts such as: • Storage of chemicals within an impervious bunded area • All refuelling of vehicles and equipment would be undertaken off site or within an impervious bunded area at the compound site at least 40 metres from drainage lines. Where this cannot occur, mobile fuel trucks should be equipped with a self bunded tank, spill prevention equipment and spill kits • Requirement for an emergency spill kit to be kept on site at all times and be easily accessible and staff awareness and training in its use • Removal of contaminated material (soils, water, clean up materials) offsite by a licensed contractor and disposed of at an appropriately licensed facility.	Contractor	Construction	Additional safeguard
C11	Erosion and Sediment	An Erosion and Sedimentation Control Plan (ESCP) shall be developed for the works. The ESCP shall provide for: • Prevent sediment moving off-site and sediment laden water entering any water course, drainage lines, or drain inlets • Reduce water velocity and capture sediment on site. • Minimise the amount of material transported from site to surrounding pavement surfaces • Erosion and sedimentation controls are to be checked and maintained on a regular basis and records kept and provided on request • Erosion and sediment control measures are not to be removed until the works are complete or areas are stabilised • Work areas are to be stabilised progressively during the works • Divert clean water around the site (in accordance with the Landcom/Department of Housing Managing Urban Stormwater, Soils and Construction Guidelines (the Blue Book).	Construction contractor	Pre-construction, construction.	Additional Safeguard

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
C12	Erosion and sediment	The maintenance of established stockpile sites during construction is to be in accordance with the Roads and Maritime Stockpile Site Management Procedures, 2001	Contractor	Pre-construction, construction	Additional safeguard
TT1	Traffic and transport	A Traffic Management Plan (TMP) will be prepared and implemented as part of the CEMP. The TMP will be prepared in accordance with the Transport for NSW Traffic Control at Work Sites Manual (RTA, 2010) and QA Specification G10 Control of Traffic (Roads and Maritime, 2008). The TMP will include: • Confirmation of haulage routes • Measures to maintain access to local roads and properties • Site specific traffic control measures (including signage) to manage and regulate traffic movement • Measures to maintain pedestrian and cyclist access • Requirements and methods to consult and inform the local community of impacts on the local road network • Access to construction sites including entry and exit locations and measures to prevent construction vehicles queuing on public roads. • A response plan for any construction traffic incident • Consideration of other developments that may be under construction to minimise traffic conflict and congestion that may occur due to the cumulative increase in construction vehicle traffic • Monitoring, review and amendment mechanisms.	Contractor	Detailed design, pre-construction	Core standard safeguard Section 4.3 of QA G36 Environmental Management
TT2	Construction traffic	The TMP will also include: • Scheduling the delivery of plant, equipment and construction materials to generally occur out of peak traffic periods • Consideration of methods to minimise peak period traffic disruptions during each stage of construction • Roads and Maritime to liaise with utilities providers and Sydney Trains to maintain service accesses to their facilities during construction and following completion of the proposed modification. The TMP is to ensure the work site and site compound:	Contractor	Pre-construction, construction	Additional safeguard

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
		• Includes safe 'sight distances' to allow traffic to leave and enter the given areas • Uses temporary painted road lines to provide delineation • Provides suitable intersection layouts where required • Includes traffic management controls to allow for safe entry and exit.			
TT3	Intersection Signalisation	Signal phasing arrangements and timings be reviewed as part of the commissioning of the proposal to determine the coordination arrangements as an extension to the existing conditions.	Roads and Maritime (Transport)	Construction/ Pre-operation	Additional safeguard
TT4	Operation of Macarthur Drive intersection	The operation of the signalised intersection of Heathcote Road and Macarthur Drive should be periodically reviewed to identify if additional Holsworthy Train Station-generated demands are intermittently affecting signal operations and localised congestion. Appropriate signal timing plans to be adopted added if needed.	Roads and Maritime	Operation	Additional safeguard
TT5	Operational Monitoring	Monitoring of the queuing and congestion impacts along Macarthur Drive to the Morningside Parade intersection to manage any residual queueing impacts at this location and associated safety impacts.	Roads and Maritime	Operation	Additional safeguard
NV1	Noise and vibration	A Noise and Vibration Management Plan (NVMP) will be prepared and implemented as part of the CEMP. The NVMP will generally follow the approach in the ICNG (DECC, 2009) and identify: • All potential significant noise and vibration generating activities associated with the activity • Feasible and reasonable mitigation measures to be implemented, taking into account Beyond the Pavement: urban design policy, process and principles (Roads and Maritime, 2014). • A monitoring program to assess performance against relevant noise and vibration criteria • Arrangements for consultation with affected neighbours and sensitive receivers, including notification and complaint handling procedures • Contingency measures to be implemented in the event of non-compliance with noise and vibration criteria.	Contractor	Detailed design, pre-construction	Core standard safeguard Section 4.6 of QA G36 Environmental Management
NV2	Noise and vibration	All sensitive receivers (e.g. schools, local residents) likely to be affected will be notified at least five days prior to commencement of	Contractor	Detailed design / preconstruction	Core standard safeguard

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
		any works associated with the activity that may have an adverse noise or vibration impact. The notification will provide details of: • The proposal • The construction period and construction hours • Contact information for proposal management staff • Complaint and incident reporting how to obtain further information.			
NV3	Noise impacts	• Work is undertaken in accordance with the Construction Noise and Vibration Guideline (Roads and Maritime, 2016f) • Orientate stationary and directional noise sources away from sensitive receivers • Utilise vehicles, obstacles and stockpiles on site to provide shielding to receivers, especially for static noise sources • Use equipment that has noise levels equal to or less than the sound power levels in Table 6-2 of Appendix J.	Contractor	Preconstruction, Construction	Additional Safeguard
NV4	Vibration	• Condition surveys of areas prior to the commencement of construction where vibration intensive equipment is to be used within the safe working distances. • Where possible, the use of less vibration intensive methods of construction or equipment should be considered where possible to reduce the potential for cosmetic damage. • All equipment should be maintained and operated in an efficient manner, in accordance with manufacturer's specifications, to reduce the potential for adverse vibration impacts. • Site-specific safe working distances are to be established on site prior to the vibration generating works commencing. • Ensure that safe working distances established on site are complied with. • If vibration intensive equipment is to be used within the safe working distances, attended vibration measurements are to be undertaken when work commences to determine site specific safe working distances.	Contractor	Pre-construction, Construction	Additional Safeguard

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
		• Vibration intensive work should not proceed within the safe working distances unless a permanent vibration monitoring system is installed approximately one metre from the building footprint, to warn operators (via flashing light, audible alarm, SMS etc.) when vibration levels are approaching the peak particle velocity trigger levels.			
NV5	Potential noise and vibration nuisance and amenity impacts	Develop a community information program before starting work. This would involve identification of a nominated community liaison officer and informing affected community members in advance of starting work through advertisements, flyers and community consultation sessions. Provide a 24-hour community hotline for complaints and queries concerning construction and advertise this ahead of starting any work. Develop a complaints handling procedure and ensure a timely response to complaints. Provide actions and progress towards resolving concerns. Make the work program available to the community and ensure it is routinely updated as work progresses.	Contractor	Preconstruction	Additional safeguard
NV6	Construction out of hours work	The Contractor would be required to justify the requirement for out-of-hours work and suitably demonstrate why the work cannot be reasonably undertaken during normal working hours. The Contractor would be required to assess proposed out-of-hours work and take reasonable and feasible steps to mitigate construction noise. The Contractor should seek approval from the Principal to undertake out-of-hours work. Out of hours work will be undertaken to comply with quality assurance specification G36: Environmental Management (Roads and Maritime, 2014b) and the Construction Noise and Vibration Guideline (Roads and Maritime, 2016f).	Contractor	Construction	Additional safeguard
NV7	Noise and vibration complaints while building the proposal	Undertake attended noise and/or vibration monitoring following a complaint. Report the monitoring results as soon as possible. In the case that exceedances of the management levels are recorded, review the situation and identify means to reduce the impacts to noise and vibration sensitive receivers. This is to include revision to the CNVMP where required.	Contractors	Construction	Additional safeguard
NV8	The potential for exceedance of the NMLs	Ensure toolbox talks and environmental induction training is provided to include specific noise and vibration management including, but not limited to: • Avoiding the use of radios outside of standard working hours	Contractors	Construction	Additional safeguard

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
		• Avoiding shouting and slamming doors • Operating machinery at low speeds or powers and switch off equipment when it is not being used • Minimising reversing • Avoiding dropping material from height.			
NV9	Operational noise mitigation	Investigate mitigation measures including: • Quieter pavement surfaces and suitability of such pavement types for through lanes and areas of acceleration, deceleration and turning movements • Noise barriers • At property treatments for residually affected receivers where feasible and reasonable. • Consideration of existing noise mitigation and any specified mitigation in development applications for acute receivers in NCAs A, B and D (both barriers and architectural) when determining reasonable and feasible mitigation.	Roads and Maritime (Transport)	Detailed Design	Additional Safeguard
NV10	Property treatments	Where at property treatments are identified, these would be implemented at the commencement of construction. These treatments would alleviate any noise concerns/ complaints during the construction period.	Contractors	Construction	Additional Safeguard
AH1	Aboriginal heritage	An Aboriginal Heritage Management Plan (AHMP) will be prepared in accordance with the Procedure for Aboriginal cultural heritage consultation and investigation (Roads and Maritime, 2011f) and Standard Management Procedure - Unexpected Heritage Items (Roads and Maritime, 2015d) and implemented as part of the CEMP. It will provide specific guidance on measures and controls to be implemented for managing impacts on Aboriginal heritage. The AHMP will be prepared in consultation with all relevant Aboriginal groups.	Contractor	Detailed design, pre-construction	Core standard safeguard Section 4.9 of QA G36 Environmental Management
AH2	Aboriginal heritage	The Standard Management Procedure - Unexpected Heritage Items (Roads and Maritime, 2015d) will be followed in the event that an unknown or potential Aboriginal object/s, including skeletal remains, is found during construction. This applies where Roads and Maritime does not have approval to disturb the object/s or where a specific safeguard	Contractor	Detailed design, pre-construction	Core standard safeguard Section 4.9 of QA G36

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
		for managing the disturbance (apart from the Procedure) is not in place. Work will only re-commence once the requirements of that Procedure have been satisfied.			Environmental Management
H1	Non-Aboriginal heritage	A Non-Aboriginal Heritage Management Plan (NAHMP) will be prepared and implemented as part of the CEMP. It will provide specific guidance on measures and controls to be implemented to avoid and mitigate impacts to Non-Aboriginal heritage. The NAHMP will be prepared in consultation with the Office of Environment and Heritage.	Contractor	Detailed design, pre-construction	Core standard safeguard Section 4.10 of QA G36 Environmental Management
H2	Non-Aboriginal heritage	The Standard Management Procedure - Unexpected Heritage Items (Roads and Maritime, 2015d) will be followed in the event that any unexpected heritage items, archaeological remains or potential relics of Non-Aboriginal origin are encountered. Work will only re-commence once the requirements of that Procedure have been satisfied.	Contractor	Detailed design, pre-construction	Core standard safeguard Section 4.10 of QA G36 Environmental Management
H3	Non-Aboriginal heritage	A heritage induction will be prepared and implemented as part of the project's general induction to raise awareness to construction personnel. The induction will include: • An outline of the history and heritage values of the study area • The relevant requirements of the Heritage Act • Description and explanation of the unexpected finds procedure.	Transport for NSW	Pre-construction, construction	Additional safeguard
H4	Impacts to Holsworthy Pedestrian Bridge	• Undertake archival recording and heritage interpretation of the Bridge prior to removal of superstructure. This should be combined detailed historical research • Conservation of elements of the bridge, such as the piers, iron fixings and plaque • Site protection measures for piers, iron fixings and plaque to be included during construction • Construction of a new footbridge in the same or similar location, with associated footpaths following the original alignment of the former rail line, so far as is possible • Inclusion of a heritage interpretation to be considered.	Roads and Maritime (Transport)	Detailed design / preconstruction	Additional safeguard

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
H5	Impacts to Harris Creek Bridge and Williams Creek Bridge	• Consultation with the Office of Environment and Heritage should be undertaken prior to impacts to the bridge. This would be in accordance with s170A of the Heritage Act 1977 • Archival recording of bridges prior to removal including archival photography and measured drawings • Design of replacement bridges and associated shared paths to balance safety and complement the surrounding landscape character and heritage values, including the consideration of material types and finishes.	Roads and Maritime (Transport)	Detailed design / pre-construction	Additional safeguard
UD1	Landscape character and visual impact	An Urban Design Plan in consultation with Liverpool City Council will be prepared to support the final detailed design and implemented as part of the CEMP. The Urban Design Plan will present an integrated urban design for the proposed modification, providing practical detail on the application of design principles and objectives identified in the environmental assessment. The Plan will include design treatments for: • Location and identification of existing vegetation and proposed • landscaped areas, including species to be used • Built elements including retaining walls and bridges • Pedestrian and cyclist elements including footpath location, paving types and pedestrian crossings • Fixtures such as seating, lighting, fencing and signs • Details of the staging of landscape works taking account of related environmental controls such as erosion and sedimentation controls and drainage • Procedures for monitoring and maintaining landscaped or rehabilitated areas. • Interpretation signage for the Holsworthy pedestrian bridge. The Urban Design Plan will be prepared in accordance with relevant guidelines, including: • Beyond the Pavement urban design policy, process and principles (Roads and Maritime, 2014e)	Contractor	Pre-construction, construction	Core standard safeguard

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
		• Landscape Guideline (Roads and Maritime, 2008) • Bridge Aesthetics (Roads and Maritime 2012e) • Shotcrete Design Guideline (Maritime, 2005).			
SE1	Socio-economic and communication	A Communication Plan (CP) will be prepared and implemented as part of the CEMP to help provide timely and accurate information to the community during construction. The CP will include (as a minimum): • Mechanisms to provide details and timing of proposed activities to affected residents, including changed traffic and access conditions • Contact name and number for complaints. The CP will be prepared in accordance with the Community Involvement and Communications Resource Manual (RTA, 2008).	Transport for NSW Contractor	Preconstruction Construction	Standard safeguards EIA-P05-G01-T02
SE2	Socio-economic	Road users will be informed of changed conditions, including likely disruptions to access during construction.	Contractor	Preconstruction, construction	Additional safeguard
SE3	Community impacts during construction across the proposed modification footprint	Consultation will be undertaken with potentially affected residences prior to the commencement of and during works in accordance with Transport for NSW's Community Involvement and Communications Resource Manual. Consultation will include but not limited to door knocks, newsletters or letter box drops providing information on the proposed works, working hours and a contact name and number for more information or to register complaints.	Contractor	Construction	Additional safeguard
SE4	Community impacts during construction across the proposed modification footprint	A complaints handling procedure and register would be included in the CEMP. The complaints register will be maintained throughout construction.	Transport for NSW	Preconstruction, construction	Additional safeguard
SE5	Emergency access	Access for emergency vehicles will be maintained at all times during construction. Any site-specific requirements will be determined in consultation with the relevant emergency services agency.	Transport for NSW	Construction	Additional safeguard

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
SE6	Impacts to properties	Consultation will be undertaken with all affected property owners during detailed design and construction to develop and implement measures to mitigate impacts on land use viability, infrastructure and severance.	Roads and Maritime (Transport)	Detailed Design	Additional safeguard
BF1	Bushfire	A Bushfire Risk Management Plan (BRMP) will be prepared and implemented as part of the CEMP. The BRMP will include but not be limited to: • Fire response equipment such as fire extinguisher and fire blanket to be kept on vehicles at the works and compound sites • The fire rating will be checked at the start of each day • Hot works will not be permitted on total fire ban days • An evacuation plan will be kept onsite and staff will be made aware of this and their responsibilities in the event of a fire • A site for smoking will be established at least 40 metres away from dense vegetation and butt disposal bins will be made available.	Contractor	Construction	Additional safeguard
UXO1	Hazard and risk – dangerous goods and explosives	The occurrence of unexploded ordinance will be further investigated during detailed design by using prequalified specialists on the Defence Environment and Heritage Panel to confirm the presence and/or or absence of unexploded ordinance within the project area. If present, a plan for remediation works would be prepared and implemented prior to construction. Investigations would be undertaken in consultation with the Department of Defence.	Roads and Maritime (Transport) Contractor	Detailed design, Preconstruction	Additional safeguard
AQ1	Air quality emissions and dust propagation across the proposed modification footprint	An Air Quality Management Plan (AQMP) would be prepared as part of the CEMP. The plan would include but not be limited to the following: • A procedure for monitoring dust on site and weather conditions • Identification of dust generating activities and associated mitigation measures • Limits on the area that can be opened-up or distributed at any one time • Stabilising temporary stockpiles and spoil set down locations • Compliance with Stockpile Site Management Guidelines (Roads and Maritime, 2008a)	Contractor	Construction	Additional safeguard

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
		• Progressive stabilisation plans • Imposing speed limits throughout the proposed modification footprint and in the site compound Implementation of additional dust control measures in exposed areas where the wind speed is excessive (including periodic gusts) or produces visible dust • Implementation of a vehicle, plant and machinery maintenance program to comply with manufacturer's specifications and ensure compliance with the NSW Protection of Environment Operations Act 1997 • Prevention of equipment idling for an excessive period of time while ideally locating machinery away from adjacent receivers • Prohibition of any burning onsite or in the construction compounds • Visual inspection of local conditions to ensure management measures are implemented and effective • Routine sweeping of areas (at least once a day) to minimise surface dust notwithstanding the requirement to prevent sediment-laden runoff • Covering and sheeting of all trucks leaving site and ensure methods to remove sediment from truck wheels are implemented • Revision of work activities should the dust control measures prove ineffective • Avoiding emissions-generating activities (i.e. paint spraying, grout, concrete mixing) during high winds and employ methods to minimise dust dispersion • Not stockpiling fine construction materials in exposed areas • Monitoring wind conditions and schedule activities to avoid high-wind periods to avoid impacting on adjacent receivers.			
AQ2	Dust deposition impacts	Ensure that the consultation strategy (refer to chapter 5) includes provision for managing dust nuisance complaints during the work.	Contractor	Construction	Additional safeguard

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
AQ3	Improving energy efficiency and sustainability	Machinery onsite would be required to run efficiently to ensure optimal performance, minimise down time and improve fuel efficiency.	Contractor	Construction	Additional safeguard
AQ4	Dust deposition impacts	Stabilisation would be undertaken within the proposed modification as each section of work is completed or in areas that are inactive for more 20 days.	Contractor	Construction	Additional safeguard
GGCC1	Manage and reduce consumption	Consider using biofuels, lower emission fuels (e.g. e10) or fuels that allow the plant to run more efficiently during construction. Vehicles, plant and machinery would be appropriately sized for the task and properly maintained so as to achieve optimum fuel efficiency.	Contractor	Construction	Additional safeguard
GGCC2		Use low embodied energy materials Consider using recycled or locally sourced materials (where readily available, economic, and fit for purpose) to reduce impacts from transportation emissions, reduce fuel costs and support local economies. Deliveries would be programmed so that the minimum amount of trips is made without compromising site requirements.	Construction contractor	Construction	Additional safeguard
GGCC3	Use low embodied energy materials	Ensure the detailed design considers opportunities to reduce construction material quantities.	Roads and Maritime	Detailed design	Additional safeguard
GGCC4	Maintain and reduce vehicle emissions for the whole proposal	The Roads and Maritime (Transport) Resource Recovery Exemptions, will be followed to maximise opportunities to reuse construction and demolitions materials where feasible and permissible.	Construction contractor	Construction	Additional safeguard
GGCC5	Manage the design to accommodate the climate change factors of increased temperature and rainfall events across the whole proposal	Consider options in adopting the latest pavement design to ensure resilience against extreme temperature and rainfall events. Detailed design for rainfall, runoff and waterways to take into consideration the effects of sea level rise, changes to rainfall frequency and/or intensity as a result of climate change as per the Roads and Maritime Technical Guide: Climate Change Adaptation for the State Road Network	Roads and Maritime	Detailed design	Additional safeguard

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
GGCC6	Manage the design to accommodate the climate change factors of increased temperature and rainfall events across the whole proposal	Detailed design would also consider adaptation and resilience of the proposed road design to better respond to potential climate change impacts (temperature and rainfall).	Roads and Maritime (Transport)	Detailed design	Additional safeguard
W1	Waste	A Waste Management Plan (WMP) will be prepared and implemented as part of the CEMP. The WMP will include but not be limited to: • Measures to avoid and minimise waste associated with the proposed modification • Classification of wastes and management options (re-use, recycle, stockpile, disposal) • Statutory approvals required for managing both on and off-site waste, or application of any relevant resource recovery exemptions • Procedures for storage, transport and disposal • Monitoring, record keeping and reporting. The WMP will be prepared taking into account the Environmental Procedure - Management of Wastes on Roads and Maritime Services Land (Roads and Maritime, 2014f) and relevant Roads and Maritime Waste Fact Sheets.	Contractor	Preconstruction, construction	Core standard safeguard
CI1	Cumulative impacts	If required, modify the proposed modification's construction traffic management plan on account of any identified cumulative impacts to: • Implement traffic management controls to respect critical timing requirements of these other projects • Carefully select appropriate work site access and egress locations. • Monitor traffic levels and network performance across the proposal footprint and wider area to consider cumulative effects from other projects.	Transport for NSW, contractor	Preconstruction, construction	Additional safeguard
CI2	Cumulative impacts	Consult with other developers to obtain information about project timeframes and impacts. Identify and implement appropriate	Roads and Maritime (Transport)	Pre-construction, Construction	Additional safeguard

No.	Impact	Environmental safeguards	Responsibility	Timing	Reference
		safeguards and management measures to minimise cumulative impacts.	Contractor		
CI3	Cumulative impacts	Consult with other developers before starting work to manage the interfaces of the proposal's staging and programming in combination with the other projects occurring in the area.	Roads and Maritime	Pre-construction	Additional safeguard
CI4	Cumulative impacts	Prepare all environmental management plans (including but not limited to the Construction Noise and Vibration Management Plan and Traffic Management Plan) to consider other developments in the area.	Contractor	Preconstruction	Additional safeguard

7.3 Licensing and approvals

All relevant licenses, permits, notifications and approvals needed for the Heathcote Road Upgrade, Infantry Parade to The Avenue and when they need to be obtained are listed in Table 4-2 of the Submissions Report.

8. Strategic environmental considerations

8.1 Clause 171 factors

Clause 171 of the EP&A Regulation provides a list of factors that should be considered in determining the likely impacts of many varied activities on the natural and built environment. They are framed so that all potential effects on the environment are considered. Table 8-1 sets out these factors, along with commentary with respect to how the Project responds to these matters.

Table 8-1: Consideration of proposed modification to clause 171 factors

Clause 171 Factors		Outcomes	Impact
(a)	Any environmental impact on a community?	Some short-term impacts during construction are anticipated, however, these impacts are easily mitigated provided that mitigations are implemented.	Construction: Short-term minor negative impacts Operation: Nil
(b)	Any transformation of a locality?	The proposed modifications will result in the extension of existing road batter and the removal of a tree.	Construction: Short-term minor negative impacts Operation: Nil
(c)	Any environmental impact on the ecosystems of the locality?	The proposed modifications will avoid or address adverse impacts in the short and long term on ecology and ecosystems provided that mitigations are implemented.	Construction: Short-term minor negative impacts Operation: Nil
(d)	Any reduction on the aesthetic, recreational, scientific, or other environmental quality or value of a locality?	The proposed modification for the removal of the tree will have a negligible negative impact in construction and in operation however a community safety and access benefit will be enabled. The fill emplacement proposed modification will have negligible impact with the placement of potentially contaminated (classified) fill from the project in one location.	Construction: Short term minor negative impact Operation: Minor positive and negligible negative
(e)	Any effect on a locality, place or building having aesthetic, anthropological, archaeological, architectural, cultural, historical, scientific or social significance or other special value for present or future generations?	The proposed modifications will result in a moderate impact on the aesthetics of the area during construction.	Construction: Short-term minor negative impact Operation: Nil
(f)	Any impact on the habitat of protected animals (within the meaning of the *Biodiversity Conservation Act 2016*)?	The FFA technical memo (refer to Appendix E) determined that the proposed modifications will require the removal of exotic vegetation, native trees, and shrubs, which are unlikely to	Construction: Short-term minor negative impacts Operation: Nil

Clause 171 Factors		Outcomes	Impact
		provide important habitat for threatened fauna species.	
(g)	Any endangering of any species of animal, plant or other form of life whether living on land, in water or in the air?	The FFA technical memo (refer to Appendix E) determined that the proposed modifications are unlikely to have a significant impact on biodiversity, and is unlikely to endanger any species of animal, plant, or other life form. Mitigation measures to minimise the risk of impact during construction activities have been provided within this addendum REF.	Construction: Short-term minor negative impacts Operation: Nil
(h)	Any long-term effects on the environment?	The FFA technical memo (refer to Appendix E) determined that the proposed modifications are unlikely to have a significant impact on biodiversity, and is unlikely to endanger any species of animal, plant, or other life form. Mitigation measures to minimise the risk of impact during construction activities have been provided within this addendum REF.	Construction: Short-term minor negative impacts Operation: Nil
(i)	Any degradation of the quality of the environment?	The proposed modifications will have some minor impacts associated with construction activities. There will be no long-term degradation of the quality of the environment. The project won fill at the emplacement sites will be assessed for contaminates, classified and appropriately managed.	Construction: Short-term minor negative impact Operation: Nil
(j)	Any risk to the safety of the environment?	The proposed modifications will reduce the generation off waste off site and improve the safety of the environment by allowing the implementation of the design elements that will contribute to pedestrian safety.	Construction: Short-term minor negative impact Operation: Long-term positive impact
(k)	Any reduction in the range of beneficial uses of the environment?	The proposed modifications will not limit any beneficial uses of the environment.	Construction: Short-term minor negative impact Operation: Nil
(l)	Any pollution of the environment?	During construction, there is potential for pollution to the environment via construction activities. Appropriate mitigation measures to minimise the risk of impact during construction activities have been provided in this addendum REF.	Construction: Short-term minor negative impact Operation: Nil
(m)	Any environmental problems associated with the disposal of waste?	The proposed modification will reduce the generation of waste (soil - potentially contaminated) requiring offsite disposal. All other materials will be taken to an appropriately licensed facility.	Construction: Short-term minor negative impact Operation:

Clause 171 Factors		Outcomes	Impact
			Nil
(n)	Any increased demands on natural or other resources that are, or are likely to become, in short supply?	The proposed modifications will require materials that are not in short supply.	Construction: Nil Operation: Nil
(o)	Any cumulative environmental effect with other existing or likely future activities?	The proposed modifications will be undertaken in a contained area and in a short timeframe. As no other works are planned at this locality or during the same time period the proposed modification is not likely to have a cumulative effect with any other existing or likely future activities.	Construction: Nil Operation: Nil
(p)	Any impact on coastal processes and coastal hazards, including those under Projected climate change conditions?	The site is not subject to coastal processes or hazards.	Construction: Nil Operation: Nil
(q)	Applicable local strategic planning statements, regional strategic plans, or district strategy plans made under Division 3.1 of the EP&A Act?	The proposed modifications are minor in respect of these strategic plans, but will contribute to improving community access and safety in respect of the tree and the emplacement sites proposed modification will respond to some existing potentially contaminated soil issues. The proposed modification contributes to the broader Heathcote Road Upgrade Project that will improve transportation in this region of Sydney.	Construction: Nil Operation: Nil.

8.2 Objects of the EP&A Act

The proposed modification has been considered against the objectives of the EP&A Act (refer to Table 8-2).

Table 8-2: Consideration of proposed modification against EP&AA Act objectives

Object	Comment
1.3(a) To promote the social and economic welfare of the community and a better environment by the proper management, development and conservation of the State's natural and other resources.	The proposed modification would have relatively minor additional impacts. The proposed safeguards and management measures detailed in this addendum REF allow for the proper management, development and conservation of natural and artificial resources. This proposed modification (tree removal) will enable the delivery of design elements that will provide safety and access benefits to the community. This proposed modification (fill emplacement) will enable the re-use of soil as fill within the Project area and avoid its external disposal as waste.

Object	Comment
1.3(b) To facilitate ecologically sustainable development by integrating relevant economic, environmental and social considerations in decision-making about environmental planning and assessment.	The consistency of the Project with the principles of ecologically sustainable development remains consistent with the discussion in Section 8.2.1 to 8.2.4 of the Project REF.
1.3(c) To promote the orderly and economic use and development of land.	The Project, inclusive of the proposed modification, would improve access to residential, recreation and DoD land uses in the immediate area. It would also improve access to between Sydney's southern suburbs and employment land uses in Liverpool.
1.3(d) To promote the delivery and maintenance of affordable housing.	Not relevant to the proposed modification or Project.
1.3(e) To protect the environment, including the conservation of threatened and other species of native animals and plants, ecological communities and their habitats.	Impacts of the Project, inclusive of the proposed modification, have been assessed as not significant.
1.3(f) To promote the sustainable management of built and cultural heritage (including Aboriginal cultural heritage).	The proposed modification is not expected to impact built and cultural heritage (including Aboriginal cultural heritage).
1.3(g) To promote good design and amenity of the built environment.	The proposed modifications includes measures to ensure the integration of earthworks design with existing landform and minimisation of visual impacts. This proposed modification will enable the delivery of design elements that will provide safety and access benefits to the community.
1.3(h) To promote the proper construction and maintenance of buildings, including the protection of the health and safety of their occupants.	Not relevant to the proposed modifications or Project.
1.3(i) To promote the sharing of the responsibility for environmental planning and assessment between the different levels of government in the State.	Not relevant to the proposed modifications or Project.
1.3(j) To provide increased opportunity for community participation in environmental planning and assessment.	Community and stakeholder consultation for the project is discussed in Chapter 5 of the Project REF, Addendum 1 REF, Addendum 2 REF, Addendum 3 REF and in the Submissions Report. This remains relevant to this addendum REF.

8.3 Ecologically sustainable development

8.3.1 The precautionary principle

This principle states that 'if there are threats of serious or irreversible damage, lack of scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation'.

The assessment of potential environmental impacts in the development of the proposed design changes that comprise this proposed modification has sought to minimise impacts on the urban and natural amenity of the proposed modification area while maintaining engineering feasibility, and safety and access benefits for the community. A number of safeguards have been proposed in chapter 7 to minimise potential impacts. These safeguards would be implemented during construction and operation of the Project.

Works would be undertaken as per the existing Project CEMP. This requirement would ensure that the proposed activities achieve a high-level of environmental performance. No mitigation measures or management mechanisms would be postponed as a result of a lack of information.

8.3.2 Intergenerational equity

The principle states that 'the present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations.

The proposed modification will allow for the reuse of soil as fill within the project site and avoid the need to dispose of it as waste. It will also allow for the provision of design elements that will provide safety and access benefits to the community. The proposed modification would benefit future generations by ensuring that the proposed modification does not give rise to long term adverse impacts on the environment and potential impacts would be minimised by implementation of appropriate safeguards.

8.3.3 Conservation of biological diversity and ecological integrity

This principle states that the 'diversity of genes, species, populations and communities, as well as the ecosystems and habitats to which they belong, must be maintained and improved to ensure their survival'.

The proposed modification is not considered to have a significant impact on biological diversity and ecological integrity. The potential impact of the proposed modification on biodiversity has been considered in Section 6.2.

8.3.4 Improved valuation, pricing and incentive mechanisms

This principle requires that 'costs to the environment should be factored into the economic costs of a project'.

This addendum REF has examined the environmental consequences of the proposed modification and identified management measures and safeguards for areas which have the potential to experience adverse impacts.

Requirements imposed in terms of implementation of these mitigation measures would result in an economic cost to the Transport for NSW. The implementation of management measures and safeguards would increase both the capital and operating costs of the proposed modification. This signifies that environmental resources have been given appropriate valuation.

9. Conclusion

9.1 Justification

The proposed modifications are the result of further design development by Transport and is required to provide an avenue for the re-use of site won material in a sustainable manner and enable the unimpeded implementation of design elements that provide safety and access benefits to the community.

While there would be some additional environmental impacts as a consequence of the proposed modifications, including removal of additional native trees, exotic grasses and weed removal, and the emplacement of fill collected from across the project site, these have been avoided or minimised wherever possible through design and the site-specific safeguards summarised in Chapter 7.

The benefits of the proposed modifications are considered to outweigh the temporary adverse impacts and risks.

9.2 Conclusion

This addendum REF has examined and taken into account to the fullest extent possible all matters affecting or likely to affect the environment by reason of the proposed modifications.

This has included consideration where relevant, of conservation agreements and plans of management under the NPW Act, biodiversity stewardship sites under the BC Act, wilderness areas, areas of outstanding value, impacts on threatened species, populations and ecological communities and their habitats and other protected fauna and native plants. It has also considered potential impacts to matters of national environmental significance listed under the Federal EPBC Act.

A number of potential environmental impacts from the proposed modifications have been avoided or reduced during the design development and options assessment. The proposed modifications as described in the addendum REF best meets the project objectives and would have minor impacts on biodiversity. Safeguards and management measures as detailed in this addendum REF would ameliorate or minimise these expected impacts. On balance, the proposed modifications are considered justified, and the following conclusions are made.

9.2.1 Significance of impact under NSW legislation

The proposed modifications would not result in a change to the findings of the Project REF and other Approved Project Documentation and would be unlikely to cause a significant impact on the environment. Therefore, it is not necessary for an environmental impact statement to be prepared and approval to be sought from the Minister for Planning under Division 5.2 of the EP&A Act. A Biodiversity Development Assessment Report or Species Impact Statement is not required. The proposed modifications are subject to assessment under Division 5.1 of the EP&A Act. Consent from council is not required.

9.2.2 Significance of impact under Australian legislation

The proposed modifications would not likely cause a significant impact on matters of national environmental significance or the environment of Commonwealth land within the meaning of the EPBC Act. A referral to the Australian Government DCCEEW is not required.

This addendum REF has been prepared to meet the requirements of the EPBC Act strategic assessment approval for Transport for NSW Division 5.1 road activities.

10. Certification

This addendum review of environmental factors provides a true and fair review of the proposed modifications in relation to its potential effects on the environment. It addresses to the fullest extent possible all matters affecting or likely to affect the environment as a result of the proposed modifications.

Raheem Halloum

Environmental Planner

SMEC Australia Pty Ltd

Date: 21/03/2025

I have examined this addendum review of environmental factors and accept it on behalf of Transport for NSW.

Ken Vo
Senior Project Manager
Western Sydney Project Office
Infrastructure Projects and Engineering
Transport for NSW

Date: 28/03/2025

11. EP&A Regulation publication requirement

Respondent	Yes/No
Does this REF need to be published under section 171(4) of the EP&A Regulation?	No

12. Terms and acronyms used in this addendum REF

Term /acronym	Description
AHIMS	Aboriginal Heritage Information Management System
Approved Project Documentation	Comprises of environmental assessments previously completed for the Project, including the Project REF (2016), Submissions Report (2016), Addendum 1 REF (2019), Addendum 2 REF (2021), MWREF (2022) and Addendum 3 REF (2022)
ASS	Acid Sulfate Soils
ASSMP	Acid Sulfate Soils Management Plan
BC Act	*Biodiversity Conservation Act 2016 (NSW).*
BDAR	Biodiversity Development Assessment Report
CEMP	Construction / Contractor's environmental management plan
DoD	Department of Defence
EIA	Environmental impact assessment
EP&A Act	*Environmental Planning and Assessment Act 1979* (NSW). Provides the legislative framework for land use planning and development assessment in NSW
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Commonwealth). Provides for the protection of the environment, especially matters of national environmental significance, and provides a national assessment and approvals process.
EPL	Environment Protection Licence
ESD	Ecologically sustainable development. Development which uses, conserves and enhances the resources of the community so that ecological processes on which life depends, are maintained and the total quality of life, now and in the future, can be increased
FFA Tech Memo	Flora and Fauna Technical Memorandum
FM Act	*Fisheries Management Act 1994* (NSW)
Heritage Act	*Heritage Act 1977* (NSW)
Infantry Parade Tree	One tree in conflict with proposed modifications, located near the corner of Infantry Parade and Heathcote Road
LALC	Local Aboriginal Land Council
LEP	Local Environmental Plan. A type of planning instrument made under Part 3 of the EP&A Act.
Liverpool LEP 2008	Liverpool Local Environmental Plan 2008
LoS	Level of Service. A qualitative measure describing operational conditions within a traffic stream and their perception by motorists and/or passengers.
MNES	Matters of national environmental significance under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*.
NPW Act	National Parks and Wildlife Act 1974 (NSW)

PFAS	Per-and Polyfluoroalkyl Substances
Proposed modifications	The first proposed modification is the expansion of three existing road batters along Heathcote Road, all within one area, referred to as the 'fill emplacement modification'. The second proposed modification is the removal of one tree at Infantry Parade (intersection with Heathcote Road) to allow for the progression of existing design elements, referred to as the 'tree removal modification'.
Project REF	A Review of Environmental Factors prepared in 2016 that assessed the environmental impacts of the Project.
Project Study Area	Previously assessed study area of the Approved Project Documentation
REF	Review of Environmental Factors
Roads and Maritime	NSW Roads and Maritime was dissolved by the Transport Administration Amendment Bill in August 2019, all function are now managed by Transport for NSW
SEPP	State Environmental Planning Policy. A type of planning instrument made under Part 3 of the EP&A Act.
SEPP (Biodiversity and Conservation)	State Environmental Planning Policy (Biodiversity and Conservation) 2021
SEPP (Planning Systems)	State Environmental Planning Policy (Planning Systems) 2021
SEPP (Precincts – Central River City)	State Environmental Planning Policy (Precincts – Central River City) 2021
SEPP (Precincts – Eastern Harbour City)	State Environmental Planning Policy (Precincts – Eastern Harbour City) 2021
SEPP (Precincts – Regional)	State Environmental Planning Policy (Precincts – Regional) 2021
SEPP (Precincts – Western Parkland City)	State Environmental Planning Policy (Precincts – Western Parkland City) 2021
SEPP (Resilience and Hazards)	State Environmental Planning Policy (Resilience and Hazards) 2021
SEPP (Transport and Infrastructure)	State Environmental Planning Policy (Transport and Infrastructure) 2021
SMEC	SMEC Australia Pty Ltd
SIS	Species Impact Statement
TEC	Threatened Ecological Communities
The Project	NSW Government upgrade of the 2.2 kilometre (km) section of Heathcote Road between Infantry Parade, Holsworthy and The Avenue at Voyager Point from two lanes to four lanes
Transport	Transport for NSW
TSC Act	*Threatened Species Conservation Act 1995* (NSW)
QA Specifications	Specifications developed by Roads and Maritime Services for use with road work and bridge work contracts let by Transport for NSW.
2019 VCB	Addendum 1 REF (2019) mapped approved vegetation clearing boundary.

13. References

Hills Environmental (2019), Heathcote Road Upgrade, Infantry Parade to The Avenue Addendum Review of Environmental Factors, prepared for Roads and Maritime, Sydney

Environment Protection Agency (EPA) NSW 2024. *The NSW Government PFAS Investigation Program* webpage and search facility. The NSW Government PFAS Investigation Program | EPA accessed 6 March 2025

SMEC (2021), Heathcote Road Upgrade, Infantry Parade to The Avenue Addendum Review of Environmental Factors, prepared for Transport for NSW, Sydney

SMEC (2022), Heathcote Road Upgrade, Infantry Parade to The Avenue, Biodiversity Technical Memorandum, prepared for Transport for NSW, Sydney

WSP I Parsons Brinckerhoff (2016), Heathcote Road Upgrade, Infantry Parade to The Avenue Review of Environmental Factors, prepared for Roads and Maritime, Sydney

WSP I Parsons Brinckerhoff (2017), Heathcote Road Upgrade, Infantry Parade to The Avenue Submissions Report, prepared for Roads and Maritime, Sydney.

Appendix A

Figures

0 50 100 150 200 250 300
Metres
GDA2020 MGA Zone 56
Scale: 1:7,000 at A3

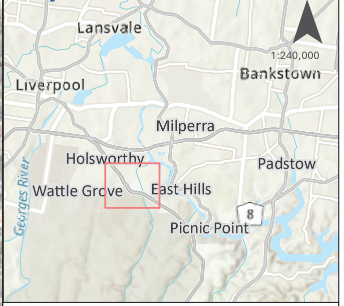
Legend

- Project REF (2016) Proposal Area
- Project REF (2016) Study Boundary
- Addendum 1 REF (2019) Study Boundary
- Addendum 2 REF (2021) Study Boundary
- Addendum 3 REF (2022) Study Boundary
- Addendum 4 REF (2025) Study Boundary
- Addendum 1 REF (2019) Vegetation Clearing Boundary
- Addendum 2 REF (2021) Vegetation Clearing Boundary
- Addendum 3 REF (2022) Vegetation Clearing Boundary
- Addendum 4 REF (2025) Vegetation Clearing Boundary
- Watercourse

Proposed Modification

- Fill emplacement modification site
- Tree removal modification site

Project Location



Sources:
1. © State of New South Wales (Spatial Services, a business unit of the Department of Customer Service NSW).
2. © WSP 2016
3. World Topographic Map: Esri, TomTom, Garmin, Foursquare, METI/ NASA, USGS
Australia latest:
World Hillshade: Esri, Geoscience Australia, NASA, NGA, USGS, Aerometrex Pty Ltd

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Project No:	30013140
Figure No:	1 - 1
Figure Name:	Location of the Proposed Modifications
Version:	1
Date:	10/03/2025
Created by:	LL16284
Page Size:	A3

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Metres

GDA2020 MGA Zone 56
Scale: 1:1,000 at A3

Legend

- Project REF (2016) Proposal Area
- Project REF (2016) Study Boundary
- Addendum 1 REF (2019) Study Boundary
- Addendum 4 REF (2025) Study Boundary
- Addendum 1 REF (2019) Vegetation Clearing Boundary
- Addendum 4 REF (2025) Vegetation Clearing Boundary

Proposed Modification

- Fill emplacement modification site

Project Location

Project No:	30013140
Figure No:	1 - 2
Figure Name:	Fill emplacement modification sites
Version:	1
Date:	21/03/2025
Created by:	LL16284
Page Size:	A3

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Metres
GDA2020 MGA Zone 56
Scale: 1:500 at A3

Legend

- Project REF (2016) Proposal Area
- Project REF (2016) Study Boundary
- Addendum 1 REF (2019) Study Boundary
- Addendum 4 REF (2025) Study Boundary
- Addendum 1 REF (2019) Vegetation Clearing Boundary
- Addendum 4 REF (2025) Vegetation Clearing Boundary

Proposed Modification

- Tree removal modification site

Project Location

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3. Light Gray Base: Esri, TomTom, Garmin, Foursquare, METI/NASA, USGS
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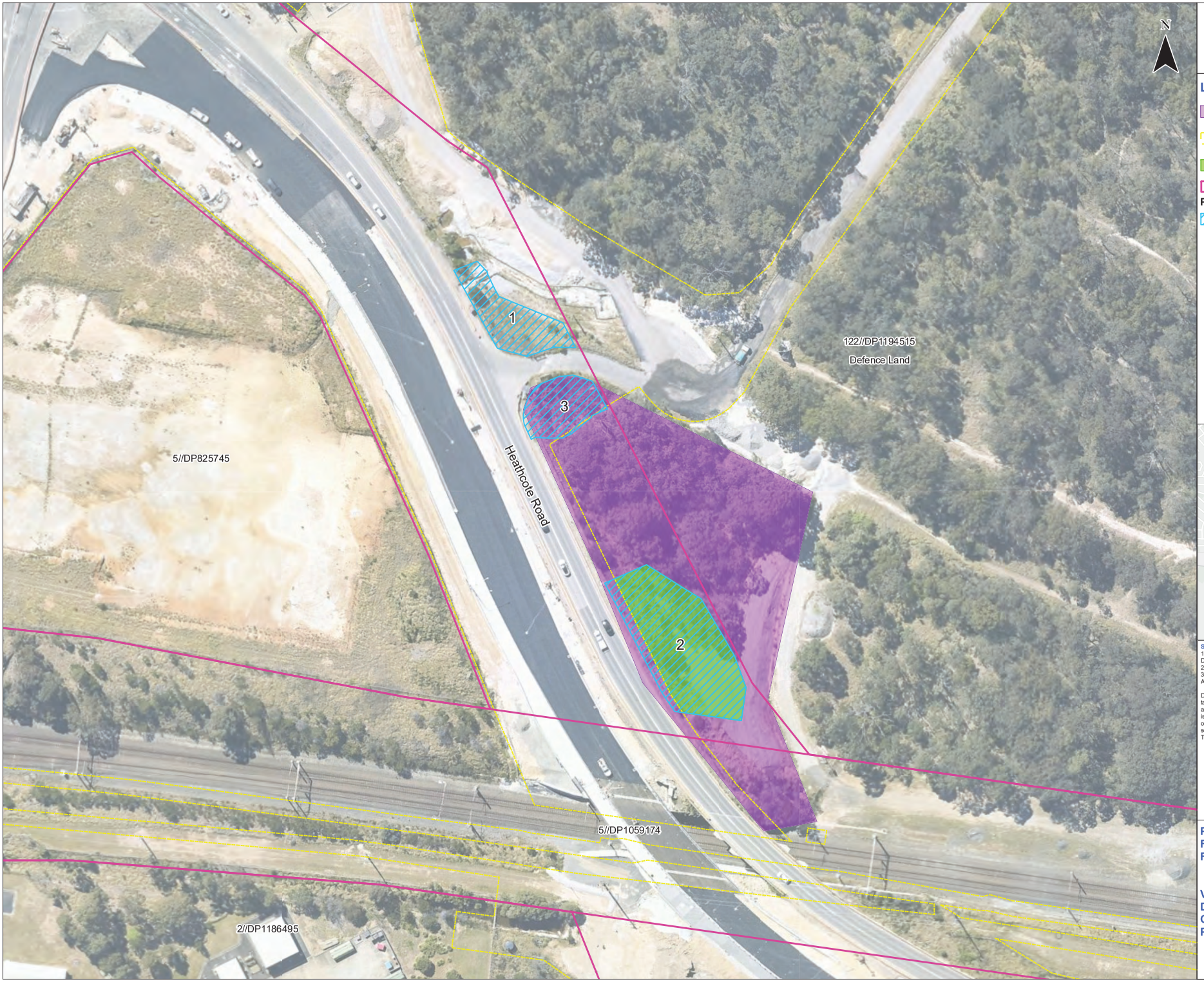
Project No:	30013140
Figure No:	1 - 3
Figure Name:	Tree removal modification site
Version:	1
Date:	10/03/2025
Created by:	LL16284
Page Size:	A3



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Metres

GDA2020 MGA Zone 56
Scale: 1:1,000 at A3

Legend

- Addendum 4 REF (2025) Study Boundary
- Addendum 1 REF (2019) Vegetation Clearing Boundary
- Addendum 4 REF (2025) Vegetation Clearing Boundary
- Cadastre

Proposed Modification

- Fill emplacement modification site

Project Location

Sources:
1. © State of New South Wales (Spatial Services, a business unit of the Department of Customer Service NSW).
2. © WSP 2016
3. Light Gray Base: Esri, TomTom, Garmin, METI/NASA, USGS
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Project No:	30013140
Figure No:	1 - 4
Figure Name:	Fill emplacement modification - Lot (Cadastre) Mapping
Version:	1
Date:	24/03/2025
Created by:	LL16284
Page Size:	A3

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Metres
GDA2020 MGA Zone 56
Scale: 1:500 at A3

Legend

- Addendum 4 REF (2025) Study Boundary
- Addendum 1 REF (2019) Vegetation Clearing Boundary
- Addendum 4 REF (2025) Vegetation Clearing Boundary
- Cadastre

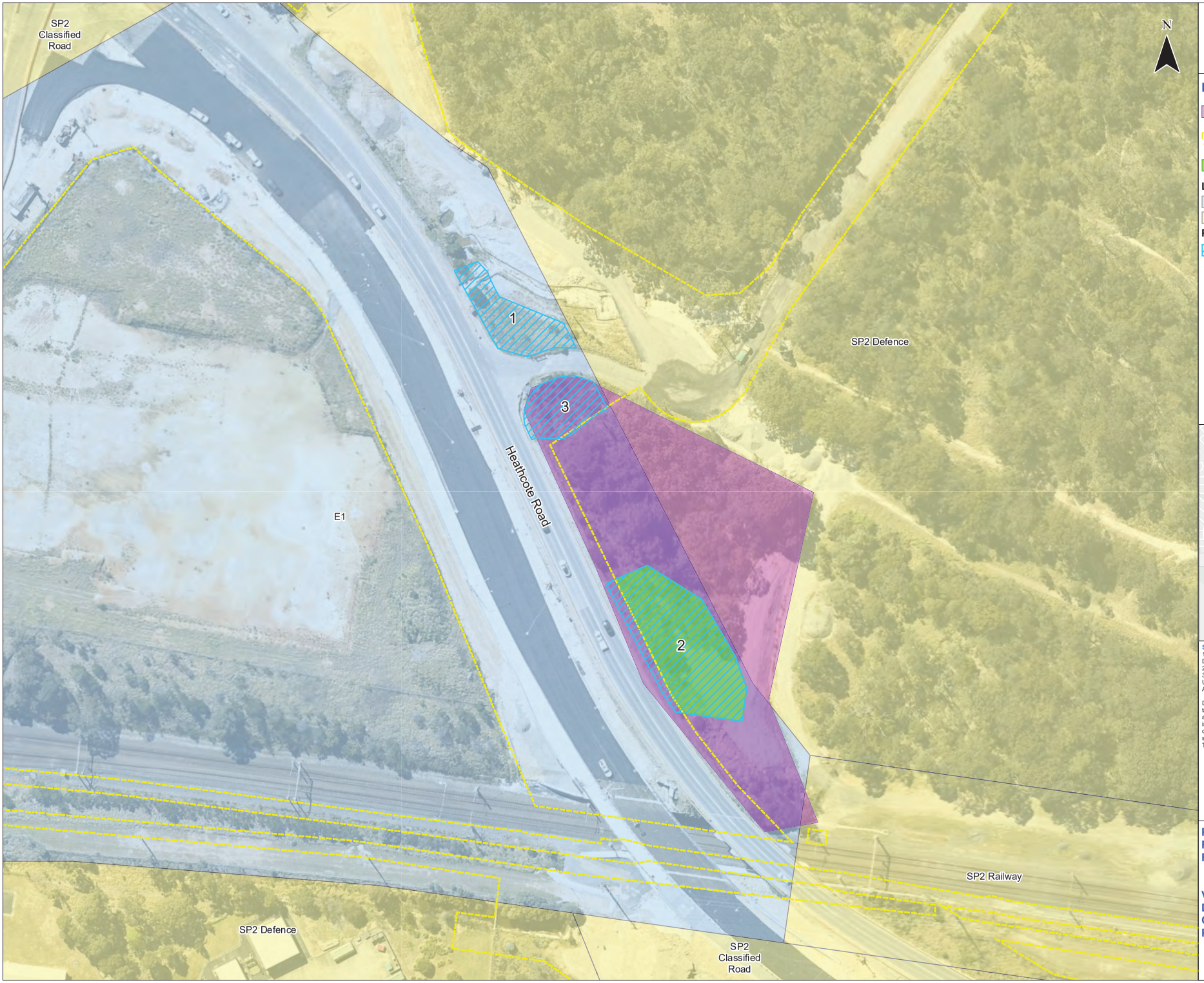
Proposed Modification

- Tree removal modification site

Project Location

Sources:
1. © State of New South Wales (Spatial Services, a business unit of the Department of Customer Service NSW).
2. © WSP 2016
3. Light Gray Base: Esri, TomTom, Garmin, Foursquare, METI/NASA, USGS
Australia latest: © Aerometrex Pty Ltd

Project No:	30013140
Figure No:	1 - 5
Figure Name:	Tree removal modification - Lot (Cadastre) Mapping
Version:	1
Date:	10/03/2025
Created by:	LL16284
Page Size:	A3



0 10 20 30 40
Metres

GDA2020 MGA Zone 56
Scale: 1:1,000 at A3

Legend

- Addendum 4 REF (2025) Study Boundary
- Addendum 1 REF (2019) Vegetation Clearing Boundary
- Addendum 4 REF (2025) Vegetation Clearing Boundary

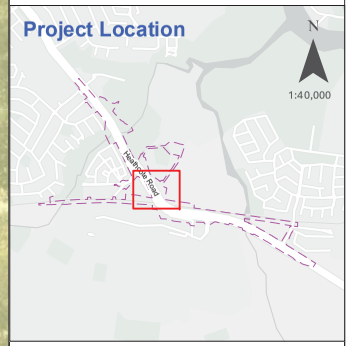
Land Zoning Map

- E1 - Local Centre
- SP2 - Infrastructure

Proposed Modification

- Fill emplacement modification site

Project Location



Sources:
1. © State of New South Wales (Spatial Services, a business unit of the Department of Customer Service NSW).
2. © WSP 2016
3. Light Gray Base: Esri, TomTom, Garmin, Foursquare, METI/NASA, USGS
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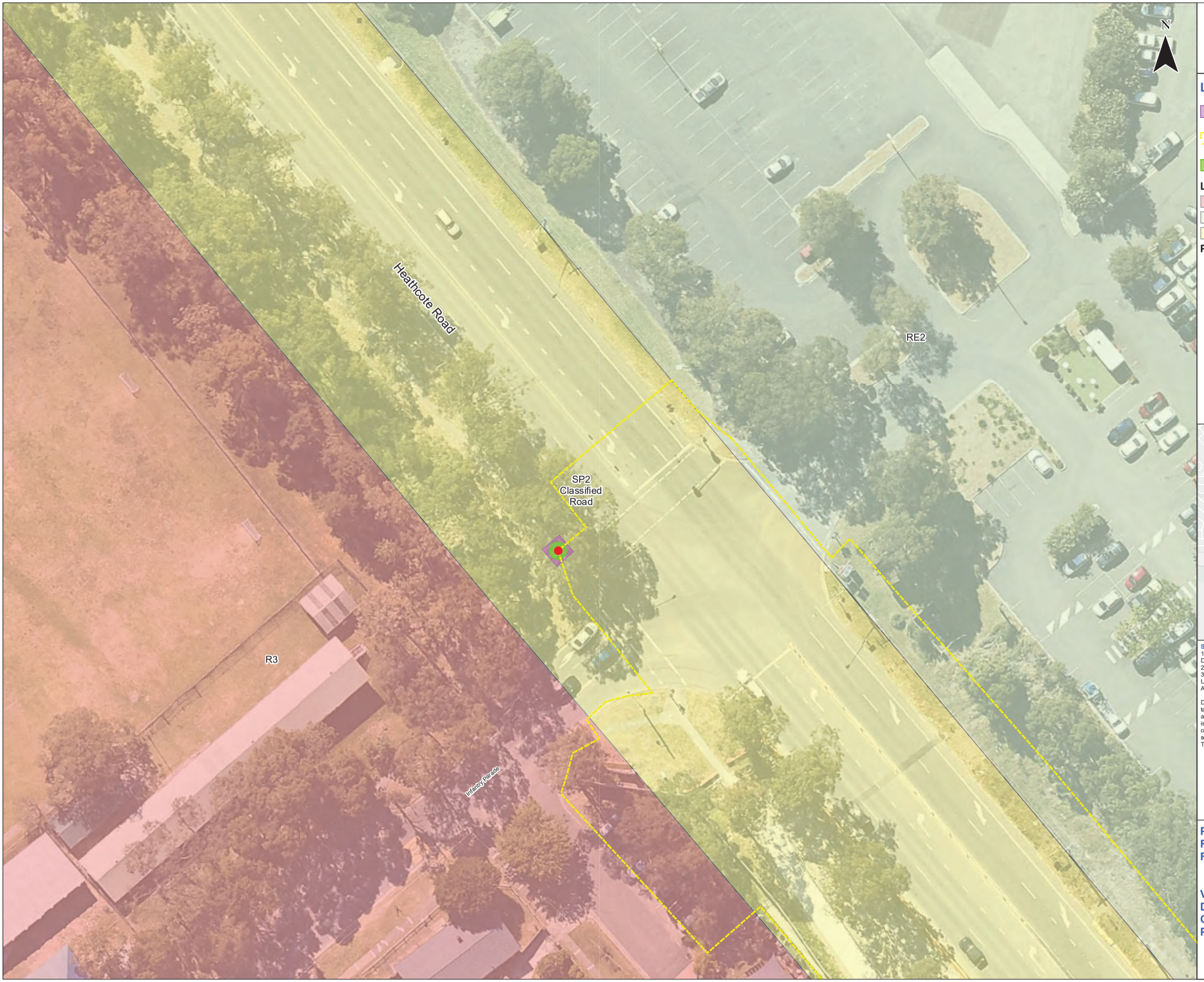
Project No:	30013140
Figure No:	1 - 6
Figure Name:	Fill emplacement modification - Land Zone Mapping
Version:	1
Date:	20/03/2025
Created by:	LL16284
Page Size:	A3



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GDA2020 MGA Zone 56
Scale: 1:500 at A3

Legend

- Addendum 4 REF (2025) Study Boundary
- Addendum 1 REF (2019) Vegetation Clearing Boundary
- Addendum 4 REF (2025) Vegetation Clearing Boundary

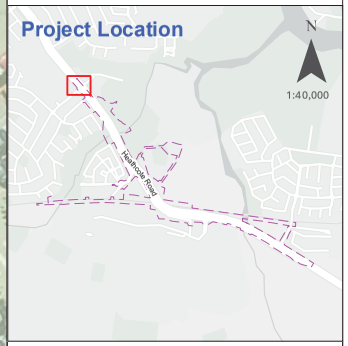
Land Zoning Map

- R3 - Medium Density Residential
- RE2 - Private Recreation
- SP2 - Infrastructure

Proposed Modification

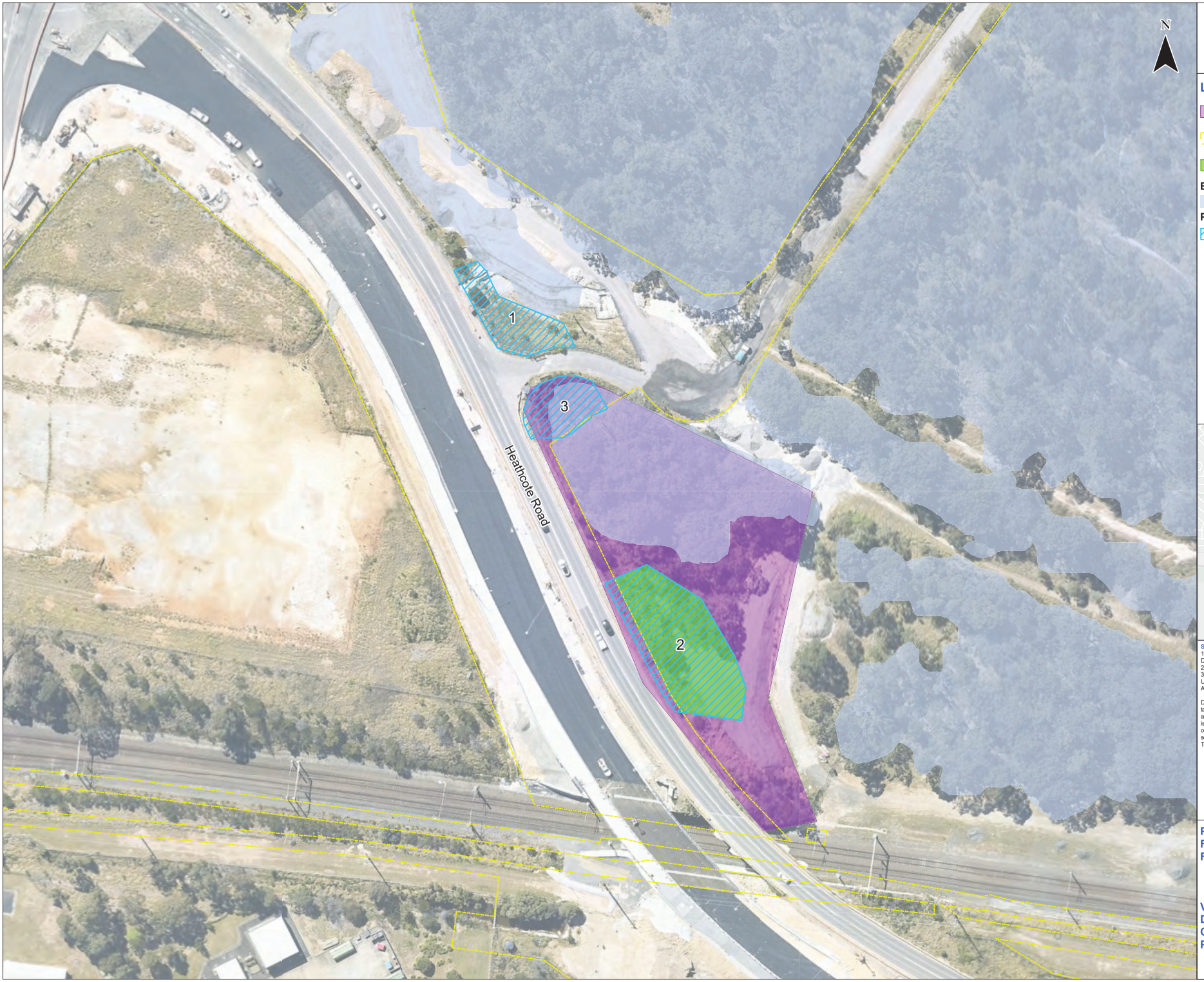
- Tree removal modification site

Project Location



Sources:
1. © State of New South Wales (Spatial Services, a business unit of the Department of Customer Service NSW).
2. © WSP 2016
3. Light Gray Base: Esri, TomTom, Garmin, Foursquare, METI/NASA, USGS
Australia latest: © Aerometrex Pty Ltd

Project No:	30013140
Figure No:	1 - 7
Figure Name:	Tree removal modification - Land Zone Mapping
Version:	1
Date:	10/03/2025
Created by:	LL16284
Page Size:	A3



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Metres
GDA2020 MGA Zone 56
Scale: 1:1,000 at A3

Legend

- Addendum 4 REF (2025) Study Boundary
- Addendum 1 REF (2019) Vegetation Clearing Boundary
- Addendum 4 REF (2025) Vegetation Clearing Boundary

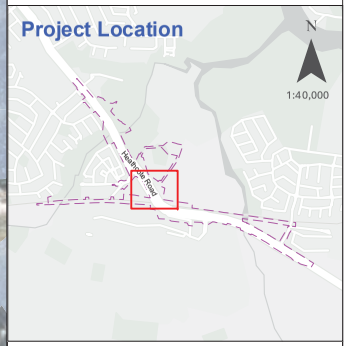
Biodiversity Values

- Biodiversity Values

Proposed Modification

- Fill emplacement modification site

Project Location



Sources:
1. © State of New South Wales (Spatial Services, a business unit of the Department of Customer Service NSW).
2. © WSP 2016
3. Light Gray Base: Esri, TomTom, Garmin, Foursquare, METI/NASA, USGS
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Project No:	30013140
Figure No:	1 - 8
Figure Name:	Fill emplacement modification - Biodiversity Values Mapping
Version:	1
Date:	20/03/2025
Created by:	LL16284
Page Size:	A3

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Metres
GDA2020 MGA Zone 56
Scale: 1:500 at A3

Legend

- Addendum 4 REF (2025) Study Boundary
- Addendum 1 REF (2019) Vegetation Clearing Boundary
- Addendum 4 REF (2025) Vegetation Clearing Boundary

Proposed Modification

- Tree removal modification site

Project Location

Sources:
1. © State of New South Wales (Spatial Services, a business unit of the Department of Customer Service NSW).
2. © WSP 2016
3. Light Gray Base: Esri, TomTom, Garmin, Foursquare, METI/NASA, USGS
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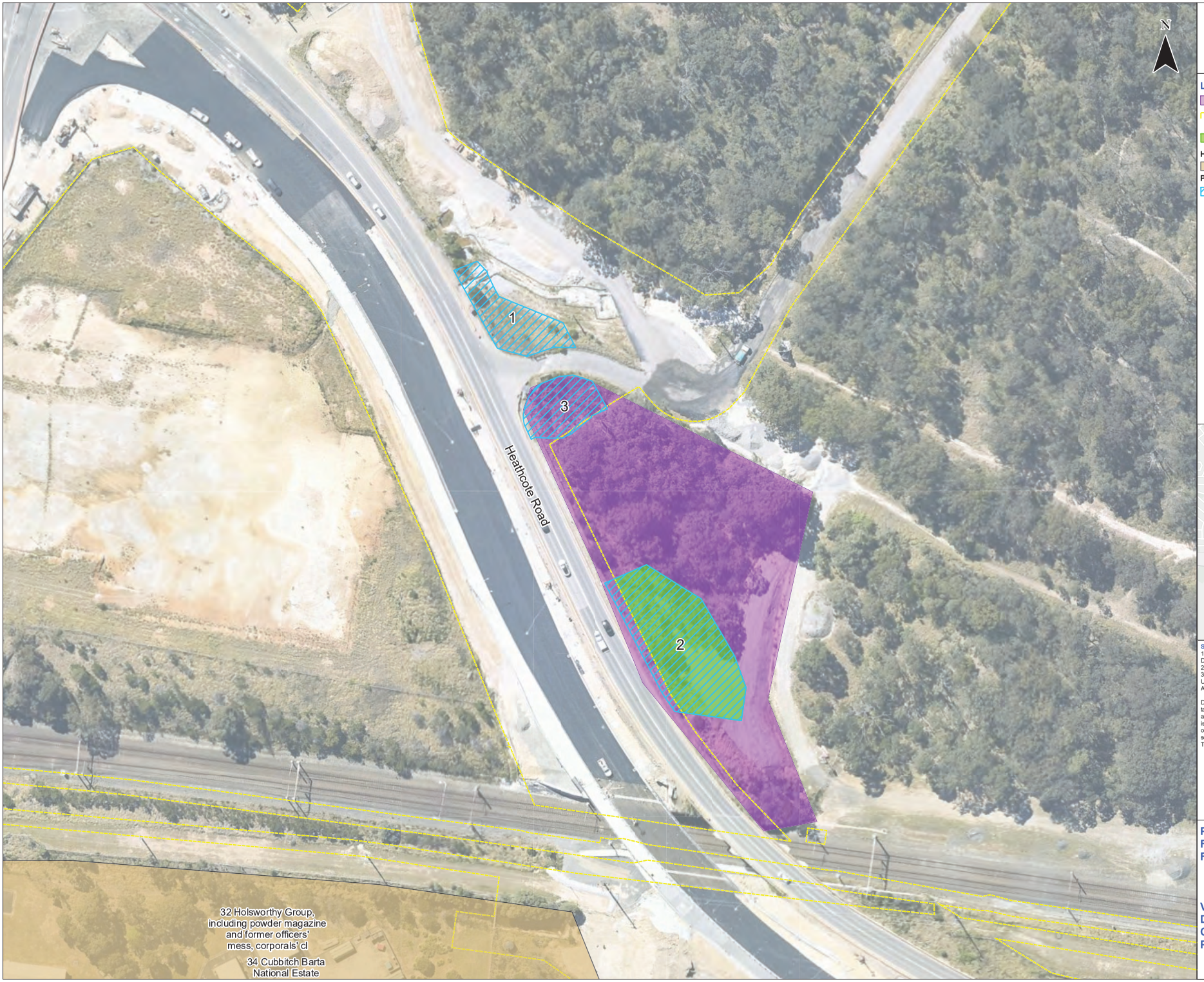
Project No:	30013140
Figure No:	1 - 9
Figure Name:	Tree removal modification - Biodiversity Values Mapping
Version:	1
Date:	10/03/2025
Created by:	LL16284
Page Size:	A3



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GDA2020 MGA Zone 56
Scale: 1:1,000 at A3

Legend

- Addendum 4 REF (2025) Study Boundary
- Addendum 1 REF (2019) Vegetation Clearing Boundary
- Addendum 4 REF (2025) Vegetation Clearing Boundary

Heritage

- Item - General

Proposed Modification

- Fill emplacement modification site

Project Location

Project No:	30013140
Figure No:	1 - 10
Figure Name:	Fill emplacement modification - Non-Aboriginal Heritage Mapping
Version:	1
Date:	20/03/2025
Created by:	LL16284
Page Size:	A3

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Metres
GDA2020 MGA Zone 56
Scale: 1:500 at A3

Legend

- Addendum 4 REF (2025) Study Boundary
- Addendum 1 REF (2019) Vegetation Clearing Boundary
- Addendum 4 REF (2025) Vegetation Clearing Boundary

Proposed Modification

- Tree removal modification site

Project Location

Project No:	30013140
Figure No:	1 - 10
Figure Name:	Tree removal modification - Non-Aboriginal Heritage Mapping
Version:	1
Date:	10/03/2025
Created by:	LL16284
Page Size:	A3

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Metres

GDA2020 MGA Zone 56
Scale: 1:1,000 at A3

Legend

- Addendum 1 REF (2019) Study Boundary
- Addendum 4 REF (2025) Study Boundary
- Addendum 1 REF (2019) Vegetation Clearing Boundary
- Addendum 4 REF (2025) Vegetation Clearing Boundary
- EPL Boundary
- Cadastre

Proposed Modification

- Fill emplacement modification site

Project Location

Sources:
1. © State of New South Wales (Spatial Services, a business unit of the Department of Customer Service NSW).
2. © WSP 2016
3. Light Gray Base: Esri, TomTom, Garmin, METI/NASA, USGS
Australia latest: © Aerometrex Pty Ltd

Disclaimer: Subject to detailed design.While all reasonable care has been taken to ensure the information contained on this map is up to date and accurate, this map contains data from a number of sources - no warranty is given that the information contained on this is free from error or omission. Any reliance placed on such information shall be at the user's sole risk. Please verify the accuracy of all information prior to using it. This map is not a design document.

Project No:	30013140
Figure No:	1 - 12
Figure Name:	EPL Boundary
Version:	1
Date:	25/03/2025
Created by:	LL16284
Page Size:	A3

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Metres

GDA2020 MGA Zone 56
Scale: 1:1,000 at A3

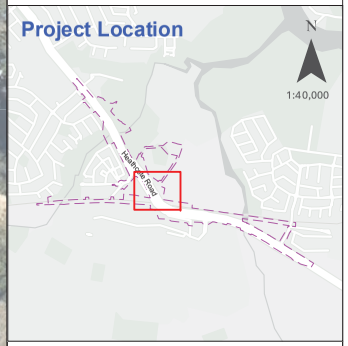
Legend

- Addendum 1 REF (2019) Study Boundary
- Addendum 4 REF (2025) Study Boundary
- Addendum 1 REF (2019) Vegetation Clearing Boundary
- Addendum 4 REF (2025) Vegetation Clearing Boundary
- Fill emplacement modification site

PCT name,Condition

- PCT 3448: Castlereagh Ironbark Forest – good condition
- PCT 3448: Castlereagh Ironbark Forest – low condition

Project Location



Project No:	30013140
Figure No:	6 - 1
Figure Name:	Plant community type mapping
Version:	1
Date:	20/03/2025
Created by:	LL16284
Page Size:	A3

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Metres
GDA2020 MGA Zone 56
Scale: 1:1,000 at A3

Legend

- Addendum 1 REF (2019) Study Boundary
- Addendum 4 REF (2025) Study Boundary
- Addendum 1 REF (2019) Vegetation Clearing Boundary
- Addendum 4 REF (2025) Vegetation Clearing Boundary
- Fill emplacement modification site

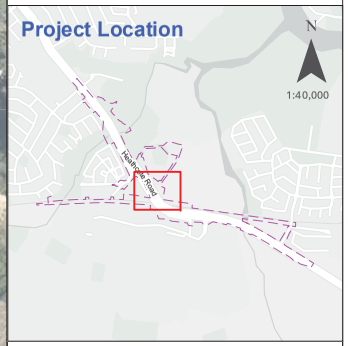
Threatened Ecology Communities

- Shale gravel transition forest BC Act, EPBC Act
- Shale gravel transition forest BC Act only

Threatened Flora Species (WSP)

- Hibbertia puberula ssp. puberula

Project Location



Project No:	30013140
Figure No:	6 - 2
Figure Name:	TECs and threatened species
Version:	1
Date:	20/03/2025
Created by:	LL16284
Page Size:	A3

Appendix B

Consideration of Matters of National Environmental Significance and Commonwealth land

Matters of National Environmental Significance and Commonwealth land

Under the environmental assessment provisions of the EPBC Act, the following matters of national environmental significance and impacts on Commonwealth land are required to be considered to assist in determining whether the proposed modifications should be referred to the Australian Government Department of Climate Change, Energy, the Environment and Water.

Under the EPBC Act strategic assessment approval a referral is not required for proposed road actions that may affect nationally listed threatened species, populations, endangered ecological communities and migratory species. Impacts on these matters are assessed in detail as part of this addendum REF in accordance with Australian Government significant impact criteria and taking into account relevant guidelines and policies.

Factor	Impact
Any impact on a World Heritage property? **The proposed modifications would not impact World Heritage property.**	Nil
Any impact on a National Heritage place? **The proposed modifications would not impact a National Heritage Place.**	Nil
Any impact on a wetland of international importance? **The proposed modifications would not impact a wetland of international importance.**	Nil
Any impact on a listed threatened species or communities? The proposed modification would not have any impact on a listed threatened species or communities	Nil
Any impacts on listed migratory species? **The proposed modifications would not impact on listed migratory species.**	Nil
Any impact on a Commonwealth marine area? **The proposed modification would not impact on listed migratory species.**	Nil
Does the proposed modification involve a nuclear action (including uranium mining)? **The proposed modifications would not involve a nuclear action (including uranium mining).**	Nil
Additionally, any impact (direct or indirect) on Commonwealth land? **The proposed modifications would not have any impact (direct or indirect) on Commonwealth land.**	Nil

Appendix C

Statutory consultation checklists

Certain development types

Development type	Description	Yes / No	If 'yes' consult with	SEPP (Transport and Infrastructure) section
Car park	Does the project include a car park intended for the use by commuters using regular bus services?	No	N/A	Section 2.110
Bus depots	Does the project propose a bus depot?	No	N/A	Section 2.110
Permanent road maintenance depot and associated infrastructure	Does the project propose a permanent road maintenance depot or associated infrastructure such as garages, sheds, tool houses, storage yards, training facilities and workers' amenities?	No	N/A	Section 2.110

Development within the Coastal Zone

Issue	Description	Yes / No / N/A	If 'yes' consult with	SEPP (Transport and Infrastructure) section
Development with impacts on certain land within the coastal zone	Is the proposal within a coastal vulnerability area and is inconsistent with a certified coastal management program applying to that land?	No	N/A	Section 2.14

Note: See interactive map Coastal management - (nsw.gov.au). Note the coastal vulnerability area has not yet been mapped.

Note: a certified coastal zone management plan is taken to be a certified coastal management program.

Council related infrastructure or services

Development type	Potential impact	Yes / No	If 'yes' consult with the relevant local council(s).	SEPP (Transport and Infrastructure) section
Stormwater	Are the works likely to have a substantial impact on the stormwater management services which are provided by council?	No	Liverpool Council	Section 2.10
Traffic	Are the works likely to generate traffic to an extent that will strain the capacity of the existing road system in a local government area?	No	Liverpool Council	Section 2.10
Sewerage system	Will the works involve connection to a council owned sewerage system? If so, will this connection have a substantial impact on the capacity of any part of the system?	No	Liverpool Council	Section 2.10
Water usage	Will the works involve connection to a council owned water supply system? If so, will this require the use of a substantial volume of water?	No	Liverpool Council	Section 2.10
Temporary structures	Will the works involve the installation of a temporary structure on, or the enclosing of, a public place which is under local council management or control? If so, will this cause more than a minor or inconsequential disruption to pedestrian or vehicular flow?	No	Liverpool Council	Section 2.10
Road and footpath excavation	Will the works involve more than minor or inconsequential excavation of a road or adjacent footpath for which council is the roads authority and responsible for maintenance?	No	Liverpool Council	Section 2.10

Local heritage items

Development type	Potential impact	Yes / No	If 'yes' consult with the relevant local council(s).	SEPP (Transport and Infrastructure) section
Local heritage	Is there is a local heritage item (that is not also a State heritage item) or a heritage conservation area in the study area for the works? If yes, does a heritage assessment indicate that the potential impacts to the heritage significance of the item/area are more than minor or inconsequential?	No	Liverpool Council	Section 2.11

Flood liable land

Development type	Potential impact	Yes / No	If 'yes' consult with	SEPP (Transport and Infrastructure) section
Flood liable land	Are the works located on flood liable land? If so, will the works change flood patterns to more than a minor extent?	No	N/A	Section 2.12
Flood liable land	Are the works located on flood liable land? (to any extent). If so, do the works comprise more than minor alterations or additions to, or the demolition of, a building, emergency works or routine maintenance	No	State Emergency Services	Section 2.13

Note: Flood liable land means land that is susceptible to flooding by the probable maximum flood event, identified in accordance with the principles set out in the manual entitled Floodplain Development Manual: the management of flood liable land published by the New South Wales Government.

Public authorities other than councils

Development type	Potential impact	Yes / No	If 'yes' consult with the relevant local council(s).	SEPP (Transport and Infrastructure) section
National parks and reserves	Are the works adjacent to a national park or nature reserve, or other area reserved under the *National Parks and Wildlife Act 1974*, or on land acquired under that Act?	No	DPE	Section 2.15
National parks and reserves	Are the works on land in Zone E1 National Parks and Nature Reserves or in a land use zone equivalent to that zone?	No	DPE	Section 2.15
Aquatic reserves and marine parks	Are the works adjacent to an aquatic reserve or a marine park declared under the *Marine Estate Management Act 2014*?	No	Department of Industry	Section 2.15
Sydney Harbour foreshore	Are the works in the Sydney Harbour Foreshore Area as defined by the *Sydney Harbour Foreshore Authority Act 1998*?	No	Sydney Harbour Foreshore Authority	Section 2.15
Bush fire prone land	Are the works for the purpose of residential development, an educational establishment, a health services facility, a correctional centre or group home in bush fire prone land?	No	Rural Fire Service	Section 2.15
Artificial light	Would the works increase the amount of artificial light in the night sky and that is on land within the dark sky region as identified on the dark sky region map? (Note: the dark sky region is within 200 km of the Siding Spring Observatory)	No	Director of the Siding Spring Observatory	Section 2.15
Defence communications buffer land	Are the works on buffer land around the Defence communications facility near Morundah? (Note: refer to Defence Communications Facility Buffer Map referred to in section 5.15 of Lockhart LEP 2012, Narrandera LEP 2013 and Urana LEP 2011).	No	Secretary of the Commonwealth Department of Defence	Section 2.15

Development type	Potential impact	Yes / No	If 'yes' consult with the relevant local council(s).	SEPP (Transport and Infrastructure) section
Mine subsidence land	Are the works on land in a mine subsidence district within the meaning of the *Mine Subsidence Compensation Act 1961*?	No	Mine Subsidence Board	Section 2.15

Appendix D

EPBC Protected Matters Search

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Please see the caveat for interpretation of information provided here.

Report created: 07-Feb-2025

Summary

Matters of National Environment Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance (Ramsar	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	8
Listed Threatened Species:	58
Listed Migratory Species:	13

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at https://www.dcceew.gov.au/parks-heritage/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Lands:	57
Commonwealth Heritage Places:	1
Listed Marine Species:	25
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have

State and Territory Reserves:	None
Regional Forest Agreements:	None
Nationally Important Wetlands:	None
EPBC Act Referrals:	8
Key Ecological Features (Marine):	None
Biologically Important Areas:	None
Bioregional Assessments:	1
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

Listed Threatened Ecological Communities [Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.
Status of Vulnerable, Disallowed and Ineligible are not MNES under the EPBC Act.

Community Name	Threatened Category	Presence Text
Castlereagh Scribbly Gum and Agnes Banks Woodlands of the Sydney Basin Bioregion	Endangered	Community likely to occur within area
Coastal Swamp Oak (Casuarina glauca) Forest of New South Wales and South East Queensland ecological community	Endangered	Community likely to occur within area
Cooks River/Castlereagh Ironbark Forest of the Sydney Basin Bioregion	Critically Endangered	Community likely to occur within area
Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest	Critically Endangered	Community likely to occur within area
River-flat eucalypt forest on coastal floodplains of southern New South Wales and eastern Victoria	Critically Endangered	Community likely to occur within area
Shale Sandstone Transition Forest of the Sydney Basin Bioregion	Critically Endangered	Community likely to occur within area
Upland Basalt Eucalypt Forests of the Sydney Basin Bioregion	Endangered	Community may occur within area
Western Sydney Dry Rainforest and Moist Woodland on Shale	Critically Endangered	Community may occur within area

Listed Threatened Species [Resource Information]

Status of Conservation Dependent and Extinct are not MNES under the EPBC Act.
Number is the current name ID.

Scientific Name	Threatened Category	Presence Text
BIRD		
Anthochaera phrygia		
Regent Honeyeater [82338]	Critically Endangered	Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
Aphelocephala leucopsis Southern Whiteface [529]	Vulnerable	Species or species habitat may occur within area
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat known to occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Callocephalon fimbriatum Gang-gang Cockatoo [768]	Endangered	Species or species habitat likely to occur within area
Calyptorhynchus lathami lathami South-eastern Glossy Black-Cockatoo [67036]	Vulnerable	Species or species habitat likely to occur within area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat may occur within area
Climacteris picumnus victoriae Brown Treecreeper (south-eastern) [67062]	Vulnerable	Species or species habitat likely to occur within area
Dasyornis brachypterus Eastern Bristlebird [533]	Endangered	Species or species habitat may occur within area
Erythrotriorchis radiatus Red Goshawk [942]	Endangered	Species or species habitat may occur within area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat likely to occur within area
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat likely to occur within area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat likely to occur within area
Melanodryas cucullata cucullata South-eastern Hooded Robin, Hooded Robin (south-eastern) [67093]	Endangered	Species or species habitat may occur within area
Neophema chrysostoma Blue-winged Parrot [726]	Vulnerable	Species or species habitat may occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pachyptila turtur subantarctica Fairy Prion (southern) [64445]	Vulnerable	Species or species habitat known to occur within area
Pycnoptilus floccosus Pilotbird [525]	Vulnerable	Species or species habitat may occur within area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area
Stagonopleura guttata Diamond Firetail [59398]	Vulnerable	Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
Tringa nebularia		
Common Greenshank, Greenshank [832]	Endangered	Species or species habitat likely to occur within area
FISH		
Macquaria australasica		
Macquarie Perch [66632]	Endangered	Species or species habitat may occur within area
FROG		
Litoria aurea		
Green and Golden Bell Frog [1870]	Vulnerable	Species or species habitat likely to occur within area
MAMMAL		
Chalinolobus dwyeri		
Large-eared Pied Bat, Large Pied Bat [183]	Endangered	Species or species habitat likely to occur within area
Dasyurus maculatus maculatus (SE mainland population)		
Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat likely to occur within area
Notamacropus parma		
Parma Wallaby [89289]	Vulnerable	Species or species habitat may occur within area
Petauroides volans		
Greater Glider (southern and central) [254]	Endangered	Species or species habitat may occur within area
Petaurus australis australis		
Yellow-bellied Glider (south-eastern) [87600]	Vulnerable	Species or species habitat likely to occur within area
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT)		
Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Endangered	Species or species habitat known to occur within area
Pseudomys novaehollandiae		
New Holland Mouse, Pookila [96]	Vulnerable	Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
Pteropus poliocephalus Grey-headed Flying-fox [186]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
PLANT		
Acacia bynoeana Bynoe's Wattle, Tiny Wattle [8575]	Vulnerable	Species or species habitat may occur within area
Acacia pubescens Downy Wattle, Hairy Stemmed Wattle [18800]	Vulnerable	Species or species habitat likely to occur within area
Allocasuarina glareicola [21932]	Endangered	Species or species habitat known to occur within area
Caladenia tessellata Thick-lipped Spider-orchid, Daddy Long-legs [2119]	Vulnerable	Species or species habitat may occur within area
Cryptostylis hunteriana Leafless Tongue-orchid [19533]	Vulnerable	Species or species habitat may occur within area
Cynanchum elegans White-flowered Wax Plant [12533]	Endangered	Species or species habitat likely to occur within area
Genoplesium baueri Yellow Gnat-orchid, Bauer's Midge Orchid, Brittle Midge Orchid [7528]	Endangered	Species or species habitat likely to occur within area
Grevillea parviflora subsp. parviflora Small-flower Grevillea [64910]	Vulnerable	Species or species habitat likely to occur within area
Leucopogon exolasius Woronora Beard-heath [14251]	Vulnerable	Species or species habitat likely to occur within area
Melaleuca deanei Deane's Melaleuca [5818]	Vulnerable	Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
Persicaria elatior Knotweed, Tall Knotweed [5831]	Vulnerable	Species or species habitat likely to occur within area
Persoonia hirsuta Hairy Geebung, Hairy Persoonia [19006]	Endangered	Species or species habitat likely to occur within area
Persoonia nutans Nodding Geebung [18119]	Endangered	Species or species habitat known to occur within area
Pimelea curviflora var. curviflora [4182]	Vulnerable	Species or species habitat may occur within area
Pimelea spicata Spiked Rice-flower [20834]	Endangered	Species or species habitat likely to occur within area
Pomaderris brunnea Rufous Pomaderris, Brown Pomaderris [16845]	Vulnerable	Species or species habitat may occur within area
Pterostylis saxicola Sydney Plains Greenhood [64537]	Endangered	Species or species habitat likely to occur within area
Pultenaea aristata [18062]	Vulnerable	Species or species habitat may occur within area
Rhizanthella slateri Eastern Underground Orchid [11768]	Endangered	Species or species habitat may occur within area
Rhodamnia rubescens Scrub Turpentine, Brown Malletwood [15763]	Critically Endangered	Species or species habitat likely to occur within area
Rhodomyrtus psidioides Native Guava [19162]	Critically Endangered	Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Syzygium paniculatum Magenta Lilly Pilly, Magenta Cherry, Daguba, Scrub Cherry, Creek Lilly Pilly, Brush Cherry [20307]	Vulnerable	Species or species habitat likely to occur within area
Thelymitra kangaloonica Kangaloon Sun Orchid [81861]	Critically Endangered	Species or species habitat may occur within area
Thesium australe Austral Toadflax, Toadflax [15202]	Vulnerable	Species or species habitat may occur within area

Listed Migratory Species [Resource Information]

Scientific Name	Threatened Category	Presence Text
Migratory Marine Birds		
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Migratory Terrestrial Species		
Cuculus optatus Oriental Cuckoo, Horsfield's Cuckoo [86651]		Species or species habitat may occur within area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area
Migratory Wetlands Species		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat may occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat likely to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pandion haliaetus Osprey [952]		Species or species habitat likely to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]	Endangered	Species or species habitat likely to occur within area

Other Matters Protected by the EPBC Act

Commonwealth Lands [Resource Information]

The Commonwealth area listed below may indicate the presence of Commonwealth land in this vicinity. Due to the unreliability of the data source, all proposals should be checked as to whether it impacts on a Commonwealth area, before making a definitive decision. Contact the State or Territory government land department for further information.

Commonwealth Land Name	State
Defence	
Defence - EAST HILLS BARRACKS - OP SAFE HAVEN [10191]	NSW
Defence - Defence Housing Authority	
Commonwealth Land - Defence Housing Authority [16518]	NSW
Commonwealth Land - Defence Housing Authority [16512]	NSW
Commonwealth Land - Defence Housing Authority [16517]	NSW
Commonwealth Land - Defence Housing Authority [16513]	NSW
Commonwealth Land - Defence Housing Authority [16516]	NSW
Commonwealth Land - Defence Housing Authority [16514]	NSW

Commonwealth Land Name	State
Commonwealth Land - Defence Housing Authority [16515]	NSW
Commonwealth Land - Defence Housing Authority [15988]	NSW
Commonwealth Land - Defence Housing Authority [15989]	NSW
Commonwealth Land - Defence Housing Authority [15984]	NSW
Commonwealth Land - Defence Housing Authority [15986]	NSW
Commonwealth Land - Defence Housing Authority [15987]	NSW
Commonwealth Land - Defence Housing Authority [15562]	NSW
Commonwealth Land - Defence Housing Authority [15560]	NSW
Commonwealth Land - Defence Housing Authority [15995]	NSW
Commonwealth Land - Defence Housing Authority [15561]	NSW
Commonwealth Land - Defence Housing Authority [16003]	NSW
Commonwealth Land - Defence Housing Authority [15983]	NSW
Commonwealth Land - Defence Housing Authority [16489]	NSW
Commonwealth Land - Defence Housing Authority [16488]	NSW
Commonwealth Land - Defence Housing Authority [16487]	NSW
Commonwealth Land - Defence Housing Authority [15558]	NSW
Commonwealth Land - Defence Housing Authority [15559]	NSW
Commonwealth Land - Defence Housing Authority [15992]	NSW
Commonwealth Land - Defence Housing Authority [15994]	NSW
Commonwealth Land - Defence Housing Authority [15990]	NSW
Commonwealth Land - Defence Housing Authority [15991]	NSW
Commonwealth Land - Defence Housing Authority [15555]	NSW
Commonwealth Land - Defence Housing Authority [15556]	NSW
Commonwealth Land - Defence Housing Authority [15557]	NSW
Commonwealth Land - Defence Housing Authority [16004]	NSW
Commonwealth Land - Defence Housing Authority [15551]	NSW
Commonwealth Land - Defence Housing Authority [15552]	NSW

Commonwealth Land Name	State
Commonwealth Land - Defence Housing Authority [15553]	NSW
Commonwealth Land - Defence Housing Authority [15554]	NSW
Commonwealth Land - Defence Housing Authority [16027]	NSW
Commonwealth Land - Defence Housing Authority [15550]	NSW
Commonwealth Land - Defence Housing Authority [16519]	NSW
Commonwealth Land - Defence Housing Authority [15980]	NSW
Commonwealth Land - Defence Housing Authority [15549]	NSW
Commonwealth Land - Defence Housing Authority [16521]	NSW
Commonwealth Land - Defence Housing Authority [16522]	NSW
Commonwealth Land - Defence Housing Authority [15982]	NSW
Commonwealth Land - Defence Housing Authority [16026]	NSW
Commonwealth Land - Defence Housing Authority [16523]	NSW
Unknown	
Commonwealth Land - [13820]	NSW
Commonwealth Land - [13823]	NSW
Commonwealth Land - [13822]	NSW
Commonwealth Land - [13825]	NSW
Commonwealth Land - [13824]	NSW
Commonwealth Land - [13826]	NSW
Commonwealth Land - [12926]	NSW
Commonwealth Land - [13821]	NSW
Commonwealth Land - [16188]	NSW
Commonwealth Land - [13669]	NSW
Commonwealth Land - [16520]	NSW

Commonwealth Heritage Places

[Resource Information]

Name	State	Status
Indigenous		
Cubbitch Barta National Estate Area	NSW	Listed place

Listed Marine Species		[Resource Information]
Scientific Name	Threatened Category	Presence Text
Bird		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat may occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area
Bubulcus ibis as Ardea ibis Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area
Calidris acuminata Sharp-tailed Sandpiper [874]	Vulnerable	Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area overfly marine area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat may occur within area overfly marine area
Chalcites osculans as Chrysococcyx osculans Black-eared Cuckoo [83425]		Species or species habitat likely to occur within area overfly marine area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat may occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]	Vulnerable	Species or species habitat likely to occur within area overfly marine area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area overfly marine area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat likely to occur within area overfly marine area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area overfly marine area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area overfly marine area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area overfly marine area
Neophema chrysostoma Blue-winged Parrot [726]	Vulnerable	Species or species habitat may occur within area overfly marine area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat may occur within area
Pachyptila turtur Fairy Prion [1066]		Species or species habitat known to occur within area
Pandion haliaetus Osprey [952]		Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
Pterodroma cervicalis White-necked Petrel [59642]		Species or species habitat may occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat likely to occur within area overfly marine area
Rostratula australis as Rostratula benghalensis (sensu lato) Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area overfly marine area
Sterna striata White-fronted Tern [799]		Migration route may occur within area
Tringa nebularia Common Greenshank, Greenshank [832]	Endangered	Species or species habitat likely to occur within area overfly marine area

Extra Information

EPBC Act Referrals			[Resource Information]
Title of referral	Reference	Referral Outcome	Assessment Status
Controlled action			
Lyn Parade Extension	2004/1392	Controlled Action	Post-Approval
Not controlled action			
construction of a road linking Newbridge Road and Nuwarra Road	2004/1843	Not Controlled Action	Completed
Extension to Lucas Heights production building	2003/1114	Not Controlled Action	Completed
Holsworthy Redevelopment Project Program of Works	2004/1391	Not Controlled Action	Completed
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed
INDIGO Central Submarine Telecommunications Cable	2017/8127	Not Controlled Action	Completed

Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action (particular manner)			
INDIGO Marine Cable Route Survey (INDIGO)	2017/7996	Not Controlled Action (Particular Manner)	Post-Approval
Moorebank Units Relocation Project, Holsworthy Training Area, NSW	2012/6462	Not Controlled Action (Particular Manner)	Post-Approval

Bioregional Assessments [Resource Information]

SubRegion	BioRegion	Website
Sydney	Sydney Basin	BA website

Caveat

1 PURPOSE

This report is designed to assist in identifying the location of matters of national environmental significance (MNES) and other matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) which may be relevant in determining obligations and requirements under the EPBC Act.

The report contains the mapped locations of:

- World and National Heritage properties;
- Wetlands of International and National Importance;
- Commonwealth and State/Territory reserves;
- distribution of listed threatened, migratory and marine species;
- listed threatened ecological communities; and
- other information that may be useful as an indicator of potential habitat value.

2 DISCLAIMER

This report is not intended to be exhaustive and should only be relied upon as a general guide as mapped data is not available for all species or ecological communities listed under the EPBC Act (see below). Persons seeking to use the information contained in this report to inform the referral of a proposed action under the EPBC Act should consider the limitations noted below and whether additional information is required to determine the existence and location of MNES and other protected matters.

Where data is available to inform the mapping of protected species, the presence type (e.g. known, likely or may occur) that can be determined from the data is indicated in general terms. It is the responsibility of any person using or relying on the information in this report to ensure that it is suitable for the circumstances of any proposed use. The Commonwealth cannot accept responsibility for the consequences of any use of the report or any part thereof. To the maximum extent allowed under governing law, the Commonwealth will not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance on the contents of this report.

3 DATA SOURCES

Threatened ecological communities

For threatened ecological communities where the distribution is well known, maps are generated based on information contained in recovery plans, State vegetation maps and remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species

Threatened, migratory and marine species distributions have been discerned through a variety of methods. Where distributions are well known and if time permits, distributions are inferred from either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc.) together with point locations and described habitat; or modelled (MAXENT or BIOCLIM habitat modelling) using point locations and environmental data layers.

Where little information is available for a species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc.).

In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More detailed distribution mapping methods are used to update these distributions when time permits.

4 LIMITATIONS

The following species and ecological communities have not been mapped and do not appear in this report:

- threatened species listed as extinct or considered vagrants;
- some recently listed species and ecological communities;
- some listed migratory and listed marine species, which are not listed as threatened species; and
- migratory species that are very widespread, vagrant, or only occur in Australia in small numbers.

The following groups have been mapped, but may not cover the complete distribution of the species:

- listed migratory and/or listed marine seabirds, which are not listed as threatened, have only been mapped for recorded breeding sites; and
- seals which have only been mapped for breeding sites near the Australian continent

The breeding sites may be important for the protection of the Commonwealth Marine environment.

Refer to the metadata for the feature group (using the Resource Information link) for the currency of the information.

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact us page.

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Appendix E

Flora and Fauna Assessment Technical Memorandum

Technical Memorandum

Memo No.	01	**Date of Issue**	21 March 2025
Subject	Biodiversity Assessment Addendum	**Discipline**	Biodiversity
Project Title	Heathcote Road Upgrade	**Project No.**	30012222
Document No.		**Revision**	Draft Final
Author	Gregg Goldin, Senior Scientist - Ecology		
Reviewed by	Rebecca Carman Karen Hughes	**Approved by**	Jathu Shanmugam
Prepared for	Transport for NSW	**Attention to**	Ken Vo
Attachments	n/a		

1. Purpose/Introduction

1.1 Project background and previous documentation

Heathcote Road is a major arterial road that runs between Liverpool and Heathcote, connecting Sydney's southern suburbs to the motorway network in the south-west including the M5 and M7 motorways. It is also a key link for commuters who drive, walk or cycle to Holsworthy Train Station and the Holsworthy Army Barracks.

The existing road between Infantry Parade and The Avenue is generally a two-lane road and contains three bridges across Williams Creek, the T8 Airport railway line and Harris Creek. Congestion is often experienced along these sections of the road, particularly near the Macarthur Drive roundabout.

As such the NSW Government in 2016 proposed to upgrade the 2.2-kilometre section of Heathcote Road from two lanes to four lanes between Infantry Parade, Holsworthy and The Avenue at Voyager Point (The Project). The Project aims to help reduce congestion, improve road safety and provide more reliable journeys for all road users.

1.1.1 Project REF (2016)

A Review of Environmental Factors (REF) was prepared for the Project in October 2016 (Project REF). The Project REF covered the initial proposed scope, including widening the two-lane road to a four-lane divided road over two kilometres, duplicating and replacing several road bridges, and partially removing a pedestrian bridge. It also included constructing a shared-use path, upgrading intersections with traffic lights, and converting a roundabout into a signalised intersection. Additional work includes relocating utilities, installing drainage, lighting, signage, safety barriers, and other necessary infrastructure. The Project REF was determined on 17 January 2017.

1.1.2 Addendum 1 REF and BAR (2019)

In 2019, an addendum to the Project REF (Addendum 1 REF) was prepared to address changes to the approved scope of work for the Project, including changes to the Project boundary and 2.08 hectares of additional vegetation clearing to accommodate all elements of the detailed design. The Biodiversity Assessment Report (BAR 2019) updated the assessment conducted by WSP | Parsons Brinckerhoff for the Project REF, to

incorporate the 100 percent detailed design. The BAR 2019 assessed the potential impacts to biodiversity and calculated biodiversity offset requirements using the Biobanking Assessment Methodology (BBAM).

The Addendum 1 REF was determined on 20 September 2019.

1.1.3 Addendum 2 REF (2021)

In 2021, an addendum to the Project REF (Addendum 2 REF) was prepared to address changes to the approved scope of work for the Project, including clearing of 0.057ha of vegetation to enable construction of a Utility Bridge. The Addendum 2 REF was determined on 12 November 2021. A Biodiversity Assessment calculated impacts and calculated offsets using the Biodiversity Assessment Methodology (BAM). The offsets were for a vegetation community which had not been impacted under the initial BAR and therefore represented the only Biodiversity credits under the current NSW Biodiversity Offset Scheme. All other biodiversity credits options for the project are from the now retired Framework for Biodiversity Assessment (FBA).

1.1.4 Minor Works REF (2022)

In 2022 a minor works review of environmental factors (MWREF) was prepared to address changes to approved scope of works for the Project, including changes to the Project boundary to install one additional temporary power pole. The MWREF was determined on 28 March 2022.

1.1.5 Addendum 3 REF (2022)

In August 2022 an addendum to the Project REF (Addendum 3 REF) was prepared to address changes to the approved scope of work for the Heathcote Road Upgrade including to extend the existing construction compound to increase stockpiling space and parking spaces. This required an additional 0.23 hectares of area beyond the project boundary.

1.2 Assessment areas

Transport for New South Wales (TfNSW) proposes to modify the Project (Figure 1-1). The key features of the proposed modification to the Project would include:

- Fill emplacement site number two - Excavated soil from the project to be emplaced to extend an existing batter. Located within an area of about 434 square metres within the road reserve, north of the Heathcote Road crossing of the railway line (Figure 1-3).
- Tree removal - Removal of a tree near Infantry Parade to enable the shared path, ramp landing and streetlight (infrastructure) elements to be progressed as designed (Figure 1-2).

The proposed modification would be located on land that is within the road corridor and so managed by Transport for NSW.

The proposed modification is within the Liverpool Local Government Area.

1.3 Purpose

This technical memorandum has been prepared to assess the impact of the proposed modification to the Project, particularly in relation to species and communities listed under the NSW *Biodiversity Conservation Act 2016* (BC Act) and Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

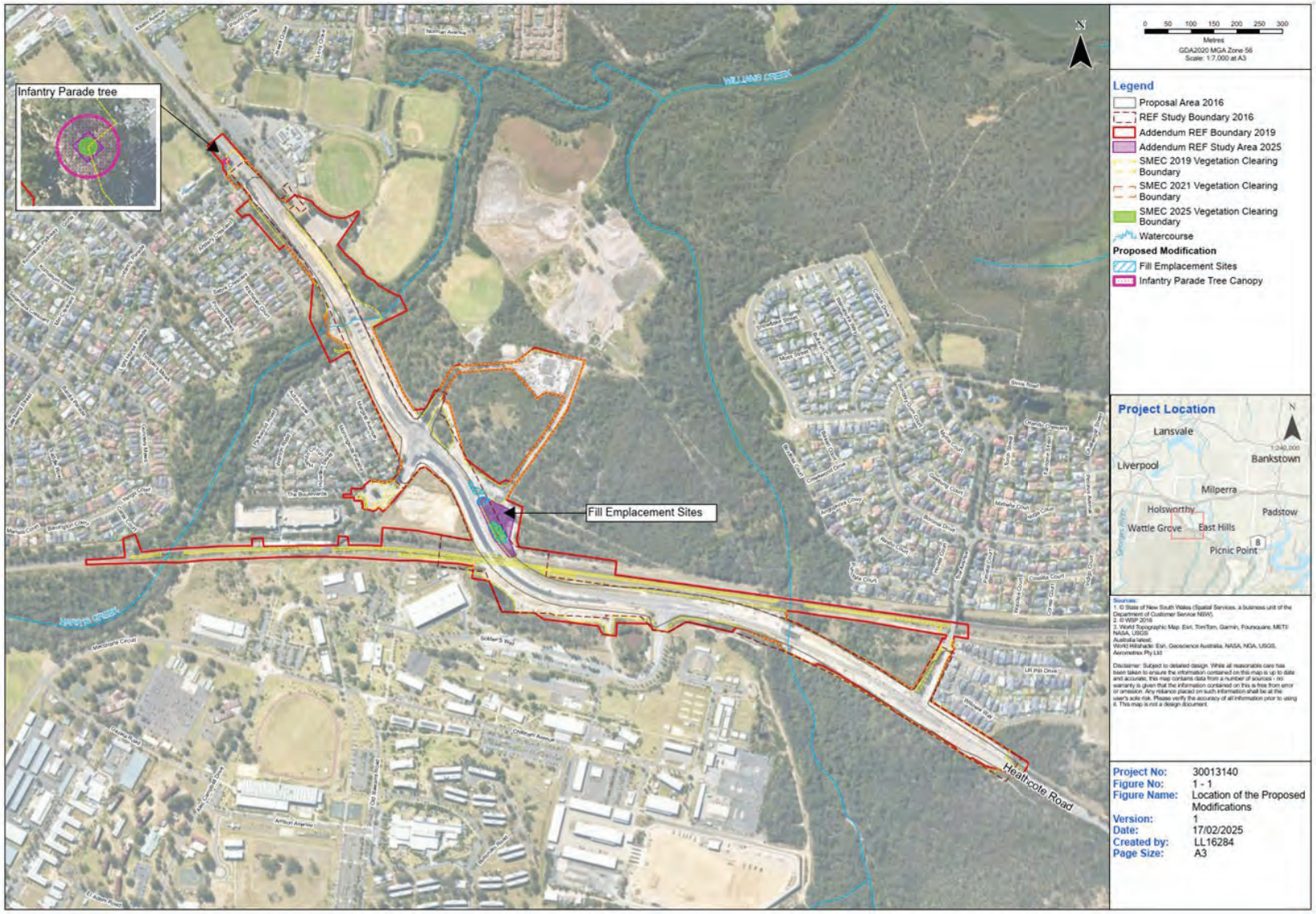


Figure 1-1: Location of the proposed modifications.

Figure 1-2: Detail of tree for removal at the corner of Infantry Parade.

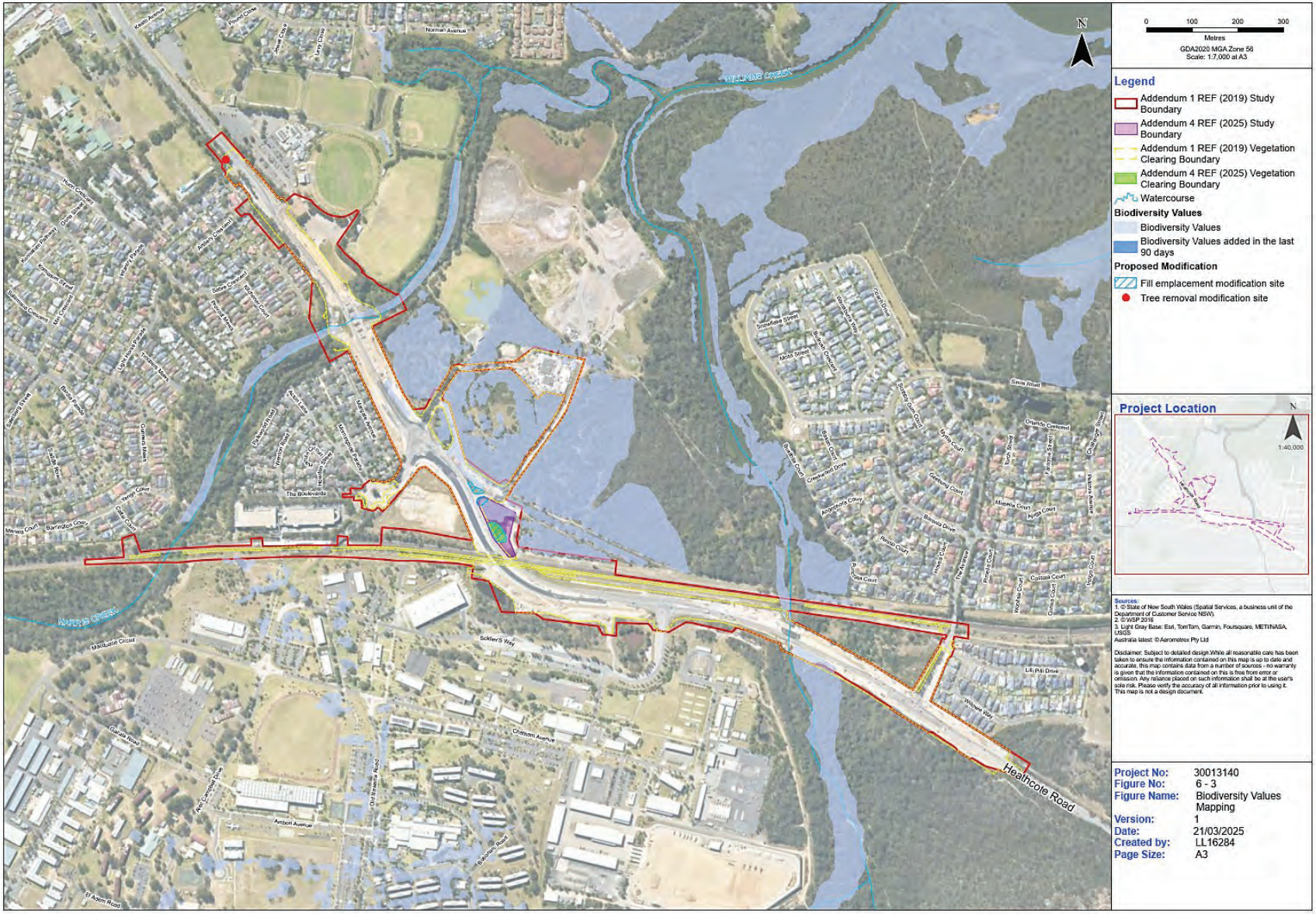


Figure 1-3: NSW Biodiversity values map

2. Methodology

2.1 Desktop assessment

A desktop review was carried out of the following reports:

- Heathcote Road Upgrade, Infantry Parade to The Avenue, REF (WSP, 2016)
- Heathcote Road Upgrade, Infantry Parade to The Avenue, addendum REF (Hills, 2019) including the Biodiversity Assessment Report (SMEC, 2019)
- A search of the Atlas of NSW Wildlife maintained by the NSW Department of Planning, Industry and Environment (DPIE 9th February 2025) (10-kilometre buffer search area around project site boundary)
- A Protected Matters Search Tool search provided under the EPBC Act (6th Feb 2021) (10km buffer from the project site boundary)
- Updated vegetation mapping - NSW Statewide Vegetation Type Mapping, Version C2.0.M2.1 (November 2024).

2.2 Field Survey

A field survey of the study area, being the sites of each modification, was carried out on 11 February 2025 by a Senior Ecologist from SMEC. Where native vegetation was identified, the vegetation type relative to listed threatened ecological communities was determined. Targeted fauna surveys in line with the guidelines were not performed.

The field survey was carried out based on the nature of direct or likely indirect impacts, likely biodiversity habitat and mapped vegetation. All areas impacted by the proposed design changes were ground truthed.

As the project REF was prepared in 2016, database searches were up to 9 years-old so they were rerun and updated for the Technical Memorandum's biodiversity study area. The likelihood of occurrence table was revised for the biodiversity study area and details of those species which have been recorded previously or are predicted to occur in the locality of the proposal included. The additional species or those with changed information are provided in Appendix A. New records of species not previously recorded in the locality since the addendum REF (Hills 2019) and the listing of new species were both reasons for additional candidate species.

The likelihood of occurrence table was developed pre-survey, with refinements made following the survey effort and ground-truthed habitat assessment.

2.2.1 Survey limitations

As per the approved scope, targeted flora and fauna surveys in line with relevant threatened species survey guidelines were not performed given constraints on the survey seasons for some species.

3. Results (Fill Emplacement Site two)

3.1 Soil Landscape

The study area is mapped as the Richmond Soil Landscape by the seed online portal (DCCEEW 2025). The Richmond Soil Landscape is described as an alluvial soil landscape of quaternary terraces of the Nepean and Georges Rivers. The surface soils observed during the field visit were generally sandy clay without surface rocks.

The Richmond Soil Landscape is described as an alluvial soil landscape of quaternary terraces of the Nepean and Georges Rivers. The surface soils observed during the field visit were generally sandy clay without surface rocks.

3.2 Plant Community Types

OEH (2025) maps the study area as supporting PCT 3448 Castlereagh Ironbark Forest. PCT 3972 Sydney Creekflat Wetland was also indicated on the NSW State Type Vegetation Mapping. Survey did not find any evidence of PCT3972 Sydney Creekflat Wetland and the study area does not contain a marked watercourse under the NSW *Water Management Act 2000*.

3.2.1 PCT 3448 - Castlereagh Ironbark Forest

Areas of PCT 3448 Castlereagh Ironbark Forest were identified with a similar distribution as mapped in the REF as the former PCT 724 - Broad-leaved Ironbark – Grey Box – Melaleuca decora grassy open forest on clay/gravel soils of the Cumberland Plain, Sydney Basin Bioregion. Species identified through rapid data assessments are included in Appendix B (Table 8–1).

A profile of this community is as follows:

Vegetation formation: Dry Sclerophyll Forests (Shrub/grass sub-formation)

Vegetation class: Cumberland Dry Sclerophyll Forests

Mapping sources: NSW Statewide Vegetation Type Mapping, C2.0.M2.1 (November2024)

Conservation status: Endangered (BC Act), Critically Endangered (EPBC Act)

Estimate of percent cleared: 93%

Condition: Good and Low

STRUCTURE	TYPICAL SPECIES
Trees	*Eucalyptus fibrosa*
Small trees	The dense shrub to small tree layer almost always includes melaleucas and acacias of which *Melaleuca decora* and *Acacia falcata* are the most frequent.
Shrubs	*Bursaria spinosa*, *Lissanthe strigosa*, *Melaleuca decora*, *Acacia falcata*, *Davesia ulicifolia*, *Melaleuca nodosa*, *Ozothamnus diosmifolia*, *Hibbertia aspera*.
Grasses	*Entolasia stricta*, *Aristida vagans*, *Microlaena stipoides*, *Lomandra multiflora*, subsp *multiflora*, *Lepidosperma laterale*, *Themeda triandra*,
Forbs	*Dianella revoluta*, *Opercularia diphylla*, *Lobelia purpurascens*, *Goodenia hederacea*
Vines & climbers	*Glycine clandestine*, *Hardenbergia violacea*, *Billardiera scandens*

Description as per BioNet Vegetation Classification - *Community Profile: Vegetation Description: A tall sclerophyll open forest with a dense mid-stratum of Melaleucas and a patchy ground layer of grasses and graminoids or a dense thicket of Melaleucas with emergent eucalypts that is found on the Cumberland Plain to the west of Sydney. It is one of a suite of forests that are associated with the subtle intergrade between clay-rich shale soil and the sandier substrates. The canopy almost always includes ironbark eucalypts (primarily Eucalyptus fibrosa), occasionally accompanied by stringybark eucalypts (Eucalyptus sparsifolia, Eucalyptus oblonga or Eucalyptus globoidea). The dense shrub to small tree layer almost always includes melaleucas and*

acacias of which Melaleuca decora and Acacia falcata are the most frequent. The smaller shrubs Bursaria spinosa and Daviesia ulicifolia are both common. The ground layer is a sparse cover of graminoids, forbs, twiners and a hardy fern. Entolasia stricta is almost always present while Aristida vagans, Cheilanthes sieberi subsp. sieberi, Microlaena stipoides, Dianella revoluta, Lomandra multiflora subsp. multiflora, Lepidosperma laterale and Opercularia diphylla are very frequent.

Vegetation condition

The southern portion of vegetation is indicated as low condition (Figure 3-1). This group of trees is a stand of one species (*Angophora bakeri*), and the understorey is exotic dominant with a dense thicket of blackberry (*Rubus fruticosus*). Species recorded are in Appendix B (Table 8-2).

The remaining portion of native vegetation is in good condition, with largely canopy and shrub layer and ground cover of at least 30% native cover (Figure 3-2). The vegetation integrity of this patch was analysed in the original BAR (Quadrat 3), and the condition class Good-Moderate (Good) assigned to the patch. Very little of this core patch will be directly impacted near the north western edge of the site (one mature Eucalyptus tree and some shrubs would be removed).

Figure 3-1: Low condition PCT 3448 composed of Angophora trees and Blackberry is proposed for clearing left of the indicative extent

Figure 3-2: Looking north along the road embankment. Stockpile would be in the foreground of the illustrated extent. Good quality PCT 3448 seen to the right. Grassland in the foreground is mainly weedy African lovegrass (*Eragrostis curvula*)

3.2.2 Non-native vegetation

Most of the study area was represented by cleared or disturbed areas (Figure 3-3), and exotic weeds and grassland.

The batter below Heathcote Road is predominantly exotic grassland composed mainly of African lovegrass (*Eragrostis curvula*) and Rhodes grass (*Chloris gayana*). The batter also includes scattered small trees and shrubs (Figure 3-4), including mostly fast colonising wattles (*Acacia decurrens*, *A. falcata*) and small leaved privet (*Ligustrum sinense*). The existing batter is not mapped as part of the Castlereagh Ironbark Forest community and the species with the non-native areas are recorded in Appendix B (Table 8–3).

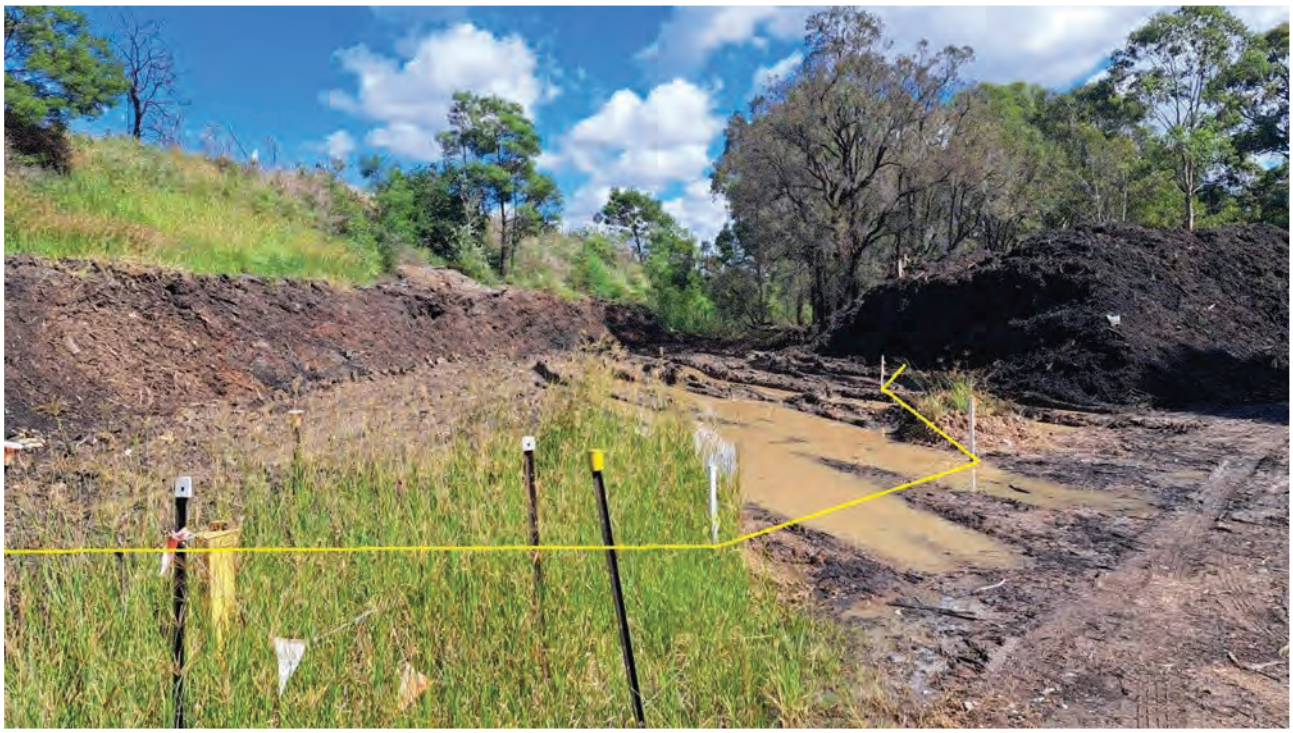


Figure 3-3: Overview of southern end of stock pile two location looking northward. Line illustrates approximate pile extent from the embankment

Figure 3-4: Exotic grassland on the existing road embankment.

Figure 3-5: Plant community type mapping.

3.3 Threatened ecological communities

BC Act

All areas of PCT 3448 in the study area (0.016ha) conforms to the Endangered Ecological Community (EEC) Shale Gravel Transition Forest in the Sydney Basin Bioregion. The NSW final determination states that "Disturbed Shale Gravel Transition Forest remnants are considered to form part of the community including where the vegetation would respond to assisted natural regeneration, such as where the natural soil and associated seedbank is still at least partially intact." Therefore, even the low-quality portion of PCT 3448 has been included as part of the TEC.

EPBC Act

The area of good condition PCT 3448 in the northern section of the study area, is also eligible to be considered the EPBC listed, Critically Endangered Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest. This patch was previously subject to plot-based assessment and allocated to the EPBC Act listed community in the BAR. The EPBC Act listing advice contains stricter condition classes than the BC Act. Patches larger than 5 hectares with at least 30% perennial understory vegetation made up of native species meet the conditions of the nationally listed community.

3.4 Threatened species

Areas of suitable habitat for threatened species were considered broadly using the methods in the addendum REF (Hills 2019) and associated BAR (SMEC 2019).

Field assessment included searching for the presence of habitat features (including tree hollows and stags) which may support species identified in the likelihood of occurrence table and noting any incidental threatened flora and fauna species sighted. No stags or hollows were identified in the biodiversity study area for this modification, and no incidental observations were made of threatened species.

The primary habitat included the native trees and shrubs. The ground layer in the clearing (emplacement site) boundary was predominantly non-native, with limited fallen timber and limited litter cover for the Cumberland Plain land snail (*Meridolum corneovirens*). The shrub layer contained the thorny shrub *Bursaria spinosa*, which can provide good sheltering sites for small birds. No streams or creeks suitable for frogs or amphibians were present. The geology did not support rocks or stones.

WSP had identified two isolated occurrences of the flower *Hibbertia puberela* subsp. *puberela*, listed as Endangered under the BC Act. The indicated locations are outside the proposed clearing area (Figure 3-7). The addendum survey was not done at the prescribed time of the year for identification (flowering) and a thorough investigation of the whole study area was not performed. A small narrow leaved hibbertia closely resembling *H. puberala* was found at one of the WSP points but was identified as *Hibbertia pedunculata*. Areas of PCT 3448 in good condition, within the impact area, are suitable habitat for *H. puberela*.

Based on the small area of the disturbance footprint, the current survey results and previous survey for threatened flora by WSP, impacts to non-cryptic threatened flora species such as trees or shrubs is unlikely.

Figure 3-6: *Hibbertia pedunculata*

No threatened fauna or flora species were noted during the field surveys. Fauna species previously identified or presumed present in suitable habitat (SMEC 2019), are assumed to be present in suitable contiguous habitat mapped during the field surveys and any additional candidate threatened species recorded in the locality were considered during habitat assessment and likelihood of occurrence assessment.

Figure 3-7: TECs and threatened species

4. Results (Infantry Parade)

The proposed modification at the corner of Infantry Parade would result in the removal of a single tree. The tree represents one of a row of street trees along Heathcote Road near Holsworthy Public School. The trees are not represented as native vegetation on the State vegetation mapping. The tree is a locally indigenous forest red-gum (*Eucalyptus tereticornis*), and is growing in the narrow verge between the footpath and the road and is a large tree with an 80 centimetre diameter at breast height (DBH). One small potential hollow was observed at least 8 metres from the ground. This hollow did not appear to be deep and is about 50mm across. While the hollow does not appear deep enough to provide good nesting sites for birds or bats caution during felling is recommended.

Figure 4-1: Tree for removal looking south along Heathcote Road

5. Potential Impacts

5.1 Construction

The fill emplacement site two would result in the clearing of approximately 0.016 hectares (160m^2) of native vegetation. All of this vegetation is identified as PCT 3448, further broken down into:

- Good condition: 0.0034 hectares
- Low condition: 0.0121hectares.

This vegetation represents the threatened ecological communities:

- BC Act listed Endangered Shale Gravel Transition Forest in the Sydney Basin Bioregion (0.016 ha, all PCT 3448).
- EPBC Act listed Critically Endangered Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest (0.0034 ha, only PCT 3448 in good condition).
- Threatened species habitat for *Hibbertia puberula subsp. puberula* (0.0034 ha of PCT 3448 in good condition).

As 14 mature trees would be removed that may not be offset under Transport's Guideline for Biodiversity Offsets area clearing thresholds, these have been noted in Table 5-1.

Table 5-1: Locally native trees for removal

Location	Number	Size class	Hollows
Low condition PCT 3448	12	Medium (20-50cm)	No
Good condition PCT 3448	1	Medium (20-50cm)	No
Infantry Parade	1	Large (50-100cm)	Yes – one small potential hollow of low value to fauna

Indirect impacts could include:

- Encroachment of disturbance into neighbouring vegetation
- Sediment run off or nutrients from the expanded batters (emplaced material sites).
- Spread of weeds
- Noise, dust and light during construction.

5.2 Operation

Operational impacts of the proposal are expected to be minimal and restricted in nature to maintenance and in extent to the vegetation clearing boundary. Re-vegetation of the batters line with Transport policy may reduce the load of weed seed currently running off the batters and represent an improvement.

5.3 Test of Significance

The need for assessments of significance under the BC Act and EPBC Act was considered for those species assessed as having moderate or higher likelihoods of occurrence. No likelihoods of occurrence were increases compared to the previous assessment (SMEC 2019). No additional candidate species in the current project's likelihood of occurrence table were assigned a moderate of higher likelihood of occurrence. Due to the very small additional areas of potential habitat impacted for species of moderate or higher likelihood compared to the BAR (SMEC 2019), it was determined that the additional impacts to the study area would not change the assessment of significance outcomes of threatened flora or fauna species likely to utilise the site. A summary of the changes is provided in Table 5-2.

Table 5-2: Summary of assessment of significance findings

Species or community name	Area assessed (2019/2022)	Assessment outcome (2019/2022)	Area assessed (2025)	Assessment outcome (2025)
Castlereagh Scribbly Gum and Agnes Banks Woodlands of the Sydney Basin Bioregion (EPBC)	3.18 hectares	Not significant	No change	Not significant
Cumberland Plain Shale Woodlands and Shale Gravel Transition Forest (EPBC)	0.93 hectares	Not significant	0.9334 hectares	Not significant
River-flat Eucalypt Forest on Coastal Floodplains of southern New South Wales and eastern Victoria (EPBC)	0.75 hectares	Not significant	No change	Not significant
Grevillea parviflora subsp. parviflora (EPBC)	9.30 hectares	Not significant	No change	Not significant
Castlereagh Scribbly Gum Woodland in the Sydney Basin Bioregion (TSC[1])	3.18 hectares	Not significant	No change	Not significant
Shale Gravel Transition Forest in the Sydney Basin Bioregion (TSC[1])	1.56 hectares	Not significant	1.576 hectares	Not significant
River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions (TSC[1])	0.69 hectares	Not significant	No change	Not significant
Grevillea parviflora subsp. *parviflora* (TSC[1])	9.46 hectares	Not significant	No change	Not significant
Hibbertia puberula subsp. *puberula* (TSC[1])	3.14 hectares	Not significant	3.1434 hectares	Not significant
Southern Myotis *Myotis macropus* (TSC[1])	0.69 hectares	Not significant	No change	Not significant

[1] 2019 assessments were completed under the *Threatened Species Conservation Act 1995*, which was replaced by the *Biodiversity Conservation Act 2016*

6. Biodiversity Offsets

Transport for NSW is committed to offsetting impacts associated with the proposal in line with its biodiversity offsetting guidelines (RMS 2016) and in general accordance with the DPIE principles for the use of biodiversity offsets in NSW.

6.1 Offset thresholds

Offsets are only presented as a mitigation option when certain thresholds are met under Transport's Policy. The Guideline for Biodiversity Offsets V2.0 (RMS 2016) is understood to still be applicable as the REF was determined prior to the release of the newer 2022 policy. Impact thresholds have been tested with the sum of direct impacts to all entities from the Project as a whole.

Two threatened entities have been considered for offsetting, and have been tested against the offset thresholds (Table 6-1):

- PCT724 Broad-leaved Ironbark – Grey Box – Melaleuca decora grassy open forest on clay/gravel soils of the Cumberland Plain, Sydney Basin Bioregion
- *Hibbertia puberula subsp. puberula*.

Table 6-1: Offset thresholds from Guidelines for Biodiversity Offsets V2.0

Description of activity or impact	Consider offsets or supplementary measures	Subject species /EEC on the addendum site	Threshold met
Works involving clearing of national or NSW listed critically endangered ecological communities (CEEC)	Where there is any clearing of an CEEC in moderate to good condition	PCT 3448 in good condition	Yes
Works involving clearing of NSW listed threatened species habitat where the species is a species credit species as defined in the OEH Threatened Species Profile Database (TSPD)	Where clearing > 1ha or where the species is the subject of an SIS	*Hibbertia puberula* subsp. *puberula*	No

6.1.1 Impacts to PCT 3448

In previous assessments for the Project the NSW vegetation classification system was different, however retired PCT 724 was closely inherited into the new PCT 3448 under the revised NSW Eastern PCTs. Both corresponded to the same threatened ecological community – Shale Gravel Transition Forest and can therefore be considered equivalent for impact assessment purposes. The detailed impact areas, including those in the BAR (2019) are outlined in Table 6-2.

Table 6-2: Total areas of Shale Gravel Transition Forest CEEC requiring offset

Condition	Project total to date	Addendum impact area	Total
Moderate to Good - Good	0.52079 ha	0.0034 ha	0.52419 ha
Moderate to Good - Moderate	0.4066 ha	0 ha	0.4066 ha

The results of the Biobanking Credit Calculator used to generate the credit requirement in the 2019 BAR are shown in Table 6-3. Note that the areas impacted are rounded to the nearest 0.01 hectares. The cumulative value of good quality PCT 3448 does not change when rounded to the nearest 0.01 ha.

Table 6-3: Credit requirement calculations from the BAR 2019 for vegetation equivalent to the CEEC Shale Gravel Transition Forest

Vegetation zone	PCT	Condition	Area impacted (Ha)	Current site value (BBAM)	Futures site value	Credit Requirement (Biobanking)
1	PCT 724	Moderate to Good - Good	0.52	69.79	0.00	30
2	PCT 724	Moderate to Good - Moderate	0.41	60.94	0.00	31

6.1.2 Impacts to *Hibbertia puberula*

At the time of the 2019 BAR, *Hibbertia puberela* was recorded as an 'individual' species under NSW legislation for the purposes of impact assessment (in contrast to 'area' species). The habitat area was calculated using the 30 metre buffer methodology and a total habitat area of 0.66 hectares was shown as the Threatened Species Habitat polygon for *Hibbertia puberela* in 2019 BAR. This is below the 1-hectare area threshold required for

offsetting under 2016 policy. The additional area of habitat clearing for this modification does not cumulatively breach the threshold.

If the assessment was conducted under the current BC Act, the habitat area calculation would be different as *Hibbertia puberela* is now an 'area' based species for impact assessment. The habitat area is over one hectare based on associated PCTs.

6.2 Offset strategy

The Addendum REF stated a Biodiversity Offset Strategy would be prepared based on the ecosystem credits for 100 percent detailed design and will describe how the offset requirements will be met.

Although impact assessment was calculated under policies applicable at the time of surveys, strategies for offset will need to come from currently available options, which are outlined in Transport's No Net Loss Guidelines (EMF – BD-GD-0011).

There are 3 main options:

- Make payment into the Biodiversity Conservation Fund (BCF)
- Purchase and retire biodiversity credits including purchasing from the Transport Biobank
- Arrange for Biodiversity Conservation Actions to be undertaken (subject to DPE approval requirements if the project has triggered the Biodiversity Offset Scheme).

As the project has not triggered the Biodiversity Offset Scheme, conservation measures can also be used. Transport is using a strategic approach to offsets for projects in the region, with a number of identified priority sites under further investigation. The retirement of credits would be used to cover residual offsets not met by conservation measures.

Most credits calculated for the Project to date have been calculated under the Framework for Biodiversity (FBA), also referred to as Biobanking. FBA credits will first require a Statement of Reasonable Equivalence from DPE to calculate the equivalent number of Biodiversity Credits under the current BOS – if the retirement of credits is to be used.

Tree replacement in line with current policy is recommended for trees to be impacted in Table 5-1.

7. Mitigation measures

Mitigation measure for the whole Project that are relevant to this report are provided in Table 7-1.

Table 7-1: Mitigation measures

Impact	Mitigation measure	Timing	Responsibility
Removal of native vegetation and habitat	Determine appropriate exclusion zones during pre-clearing surveys to minimise clearing of native vegetation. Pre-clearing surveys will be undertaken in accordance with Guide 1: Preclearing process of the Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects (Roads and Traffic Authority 2011).	Construction	Construction contractors Transport for NSW
	Exclusion zones will be set up at the limit of clearing in accordance with Guide 2: Exclusion zones of the Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects (Roads and Traffic Authority 2011).	Construction	Construction contractors Transport for NSW
	Native vegetation will be re-established in accordance with Guide 3:	Construction	Landscape designers

Impact	Mitigation measure	Timing	Responsibility
	Reestablishment of native vegetation of the Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects (Roads and Traffic Authority 2011).	Post-construction	Construction contractors Transport for NSW
Edge effects - Weed invasion	Weed species will be managed in accordance with Guide 6: Weed management of the Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects (Roads and Traffic Authority 2011).	Construction Post-construction	Construction contractors Transport for NSW
	Revegetation should be undertaken as soon as possible after establishment of the new batter to avoid colonisation by weed species.	Construction Post-construction	Construction contractors Transport for NSW
Invasion and spread of pathogens and disease	Implement hygiene procedures for the use of vehicles and the importation of materials to the project area in accordance with Guide 7: Pathogen management of the Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects (Roads and Traffic Authority 2011).	Construction	Construction contractors Transport for NSW

8. Conclusion

This Technical Memorandum has assessed the impacts of vegetation clearing associated with the proposed emplacement site two and an additional tree removal on the corner of Infantry Parade.

The vegetation near the emplacement site has been identified as exotic grassland and PCT 3448 - Castlereagh Ironbark Forest. All areas of PCT 3448 conform to the BC Act listed Endangered Ecological Community (EEC), Shale Gravel Transition Forest in the Sydney Basin Bioregion. The core area of vegetation in the patch, which would not require a very small amount of clearing is the EPBC listed, Critically Endangered Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest.

Emplacement site two would cover 0.16 hectares (160m^2) of PCT 3448. The site is an expansion of the existing batter of Heathcote Road and is therefore mainly confined to previously disturbed vegetation of low condition. The existing batter is largely colonised with exotic weeds and grasses.

The patch of native vegetation within with the emplacement site two study area has previously been investigated, initially during the preliminary environmental assessment and the REF. WSP performed threated flora transects, and included a floral quadrat in the small norther section of the patch.

WSP had identified two isolated occurrences of the shrub *Hibbertia puberala* subsp. *puberela*, listed as Endangered under the BC Act. The indicated locations are outside the proposed clearing area, and the proposal directly impacts negligible additional habitat to the REF.

The proposal is not likely to result in a significant impact to the TEC, *H. puberala* subsp. *puberela* or any other threatened flora or fauna. The successful implementation of mitigation measures is important to prevent indirect impacts, most notably avoiding encroachment of material from the slope batter into the adjacent vegetation. Successful mulching and establishment of native vegetation on the new batter slope would improve the resilience of the neighbouring native vegetation by addressing the high load of exotic weeds currently present.

The tree proposed to be removed on the corner of Infantry Parade, is a locally indigenous species (*Eucalyptus tereticornis*). It is a large tree with an 80cm diameter at breast height. It contains one small hollow of

approximately 50mm. The hollow does not appear deep enough to provide good nesting sites for birds or bats and is not recommended for replacement.

References

State Government of NSW and NSW Department of Climate Change, Energy, the Environment and Water 2020, NSW State Vegetation Type Map, accessed from The Sharing and Enabling Environmental Data Portal [https://datasets.seed.nsw.gov.au/dataset/95437fbd-2ef7-44df-8579-d7a64402d42d], date accessed 2025-02-18.

State Government of NSW and NSW Department of Climate Change, Energy, the Environment and Water 2025, Soil Landscapes of Central and Eastern NSW, accessed from The Sharing and Enabling Environmental Data Portal [https://datasets.seed.nsw.gov.au/dataset/8a20716a-0b73-4394-8223-313717373df2], date accessed 2025-02-20.

Appendix A Likelihood of occurrence

Likelihood of occurrence	Criteria
Recorded	The species was observed in the study area during the current survey
High	It is highly likely that a species inhabits the study area and is dependent on identified suitable habitat (i.e. for breeding or important life cycle periods such as winter flowering resources), has been recorded recently in the locality (10km) and is known or likely to maintain resident populations in the study area. Also includes species known or likely to visit the study area during regular seasonal movements or migration.
Moderate	Potential habitat is present in the study area. Species unlikely to maintain sedentary populations, however may seasonally use resources within the study area opportunistically or during migration. The species is unlikely to be dependent (i.e. for breeding or important life cycle periods such as winter flowering resources) on habitat within the study area, or habitat is in a modified or degraded state. Includes cryptic flowering flora species that were not seasonally targeted by surveys and that have not been recorded.
Low	It is unlikely that the species inhabits the study area and has not been recorded recently in the locality (10km). It may be an occasional visitor, but habitat similar to the study area is widely distributed in the local area, meaning that the species is not dependent (i.e. for breeding or important life cycle periods such as winter flowering resources) on available habitat. Specific habitat is not present in the study area or the species are a non-cryptic perennial flora species that were specifically targeted by surveys and not recorded.
None	Suitable habitat is absent from the study area.

Scientific Name	Common Name	BC Act	EPBC Act	BioNet records (as number) or PMST	Habitat requirements	Likelihood of occurrence: 'Low', 'Moderate', 'High', 'Recorded'.	Species, TEC or population additional to SMEC (2019): 'Yes'	Species, TEC or population likelihood of occurrence upgraded compared to SMEC (2019), and with a moderate/high likelihood of occurrence
Threatened Ecological Communities								
River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregion		E	CE	N/A	Associated with silts, clay-loams and sandy loams, on periodically inundated alluvial flats, drainage lines and river terraces associated with coastal floodplains. Generally occurs below 50 metres elevation, but may occur on localised river flats up to 250 metres above sea level.	Low: not the correct landscape position.	The community has been listed under the EPBC Act since SMEC (2019). The community was assessed only under the TSC Act of WSP (2016) and Hills (2019).	-
Flora								
Persicaria elatior	Tall Knotweed	V	V	PMST	This species normally grows in damp places, especially beside streams and lakes. Occasionally in swamp forest or associated with disturbance.	Low: While suitable habitat may occur in the study area, the nearest historical record was around Picton Lakes.	Yes – new listing	-

Scientific Name	Common Name	BC Act	EPBC Act	BioNet records (as number) or PMST	Habitat requirements	Likelihood of occurrence: 'Low', 'Moderate', 'High', 'Recorded'.	Species, TEC or population additional to SMEC (2019): 'Yes'	Species, TEC or population likelihood of occurrence upgraded compared to SMEC (2019), and with a moderate/high likelihood of occurrence
Rhizanthella slateri	Eastern underground orchid	V	E	PMST	Occurs from south-east Queensland to south-east NSW. In NSW, currently known from fewer than 10 locations, including near Bulahdelah, the Watagan Mountains, the Blue Mountains, Wiseman's Ferry area, Agnes Banks and near Nowra.	Low: possible but unlikely to occur.	Yes	-
Rhodomyrtus psidiodes	Native Guava	CE	CE	PMST	Pioneer species found in littoral, warm temperate and subtropical rainforest and wet sclerophyll forest often near creeks and drainage lines. This species is characterised being extremely susceptible to infection by Myrtle Rust. Myrtle Rust affects all plant parts.	Low: not suitable habitat	Yes – new listing	-
Fauna								
Aphelocephala leucopsis	Southern Whiteface	V	V	PMST	Southern whitefaces live in a wide range of open woodlands and shrublands where there is an understorey of grasses or shrubs, or both.	Low: Forest density is higher than would be expected for	Yes – new listing	-

Scientific Name	Common Name	BC Act	EPBC Act	BioNet records (as number) or PMST	Habitat requirements	Likelihood of occurrence: 'Low', 'Moderate', 'High', 'Recorded'.	Species, TEC or population additional to SMEC (2019): 'Yes'	Species, TEC or population likelihood of occurrence upgraded compared to SMEC (2019), and with a moderate/high likelihood of occurrence
					These areas are usually in habitats dominated by acacias or eucalypts on ranges, foothills and lowlands, and plains. Forage almost exclusively on the ground, favouring habitat with low tree densities and an herbaceous understorey litter cover.	suitable habitat.		
Calidris acuminata	Sharp-tailed Sandpiper		V	PMST	The species utilises fresh and hypersaline environments, feeding along the edge of water on mudflats, coastal and inland wetlands, and sewage ponds. After rainfall events, the species may also feed on areas of agricultural pasture.	Low: Suitable habitat not present	Yes	-
Charadrius leschenaultii	Greater Sand Plover	V	V	PMST	Almost entirely restricted to coastal areas in NSW, occurring mainly on sheltered sandy, shelly or muddy beaches or estuaries with large intertidal mudflats or sandbanks. Roosts during	Low: suitable habitat not present	Yes	-

Scientific Name	Common Name	BC Act	EPBC Act	BioNet records (as number) or PMST	Habitat requirements	Likelihood of occurrence: 'Low', 'Moderate', 'High', 'Recorded'.	Species, TEC or population additional to SMEC (2019): 'Yes'	Species, TEC or population likelihood of occurrence upgraded compared to SMEC (2019), and with a moderate/high likelihood of occurrence
					high tide on sandy beaches and rocky shores; begin foraging activity on wet ground at low tide, usually away from the edge of the water; individuals may forage and roost with other waders			
Cyanoramphus novaezelandiae subflavescens	Red-crowned Parakeet (Lord Howe Is. subsp.)	CE	Ex	1	Restricted to Lord Howe Island	None: Presumed to be an invalid record for the location	Yes	-
Erythrotriorchis radiatus	Red Goshawk	E	E	PMST	Inhabit open woodland and forest, preferring a mosaic of vegetation types, a large population of birds as a source of food, and permanent water, and are often found in riparian habitats along or near watercourses or wetlands. In NSW, preferred habitats include mixed subtropical rainforest, Melaleuca swamp forest and riparian Eucalyptus forest of coastal rivers.	Low: Not optimal habitat.	Yes	-

Scientific Name	Common Name	BC Act	EPBC Act	BioNet records (as number) or PMST	Habitat requirements	Likelihood of occurrence: 'Low', 'Moderate', 'High', 'Recorded'.	Species, TEC or population additional to SMEC (2019): 'Yes'	Species, TEC or population likelihood of occurrence upgraded compared to SMEC (2019), and with a moderate/high likelihood of occurrence
Falco hypoleucos	Grey Falcon	V	V	PMST	Usually restricted to shrubland, grassland and wooded watercourses of arid and semi-arid regions, although it is occasionally found in open woodlands near the coast.	Low: No sightings and not typical habitat.	Yes	-
Gallinago hardwickii	Latham's snipe	V	V	82	Latham's snipe feed in soft mudflats or shallow water typically at night, early morning, or evening	Low: no suitable foraging habitat	Yes – new listing	-
Neophema chrysostoma	Blue-winged Parrot	V	V	PMST	Blue-winged parrots inhabit a range of habitats from coastal, sub-coastal and inland areas, through to semi-arid zones. They tend to favour grasslands and grassy woodlands and are often found near wetlands both near the coast and in semi-arid zones	Low: the site is a shrubby forest.	Yes, new listing	-
Pycnoptilus floccosus	Pilot Bird	V	V	PMST	Pilotbirds are strictly terrestrial, living on the ground in dense forests with heavy undergrowth. Largely	Low: The site remnant is likely to be too	Yes, new listing	-

Scientific Name	Common Name	BC Act	EPBC Act	BioNet records (as number) or PMST	Habitat requirements	Likelihood of occurrence: 'Low', 'Moderate', 'High', 'Recorded'.	Species, TEC or population additional to SMEC (2019): 'Yes'	Species, TEC or population likelihood of occurrence upgraded compared to SMEC (2019), and with a moderate/high likelihood of occurrence
					sedentary, they are typically seen hopping briskly over the forest floor and foraging on damp ground or among leaf-litter.	fragmented for this species.		
Tringa nebularia	Greenshank	E	E	PMST	Forages at the edge of wetlands, in soft mud on mudflats, in channels, or within shallows around the edge of waterbodies. These locations are often situated near or among mangroves or other sparse, emergent or fringing vegetation such as sedges or saltmarsh. The bird occasionally feeds amongst seagrass beds	Low: suitable habitat not present	Yes	-
Micronomus norfolkensis	Eastern Freetail-Bat	V	-	10	Habitat preferences include dry eucalypt forest and coastal woodlands but also include the riparian zones of rainforests and wet sclerophyll forests. Forages above forest canopy or forest edge. Usually roosts in tree	Moderate: No obvious roosting habitat was observed however the forest and woodland vegetation	Genus name is new	-

Scientific Name	Common Name	BC Act	EPBC Act	BioNet records (as number) or PMST	Habitat requirements	Likelihood of occurrence: 'Low', 'Moderate', 'High', 'Recorded'.	Species, TEC or population additional to SMEC (2019): 'Yes'	Species, TEC or population likelihood of occurrence upgraded compared to SMEC (2019), and with a moderate/high likelihood of occurrence
					hollows but roosts have been found in buildings.	likely provides foraging habitat. Recorded in the project REF study area (WSP REF)		
Notamacropus parma	Parma Wallaby	V	V	PMST	Preferred habitat is moist eucalypt forest with thick, shrubby understorey, often with nearby grassy areas, rainforest margins and occasionally drier eucalypt forest. Typically feed at night on grasses and herbs in more open eucalypt forest and the edges of nearby grassy areas. During the day they shelter in dense cover.	Low: No local sightings.	Yes, new listing	-

Appendix B Species list

Cover scores
Scores base on the modified Braun-Blanquet used in the NSW plot to PCT Assignment Tool:
1 = Up to 5% projected foliage cover and uncommon.
2 = Up to 5% projected foliage cover and common
3 = 6-20% projected foliage cover.
4 = 21-50% projected foliage cover.
5 =51-75 projected foliage cover.
6 = Over 75% project foliage cover.

Table 8-1: Rapid data assessment PCT 3448 Good condition within the clearing boundary

Scientific Name	Common Name	Exotic	High Threat Weed	Cover
Angophora bakeri	Narrow-leaved Apple			4
Bursaria spinosa	Native Blackthorn			4
Eragrostis curvula	African Lovegrass	*	High Threat Weed - not manageable	4
Acacia falcata				3
Eucalyptus fibrosa	Red Ironbark			3
Hibbertia aspera	Rough Guinea Flower			3
Leucopogon juniperinus	Prickly Beard-heath			3
Melaleuca nodosa				3
Acacia decurrens	Black Wattle			2
Acacia longifolia				2
Dichondra repens	Kidney Weed			2
Entolasia stricta	Wiry Panic			2
Eucalyptus tereticornis	Forest Red Gum			2
Exocarpos cupressiformis	Cherry Ballart			2
Glycine clandestina				2
Hardenbergia violacea	False Sarsaparilla			2
Ligustrum sinense	Small-leaved Privet	*	High Threat Weed - not manageable	2
Ozothamnus diosmifolius	White Dogwood			2
Pratia purpurascens	whiteroot			2
Rubus fruticosus	Blackberry complex	*	High Threat Weed - not manageable	2
Themeda australis				2
Dodonaea triquetra	Large-leaf Hop-bush			1
Hibbertia pedunculata				1
Viminaria juncea	Native Broom			1

Scientific Name	Common Name	Exotic	High Threat Weed	Cover
Rubus fruticosus	Blackberry complex	*	High Threat Weed - not manageable	6
Angophora bakeri	Narrow-leaved Apple			5
Eragrostis curvula	African Lovegrass	*	High Threat Weed - not manageable	3
Acacia longifolia				2
Verbena bonariensis	Purpletop	*		2
Kennedia rubicunda	Dusky Coral Pea			1

Table 8-2: Rapid data assessment in PCT 3448 low quality

Scientific Name	Common Name	Exotic	High Threat Weed	Cover
Rubus fruticosus	Blackberry complex	*	High Threat Weed - not manageable	6
Angophora bakeri	Narrow-leaved Apple			5
Eragrostis curvula	African Lovegrass	*	High Threat Weed - not manageable	3
Acacia longifolia				2
Verbena bonariensis	Purpletop	*		2
Kennedia rubicunda	Dusky Coral Pea			1

Table 8-3: Rapid data assessment embankment exotic grassland

Scientific Name	Common Name	Exotic	High Threat Weed	Cover
Acacia decurrens	Black Wattle			2
Acacia falcata			2	2
Ageratina adenophora	Crofton Weed	*	High Threat Weed - not manageable	3
Chloris gayana	Rhodes Grass	*	High Threat Weed - not manageable	3
Conyza bonariensis	Flaxleaf Fleabane	*		3
Eragrostis curvula	African Lovegrass		High Threat Weed - not manageable	6
Ligustrum sinense	Small-leaved Privet	*	High Threat Weed - not manageable	2
Sida rhombifolia	Paddy's Lucerne	*		2
Verbena bonariensis	Purpletop	*		2

Appendix F

AHIMS Search Results

AHIMS Web Services (AWS)
Search Result

Your Ref/PO Number : project

Client Service ID : 973212

SMEC

Date: 07 February 2025

3 Horwood Place
sydney New South Wales 2150

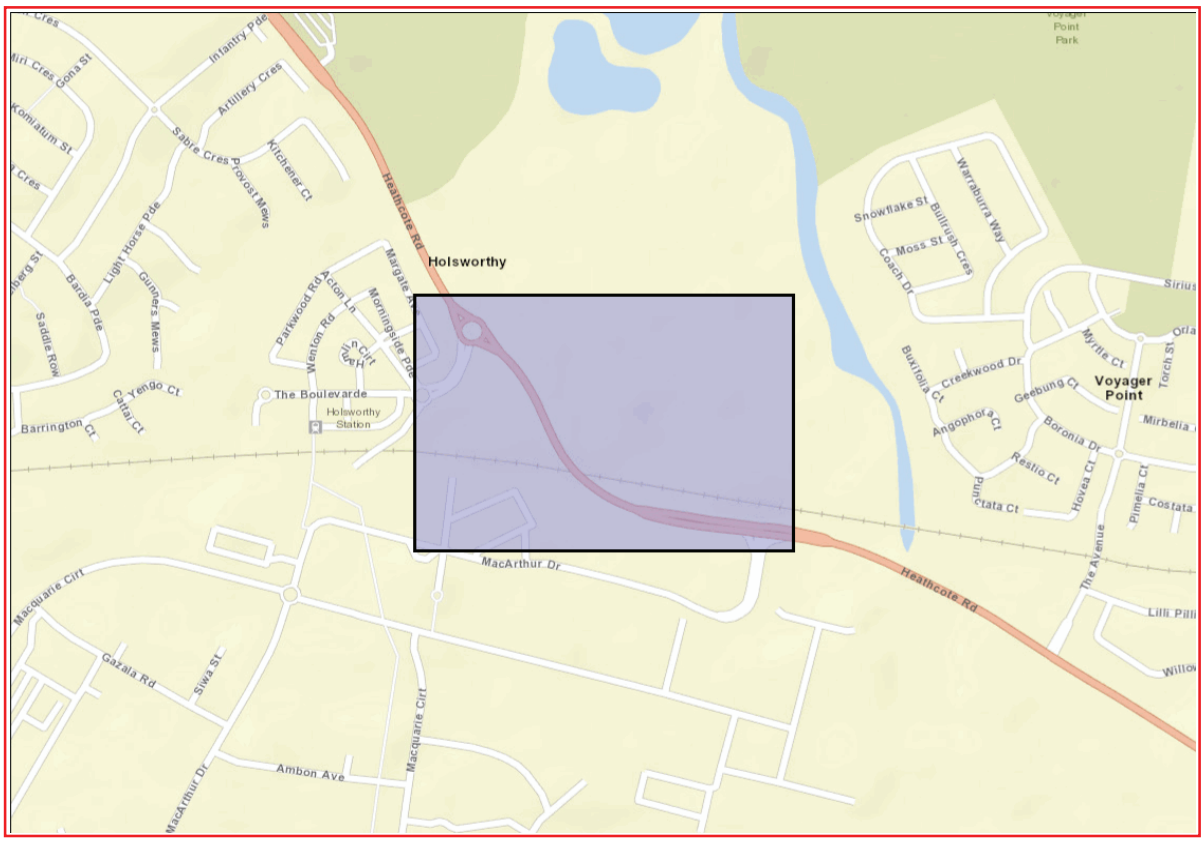
Attention: Karen Hughes

Email: karen.hughes@smec.com

Dear Sir or Madam:

AHIMS Web Service search for the following area at Lat, Long From : -33.9649, 150.9585 - Lat, Long To : -33.9605, 150.9662, conducted by Karen Hughes on 07 February 2025.

The context area of your search is shown in the map below. Please note that the map does not accurately display the exact boundaries of the search as defined in the paragraph above. The map is to be used for general reference purposes only.



A search of Heritage NSW AHIMS Web Services (Aboriginal Heritage Information Management System) has shown that:

0	Aboriginal sites are recorded in or near the above location.
0	Aboriginal places have been declared in or near the above location. *

If your search shows Aboriginal sites or places what should you do?

- You must do an extensive search if AHIMS has shown that there are Aboriginal sites or places recorded in the search area.
- If you are checking AHIMS as a part of your due diligence, refer to the next steps of the Due Diligence Code of practice.
- You can get further information about Aboriginal places by looking at the gazettal notice that declared it. Aboriginal places gazetted after 2001 are available on the NSW Government Gazette (https://www.legislation.nsw.gov.au/gazette) website. Gazettal notices published prior to 2001 can be obtained from Heritage NSW upon request

Important information about your AHIMS search

- The information derived from the AHIMS search is only to be used for the purpose for which it was requested. It is not be made available to the public.
- AHIMS records information about Aboriginal sites that have been provided to Heritage NSW and Aboriginal places that have been declared by the Minister;
- Information recorded on AHIMS may vary in its accuracy and may not be up to date. Location details are recorded as grid references and it is important to note that there may be errors or omissions in these recordings,
- Some parts of New South Wales have not been investigated in detail and there may be fewer records of Aboriginal sites in those areas. These areas may contain Aboriginal sites which are not recorded on AHIMS.
- Aboriginal objects are protected under the National Parks and Wildlife Act 1974 even if they are not recorded as a site on AHIMS.
- This search can form part of your due diligence and remains valid for 12 months.

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NSW GOVERNMENT