Transport for NSW

Henry Lawson Drive Upgrade Stage 1B

REF submissions report

February 2024





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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.



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Executive summary

The proposal

Transport for NSW (Transport) proposes to upgrade a 1.8-kilometre section of Henry Lawson Drive between Auld Avenue, Milperra and the approach to the M5 Motorway, Milperra (known as the Henry Lawson Drive Upgrade Stage 1B) (the proposal). The proposal includes road widening to increase traffic capacity and improve travel time, as well as upgrades of key intersections to enhance capability and driver safety.

Key features of the proposal, as per the design in the Henry Lawson Drive Upgrade Stage 1B Review of Environmental Factors (REF) (Transport, 2023), would include:

- widening Henry Lawson Drive from two to four lanes between Auld Avenue, Milperra and the M5 Motorway, Milperra with a raised central median
- upgrading the Henry Lawson Drive / Bullecourt Avenue signalised intersection, including:
 - an additional right-turn lane from Henry Lawson Drive (northbound) to Bullecourt Avenue (two rightturn lanes total)
 - an additional right-turn lane from Bullecourt Avenue to Henry Lawson Drive (northbound) (two rightturn lanes total)
 - converting the existing dedicated left-turn lane from Bullecourt Avenue to Henry Lawson Drive (southbound) into a dedicated left-turn slip lane
 - maintaining the dedicated left-turn lane from Henry Lawson Drive (southbound) to Bullecourt Avenue
- upgrading the Henry Lawson Drive / Pozieres Avenue signalised intersection, including:
 - a new dedicated right-turn lane from Henry Lawson Drive (southbound) to Pozieres Avenue
 - a new dedicated left-turn lane from Henry Lawson Drive (northbound) to Pozieres Avenue and relocation of the existing bus stop north of the intersection
- providing a new two-lane local link road between Auld Avenue and Keys Parade (about 160 metres), crossing over Milperra Drain, providing access to / from southbound lanes of Henry Lawson Drive and Auld Avenue, and removing up to eight parking spaces on Auld Avenue to accommodate the link road
- extending Raleigh Road about 120 metres to connect with Keys Parade at a roundabout, and removing the direct connection between Raleigh Road and Henry Lawson Drive
- converting the Henry Lawson Drive intersections to be left-in left-out only, at:
 - Ruthven Avenue
 - Whittle Avenue
 - Amiens Avenue
 - Ganmain Crescent
 - Fromelles Avenue
 - Hermies Avenue
- modifying the Bullecourt Avenue / Ashford Avenue intersection to better accommodate heavy vehicle movements
- constructing a three-metre-wide shared path:
 - on the western/southern side of Henry Lawson Drive between Pozieres Avenue and Keys Parade
 - along Keys Parade, the new Auld Avenue local link road and the extended section of Raleigh Road
- reconstruction of some existing shared paths within the proposal area
- constructing a new footpath within the proposal area:
 - on the eastern side of Henry Lawson Drive between the Flower Power and Ingram Avenue
 - along the northern side of Ingram Avenue

- along the eastern side of Fromelles Avenue
- installing new drainage infrastructure and water quality controls within the proposal area, including:
 - an upgraded longitudinal and transverse drainage pits and pipes network along Henry Lawson Drive
 - a bioretention basin between Henry Lawson Drive, Bullecourt Avenue and Fleurbaix Avenue and maintenance access to this basin
 - swales along Henry Lawson Drive and Keys Parade and installation of Gross Pollutant Traps
 - relocation of an existing swale along the Auld Avenue link road
- construction activities and ancillary work, including:
 - relocation of utilities (including electrical, gas, water, and telecommunications)
 - civil earthworks, drainage work, water quality controls, and tie-in work to adjoining sections of Henry Lawson Drive and local roads
 - final roadworks including pavement, kerb and gutters, signs, road furniture, landscaping, lighting, and line marking
 - new traffic signals and intelligent transport systems including, but not limited to, closed-circuit television
 - establishment of temporary ancillary facilities to support construction, including compound sites, site offices, stockpile and laydown locations, temporary access tracks and water quality devices.

Access along Henry Lawson Drive would be maintained during construction, however, reduced speed limits may be implemented. Traffic switches and lane closures may be required during each stage of construction. Where possible, these lane closures would be timed during low traffic periods (such as at night or outside peak periods). Motorists would be informed of changed traffic conditions prior to the changes coming into effect. Access for emergency vehicles would be maintained, as well as emergency access from the Flower Power complex.

Temporary road closures would also be required as part of construction staging.

Construction is expected to start in 2026 and would take around two years to complete.

The key features of the REF proposal are shown in Figure 1-1 The proposal . A more detailed description of the proposal is found in the Henry Lawson Drive Upgrade Stage 1B REF (Transport for NSW, 2023). The submissions report addresses feedback received on the REF, design changes that have been made in response to submissions, any relevant additional environmental assessments and some potential design changes that would be considered further as part of the detailed design process, should the proposal proceed. This submissions report should be read in conjunction with the Henry Lawson Drive Upgrade Stage 1B REF.

Display of the review of environmental factors (REF)

Transport for NSW prepared an REF for the Henry Lawson Drive Upgrade Stage 1B. The REF was publicly displayed for 40 days between 26 June 2023 and 4 August 2023 at Bankstown Library and Knowledge Centre and Canterbury Bankstown Council. The REF was also published on the Transport for NSW project website, the NSW Government Have Your Say website, and made available for download.

The community were informed of the REF display locations and website address through:

- an advertisement in the Canterbury Bankstown Torch local newspaper
- letter distribution to Milperra and surrounding suburbs
- eight banners and 10 corflute signs in Milperra
- four posts on Facebook.

During this time, Transport for NSW invited the public to provide feedback on the proposal. Transport for NSW also met with residents and businesses who would be directly affected by the proposal.

In addition, one online information session and two in-person information sessions were held during the public display period to give the community a chance to learn more about the proposal, ask questions and 'have their say'.

Targeted emails and text messages were sent out to stakeholders and community members who provided comments during community consultation in late 2022, or who signed up to receive correspondence regarding the proposal.

Summary of issues and responses

Public display of the REF and the supporting consultation resulted in a total of 25 submissions from the general community, one submission from Canterbury Bankstown Council, and one submission from the NSW State Emergency Service.

Of the submissions, eight per cent supported part or all of the proposal, 60 per cent did not support some elements of the proposal and 32 per cent did not offer their position.

The main issues raised and responses to those issues are summarised below.

Traffic and transport

A number of respondents highlighted concerns about the proposed construction of the central median along Henry Lawson Drive and access to alternate side streets along Henry Lawson Drive, as well as travel times and the alternative route options for residents leaving and returning to Milperra. Concern was also raised about the proposal's ability to cater for future traffic volumes, including in the context of increased traffic from the proposed Riverlands Development.

The design includes signalised intersections at Keys Parade, Bullecourt Avenue and Pozieres Avenue, which residents would be able to use to access the local road network. The central median would prevent right turning movements across the two lanes of traffic at other locations, which would improve safety for motorists along Henry Lawson Drive.

Traffic modelling carried out as part of the REF indicates that the proposal would improve travel times through the proposal area. The Riverlands Development was included in traffic modelling, meaning increased traffic volumes from this development are not anticipated to adversely impact travel times along Henry Lawson Drive once the project is completed. A number of respondents raised concerns about the adequacy of the proposed shared path along the western/southern side of Henry Lawson Drive, with suggestions being made for a separated cycleway and footpath.

Shared paths are deemed an appropriate solution to cater for cyclist and pedestrian activity in this area, rather than a separate footpath and cycleway. A dedicated cycleway has not been included in the proposal given the space constraints of the road corridor and efforts to preserve existing street trees as much as possible. The proposed shared path aligns with Transport policies, such as the Future Transport Strategy and the Active Transport Strategy.

Intersection layout and access

Concern was raised by a number of respondents about the proposed designs and permissible turns at some intersections.

Concerns were raised about drivers ignoring the proposed no right turn sign at the intersection between Keys Parade and the new link road. This could cause queuing and visual obstructions for vehicles trying to access Henry Lawson Drive from the new link road. Suggestions were made to amend this intersection design to a seagull intersection and realigning the link road to meet the proposed roundabout at Keys Parade.

The intersection of the link road with Keys Parade has been designed to allow vehicles exiting the link road the option to either turn left to access Henry Lawson Drive or turn right to access Keys Parade. The central median has been designed to prevent vehicles turning right from Keys Parade into the link road, while allowing the right turn movement out of the link road.

Signage would be installed informing drivers travelling westbound on Keys Parade to access the link road via the Keys Parade roundabout and that no right turn into the link road is permitted. Traffic modelling included in Appendix D of the REF indicates that the Henry Lawson Drive / Keys Parade intersection performance decreases from Level of Service (LOS) B to LOS C during the weekend periods when there would be an anticipated increase in patronage of Gordon Parker Reserve. However, queuing on the link road to enter Keys Parade would not be significant. In addition, the proposal has been designed to achieve sight distance requirements at intersections, including at the Keys Parade / Auld Avenue link road intersection.

The proposed alignment of Keys Parade, including the roundabout at its intersection with the Raleigh Road extension, is based on the Keys Parade alignment to be constructed by Mirvac prior to construction of the proposal. Adjustments to the design, including extending the link road to meet Keys Parade at the roundabout, are not considered feasible. It is also not feasible to install a seagull intersection on Keys Parade at the link road for safety reasons due to the close proximity to the Henry Lawson Drive / Keys Parade intersection.

Concerns were raised over queuing at the Henry Lawson Drive / Bullecourt Avenue intersection leading to difficulties accessing Bullecourt Avenue from the local road network, including Keysor Place, and accessing driveways along Bullecourt Avenue.

Traffic modelling has accounted for future increases in traffic volumes including along Bullecourt Avenue. The proposal would include the introduction of two lanes in each direction on Bullecourt Avenue, to the west of Keysor Place improving vehicle storage and flow through the intersection. This would reduce queue lengths on Bullecourt Avenue and increase right turn vehicle capacity into Bullecourt Avenue. For vehicles wishing to access driveways on the northern side of Bullecourt Avenue, residents would travel eastbound on Bullecourt Avenue.

Concerns were also raised about the proposed layout of the Henry Lawson Drive / Hermies Avenue intersection, which would only permit vehicles entering Henry Lawson Drive from Hermies Avenue to access the kerbside lane. Vehicles would be prevented from immediately turning right into Pozieres Avenue, as this would require crossing two lanes of traffic. Transport notes that travelling across two lanes of traffic to access Pozieres Avenue could result in road safety and traffic flow issues. The restrictions would minimise the potential for vehicle collisions. Vehicles would be able to use the Henry Lawson Drive / Bullecourt Avenue intersection or Fromelles Avenue to travel southbound on Henry Lawson Drive to access Pozieres Avenue.

Impacts to street trees

Concerns were raised about the removal of trees, particularly in relation to the construction of the shared path on the western/southern side of Henry Lawson Drive and near the proposed bioretention basin. Requests were made for the design to be refined to retain as many trees as possible to reduce urban heat impacts and reduce impacts to landscape character and biodiversity.

Transport acknowledges that the proposal does include the removal of mature street trees along Henry Lawson Drive and near the new link road.

Following display of the REF, Transport consulted with Canterbury Bankstown Council about minimising impacts to street trees. Of the 68 trees initially impacted by the shared path between Ganmain Crescent and Raleigh Road, 18 were found to be in poor condition. These trees would require removal in the short to medium term as part of regular maintenance, irrespective of whether the proposal proceeds. Changing the shared path surface from concrete to fibre reinforced plastic (FRP) grating near the remaining identified 50 trees would result in minimal tree root disturbance and up to 50 trees potentially being retained. This change would be confirmed during detailed design. In addition, the shared path alignment has been adjusted between Ganmain Crescent and Amiens Avenue, and Borella Road and Raleigh Road, to avoid removing trees in these areas.

These proposed changes to the design would contribute to minimising the landscape character, biodiversity and urban heat impacts of the proposal.

Changes to the proposal

The REF did not identify that the proposal would remove all 11 parking spaces on the northern side of Bullecourt Avenue between Henry Lawson Drive and the existing bus zone west of Keysor Place. These parking spaces would be removed to accommodate the intersection upgrades at the Henry Lawson Drive / Bullecourt Avenue intersection as described in Section 3.2.3 of the REF. Consultation with residents near this intersection was carried out in September 2023.

Several design changes have been proposed as a result of further design development and in response to submissions received on the REF.

Design changes have been made along and near the Keys Parade alignment to improve traffic flow. These include lane widening on Keys Parade and Raleigh Road near the roundabout, turning lane adjustments for vehicles approaching the roundabout on Keys Parade southbound, and additional storage for vehicles trying to turn right onto Keys Parade from Henry Lawson Drive. These changes would result in three additional areas of property acquisition, as is detailed in section 0. As part of these road alignment changes, a 50-metre-long

kerb with pit and pipe drainage would also be installed along the south-eastern side of Keys Parade between the link road and the roundabout. This would capture stormwater run-off and discharge it directly into the Milperra Drain, rather than the drainage swales as proposed in the REF.

Works on Raleigh Road have been updated to include a refined driveway tie-in to the Milperra Sports Centre and tie-in to the existing section of Raleigh Road. This change would result in one additional area of property acquisition, as detailed in section 0.

Changes are also proposed for the Henry Lawson Drive / Bullecourt Avenue intersection, including adjustments to the intersection layout to better align the intersection with Henry Lawson Drive and improve driver sight lines. This includes lengthening the left turn lane from Henry Lawson Drive into Bullecourt Avenue to 75 metres to increase vehicle storage and lengthening the unsignalised left turn lane from Bullecourt Avenue into Henry Lawson Drive. There would also be adjustments made to the footpath connection between Ingram Avenue and Bullecourt Avenue.

The shared path alignment and surface treatment has been modified to minimise tree removal, as outlined in the previous section.

Two pedestrian refuges across Auld Avenue and Keys Parade have also been changed to pedestrian and cyclist priority crossings to further improve safety for shared path users. To accommodate the priority crossing across Auld Avenue, an additional seven parking spaces from that identified in the REF would be removed on Auld Avenue near Gordon Parker Reserve, increasing from eight to 15.

Transport has also reviewed the existing kerb, traffic island and pedestrian crossing near the on-ramp from Henry Lawson Drive to the M5 Motorway and has incorporated kerb extensions and existing traffic island modification in the revised design. This would improve the sight distance to the pedestrian crossing across the slip lane for motorists travelling south along Henry Lawson Drive turning onto the M5 Motorway.

Additional assessment

An addendum Biodiversity Assessment Report (BAR) was carried out to assess impacts to biodiversity by the revised proposal area. The addendum BAR found that an additional 0.082 hectares of native vegetation would be impacted in addition to that identified in the REF. This includes an additional 0.005 hectares of PCT 725 near the tie-in works on Raleigh Road, 0.003 hectares of PCT 835 on Auld Avenue and near the tie-in works on Raleigh Road, and 0.074 hectares of PCT 1800 to the northwest and southwest of Keys Parade.

The revised proposal area would also result in minor increases to impacts to threatened fauna habitat for the Cumberland Plain Land Snail (near works on Auld Avenue) and for the Southern Myotis (near Keys Parade).

Outside of the additional biodiversity assessment required for the proposal area extension along Keys Parade, no additional detailed assessments were required. Desktop assessments were carried out for the impacts of all other changes given these are anticipated to be largely consistent with the impacts outlined in the REF.

Four updated mitigation measures have been proposed. The first relates to an updated arboricultural impact assessment that will be carried out to confirm whether proposed design changes would reduce the total number of trees that would be removed. The second relates to traffic and transport impacts and notes Transport would consult further with affected residents and Council about investigations into a driveway connection to Hermies Avenue from 553A Henry Lawson Drive. The third relates to traffic and transport impacts and notes Transport would carry out investigations into the provision of additional parking on Auld Avenue in consultation with key stakeholders, including Council. The fourth relates to surface water impacts and indicates that Transport would continue to optimise the water quality strategy for the proposal including along Keys Parade to minimise potential impacts to water quality.

Next steps

Transport for NSW as the determining authority will consider the information in the REF and this submissions report and make a decision whether or not to proceed with the proposal.

Transport for NSW will inform the community and stakeholders of this decision and where a decision is made to proceed will continue to consult with the community and stakeholders prior to and during the construction phase.

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1. Introduction and background

1.1 The proposal

Transport for NSW (Transport) proposes to upgrade a 1.8-kilometre section of Henry Lawson Drive between Auld Avenue, Milperra and the approach to the M5 Motorway, Milperra (known as the Henry Lawson Drive Upgrade Stage 1B) (the proposal). This includes road widening to increase traffic capacity and improve travel time, as well as upgrades of key intersections to enhance capability and driver safety.

Key features of the proposal, as per the design in the Henry Lawson Drive Upgrade Stage 1B Review of Environmental Factors (REF) (Transport, 2023), would include:

- widening Henry Lawson Drive from two to four lanes between Auld Avenue, Milperra and the M5 Motorway, Milperra with a raised central median
- upgrading the Henry Lawson Drive / Bullecourt Avenue signalised intersection, including:
 - an additional right-turn lane from Henry Lawson Drive (northbound) to Bullecourt Avenue (two rightturn lanes total)
 - an additional right-turn lane from Bullecourt Avenue to Henry Lawson Drive (northbound) (two rightturn lanes total)
 - converting the existing dedicated left-turn lane from Bullecourt Avenue to Henry Lawson Drive (southbound) into a dedicated left-turn slip lane
 - maintaining the dedicated left-turn lane from Henry Lawson Drive (southbound) to Bullecourt Avenue
- upgrading the Henry Lawson Drive / Pozieres Avenue signalised intersection, including:
 - a new dedicated right-turn lane from Henry Lawson Drive (southbound) to Pozieres Avenue
 - a new dedicated left-turn lane from Henry Lawson Drive (northbound) to Pozieres Avenue and relocation of the existing bus stop north of the intersection
- providing a new two-lane local link road between Auld Avenue and Keys Parade (about 160 metres), crossing over Milperra Drain, providing access to / from southbound lanes of Henry Lawson Drive and Auld Avenue, and removing up to eight parking spaces on Auld Avenue to accommodate the link road
- extending Raleigh Road about 120 metres to connect with Keys Parade at a roundabout, and removing the direct connection between Raleigh Road and Henry Lawson Drive
- converting the Henry Lawson Drive intersections to be left-in left-out only, at:
 - Ruthven Avenue
 - Whittle Avenue
 - Amiens Avenue
 - Ganmain Crescent
 - Fromelles Avenue
 - Hermies Avenue
- modifying the Bullecourt Avenue / Ashford Avenue intersection to better accommodate heavy vehicle movements
- constructing a three-metre-wide shared path:
 - on the western/southern side of Henry Lawson Drive between Pozieres Avenue and Keys Parade
 - along Keys Parade, the new Auld Avenue local link road and the extended section of Raleigh Road
- reconstruction of some existing shared paths within the proposal area
- constructing a new footpath within the proposal area:
 - on the eastern side of Henry Lawson Drive between the Flower Power and Ingram Avenue
 - along the northern side of Ingram Avenue

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- along the eastern side of Fromelles Avenue
- installing new drainage infrastructure and water quality controls within the proposal area, including:
 - an upgraded longitudinal and transverse drainage pits and pipes network along Henry Lawson Drive
 - a bioretention basin between Henry Lawson Drive, Bullecourt Avenue and Fleurbaix Avenue and maintenance access to this basin
 - swales along Henry Lawson Drive and Keys Parade and installation of Gross Pollutant Traps
 - relocation of an existing swale along the Auld Avenue link road
- construction activities and ancillary work, including:
 - relocation of utilities (including electrical, gas, water, and telecommunications)
 - civil earthworks, drainage work, water quality controls, and tie-in work to adjoining sections of Henry Lawson Drive and local roads
 - final roadworks including pavement, kerb and gutters, signs, road furniture, landscaping, lighting, and line marking
 - new traffic signals and intelligent transport systems including, but not limited to, closed-circuit television
 - establishment of temporary ancillary facilities to support construction, including compound sites, site offices, stockpile and laydown locations, temporary access tracks and water quality devices.

The key features of the REF proposal are shown in Figure 1-1. A more detailed description of the proposal is found in the Henry Lawson Drive Upgrade Stage 1B REF.

Since the REF was displayed, the design of the proposal has been revised and these are detailed in Chapter 4 of this report.



1.2 REF display

Transport prepared a REF to assess the potential environmental impacts of the proposed works. The REF was publicly displayed for 40 days between 26 June 2023 and 4 August 2023 at Bankstown Library and Knowledge Centre and Canterbury Bankstown Council, as detailed in **Error! Reference source not found.** The REF was also placed on the Transport for NSW project website and made available for download.

Table 1-1 Display locations

Location	Address
Bankstown Library and Knowledge Centre	80 Rickard Road, Bankstown, NSW, 2200
Canterbury Bankstown Council	Upper Ground Floor, Bankstown Civic Tower, 66-72 Rickard Road, Bankstown, NSW, 2200

The community were informed of the REF display locations and website address through:

- an advertisement in the Canterbury Bankstown Torch local newspaper
- letter distribution to Milperra and surrounding suburbs
- eight banners and 10 corflute signs in Milperra
- four posts on Facebook.

Transport also held in-person community information sessions at Milperra Public School on 29 June 2023 and 29 July 2023, and an online information session on 20 July 2023 to give the community a chance to learn more about the project, ask questions and 'have their say'.

During the display period, Transport invited the public to provide feedback on the proposal. Transport also met with residents and businesses who would be directly affected by the proposal.

Targeted emails and text messages were sent out to stakeholders and community members who provided comments during community consultation in late 2022, or who signed up to receive correspondence regarding the proposal.

In addition, a letter was also sent to residents near the Henry Lawson Drive / Bullecourt Avenue intersection in September 2023 to inform these residents of the loss of 11 parking spaces on Bullecourt Avenue. Residents were asked to give feedback by 29 September 2023 for inclusion in this report. One response was received, which is included in section 2.2.1. Further detail on the proposed change can be found in section 4.1.1 and the letter distributed by Transport can be found in Appendix A.

1.3 Purpose of this report

This submissions report relates to the REF prepared for the Henry Lawson Drive Upgrade Stage 1B and should be read in conjunction with that document.

The REF was placed on public display and submissions relating to the proposal and the REF were received by Transport for NSW. Chapter 2 of this submissions report summarises the issues raised by the community and provides responses to each issue. The issues raised by government agencies are summarised and responded to in Chapter 3. Chapter 4 of this report describes changes to the proposal following display of the REF. Chapter 5 describes and assesses the environmental impact of changes to the proposal. New or revised environmental management measures are identified in Chapter 6.

2. Response to community issues

Transport for NSW received 25 submissions from individuals, accepted up until the 4 August 2023. Table 2-1 lists the respondents and each respondent's allocated submission number. The table also indicates where the issues from each submission have been addressed in this chapter.

Table 2-1 Individual respondents

Submission No.	Section number where issues are addressed
1	2.2.1, 2.3.1
2	2.3.1, 2.3.2
3	2.3.2
4	2.2.1, 2.2.2, 2.2.5, 2.3.1, 2.5
5	2.2.1, 2.2.2, 2.2.6
6	2.2.1
7	2.2.1, 2.2.2, 2.3.1, 2.3.2, 2.7
8	2.4
9	2.2.1
10	2.2.1, 2.2.2, 2.3.1, 2.8
11	2.2.1
12	2.3.3
13	2.2.4, 2.3.3
14	2.4
15	2.4
16	2.4
17	2.4
18	2.2.1, 2.3.4
19	2.2.1, 2.3.1, 2.3.2, 2.4
20	2.4
21	2.4
22	2.2.3, 2.2.4, 2.3.2, 2.5, 2.6, 2.7
23	2.2.1, 2.2.2
24	2.4
25	2.2.1

2.1 Overview of issues raised

Each submission has been examined individually to understand the issues being raised. The issues raised in each submission have been extracted and collated, and corresponding responses to the issues have been provided. Where similar issues have been raised in different submissions, only one response has been provided. The issues raised and Transport's response to these issues forms the basis of this chapter.

Of the submissions, eight per cent supported part or all of the proposal, 60 per cent did not support some elements of the proposal and 32 per cent did not offer their position.

The most common issues raised by the public included:

- changes to a number of local road intersections with Henry Lawson Drive to left-in left-out only and the impacts this would have on travel times, intersection performance and detour routes for local residents
- concern about tree removal, and other related impacts and mitigation measures including revegetation
- active transport queries, including how shared paths would impact trees.

2.2 The proposal

2.2.1 Intersection layouts

Submission number(s)

1, 4, 5, 6, 7, 9, 10, 11, 18, 19, 23 and 25.

Issue description

- Suggestion for vehicles to be able to turn right onto Henry Lawson Drive from Whittle Avenue during nonpeak times, and this be controlled with signage.
- Concern that the increased traffic along Bullecourt Avenue will make it difficult to turn right into/out of Keysor Place, due to the introduction of left-in left-out intersections, including at Whittle Avenue, Ingram Avenue and Amiens Avenue. Suggestion to construct a roundabout at the Bullecourt Avenue / Keysor Place intersection to make turning right onto Bullecourt Avenue and then onto Henry Lawson Drive easier for residents of Whittle Avenue.
- Suggestion to shift the road alignment on Bullecourt Avenue towards the southern side to avoid the proposed removal of 11 parking spaces on the northern side of Bullecourt Avenue near the Henry Lawson Drive / Bullecourt Avenue intersection.
- Concern about residents not being able to turn right into driveways near the Henry Lawson Drive / Bullecourt Avenue intersection when travelling westbound on Bullecourt Avenue and request for a design solution for residents to be able to do this.
- Suggestion to implement two right hand turn lanes onto Henry Lawson Drive at Pozieres Avenue and at Keys Parade.
- Concern that more motorists would use Amiens Avenue than Pozieres Avenue to access the western side of Henry Lawson Drive from Bullecourt Avenue. Suggestion to add a dedicated left-turn lane into Amiens Avenue from Henry Lawson Drive to minimise congestion coming from Bullecourt Avenue and reduce safety risks.
- Concern around Keys Parade and the link road, including that:
 - vehicles entering Keys Parade from Henry Lawson Drive may ignore the no right turn movement proposed at the intersection with the link road
 - queuing back onto the link by vehicles waiting to turn right at Henry Lawson Drive could limit the ability for vehicles to turn right onto Keys Parade
 - queuing at the Henry Lawson Drive / Keys Parade intersection will also obstruct views for vehicles turning right onto Keys Parade.
- Suggestions to change the Keys Parade / link road intersection, including:

- realigning the link road to be straightened away from the proposed Keys Parade alignment and connect directly to the proposed roundabout for Keys Parade and Raleigh Road access
- providing parking on the link road to ease pressure around Gordon Parker Reserve.
- Suggestion to install a seagull intersection at the intersection of the new link road with Keys Parade, or to not allow vehicles to turn right from the new link road onto Keys Parade, and instead require them to turn left to use Henry Lawson Drive (heading southbound) and then Pozieres Avenue to access local roads on the western side of Henry Lawson Drive.
- Suggestion to allow vehicles turning left from Hermies Avenue to immediately turn right into Pozieres Avenue, as the proposed access to the kerbside lane on Henry Lawson Drive near Hermies Avenue only would impact movements for residents who live east of Henry Lawson Drive needing to access Pozieres Avenue.
- Concern about the proposal to only allow vehicles access to the kerbside lane on Henry Lawson Drive near Hermies Avenue as this will prevent right turns northbound and right turns into Pozieres Avenue from the driveway of 553A Henry Lawson Drive. Requests this is investigated along with driveway access to Hermies Avenue.
- Suggestion for additional access restrictions for roads intersecting with Henry Lawson Drive:
 - the Henry Lawson Drive / Hermies Avenue intersection be closed
 - the intersections of Henry Lawson Drive with Whittle Avenue and Amiens Avenue be closed.
 - the Henry Lawson Drive / Ruthven Avenue intersection be closed .
- Suggestions for adjustments to traffic signals, including:
 - installation of a left turn green light for vehicles turning left into Pozieres Avenue from Henry Lawson Drive while vehicles are turning right from Pozieres Avenue onto Henry Lawson Drive to reduce queueing along Henry Lawson Drive
 - allowing traffic to turn right into Keys Parade from Henry Lawson Drive southbound without a red right turn arrow due to the long sight lines at this intersection.

Response

- Alternate solutions suggested at some intersections, such as allowing turns during non-peak times and its associated signage, are not deemed appropriate as these would increase the safety risks associated with vehicles crossing multiple lanes of traffic.
- Transport notes the concern of turning right from Keysor Place onto Bullecourt Avenue. Traffic modelling has accounted for future increases in traffic volumes including along Bullecourt Avenue. The proposal would include the introduction of two lanes, in each direction, to the west of Keysor Place to improve vehicle storage and get more vehicles through the intersection, thereby reducing queue lengths on Bullecourt Avenue. This would increase opportunities to allow vehicles to turn right into Bullecourt Avenue. Transport would investigate opportunities to improve access to and from the local road network, including at the Bullecourt Avenue / Keysor Place intersection, during detailed design.
- Eleven parking spaces would be removed on the northern side of Bullecourt Avenue near the Henry Lawson Drive / Bullecourt Avenue intersection to allow enough space for two lanes of traffic to turn into Bullecourt Avenue. The suggestion to shift the road alignment south to retain the parking spaces has been investigated and would result in property acquisition of private property, additional tree removal, and additional utility and electrical adjustments. Due to this, shifting of the Bullecourt Avenue corridor to the south to allow for the retention of eleven parking spaces is not feasible.
- Currently, it can be dangerous for motorists to turn right into properties when travelling westbound along Bullecourt Avenue due to restricted views of vehicles turning right from Henry Lawson Drive into Bullecourt Avenue. In its current state and should the proposal proceed, residents would need to travel eastbound on Bullecourt Avenue to reach their driveways safely.
- The traffic modelling carried out for the proposal (Appendix D to the REF) confirmed that the current proposed layout at the Henry Lawson Drive / Pozieres Avenue intersection is considered appropriate, and two right turn lanes are not considered necessary. The modelling identified that the Henry Lawson Drive / Pozieres Avenue intersection would perform at the same level of service (LOS) or an improved LOS in almost all scenarios with the proposal compared to without the proposal. In addition, space constraints

due to existing properties on Pozieres Avenue would mean that two right-turn lanes would not be feasible.

The traffic modelling also indicates that the Henry Lawson Drive / Keys Parade intersection would perform at an acceptable level of service with the proposal. As such, this is deemed an appropriate alternative and extra right turn lanes onto Henry Lawson Drive are not considered necessary.

- The proposal includes two lanes of traffic in each direction along Henry Lawson Drive. This would reduce congestion and minimise the potential for traffic incidents as vehicles slow down to turn left, including at the Henry Lawson Drive / Amiens Avenue intersection. Vehicles would be able to continue travelling in the right lane while vehicles in the kerbside lane slow down to turn into Amiens Avenue. Due to the provision of two lanes on Henry Lawson Drive and space constraints (existing street trees and private properties), a left turn slip lane into Amiens Avenue from Henry Lawson Drive is not necessary.
- The Auld Avenue link road would provide access to the southbound lanes of Henry Lawson Drive from Auld Avenue after the conversion of the Henry Lawson Drive / Auld Avenue intersection to left-in left-out only. The intersection of the link road with Keys Parade has been designed to allow vehicles exiting the link road the option to either turn left to access Henry Lawson Drive or turn right to access Keys Parade.

The central median has been designed to prevent vehicles from turning right from Keys Parade into the link road, while allowing the right turn movement out of the link road. In addition, signage would be installed informing vehicles travelling westbound on Keys Parade that access to the link road is via the Keys Parade roundabout and no right turn is allowed.

Traffic modelling included in Appendix D of the REF indicates that the Henry Lawson Drive / Keys Parade intersection performance decreases from LOS B to LOS C during the weekend periods when there would be an anticipated increase in patronage of Gordon Parker Reserve. However, queuing on the link road to enter Keys Parade would not be significant.

In addition, the proposal has been designed to achieve sight distance requirements at intersections, including at the Keys Parade / Auld Avenue link road intersection. Combined with satisfactory intersection performance during the weekend peak period, queuing on Keys Parade is not expected to obstruct views for vehicles turning from the link road onto Keys Parade.

• The proposed alignment of Keys Parade, including the roundabout at its intersection with the Raleigh Road extension, is based on the Keys Parade alignment to be constructed by Mirvac. Adjustments to the arrangement of the roundabout, including extending the link road to meet Keys Parade at the roundabout, are not considered feasible. Further investigation during the detailed design phase of the proposal would be carried out to optimise the layout of the Keys Parade / link road intersection where possible.

Transport has reviewed locations where there is the opportunity to include additional parking near Gordon Parker Reserve. Due to space constraints and to minimise impacts to the Gordon Parker Reserve and Milperra Drain, it is not feasible to provide parking along the Auld Avenue link road. However, investigations into and consultation with key stakeholders about additional parking on Auld Avenue would be carried out during detailed design (refer to the updated Safeguard T12 in Table 6-1).

- It is not feasible to install a seagull intersection on Keys Parade at the Auld Avenue link road due to the close proximity to the Keys Parade and Henry Lawson Drive intersection. The right turn out of the link road onto Keys Parade has been retained to allow access between Auld Avenue and the western side of Milperra, through the local road network.
- As the proposal would provide two through lanes and one right turn lane onto Pozieres Avenue, vehicles would need to travel across two lanes of fast flowing traffic to access the turn lane. This could result in road safety and traffic flow issues, and as such, vehicles turning left out of Hermies Avenue would be unable to turn right into Pozieres Avenue, and would be required to continue their travel past Pozieres Avenue. The restrictions would minimise the potential for vehicle collisions. Vehicles would be able to use the Henry Lawson Drive / Bullecourt Avenue intersection or Fromelles Avenue to travel southbound on Henry Lawson Drive to access Pozieres Avenue.
- Transport has commenced investigations to assess whether driveway access from 553A Henry Lawson Drive to Hermies Avenue can be safely provided. Transport would consult with Council and affected property owners about this driveway access and confirm the outcome of these investigations during detailed design (refer to the updated Safeguard T8 in Table 6-1).
- Further local road intersection closures along Henry Lawson Drive are not considered necessary. The conversion of local roads intersections with Henry Lawson Drive to left-in left-out only, including Ruthven Avenue, Whittle Avenue, Amiens Avenue and Hermies Avenue, has been proposed to improve safety

throughout the proposal area. Illegal turning movements across Henry Lawson Drive would be prevented through the introduction of the central median, which would improve safety along the road alignment. The proposed left-in left-out arrangements at these intersections have been deemed an appropriate solution that would minimise adverse traffic impacts on Henry Lawson Drive and other local roads.

• Traffic signal phasing would be reviewed during the detailed design phase (including Pozieres Avenue and Keys Parade intersection) by Transport's network operations division to provide a solution which maintains the best flow of traffic and safety through the proposal area.

2.2.2 Proposal features

Submission number(s)

4, 5, 7, 10 and 23.

Issue description

- Requested clarification on what are ancillary facilities and the bioretention basin
- Queried the ability of the Milperra Drain bridge to cope with an additional two lanes of traffic.
- Concern that Transport has not listened to community concerns in regards to a pedestrian overpass at Henry Lawson Drive near Pozieres Avenue. Request for information regarding what investigations have been done for a pedestrian overpass.
- Suggestion to relocate the bus stop south of the Henry Lawson Drive / Pozieres Avenue intersection further south so that buses at this bus stop do not block the left turn lane into Pozieres Avenue.
- Suggestion for bus stops throughout the proposal area to all have dedicated stopping bays to allow continuous flow through the two lanes of traffic along Henry Lawson Drive. This includes the bus stop near the Henry Lawson Drive / Fromelles Avenue intersection and the bus stop south of the Henry Lawson Drive / Pozieres Avenue intersection.
- Suggestion to put all overhead powerlines underground for safety and visual reasons.

Response

• Ancillary facilities are the site offices, or site compounds that would be used temporarily during construction. These areas are allocated for material delivery, storage, for capturing and treating water from construction areas, and also as a place to store materials waste and mulch.

The layout and potential uses for each ancillary facility would be determined to minimise environmental impacts and finalised during detailed design. Once construction is complete, ancillary facilities would be returned to their current use. Refer to Section 3.6 of the REF for further information about the ancillary facilities identified within the proposal area.

• The bioretention basin is a sunken hole that forms part of the stormwater system to remove pollution and improve water quality by filtering surface runoff through soil and plants. During a rainfall event, it would capture water up to a depth of 300mm before it is released into the downstream drainage network.

The basin at the corner of Bullecourt Avenue and Fleurbaix Avenue is proposed to be a dry basin with water infiltrating into the ground several hours after rain stops. It would be planted in accordance with the proposal's landscaping plan (to be finalised during detailed design).

- The existing Milperra Drain bridge on Henry Lawson Drive south of Auld Avenue is only wide enough to carry two lanes of traffic. As part of the Henry Lawson Drive Upgrade Stage 1A, a new bridge will be constructed adjacent to the existing bridge to carry an additional two lanes of traffic. The new bridge would cater for the two lanes northbound on Henry Lawson Drive, with the existing bridge being retained for the two southbound lanes.
- Transport investigated options for a pedestrian overpass at Pozieres Avenue based on comments from the community. The options considered included:
 - retaining the existing at-grade crossings
 - an overpass with stairs only
 - an overpass with a lift and stairs

- an overpass with ramps and stairs
 - at-grade crossings on all approaches (new crossing on southern side).

A Value Management Workshop was held on 16 November 2022 to discuss options for a pedestrian overpass at the Henry Lawson Drive / Pozieres Avenue intersection. The workshop involved a comparison of the different options against a set of criteria. The key criteria included safety, constructability, community accessibility, environmental impacts (including visual impacts), impacts to properties, and capital and ongoing costs.

Due to the topography in this area, along with the crossing use and crash history, the implementation of at grade crossings on all approaches at the Henry Lawson Drive / Pozieres Avenue intersection was identified as the option that best aligned with the assessment criteria. This was reflected in the proposal through the introduction of a new crossing on the southern side of the intersection. This new crossing removes the need to cross Pozieres Avenue for those wishing to access the school located on the southern side of Pozieres Avenue. The bus stop south of the Henry Lawson Drive / Pozieres Avenue intersection would be moved to the northern side of the intersection to avoid buses stopping in the left turn lane creating potential conflicting movements between stopping buses and vehicles turning left into Pozieres Avenue.

- The introduction of two lanes of traffic in each direction along Henry Lawson Drive as part of the proposal is considered an appropriate alternative to adding dedicated stopping bays at all bus stops along the road alignment. Traffic would be able to maintain flow when buses are stopped by using the right lane. The addition of dedicated stopping bays is not preferred, as it negatively affects bus travel times and would require further widening of the road corridor and associated environmental and social impacts.
- Relocating powerlines underground was considered as part of the design development. It has not been pursued as there is limited space underground due to there being other existing utilities that would remain during operation of the proposal.

2.2.3 Hazard and risk

Submission number(s)

22

Issue description

• Safety concerns for children playing at Gordon Parker Reserve if cars were to roll off the elevated Keys Parade/link road.

Response

• The link road would be separated from Gordon Parker Reserve by the shared path, existing trees and kerb and gutter on both sides of the roadway. As such, it is anticipated that sufficient space would separate vehicles from users of the reserve in the event of an accident.

2.2.4 Proposal need and justification

Submission number(s)

13 and 22.

Issue description

- The entirety of Henry Lawson Drive needs to be upgraded to have two lanes in each direction.
- Query about the value of widening Henry Lawson Drive and whether this aligns with Future Transport Strategy and Active Transport goals as this would encourage further use of the road by vehicles and therefore increase congestion.

Response

• The Henry Lawson Drive Stage 1B upgrade forms part of a wider program of works to upgrade Henry Lawson Drive which will see improved traffic conditions along the whole road alignment. Other sections of

the upgrade are being delivered separately. All sections of the upgrade have undergone traffic assessments so that optimal solutions are implemented which improve traffic flow along the entirety of Henry Lawson Drive. The Henry Lawson Drive Upgrade Stage 1A project is currently in construction and is due to be complete in 2026. The Stage 1A project includes two lanes of traffic in each direction along Henry Lawson Drive between Tower Road and Auld Avenue. Further detail on the key features of the wider program of works can be found on Transport's Henry Lawson Drive Upgrade website.

- Section 2.1 of the REF outlines how the proposal relates to strategic planning and policy documents, including the Future Transport Strategy. This strategy includes 14 strategic directions and the ways in which Transport intends to respond to these strategic directions. The proposal aligns with many of these responses, including but not limited to:
 - P2.4: Build well-designed transport infrastructure that makes places more liveable and successful
 - P5.3: Build and upgrade for shocks and stresses
 - E2.1: Promote travel behaviour change to manage networks
 - C2.1: Support car-free, active and sustainable transport options
 - C2.4: Facilitate efficient freight connectivity and access
 - C4.2: Promote safe behaviours.

The Henry Lawson Drive corridor is a main road under the Movement and Place framework, forming a principal arterial road that supports travel including freight, private vehicles, bus services, people walking, and riding with active transport in verge areas.

Refer to Section 2.1 of the REF for further details.

2.2.5 Funding

Submission number(s)

4

Issue description

• Query as to whether the proposal is being funded by Mirvac.

Response

• The proposal is not being funded by Mirvac. The Henry Lawson Drive Stage 1B upgrade forms part of a wider program of works to upgrade Henry Lawson Drive which is funded by Transport and includes the construction for Henry Lawson Drive Stage 1A to the north of this project.

2.2.6 Property acquisition

Submission number(s)

5

Issue description

- Suggestion for Transport to either acquire or provide alternate access (from the lane behind Flower Power) to residences on the eastern side of Henry Lawson Drive between Flower Power and Whittle Avenue, due to the poor visibility to and from these driveways and given their location on the road bend.
- Suggestion for Transport to either acquire or adjust the frontages of 533 and 533A Henry Lawson Drive due to disruptions to the path caused by the location of the property frontages, and disruptions to the Henry Lawson Drive / Pozieres Avenue intersection caused by vehicles entering and exiting these properties.
- Suggestion for Transport to acquire 433 Henry Lawson Drive and turn into public open space due to the property being abandoned.

Response

- The request to acquire the properties on Henry Lawson Drive between Flower Power and Whittle Avenue is not within the scope of the proposal. Sight line checks carried out for these driveways have confirmed that the sight lines as part of the proposal would be similar to the existing scenario. However, the introduction of two lanes of southbound traffic on Henry Lawson Drive would allow for greater opportunity for vehicles to exit these driveways. In addition, a concealed driveway sign would be installed north of these properties to provide warning of the driveways to motorists travelling south on Henry Lawson Drive. Transport would investigate the possibility of adjusting access arrangements for these properties during the detailed design phase.
- Transport is not proposing to acquire 553 and 553A Henry Lawson Drive as part of this proposal. Following display of the REF, Transport has commenced investigations to evaluate whether a driveway access from these properties to Hermies Avenue can be safely provided as part of the proposal. Transport would consult with Council and affected property owners about this driveway access and confirm the outcome of these investigations during detailed design (refer to the updated Safeguard T8 in Table 6-1).

The acquisition of 433 Henry Lawson Drive is not within the scope of the proposal as Transport operations do not extend to the creation and management of open space.

2.3 Traffic and transport

2.3.1 Local road network

Submission number(s)

1, 2, 4, 7, 10 and 19.

Issue description

- Concern about the additional traffic and parking impacts along Dernancourt Parade and Bullecourt Avenue due to vehicles not being able to turn right onto Henry Lawson Drive from local roads (and therefore having to use the Bullecourt Avenue intersection. Bullecourt Avenue is one lane in each direction and would need to cater for two lanes in each direction entering from Henry Lawson Drive.
- Concern about the traffic impacts for vehicles travelling between the eastern and western sides of Henry Lawson Drive due to the proposed central median along Henry Lawson Drive preventing motorists from turning right into local roads. This would result in:
 - increased travel time for residents travelling between the eastern and western sides of Henry Lawson Drive
 - heavy northbound traffic on Henry Lawson Drive and congestion at the Henry Lawson Drive / Bullecourt Avenue intersection and along Bullecourt Avenue
 - residents needing to use narrow streets on the eastern side of Henry Lawson Drive to access Pozieres Avenue
 - dangerous road conditions due to trucks parking along Bullecourt Avenue, increasing queues and decreasing driver visibility
 - additional delays at the Henry Lawson Drive / Bullecourt Avenue intersection due to cars queuing across the intersection on Henry Lawson Drive.
- Clarification needed about the way in which vehicles would enter and leave Auld Avenue and concern about:
 - traffic not being able to turn right onto Henry Lawson Drive from Auld Avenue following events at Gordon Parker Reserve
 - the associated traffic congestion that would result due to vehicles turning right out of the link road and using the local road network as a detour.
- Concern about Newland Avenue not being a suitable detour route given the number of parked vehicles. It is also suggested that either:
 - traffic calming devices are installed on the road to allow for resident access while discouraging rat running

the detour route is altered to be along Raleigh Road rather than Newland Avenue.

Response

• The use of the Henry Lawson Drive / Bullecourt Avenue intersection is considered an appropriate alternative which would allow residents to access local roads safely. The proposal would increase the capacity at the intersection and include two lanes of traffic in each direction on Henry Lawson Drive. These features would allow traffic to clear faster from the Henry Lawson Drive / Bullecourt Avenue intersection and reduce congestion along Bullecourt Avenue and other local roads, such as Dernancourt Parade.

Right hand turns from local roads onto Henry Lawson Drive would not be possible, meaning the use of the Henry Lawson Drive / Bullecourt Avenue intersection would be required to travel northbound on Henry Lawson Drive from the eastern side of the road alignment. The improvements at this intersection are expected to contribute to improved travel times through the proposal area, including on Bullecourt Avenue. It is anticipated that there would not be substantial additional traffic and parking impacts on local roads such as Dernancourt Parade as local road traffic would be dispersed throughout the local road network.

The Henry Lawson Drive / Bullecourt Avenue intersection would be upgraded to have additional capacity for the two lanes of traffic turning from Henry Lawson Drive. Bullecourt Avenue would include two lanes of eastbound traffic for 96 metres. Traffic modelling carried out for the REF (included in Appendix D of the REF) found that in almost all peak periods, the Henry Lawson Drive / Bullecourt Avenue intersection would perform at the same or an improved level of service (LOS) in the 'with proposal' scenario compared to the 'without proposal' scenario. As such, it is anticipated that the upgraded capacity at the intersection would be able to cater for two lanes of traffic from Henry Lawson Drive accessing Bullecourt Avenue.

• The conversion of local road intersections with Henry Lawson Drive to left-in left-out only would improve road safety throughout the proposal area. The introduction of two lanes of traffic along Henry Lawson Drive in each direction and a central median would limit the opportunities for vehicles to cross into the opposite stream of travel. This would mean that vehicles wanting to turn right onto Henry Lawson Drive would need to alter their travel plans to access Henry Lawson Drive via Bullecourt Avenue, Pozieres Avenue or Keys Parade. While travel times may increase for residents due to the traffic changes, the safety benefits and improved travel times along Henry Lawson Drive are considered beneficial for all residents of Milperra and for vehicles travelling through the proposal area.

Using the Henry Lawson Drive / Bullecourt Avenue intersection to move between the eastern and western sides of Henry Lawson Drive would be made easier by the proposal. An additional right turn lane on Henry Lawson Drive and additional capacity on Bullecourt Avenue at the intersection, would allow vehicles to clear more quickly through the intersection. In addition, the increased capacity along Henry Lawson Drive would provide faster travel times to and from the Pozieres Avenue intersection. This would mean that, although using the local road network to access Henry Lawson Drive southbound from the eastern side of Henry Lawson Drive would become a more viable option for residents who live east of Henry Lawson Drive. The use of this upgraded intersection would also be an appropriate alternative for residents travelling northbound to access the local road network on the eastern side of Henry Lawson Drive.

Vehicle movements would not be concentrated on individual narrow streets off Henry Lawson Drive. Anticipated use of local streets as an alternative to intersections such as the Henry Lawson Drive / Bullecourt Avenue intersection to access the western side of Henry Lawson Drive would still be feasible.

The proposal would not change truck parking patterns along Bullecourt Avenue. This would mean the proposal would not result in an increase in congestion due to trucks and therefore an increase in the amount of time for vehicles to exit Bullecourt Avenue onto Henry Lawson Drive. It is acknowledged that trucks parking illegally may reduce visibility for vehicles trying to enter Bullecourt Avenue from other local roads, however this is an enforcement issue and is outside the scope of this proposal.

Queuing across the Henry Lawson Drive / Bullecourt Avenue intersection would be minimised by the proposal given the introduction of two lanes in each direction. This would mean that the intersection performance would be improved and the need to queue across the intersection, preventing vehicles from turning right from Bullecourt Avenue, would be minimised.

• As part of the Henry Lawson Drive Upgrade Stage 1A REF, Auld Avenue has been approved to be altered to a left-in left-out arrangement. This would occur after the development of a new access (link road) as part of this proposal. To access Auld Avenue from Henry Lawson Drive, vehicles would be able to turn left into Auld Avenue to enter from Henry Lawson Drive northbound, in addition to the option to use the Keys

Parade roundabout and the link road. To travel south on Henry Lawson Drive from Auld Avenue, vehicles will need to use the link road, turn left onto Keys Parade and then right onto Henry Lawson Drive.

The traffic and transport impact assessment for the proposal (Appendix D to the REF) identifies that the Henry Lawson Drive / Keys Parade intersection would remain at the same or an improved LOS both with and without the proposal in almost all scenarios. In both 2031 and 2041, intersection performance decreases from LOS B to LOS C during the weekend periods when there would be an anticipated increase in patronage of Gordon Parker Reserve. However, this is still deemed a satisfactory intersection performance.

• There are no formal permanent detour routes proposed as part of the proposal. The local road access routes outlined in Figure 3-8a-b and Figure 3-9a-b in Section 3.2.3 of the REF are suggested routes only, meaning the use of other roads, including Pozieres Avenue, would still be possible. Traffic calming devices, along local roads do not form part of the proposal.

2.3.2 Future traffic volumes

Submission number(s)

2, 3, 7, 19 and 22.

Issue description

- Concern about the impact of other developments on local traffic, including the Riverlands development, the Western Sydney University campus development, and traffic from Milperra Public School, particularly along Henry Lawson Drive, Bullecourt Avenue and Ashford Avenue which will have an increase in traffic due to local road detours.
- Objection to the construction of Keys Parade and the Riverlands Development. Concern about increased traffic on Raleigh Road due to the Riverlands Development and the need to use Keys Parade to access local roads.

Response

• Traffic modelling undertaken as part of the REF has considered future traffic growth in the area, including the Riverlands Development. The traffic and transport impact assessment for the proposal (Appendix D to the REF) identifies that the Henry Lawson Drive / Keys Parade intersection would remain at the same or an improved LOS both with and without the proposal in almost all scenarios in both 2031 and 2041. Intersection performance decreases from LOS B to LOS C during the weekend periods, when there would be an anticipated increase in patronage of Gordon Parker Reserve. However, this is still deemed a satisfactory intersection performance. Given traffic modelling has incorporated volumes from the Riverlands development, and there would be no large decrease in the intersection performance of the Henry Lawson Drive / Keys Parade intersection, the Riverlands development is not anticipated to have a substantial impact on traffic performance throughout the proposal area.

It is understood that the Western Sydney University development land has been sold and a concept development application has been submitted, but no development application for construction has been submitted or approved. As such, due to the lack of detail around what traffic volumes this would generate, it could not be included in traffic modelling for the proposal. However, when that development seeks approval, it would need to assess traffic impacts on the surrounding road network.

It is not anticipated that there would be a large increase in the number of vehicles needing to access Milperra Public School compared with the existing scenario. However, any growth has been captured in the general traffic growth of the area that has been incorporated into the proposal traffic modelling.

The traffic and transport impact assessment (Appendix D to the REF) includes LOS summaries for key intersections throughout the proposal area, including the Henry Lawson Drive / Bullecourt Avenue intersection performs at the same or an improved LOS in the 'with proposal' scenario compared with the 'without proposal' scenario. As such, the intersection is anticipated to be able to cater for two lanes of traffic from Henry Lawson Drive entering one lane of traffic on Bullecourt Avenue at almost all times of day.

In the 2041 AM peak scenario, this intersection performs at LOS F in the 'with proposal' scenario compared with LOS D in the 'without proposal' scenario for the second hour. This is because the right turn traffic movement from the Henry Lawson Drive northbound carriageway onto Bullecourt Avenue queues

back due to capacity constraints along Bullecourt Avenue between Henry Lawson Drive and Ashford Avenue. Demand at this intersection would be increased as vehicles would use Henry Lawson Drive rather than Ashford Avenue to reach Bullecourt Avenue during the 'with proposal' scenario. Although a decrease in the LOS in the 2041 AM peak scenario has been assessed, the current design is deemed an appropriate solution given improvements in all other scenarios, in addition to the safety benefits of converting other local roads to left-in, left-out only.

• Keys Parade is to be constructed by Mirvac as part of the Riverlands Development, with the proposal upgrading the road to facilitate the upgrade of Henry Lawson Drive. As part of the proposal, Raleigh Road intersection with Henry Lawson Drive would be closed and connected to Keys Parade. Residents would be able to use the Keys Parade intersection to access both carriageways of Henry Lawson Drive. This would not be possible if the intersection remained operational, as it would have been converted to a left-in left-out only arrangement.

2.3.3 Active transport

Submission number(s)

12 and 13.

Issue description

- Shared paths are not appropriate and dedicated cycleways should be installed instead to reduce impacts to pedestrians. In addition, safe pedestrian routes and better public transport are better solutions according to Transport's own publications/policies.
- Query about why some active transport infrastructure installed as part of the proposal would be footpaths only and not shared paths.

Response

• Shared paths would be installed along the western/southern side of Henry Lawson Drive between Pozieres Avenue and Borella Road and north of Keys Parade. This would allow cyclists and pedestrians to utilise active transport throughout the proposal area. Shared paths are deemed an appropriate solution to cater for cyclist and pedestrian activity in this area, rather than a separate footpath and cycleway. In addition, a dedicated cycleway has not been included in the proposal given the space constraints of the road corridor and efforts to preserve existing street trees as much as possible. Transport also notes that while some members of the community would feel safe riding next to vehicles, not all community members would feel confident doing so. As such, off-road facilities, such as shared paths, are deemed a more safe and attractive option for all community members. The proposed shared path aligns with Transport policies, such as the Future Transport Strategy and the Active Transport Strategy, both of which aim to reduce congestion on roads and encourage greater use of active transport through improved and more connected shared paths.

Bus routes would be maintained throughout the proposal area. Access to bus stops would be improved by the provision of shared paths and footpaths with direct connections to the bus stop network. The widening of Henry Lawson Drive to include two lanes in each direction would also allow for improved traffic flow for all road users including buses.

• Where footpaths are proposed, cyclists would be able to use local roads to access shops and other facilities. Pedestrians would be able to use the footpath on the eastern/northern side of Henry Lawson Drive or alternatively use the shared path on the western/southern side. This gives pedestrians multiple safe options to use active transport solutions through the proposal area.

On the eastern/northern side of Henry Lawson Drive, the footpath alignment crosses a number of driveways on local roads. Shared paths are not an appropriate solution where the path crosses driveways due to safety concerns associated with cyclists crossing driveways. Footpaths are more appropriate where the path crosses a driveway as this is a safer solution in addition to providing connection to property frontages for local residents.

Cyclists and pedestrians would be able to utilise the signalised intersections throughout the proposal area to access shared paths and footpaths.

2.3.4 Driveway access

Submission number(s)

18

Issue description

• Request for driveway warning signage to be placed in front of 553A Henry Lawson Drive to indicate that a driveway is present.

Response

• An assessment of property access at this property was completed and determined there is sufficient sight distance from the roadway to this property, due to the straight and flat nature of the road at this location. The driveway does not meet the requirements for concealed driveway signage as concealed driveway signage are used on roads with bends.

With the recently installed red light speed camera, safety is likely to improve as vehicles are less likely to speed in the area.

Over the five-year period from 1 October 2017 to 30 September 2022, there have been no reported crashes in the immediate vicinity of the driveway. Provisional crash data obtained on 21 August 2023 shows no relevant reported crashes at the Henry Lawson Drive / Pozieres Avenue intersection.

The Henry Lawson Drive Upgrade Stage 1B would install a central median preventing right turn access to and from the property, reducing confusion for vehicles heading northbound. Vehicles travelling behind the resident's vehicle may think that they are turning left into Hermies Ave and not expecting the resident to turn into the driveway. This should not be an issue with appropriate deceleration and timing of the indicator.

It is noted that sight distances and visibility of the driveway may be obstructed by large and thick hedges within the property boundary. These obstructions are outside Transport's control.

In addition, following display of the REF, Transport has commenced investigations to assess whether a driveway access from 553A Henry Lawson Drive to Hermies Avenue can be safely provided. Transport would consult with Council and nearby property owners about this driveway access and confirm the outcome of these investigations during detailed design (refer to the updated Safeguard T8 in Table 6-1).

2.4 Impacts to street trees

Submission number(s)

8, 14, 15, 16, 17, 19, 20, 21 and 24.

Issue description

- Would trees be replanted as part of the proposal and what sustainability provisions are being considered.
- Objection to the removal of trees throughout the entire proposal area, particularly in relation to the construction of the shared path and the bioretention basin. Request for the design to be refined to retain as many trees as possible to reduce urban heat impacts and reduce impacts to landscape character and biodiversity. Suggestion to locally realign the shared path to avoid trees and to use fill to cover tree roots, or otherwise remove the shared path from the design.
- Objection to fully concreted medians throughout the proposal area. Suggestion to plant trees where the median strips are widest. Recommended species include acacia implexa, dianella, local lomandra and imperata grass.
- Concern that the information provided online is misleading as the trees in visualisations would take 20 to 30 years to appear as they do and would be far smaller at the completion of the proposal.
- Concern that the removal of trees along the western side of Henry Lawson Drive will increase noise and dust impacts once the proposal is implemented, given there will be increased traffic. Request for like-for-like replacement of trees which are removed along Henry Lawson Drive.

• Concern that the proposed tree and vegetation removal measures outlined in the REF do not align with the Canterbury Bankstown Development Control Plan. Request for noise and air pollution to be mitigated, and the visual amenity of the area to be retained. Request also for Transport to discuss and develop safeguards with Council and the local community to ensure noise and air pollution is mitigated and the visual amenity of the area is retained.

Response

- Trees would be replanted as part of the proposal in line with Transport's Biodiversity Policy (Transport, 2022a). This would include consideration of no net loss to biodiversity and tree and hollow replacement. Appendix G of the REF includes the landscaping plan for the proposal area. Chapter 7 outlines how sustainability has been considered during the development of this proposal.
- The proposal does include the removal of mature street trees along Henry Lawson Drive and near the new link road. Further investigations at the detailed design stage may reduce the number of trees to be removed, including near the Henry Lawson Drive / Bullecourt Avenue intersection, and through refinements to the shared path and bioretention basin designs. Appendix G of the REF outlines the details of replacement tree planting to take place, including the species that would be replanted. Replanting of trees along the road alignment would involve planting trees at a junior size to allow them to become established and grow faster.

Section 6.5.3 and Appendix G of the REF include the impacts of the proposal on the landscape character of the local area. The existing road corridor would be impacted to a moderate-high extent due to the introduction of additional lanes and medians, and the removal of existing mature street trees. Mitigation measures outlined in section 6.5.4 of the REF include revegetation strategies, which would assist to reduce landscape character impacts in the short and long term.

Appendix H of the REF outlines impacts to biodiversity as a result of the proposal. While tree removal would take place as part of the proposal, the final construction footprint would seek to retain as many areas of native vegetation and fauna habitat as possible. Impacts to wildlife connectivity would be minimal, given any fauna which use the trees proposed for removal would have other similar habitat present throughout the urban area. Additionally, the likelihood of vehicle strike during the operation of the proposal would be low given the landscape is already highly disturbed. Mitigation measures outlined in section 6.6.4 of the REF would assist in minimising any impacts to wildlife.

Following display of the REF, Transport has consulted with Canterbury Bankstown Council about minimising impacts to street trees. Of the 68 trees initially impacted by the shared path between Ganmain Crescent and Raleigh Road, 18 were found to be in poor condition. These trees would require removal in the short to medium term as part of regular maintenance, irrespective of whether the proposal proceeds. Changing the shared path surface from concrete to fibre reinforced plastic (FRP) grating near the remaining identified 50 trees would result in minimal tree root disturbance and up to 50 trees potentially being retained. This change would be confirmed during detailed design.

In addition, the shared path alignment has been adjusted between Ganmain Crescent and Amiens Avenue, and Borella Road and Raleigh Road, to avoid removing trees in these areas. Refer to Section 4.2.4 for further details.

Transport will continue to review the shared path design through the detailed design phase to further minimise tree removal in accordance with Safeguard A1. Tree retention through design refinements would assist to reduce urban heat impacts and impacts to landscape character and biodiversity.

Opportunities to minimise increases in urban heat have also been considered during the development of the proposal, including minimising vegetation removal and the revegetation strategy outlined in Appendix G of the REF.

- The proposal would include a range of different types and widths of medians. Medians of less than two metres wide, where pedestrian access is required, or within 25 metres from the end of the median nosing (where there are potential sight line issues) would have a concrete finish. Medians between two and three metres wide would have low shrub or grasses and groundcover planting. Appendix G of the REF also includes planting intended for median strips throughout the proposal area.
- The visualisations of the proposal provided on the Transport project website include trees to be replanted and trees to be retained. Further investigations would be carried out during the detailed design phase to retain as many mature, established trees as possible. Replanting of trees along to road alignment would involve planting trees at a junior size to allow them to become established and grow faster.

Section 6.3.4 of the REF outlines that the proposal is generally not predicted to substantially alter operational road traffic noise levels in and near the proposal area. Most receivers are predicted to experience operational noise levels that are within one decibel of existing noise levels. As is noted in section 6.3.4 of the REF, however, noise levels are predicted to increase by slightly more than two decibels in noise catchment area three (to the west of Henry Lawson Drive and north of Pozieres Avenue) where widening work would bring Henry Lawson Drive closer to nearby receivers. This section of the REF notes that 116 residential receiver buildings are considered eligible for consideration of additional noise mitigation, as per the operational road traffic noise criteria.

It is noted that certain areas of residential properties next to Henry Lawson Drive are separated by the noise wall near the M5 intersection or have existing private fencing along the boundary with the road corridor between the M5 Motorway and Pozieres Avenue, and between Amiens Avenue and Whittle Avenue on the southern side of the road corridor, which would likely provide some degree of noise shielding to the residential receivers themselves.

Section 6.12.1 of the REF outlines that there are increases in the concentration of particulate matter as a result of the proposal. However, increases in the predicted cumulative annual average concentrations of particulate matter at 10 metres from the kerbside as a result of the proposal would be minimal. As such, it is anticipated that dust impacts to homes would be minimal despite the removal of trees along Henry Lawson Drive. Mitigation measures for air quality impacts as a result of the proposal area included in section 6.12.2 of the REF.

Water would be used during the construction phase for dust suppression to limit impacts to nearby homes. During operation, motor vehicles using the proposal would generate road dust, however this is not anticipated to impact homes to a greater extent than in the existing scenario.

Appendix G of the REF includes the details of replacement tree planting to take place, including the species that would be replanted. Replanting of trees along the road alignment would involve planting trees at a junior size to allow them to become established and grow faster.

• The proposal has been designed in line with Transport's guidelines, including the Biodiversity Policy. Appendix G of the REF includes the details of replacement tree planting to take place, including the species that would be replanted. Replanting of trees along the road alignment would involve planting trees at a junior size to allow them to become established and grow faster.

Transport has consulted with Canterbury Bankstown Council throughout the development of the proposal and would continue to be consulted during detailed design about proposed tree removal and landscaping plan.

2.5 Hydrology, flooding and coastal processes

Submission number(s)

4 and 22.

Issue description

- Queried how the proposal will benefit/assist already flood impacted areas.
- Concern about the flooding impacts of Keys Parade given it is an elevated road.

Response

• The proposal has been designed to minimise impacts on the existing flood behaviour in the area and is anticipated the impacts of the proposal on flood prone areas would be minimal.

During operation, it is anticipated that there would be minor increases in flood levels from the Milperra Drain catchment to some locations throughout the proposal area, including to two properties east of the Henry Lawson Drive / Auld Avenue intersection and in the industrial area upstream of the proposal area and to the east of the Bankstown Golf Course. Very minor increases in flood velocities from the Milperra Drain catchments would also occur, however these would be less than 0.1 metres per second. No worsening of the flood hazard category is shown from the Milperra Drain due to the minor increase in flood levels and the current flooding depth experienced. Further details are provided in Table 6-38 in Section 6.4.3 of the REF.

There would be no increase in flood levels, only minimal increases in flood velocities (of less than 0.1 metres per second) and no worsening of flood hazards from the Georges River catchment.

 An increase in flood level of around 18 millimetres is shown along sections of Auld Avenue and Keys Parade to the west of Henry Lawson Drive near Gordon Parker Reserve. This afflux is caused by the Auld Avenue/Keys Parade and link road section of the proposal. The impact of this afflux would be minimal, considering that affected properties would be flooded in the existing environment (with relatively high flood depths).

It should be noted that Keys Parade would be constructed by Mirvac as part of the Riverlands Development. As part of the proposal, Transport would widen the road to integrate with the widening of Henry Lawson Drive and connection to the Auld Avenue link road.

2.6 Air quality

Submission number(s)

22.

Issue description

• Concern about local air pollution and dust entering homes.

Response

• Water would be used during the construction phase for dust suppression to limit impacts to nearby homes. In accordance with Safeguard O3, an air quality management plan would be implemented for the proposal which would include measures to minimise air quality impacts to nearby homes during construction.

During operation, motor vehicles using the proposal would generate road dust, however this is not anticipated to impact homes to a greater extent than in the existing scenario. While air quality impacts would result from the proposal as a result of increased traffic on Henry Lawson Drive, the increases in the predicted cumulative annual average concentrations at 10 metres from the kerbside as a result of the upgrade are minimal.

2.7 Consultation

Submission number(s)

7 and 22.

Issue description

- A previous submission regarding the proposal was made in October 2022 which was not responded to.
- The local area held a meeting at the primary school and the residents left feeling they were not heard and that their points were not going to be included in the plans of the Henry Lawson Drive Stage 1B upgrade.

Response

• The Henry Lawson Drive Upgrade Stage 1B, Milperra Consultation Report was attached to the REF as Appendix C. This report contains responses to all Have Your Say submissions received. The consultation report provided an opportunity for Transport to respond to all community concerns around the proposal and incorporate design changes where possible.

In addition, this submissions report provides an opportunity for Transport to review submissions from the local community and respond with proposed design changes or reasons for design choices in the current proposal. Transport will consider all submissions made by community members and community groups against the objectives of the proposal and relevant local and state policies so that the best outcome for residents and the community is implemented.

• Transport held online and in-person information sessions during the REF display period, which allowed community members and other stakeholders the opportunity to engage with the project team and speak about any concerns that they may have.

2.8 Support

Submission number(s)

10

Issue description

• Support for two lanes of traffic in each direction along Henry Lawson Drive.

Response

• Support for the proposal is noted.

3. Response to government agency issues

3.1 Overview of issues received

A total of two formal submissions were received from government agencies in response to the display of the REF, which have been responded to in the following sections. This included responses from Canterbury Bankstown Council and the NSW State Emergency Service.

Transport has and will continue to consider any feedback provided by government agencies during detailed design and construction of the proposal.

In summary, the issues raised by each government agency generally relate to the topics outlined in Table 3-1

Government agency	Key issues
Canterbury Bankstown Counc	• Design suggestions, including those relating to active and public transport, intersection layouts, drainage design and maintenance
	Impact to street trees
	• Traffic performance due to the proposal on the local road network, including near Keys Parade
	Impacts of the proposal on flooding
NSW State Emergency Service	Emergency access
	Construction weather monitoring requirements

Table 3-1 Key issues raised by government agencies

3.2 Canterbury Bankstown Council

3.2.1 Design

Active and public transport

Issue description

- Request for a 1.5 metre footpath to be provided along Ingram Avenue and Fromelles Avenue. This would be in line with funding received by Council under the NSW Active Transport Grant Program, where minimum footpath widths are 1.5 metres.
- It is unclear whether an active transport connection would be implemented between the proposal and the proposed residential development at Western Sydney University, which would likely require active transport improvements.
- Request for the construction of a pedestrian overpass over Henry Lawson Drive at the Pozieres Avenue intersection to provide a safer and more reliable connection between the eastern and western sides of Milperra. It is noted that Council had previously written to the Minister for Transport and Roads about this design option in November 2021.
- Request for bus stops along Henry Lawson Drive to be reinstalled to comply with the Disability Standards for Accessible Public Transport.
- Support for the provision of lighting at the bus stops being in compliance with the Public Lighting Code ASNZS 1158.
- Suggestion for the pedestrian/cyclist crossing near the M5 exit ramp on Henry Lawson Drive to be included in the proposal to reduce safety risks associated with poor sight lines for active transport users and motorists.

Response

- The proposal would involve the construction of two-metre-wide footpaths with local narrowing as required to minimise tree removal. The footpath would be located:
 - on the eastern side of Henry Lawson Drive between the Flower Power and Ingram Avenue
 - along the northern side of Ingram Avenue
 - along the eastern side of Fromelles Avenue.

The proposal would also involve the construction of four-metre-wide shared paths on the western/southern side of Henry Lawson Drive between Pozieres Avenue and Keys Parade and along Keys Parade, the new Auld Avenue link road and the extended section of Raleigh Road. The shared path would narrow to three metres wide near trees that are to be retained throughout the proposal area. Further details on refinements to the shared path design are outlined in section 4.2.4.

• The shared path network being installed as part of the proposal would not be near the Western Sydney University development as this is outside the proposal area.

As noted in Section 3.2.3 of the REF, the proposal would only involve the installation of shared paths along Henry Lawson Drive, the extension of Raleigh Road and near the new link road. In addition, the proposal would only provide new footpaths on the eastern side of:

- Henry Lawson Drive between the existing footpath outside Flower Power and Ingram Avenue
- Fromelles Avenue and Ingram Avenue connecting into existing Council paths.
- Transport investigated options for a pedestrian overpass at Pozieres Avenue based on comments from the community. The options considered included:
 - retaining the existing at-grade crossings
 - an overpass with stairs only
 - an overpass with a lift and stairs
 - an overpass with ramps and stairs
 - at-grade crossings on all approaches (new crossing on southern side).

A Value Management Workshop was held on 16 November 2022 to discuss options for a pedestrian overpass at the Henry Lawson Drive / Pozieres Avenue intersection. The workshop involved a comparison of the different options against a set of criteria. The key criteria included safety, constructability, community accessibility, environmental impacts (including visual impacts), impacts to properties, and capital and ongoing costs.

Due to the topography in this area, crossing location, use type, and crash history, the implementation of at-grade crossings on all approaches at the Henry Lawson Drive / Pozieres Avenue intersection was identified as the option that best aligned with the assessed criteria.

- The proposal would involve the installation of like-for-like bus stops that would comply with the Disability Standards for Accessible Public Transport.
- Like-for-like lighting at bus stops would be provided by the proposal with street lighting being designed to the required standards for the road classification.
- Following display of the REF, Transport has reviewed the kerb, traffic island and pedestrian crossing alignment near the left turn slip lane from Henry Lawson Drive onto the M5 Motorway eastbound. Kerb extensions and existing traffic island modifications have been incorporated into the design. This would improve safety for pedestrians at this location as it would improve the sight distance to the pedestrian crossing across the slip lane for motorists travelling south along Henry Lawson Drive turning onto the M5 Motorway. Refer to Section 0 for further details.

Drainage

Issue description

- Request for further details about the proposed drainage design. It is noted that redirection of flows into the Newlands Wetlands would be ideal.
- Preference for a bridge where the link road crosses Milperra Drain instead of a culvert. The benefits of the bridge instead of culverts could include better ongoing maintenance access and better hydraulic capacity.
- The proposal should include the clearing and widening of the existing Milperra Drain between Henry Lawson Drive, Auld Avenue and Keys Parade to avoid a constriction for the upstream flows during flooding events.
- The stormwater network along Henry Lawson Drive should be designed to be able to capture flows from 491 Henry Lawson Drive and direct them towards the Milperra Drain.
- Kerb and guttering and associated stormwater pits and pipes should be provided along the alignment of Henry Lawson Drive to meet relevant design requirements for the control of flow width on the road and prevention of nuisance flooding of properties.

Response

- As noted in Section 3.2.3 of the REF, road drainage infrastructure and water quality management and stormwater treatment measures would be installed along the length of the proposal. This would include:
 - A system of pits and pipes within the median and kerb on Henry Lawson Drive and Keys Parade, as well as across the Bullecourt Avenue / Ashford Avenue intersection. This network has been designed to remove water from the road surface as quickly as possible
 - Three drainage swales, located on the western side of Henry Lawson Drive between Borella Road and Ruthven Avenue, on the eastern side of the new link road between Auld Avenue and Keys Parade and on the western side of Keys Parade
 - A box culvert across Milperra Drain as part of the Auld Avenue to Keys Parade local link road
 - A bioretention basin between Henry Lawson Drive, Bullecourt Avenue and Fleurbaix Avenue
 - Two Gross Pollutant Traps (near Ingram Avenue and north of Keys Parade)
 - Scour protection at longitudinal pipes, drainage outlets and swales to prevent erosion and scour from the flow of water.

The proposal would not redirect any existing outlets or change any water output, including flows into the wetlands in Newland Reserve. Runoff cannot be redirected to the wetlands due to the distance between the road and the wetlands, unfavourable contours, and the extent of pipes required through open space and local roads to reach the wetlands. As such, redirection of flows was not favourable.

The pavement drainage pit and pipe network would be designed to achieve flood immunity for a 10 per cent annual exceedance probability (AEP) flood event, with additional capacity in major storm events. During the one per cent AEP flood events, flows would be conveyed overland to the sag/low points and then discharged through the outlet points by spilling over the back of the formation. The swales would be designed to provide protection against a 20 per cent Annual Exceedance Probability (AEP) flood event.

• Transport have consulted with Canterbury Bankstown Council about design solutions for the Milperra Drain crossing by the link road. The current design includes a culvert with sufficient hydraulic capacity and maintenance access.

Further investigations including consideration of a bridge would be undertaken during detailed design of the proposal to make sure the most appropriate solution is implemented. Council would continue to be consulted about the design solution.

• Works within Milperra Drain to construct the culvert under the Auld Avenue link road would be carried out with consideration to the design and construction considerations in the *Guidelines for instream works on waterfront land*, (Department of Primary Industries Office of Water, 2012a), *Guidelines for watercourse crossings on waterfront land* (Department of Primary Industries Office of Water, 2012b), and in line with relevant Transport specifications and guidelines. Clearing of the drain would be carried out near the proposal area during the construction phase to avoid impacts to upstream flows and minimise potential impacts during flood events.

A soil and water management plan would be developed for the proposal in addition to erosion and sediment controls included in the erosion and sediment control plans for the proposal. These would be further developed during the detailed design phase and may include removing localised blockages within the channel within the proposal area.

- As part of the proposal, drainage along Henry Lawson Drive would be upgraded. While this would include roadside drainage near 491 Henry Lawson Drive to capture excess flows, the proposal would not provide direct drainage connections to private properties.
- As noted in Section 3.2.3 of the REF, the proposal would provide longitudinal drains, which are designed to remove water from the road surface as quickly as possible. This would include a system of pits and pipes within the median and kerb on Henry Lawson Drive and Keys Parade, as well as across the Bullecourt Avenue / Ashford Avenue intersection. This network would connect with water quality management measures and allow natural stormwater runoff collection from the road surface. The proposal generally achieves flow width requirements identified in Austroads standards. There are some instances where flow width does not comply due to flooding in the Milperra Drain, undersized existing pipes and proposed road levels. Further investigation and development of mitigation strategies would be carried out during the detailed design phase to minimise the impacts where the proposal does not comply with flow width requirements. Nuisance flooding of properties would be prevented through the updated road levels with gradients directing flows to the pits and pipes network, rather than to properties.

Intersection layout

Issue description

- Clarification about whether a continuous central median has been considered along Keys Parade to prevent vehicles turning right from Keys Parade onto the link road
- Clarification about whether a pedestrian/bicycle refuge would be provided at the Henry Lawson Drive / Auld Avenue intersection to provide safer access onto the proposed shared path alignment. Poor sightlines exist for active transport users travelling northbound across Auld Avenue due to the alignment of Henry Lawson Drive. Request for the refuge to be set further back from the intersection to improve pedestrian and cyclist safety, especially while vehicles are queuing to turn onto Henry Lawson Drive.
- Request for the installation of traffic signals at the Bullecourt Avenue / Dernancourt Parade intersection to address safety issues and intersection performance.

Response

- A continuous centre median along Keys Parade has been considered but cannot be implemented due to the need for vehicles to be able to turn right out of the link road onto Keys Parade to access the local road network. A 'No right turn' sign would be installed instead of a centre median to prevent vehicles turning directly from Keys Parade into the link road. In addition, the position of the island on the link road near its intersection with Keys Parade has been designed to prevent vehicles from turning right from Keys Parade.
- A bicycle refuge solution was incorporated into the Henry Lawson Drive Upgrade Stage 1A design during its detailed design phase, where the location of this refuge was refined to be set further back from the Henry Lawson Drive / Auld Avenue intersection. The bicycle refuge would be constructed as part of the Henry Lawson Drive Upgrade Stage 1B proposal as part of the Auld Avenue intersection upgrade. This would improve safety for cyclists and pedestrians. Canterbury Bankstown Council would continue to be consulted about the design solution for the bicycle refuge through the detailed design phase.
- Upgrades to the Bullecourt Avenue / Dernancourt Parade intersection are not currently proposed as part of the proposal. Transport would continue to consider potential upgrades to this intersection in consultation with Council during detailed design.

Maintenance and ownership

Issue description

- Question about which areas of the proposal would be maintained by Council during operation and a request for a separate plan showing areas to be maintained by Council. Grass slopes or batter must not exceed Council's requirements for maintenance.
- Residual land will remain between Henry Lawson Drive and Raleigh Road at the conclusion of the works. Council will continue conversations with Transport regarding ownership and treatment of this land.

Response

- On completion of construction, Transport would hand over relevant assets to Council to maintain. This would include verges, shared paths, footpaths and other residual land. Transport would continue to consult with Council during detailed design about ownership and maintenance. This will include consideration of Council's maintenance requirements such as the gradient of grass slopes or batters.
- Transport would consult with Council about residual land that would remain at the conclusion of construction, including ownership and treatment of this land.

3.2.2 Impact to street trees

Issue description

- Preference to retain as many trees as possible along the shared path alignment between Ruthven Avenue and Ganmain Crescent. Council anticipates that:
 - further investigations would take place at the next design phase to minimise impacts from the shared path to the second row of trees on the western side of Henry Lawson Drive
 - any design alternatives would be assessed in consultation with Council.
- A discussion on the health, condition and significance of trees to be retained and removed throughout the proposal area should be included in the arboricultural impact assessment. The assessment should also consider offset planting.
- Tree impacts should be minimised, with preference for minimal or no tree loss as a result of the proposal. Appropriate levels of community consultation should take place due to the sensitivity of the issue to community. Clarification is required about the proposed offsetting solution for tree removal and whether trees removed would be offset at a minimum 3:1 ratio within the road corridor.
- Preference for revegetation to be consistent with historic vegetation communities from the proposal area. Landscaping should favour large canopy trees throughout the corridor and midstory and groundcover planting where appropriate.

Response

• Transport has consulted with Council about minimising impacts to street trees. In consultation with Council, of the 68 trees initially impacted by the shared path between Ganmain Crescent and Raleigh Road, 18 were found to be in poor condition. These trees would require removal in the short to medium term as part of regular maintenance separate from tree removal required for the proposal.

Near the remaining trees identified as being impacted by the shared path design in this area, the surface type has been changed from concrete to fibre reinforced plastic (FRP) grating. This would potentially allow up to 50 trees to be retained due to the construction of the path being at ground level with minimal ground and tree root disturbance. This would be confirmed through further consultation with council during detailed design.

In addition, the shared path alignment has been adjusted between Ganmain Crescent and Amiens Avenue and Borella Road and Raleigh Road to avoid removing trees in these areas.

Refer to Section 4.2.4 for further details.

Transport will continue to review the shared path design through the detailed design phase to further minimise tree removal in accordance with Safeguard A1.

- The health, condition and significance of trees to be retained and removed has been considered in the arboricultural impact assessment carried out for the proposal, which has been provided to Council.
- Replacement planting would be discussed with Council and would occur within the Henry Lawson Drive corridor, where possible.

Impacts of the proposal to vegetation and threatened species habitat would be offset, where required, in line with Transport's Biodiversity Policy (Transport, 2022a). This would include consideration of no net loss to biodiversity and tree and hollow replacement.

• To minimise the long-term impacts of tree removal to the character of the area, a landscaping and replanting plan would be implemented in accordance with Safeguard V2. A concept landscaping plan has been included in Appendix G of the REF. This plan includes the proposed species for replanting throughout the proposal area, including along the western side of Henry Lawson Drive. The landscaping and replanting plan would be further refined during detailed design.

3.2.3 Traffic and transport

Issue description

- Queries about the proposed changes near Keys Parade, including:
 - clarification required about whether the right hand turn out of the link road onto Keys Parade would be possible as part of the proposal
 - concern about traffic congestion on Keys Parade, the Auld Avenue link road and on Henry Lawson Drive northbound (from traffic turning out of Keys Parade) due to future traffic increases from the Riverlands development
 - request for further traffic modelling for Keys Parade, including the link road intersection and the Raleigh Road roundabout to ensure that there is capacity and that queuing on the link road to turn right onto Keys Parade is minimised
- Clarification needed about whether kerbside parking would still be possible on Bullecourt Avenue between Henry Lawson Drive and Keysor Place. Further understanding required about the implications of the proposal for the use of Bullecourt Avenue as a local road and for parking given its proposed use as a B-Double route, and the effects this would have on other local roads.
- Impacts of the proposal to garbage truck movements would be assessed by Council as the design progresses.

Response

• The current design allows for vehicles to turn right out of the link road onto Keys Parade.

As outlined in section 2.3.3 of Appendix D of the REF (Traffic and Transport Impact Assessment), increased traffic from the Riverlands development has been included in future traffic modelling.

The traffic and transport impact assessment for the proposal included modelling of the traffic performance of the concept design, including Keys Parade, the Keys Parade roundabout, and the Keys Parade / Auld Avenue link road intersection. The impacts of the proposal on traffic and transport performance during operation are presented as Level of Service (LOS) for both the 'without proposal' and 'with proposal' scenarios in the 2031 and 2041 future models.

The traffic movements along Keys Parade are reflected in the intersection performance of the Henry Lawson Drive / Keys Parade intersection. Additionally, due to the proximity of the roundabout and link road intersection to the Henry Lawson Drive / Keys Parade intersection, the LOS at this intersection is representative of performance of the proposal in these areas.

In almost all peak period scenarios, the intersection would remain at the same LOS or an improved LOS in the 'with proposal' scenario compared to the 'without proposal' scenario for both 2031 and 2041. The 'without proposal' scenario includes Keys Parade (to be constructed by others) but does not include the link road or its intersection with Keys Parade. On weekends (when there would be an anticipated increase in patronage of Gordon Parker Reserve), the LOS does decrease from LOS B in the 'without proposal' scenario to LOS C in the 'with proposal' scenario in both 2031 and 2041. However, this is still deemed a satisfactory intersection performance. As such, there would be sufficient capacity on Keys Parade to accommodate traffic in this area.
In addition, the proposal would provide additional exit points from Gordon Parker Reserve. Vehicles would be able to turn left from Auld Avenue to travel northbound on Henry Lawson Drive or use the link road to access the local roads of Milperra or the southbound lanes of Henry Lawson Drive. Vehicles being able to use these options would ease congestion at the different exit points.

• The proposal would result in the removal of all parking spaces on Bullecourt Avenue between Henry Lawson Drive and Keysor Place. This amounts to 11 parking spaces which currently permit vehicles under 6 metres to park with no time restrictions. Refer to Section 4.1.1 for further details. Doorknocking was carried out by Transport with affected residents to inform them of the impacts of the upgrade on parking on Bullecourt Avenue. A letter was also left at all properties with details of the parking impacts of the proposal. A copy of the letter is available in Appendix A. One submission was received in response to this, which is addressed in section 2.2.1 of this report.

The submission suggested shifting the road alignment south to retain the parking spaces. This has been investigated and would result in property acquisition of private property, additional tree removal, and additional utility and electrical adjustments. Due to this, shifting of the Bullecourt Avenue road corridor to the south to allow for the retention of 11 parking spaces is not feasible.

The submission also called for a design solution to be implemented to allow motorists to turn right into driveways from Bullecourt Avenue westbound between Henry Lawson Drive and Keysor Place. Currently, it can be dangerous for motorists to turn right into properties when travelling westbound along Bullecourt Avenue due to restricted views of vehicles turning right from Henry Lawson Drive into Bullecourt Avenue. As such, residents would need to travel eastbound on Bullecourt Avenue to reach their driveways safely. This would be the same situation with the proposal.

In addition, the proposal would not and Transport is not considering the conversion of Bullecourt Avenue into a B-Double route.

• Transport notes that Council would consider impacts of the proposal on garbage truck movements.

3.2.4 Hydrology, flooding and coastal processes

Flood impacted areas

Issue description

• How has flood affectation been considered in the design and materials selection and will the design mitigate flooding issues in highly flood affected areas between Milperra Road and Bullecourt Avenue?

Response

• The proposal has been designed to minimise impacts to flood affected areas, including no alterations to the grade of Henry Lawson Drive to minimise impacts to flood behaviour. Section 6.4.3 of the REF details the anticipated construction and operational flooding impacts of the proposal.

In areas susceptible to flooding (particularly in the northern section of the proposal area), pavement and drainage materials that can accommodate inundation during flood events have been selected. Pavement subsurface drainage is also provided in these areas to provide adequate drainage considering the relatively high frequency of flooding.

During the operational phase of the proposal, it is anticipated that there would be minor increases in flood levels from the Milperra Drain catchment to some locations throughout the proposal area. Very minor increases in flood velocities from the Milperra Drain catchments would also occur, however these would be less than 0.1 metres per second. No worsening of the flood hazard category would occur from the Milperra Drain catchment due to the minor increase in flood levels and the current flooding depth experienced. Further details are provided in Table 6-38 in Section 6.4.3 of the REF.

There would be no increase in flood levels, only minimal increases in flood velocities (of less than 0.1 metres per second) and no worsening of flood hazards from the Georges River catchment.

As such, it is anticipated that the impacts of the proposal on flood prone areas would be minimal.

3.2.5 Surface water

Issue description

• Is the Neutral or Beneficial Effect (NorBE) principal being applied toward water quality?

Response

• While the proposal is not within the Sydney Drinking Water Catchment and as such does not require a Neutral or Beneficial Effect (NorBE) assessment, the proposed water quality treatment as part of the drainage design has achieved the stringent NorBE criteria (refer to Appendix J of the REF). The proposal would not worsen water quality conditions from pre-development conditions. The water quality strategy for the proposal is to limit the discharge of pollutants to meet the water quality objectives and maintain the environmental values for the Georges River Estuary and tributaries. The proposal, with the controls outlined in section 6.8.4 of the REF in place, would reduce the pollutant load levels to below the existing levels and achieve stringent NorBE criteria. The bioretention basin, gross pollutant traps and swales would all contribute to achieving this during operation of the proposal.

3.2.6 Non-Aboriginal heritage

Issue description

• Preference to retain and relocate the Milperra Memorial Sign so that it remains adjacent to the shared path and facing Henry Lawson Drive. Council has previously provided comments on this.

Response

• In accordance with Safeguard NA8 (refer to Section 6.2), the Milperra Memorial Sign would be retained and relocated to a similar vantage point along Henry Lawson Drive once the proposal is completed.

3.2.7 Biodiversity

Issue description

- Request for further information about the impacts of the proposed new link road on riparian vegetation and habitat, as well as information about how runoff would be treated prior to entering Milperra Drain.
- Clarification required about how the impacts to threatened ecological communities and threatened species habitat as a result of the proposal are being offset.

Response

• The design of the new link road has been developed to retain as many existing mature trees as possible. The Biodiversity Assessment Report for the proposal (Appendix H of the REF) acknowledges that the construction of the link road would have impacts to an artificial wetland (PCT 781) and areas of PCT 835 and PCT 1800. In addition, the link road would present a new collision risk for fauna during construction and operation, however this risk is anticipated to be low given there are no large areas of adjacent habitat, including riparian vegetation, that would support a large number of ground dwelling fauna.

A drainage swale would be located on the eastern side of the new link road to treat runoff from the link road prior to entering Milperra Drain. This would be a like-for-like solution to the swale next to the existing footpath in this area. This would help to minimise impacts from surface water runoff to riparian vegetation and habitat.

• The Biodiversity Assessment Report for the proposal (Appendix H of the REF) outlines that 11.44 hectares of vegetation is estimated to be cleared by the proposal. This includes 2.62 hectares of planted native vegetation, 5.76 hectares of exotic vegetation, and 3.06 hectares of native vegetation communities. It is noted that the estimated area of vegetation to be impacted has been overstated, meaning the vegetation proposed to be removed is likely to decrease as the design progresses. The 5.68 hectares of native vegetation to be removed as part of the proposal includes some areas of threatened fauna habitat (outlined in Table 6-48 of the REF).

The biodiversity assessment report concluded that the proposal is not likely to significantly impact threatened species or ecological communities or their habitats, within the meaning of the Biodiversity Conservation Act, 2016 or Fisheries Management Act 1994 and therefore a Species Impact Statement or Biodiversity Development Assessment Report is not required. As such, any requirements for offsets would be under Transport's Biodiversity Policy. As the proposal would involve clearing over one hectare of habitat for the Southern Myotis and Cumberland Plain Land Snail, offsets for these species would be required under the policy. These species would require 32 and 18 species credits respectively. All other

vegetation to be cleared would not require offsetting given that there would be less than two hectares to be cleared or the condition of the vegetation is considered low. The proposal would still incorporate a landscaping plan to revegetate the proposal area. This plan is included in Appendix G of the REF. Transport will further develop the offsetting plan for the proposal during detailed design.

3.2.8 Support

Issue description

- Support for:
 - the upgrade due to the benefits it provides, including reduced congestion, improved safety and connectivity, and improved functionality of the nearby industrial precinct. Support for the investment by Transport in improving transport infrastructure within the City of Canterbury Bankstown.
 - the construction of the link road and the introduction of the left-in left-out intersection at Auld Avenue (as included in the Henry Lawson Drive Upgrade Stage 1A), which will provide a safer route for vehicles from Gordon Parker Reserve.
 - improvements to the shared path route along Henry Lawson Drive, given the connections this provides within the LGA and to other LGAs.

Response

• Transport notes Council's support for the proposal.

3.3 NSW State Emergency Service

3.3.1 Hydrology, flooding and coastal processes

Emergency access

Issue description

- Continued consultation with the NSW SES is required to minimise impacts from floods, including disruptions to emergency access.
- The Henry Lawson Drive / Auld Avenue intersection is a crucial flood rescue location. It is noted that emergency access may be hindered by the no right turn and that the proximity to the Milperra Drain bridge would pose a risk to life during a flood.

Response

- In accordance with Safeguard H3, continued consultation would be carried out with the NSW SES during detailed design and construction around any anticipated flood risks. Transport would communicate anticipated disruptions and changes to the road network during construction and operation so that impacts from floods, including emergency response, are minimised.
- Under the Henry Lawson Drive Upgrade Stage 1A project (subject to a separate planning approval), Auld Avenue would be converted to left-in left-out only. However, as discussed in the Henry Lawson Drive Upgrade Stage 1A Submissions Report (Transport, 2021), this would only occur once an alternative access (via a link road) is constructed.

The local link road between Keys Parade and Auld Avenue forms part of this proposal. Access to Auld Avenue would be via the right turn from Henry Lawson Drive until construction of the link road is complete. At that stage, NSW SES would be able to access Auld Avenue via the Henry Lawson Drive / Keys Parade intersection and local link road. As such, despite changes to access arrangements to Auld Avenue, access to this road would be maintained at all times prior to, during and after construction.

Weather monitoring

Issue description

• Recommendation to include a measure to check the Bureau of Meteorology website before the start of each construction day to assess flood risk and to close the worksite if necessary.

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Response

• In accordance with Safeguard H2, a Flood Management Plan would be developed for the proposal. This includes provisions for a weather monitoring procedure, for the removal of construction equipment and materials from flood prone areas prior to heavy rainfall or when a weather warning is issued, and for an emergency evacuation procedure in the event of a severe weather warning or flood alert.

4. Changes to the proposal

This chapter addresses REF clarifications and design changes that have been made in response to submissions received on the REF.

4.1 REF clarification

4.1.1 Parking on Bullecourt Avenue

The REF did not identify that the proposal would remove all 11 parking spaces on the northern side of Bullecourt Avenue between Henry Lawson Drive and the existing bus zone west of Keysor Place. These parking spaces currently permit unrestricted parking for vehicles under six metres long. They would need to be removed to accommodate the intersection upgrades at the Henry Lawson Drive / Bullecourt Avenue intersection as described in Section 3.2.3 of the REF.

Section 2.2.1 of this report includes the response to one submission received in response to a letter sent to residents affected by this removal of parking spaces.

4.2 Design changes

Following display of the REF, in response to community and stakeholder feedback and as part of ongoing design development, the proposal design has been refined (the revised design). The revised design includes:

- Works near Keys Parade, including adjustments to the road, shared path and drainage design near Keys Parade to improve compliance to standards, user comfortability and road safety (refer to section 4.2.1)
- Raleigh Road works near Milperra Sports Centre, including an adjustment to the Raleigh Road tie-in to the Milperra Sports Centre to improve access to this facility (refer to section 4.2.2)
- Henry Lawson Drive / Bullecourt Avenue intersection works, including adjustments to the intersection layout to improve the flow of traffic from Bullecourt Avenue onto Henry Lawson Drive (refer to section 4.2.3)
- Active transport improvements across the proposal area, including:
 - changes to the shared path surface type to retain existing street trees
 - widening of the shared path to four-metre-wide north of Borella Road to provide more space for active transport users
 - modification of pedestrian refuges to pedestrian and cyclist priority crossings on Keys Parade near the Raleigh Road extension and on Auld Avenue near the link road to improve pedestrian and cyclist safety
 - adjustments to the left-turn slip lane from Henry Lawson Drive onto the M5 Motorway eastbound to improve sight lines for motorists and to improve pedestrian safety (refer to section 4.2.4).

Further details about the revised design are provided in the following sections. Most of the revised design has been undertaken within the REF proposal area, however there are a few items near Keys Parade, Raleigh Road, Auld Avenue and the M5 Motorway on-ramp that extend outside the REF proposal area. The revised design, the REF proposal area and revised proposal area are shown in Figure 4-1a-d.



Figure 4-1a Changes to the proposal



REF submissions report

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REF submissions report



Figure 4-1c Changes to the proposal



Figure 4-1d Changes to the proposal

4.2.1 Work near Keys Parade

Design changes have been made to the Keys Parade alignment and its intersection with Raleigh Road, the link road and Henry Lawson Drive to improve user experience, road safety and road drainage. The revised design includes:

- increase in length of the second right turn lane into Keys Parade from Henry Lawson Drive southbound to increase vehicle storage
- adjustments to the pedestrian refuge and associated island at the link road crossing to improve sight lines for pedestrians
- dual lane approach to the roundabout on Keys Parade westbound, with the left lane catering for left turning vehicles into Raleigh Road and the right lane permitting through and U-turn movements
- lane widening on Keys Parade between Henry Lawson Drive and the roundabout and on Raleigh Road between the existing road and the roundabout to provide sufficient lane widths
- addition of a raised concrete median on Keys Parade between the link road and the roundabout
- inclusion of a 50-metre-long kerb with pit and pipe drainage along the south-eastern side of Keys Parade between the link road and the roundabout, which would discharge water directly into the Milperra Drain, rather than the drainage swales as proposed in the REF.

These changes have resulted in the following extensions to the REF proposal area:

- to the south-west along Keys Parade, within the existing road reserve for the future Keys Parade (to be developed by others).
- to the north-west along Keys Parade towards Milperra Drain
- to the east of Henry Lawson Drive near Flower Power to accommodate the lane adjustments on Henry Lawson Drive southbound. This section is between the existing Henry Lawson Drive road corridor and Flower Power.

The revised proposal area is shown in Figure 4-1a-d. The other design changes in this area are within the REF proposal area.

4.2.2 Raleigh Road works near Milperra Sports Centre

The Raleigh Road works have been updated to include a refined driveway tie-in to the Milperra Sports Centre and tie-in to the existing section of Raleigh Road.

These changes have resulted in an extension of the REF proposal area to accommodate an increase in property acquisition of the Milperra Sports Centre for the driveway tie-in and tie-in work further south on Raleigh Road. The revised proposal area is shown in Figure 4-1a-d.

4.2.3 Henry Lawson Drive / Bullecourt Avenue intersection

Changes have been made to the Henry Lawson Drive / Bullecourt Avenue intersection to improve user experience and road safety. The changes are as follows:

- The left turn slip lane from Bullecourt Avenue onto Henry Lawson Drive southbound and kerb alignment at the Henry Lawson Drive / Bullecourt Avenue intersection has been shifted west and modified to better align the intersection to Henry Lawson Drive. The left turn is now proposed to be lengthened and the left turn width at the intersection has also been narrowed to allow a single vehicle to turn.
- The outer right turn lane onto Henry Lawson Drive northbound now begins west of the Bullecourt Avenue / Fleurbaix Avenue intersection.
- The left turn lane from Henry Lawson Drive southbound into Bullecourt Avenue has also been extended to be 75 metres long to increase vehicle storage.
- Associated adjustments to the footpath connection between Ingram Avenue and Bullecourt Avenue

These changes are within the REF proposal area shown in Figure 4-1a-d.

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4.2.4 Active transport improvements across the proposal area

Shared path design

The REF noted that a three-metre-wide concrete shared path would be installed along the western/southern side of Henry Lawson Drive between Pozieres Avenue and Borella Road and north of Keys Parade. The sections of new path would tie into retained sections of existing Council shared path along Henry Lawson Drive.

Following display of the REF, Transport has consulted with Council to further investigate opportunities to minimise impacts to street trees while maintaining the proposed improvements to active transport infrastructure.

As such, to assist in the retention of good condition street streets, the surface type of shared path near these trees would be changed from concrete to fibre reinforced plastic (FRP) grating. FRP grating would allow the path to be constructed at ground level with minimal ground and tree root disturbance, allowing retention of additional trees.

The sections of shared path with FRP grating surface would maintain a width of three metres. All other sections of shared path with a concrete surface have been widened and are now proposed to be four metres wide.

In addition, the shared path alignment has been adjusted between Ganmain Crescent and Amiens Avenue, and Borella Road and Raleigh Road, to avoid removing trees in these areas.

The shared path design has also been refined in response to community feedback to improve cyclist and pedestrian connectivity throughout the proposal area. This includes:

- Widening of shared path north of Borella Road on Henry Lawson Drive to four metres. Where the proposal
 ties into the upgraded Keys Parade, the shared path would taper back to three metres wide.
- Conversion of the footpath south of Pozieres Avenue on Henry Lawson Drive to a three-metre-wide shared path to accommodate for cyclists and pedestrians and to allow for shared path connectivity along the western side of Henry Lawson Drive.
- Including kerb ramps to connect the shared path to Ganmain Crescent and Ruthven Avenue.

Further investigations would be carried out to identify opportunities to provide additional shared path connections along Keys Parade.

Most of these changes are within the REF proposal area. The widening of shared path to be four metres on Keys Parade has resulted in the extension of the REF proposal area to the north-west towards the Milperra Drain. The revised proposal area is shown in Figure 4-1a-d.

Pedestrian and cyclist priority crossings

In the REF, pedestrian refuges were proposed on Keys Parade near the Raleigh Road extension and on Auld Avenue near the link road to allow pedestrians and cyclists using the shared path networks to safely cross these roads.

These pedestrian refuges would be upgraded to pedestrian and cyclist priority crossings at these locations. This would further improve safety for pedestrians and cyclists using the shared path network when crossing these roads.

While this change has been accommodated within the REF proposal area on Keys Parade, it has resulted in an extension of the REF proposal area on Auld Avenue to accommodate tie-ins with the existing active transport network on Auld Avenue. The revised proposal area is shown in Figure 4-1a-d and includes an additional section of road corridor. To accommodate a priority crossing across Auld Avenue, the number of parking spaces being removed on Auld Avenue near Gordon Parker Reserve increases from eight in the REF to 15.

Left turn slip lane onto the M5 Motorway

In response to the public display of the REF, Council requested that Transport include adjustments to the left turn slip lane from Henry Lawson Drive onto the M5 Motorway eastbound in the proposal to improve sight lines for motorists and improve safety for pedestrians.

Transport has reviewed the kerb, traffic island and pedestrian crossing in this location and incorporated kerb extensions and existing traffic island modification in the revised design. This would improve the sight distance

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to the pedestrian crossing across the slip lane for motorists travelling south along Henry Lawson Drive turning onto the M5 Motorway.

To accommodate this change, the REF proposal area has been extended to the south-east near the pedestrian crossing and slip lane. The revised proposal area is shown in Figure 4-1a-d.

5. Environmental assessment

As a result of the refinements to the proposal outlined in Chapter 4, there are some changes to the magnitude and type of environmental impacts as assessed in the REF. The following sections assess the design refinements against environmental assessment disciplines where changes in impacts are expected. As the extensions to the REF proposal area are immediately adjacent to the proposal area, the existing environment would be consistent with that outlined in the REF.

5.1 Arboriculture

The trees assessed in the arboricultural impact assessment (AIA) for the REF were identified due to their proximity to the edge of proposed design elements that would require excavation during construction such as kerbs or shared paths and uncertainty whether they could be retained. The AIA study area is shown in Figure 6-1 of the REF. The AIA study area was reviewed with consideration of the design changes and no additional trees were identified for arboricultural assessment that had not been assessed in the REF.

5.1.1 Potential impacts

The realignment and design refinements to the shared path along Henry Lawson Drive would reduce impacts to existing street trees compared to the impacts outlined in section 6.1.3 of the REF.

As is detailed in section 4.2.4, the shared path alignment has been adjusted between Ganmain Crescent and Amiens Avenue, and Borella Road and Raleigh Road to avoid removing trees in these areas.

Of the 68 trees initially impacted by the shared path between Ganmain Crescent and Raleigh Road, 18 were found to be in poor condition. These trees would require removal in the short to medium term as part of regular maintenance, irrespective of whether the proposal proceeds. Changing the shared path surface from concrete to FRP grating near the remaining identified 50 trees would result in minimal tree root disturbance and up to 50 trees potentially being retained. This change would be confirmed during detailed design. In addition, the shared path alignment has been adjusted between Ganmain Crescent and Amiens Avenue, and Borella Road and Raleigh Road, to avoid removing trees in these areas. The number of trees to be retained would be confirmed during detailed design (Safeguard A1).

As such, although some trees along Henry Lawson Drive would still need to be removed as part of the proposal, there would be an overall decrease in the number of trees proposed to be removed and therefore a reduction in arboricultural impacts. In accordance with Safeguard A1, during detailed design, opportunities to reduce the number of trees impacted by the proposal would also continue to be explored.

5.1.2 Revised safeguards and management measures

Although there would be a reduced number of trees proposed for removal as part of the revised design, all arboriculture safeguards and management measures identified in the REF are still applicable to the revised design.

Safeguard A1 has been amended due to the revised design (refer to Table 5-1). No additional safeguards and management measures would be required.

Table 5-1 Additional safeguard and management measure - arboriculture

No.	Impact	Environmental safeguards	Responsibility	Timing
A1	Tree removal	During detailed design, opportunities to reduce the number of trees impacted by the proposal will continue to be explored. Where possible, consideration will be given to refining the proposal's alignment and shared path design options to avoid or minimise impact on root zones. <u>An updated arboricultural impact</u> <u>assessment will be carried out against the</u> <u>detailed design to confirm the total number of</u> <u>trees to be retained and removed by the</u> <u>proposal.</u>	Transport	Detailed design

5.2 Traffic and transport

The traffic and transport impacts of the revised design would largely be consistent with those outlined in the REF. Almost all design changes outlined in section 4.2 would provide benefits to traffic and transport through the proposal area, including through improved vision for motorists and improved safety for motorists and active transport users. However, adverse traffic and transport impacts include reduced parking on Auld Avenue from the construction of the pedestrian and cyclist priority crossing.

Given all changes to traffic and transport would occur within the REF proposal area, no additional traffic modelling was required.

5.2.1 Potential impacts

Construction of the revised design would occur in the same general area as the proposal and would not require any additional construction vehicles or traffic disruptions. The extensions to the REF proposal area directly adjoin the REF proposal area and would form part of the same work site. As such, there are no anticipated additional construction traffic impacts as part of the revised design or extensions to the REF proposal area.

Changes to the road design along Keys Parade, at the Raleigh Road tie-in and at the Henry Lawson Drive / Bullecourt Avenue intersection have been made to improve traffic performance throughout the revised proposal area. The works along Keys Parade and near the Henry Lawson Drive / Bullecourt Avenue intersection, such as increased turning lane lengths and adjustments to intersection layouts, would allow for improved traffic flow and access to the local road network from Henry Lawson Drive. The Raleigh Road tie-in would allow for improved access to the Milperra Sports Centre from the local road network.

The revised design would also include the optimisation of the active transport network through the proposal area, which would result in improved connectivity and access for pedestrians and cyclists. The shared path location would be adjusted along Henry Lawson Drive, which would allow for shared path connectivity along the road alignment to be maintained while also increasing the number of street trees that can be retained, to provide shade and improved amenity. Additionally, the conversion of the footpath on Henry Lawson Drive south of Pozieres Avenue to a shared path as part of the revised design would improve connectivity for active transport users.

Pedestrian and cyclist safety would also be improved through the installation of kerb ramps and through the upgrade of pedestrian refuges throughout the proposal area to pedestrian and cyclist priority crossings. Sight line improvements for the pedestrian crossing at the on-ramp to the M5 Motorway would also improve safety for both pedestrians and motorists.

There would be minor adverse impacts to users of Gordon Parker Reserve, where the conversion of the pedestrian refuge on Auld Avenue to a pedestrian and cyclist priority crossing as part of the revised design would result in the removal of an additional seven parking spaces (15 in total). Investigations into and consultation with key stakeholders, including Council, about the provision of additional parking on Auld Avenue would be carried out during detailed design (Safeguard T12).

As is noted in section 2.2.1, Transport has commenced investigations to assess whether driveway access from 553A Henry Lawson Drive to Hermies Avenue can be safely provided. Transport would consult with Council and

affected property owners about this driveway access and confirm the outcome of these investigations during detailed design (Safeguard T8).

5.2.2 Revised safeguards and management measures

Safeguards T8 and T12 have been amended due to the revised design (refer to Table 5-2). No additional safeguards and management measures would be required.

Table 5-2 Additional safeguard and management measure - traffic and transport

No.	Impact	Environmental safeguards	Responsibility	Timing
Т8	Property access	 Property access would be maintained where feasible and reasonable and property owners would be consulted well in advance of work starting that may temporarily restrict or control access. Consultation would be carried out with the community regarding alternate access arrangements during operation 	Transport / contractor	Detailed design / construction
		 associated with the provision of left-in left-out intersections. Notification would be issued to emergency services about changes in 		
		 traffic conditions. Transport would consult with Council and affected property owners about investigations to assess whether driveway access from 553A Henry Lawson Drive to Hermies Avenue can be safely provided and confirm the outcome of these investigations during detailed design. 		
T12	Auld Avenue parking	During detailed design, Transport will consider opportunities to minimise the number of parking spaces that need to be removed on Auld Avenue Transport would carry out investigations into and consultation with key stakeholders, including Council, about the provision of additional formalised parking on Auld Avenue.	Transport	Detailed design

5.3 Noise and vibration

All design changes would be carried out in the same area as the REF proposal area, with only minor shifts towards sensitive receivers in some locations. Design changes would not require additional construction vehicles or equipment and are not anticipated to require noisier works than those assessed in the REF. As such, no further noise modelling was carried out for the refined design.

5.3.1 Potential impacts

The extension of the REF proposal area east of Keys Parade near the Flower Power complex to accommodate the lane adjustments on Henry Lawson Drive southbound would only extend works slightly closer to receivers in NCA02. The Flower Power complex was assessed to experience clearly audible construction noise and vibration impacts due to the REF proposal. Given this is a commercial receiver and work would be about five metres closer to this receiver, there would be negligible increase in impacts would be experienced by these receivers.

The extension of the REF proposal area near the M5 Motorway on-ramp would bring construction works slightly closer to sensitive receivers in NCA06, however the existing noise wall that separates sensitive receivers from

Henry Lawson Drive and the M5 Motorway would minimise noise impacts experienced by sensitive receivers near this design change. Additionally, the works are small in nature and would not require any additional construction equipment that would involve greater noise impacts than other nearby construction works modelled in the noise and vibration assessment carried out for the REF.

Works at the Henry Lawson Drive / Bullecourt Avenue intersection would only involve changes to the intersection layout and the length of the left turn lane from Henry Lawson Drive southbound into Bullecourt Avenue. These works would be within the REF proposal area and would not require any additional construction equipment compared to that which was assessed in the REF. As such, this design change would not result in increased construction noise and vibration impacts.

Similarly, adjustments to the location and surface type of the shared path throughout the proposal area would be within the assessed REF proposal area and would not involve noise impacts greater than those assessed in the REF.

There would be a minor increase in operational noise and vibration impacts due to the dual lane approach to the roundabout on Keys Parade westbound, which would result in slightly increased traffic noise in this area. Additional impacts would be minor from those assessed in the REF given traffic volumes wouldn't change and the dual lane would improve traffic flow.

5.3.2 Revised safeguards and management measures

All noise and vibration safeguards and management measures identified in the REF are applicable to the revised design. No additional safeguards and management measures would be required.

5.4 Hydrology and flooding

The impacts associated with the design refinements are consistent with the hydrology and flooding section of the REF (Section 6.4). The inclusion of a kerb with pit and pipe drainage on the south-eastern side of Keys Parade near the Keys Parade roundabout is the only design change that may interact with the operational hydrology and flooding behaviour of the proposal.

5.4.1 Potential impacts

Similar to the REF proposal area, the revised proposal area would be exposed to flood inundation. As per Safeguard H2 in the REF, a Flood Management Plan would be developed for the construction area and would include details and procedures to minimise the potential for construction activities to adversely impact on flood behaviour in neighbouring properties.

The drainage adjustments on the south-eastern side of Keys Parade have been made to improve the collection and removal of water from the road surface. Additionally, the drainage adjustments would connect into the drainage network proposed in the REF and would be able to capture more runoff than the initially proposed drainage, meaning there would be less uncaptured surface water that would run off the road. Consistent with the rest of the pavement drainage pit and pipe network, the new drainage infrastructure in this location would be designed to achieve flood immunity for a 10 per cent AEP flood event, with additional capacity in major storm events. As such, the addition of this drainage infrastructure is not anticipated to change the hydrology and flooding impacts of the proposal in this area.

5.4.2 Revised safeguards and management measures

All hydrology and flooding safeguards and management measures identified in the REF are applicable to the revised design. No additional safeguards and management measures would be required.

5.5 Biodiversity

A Biodiversity Assessment Report (BAR) was prepared by Ecoplanning (2023) to assess the likely biodiversity impacts of the proposal. Since the preparation of the BAR, seven additional areas outside of the BAR subject land have been included for the proposal (as outlined in Figure 4-1a-d). As such, an addendum BAR has been prepared by Ecoplanning (2023) to assess the likely additional impacts to biodiversity from these additional areas for the proposal. This is attached as Appendix B.

5.5.1 Methodology

For consistency with the assessment in the BAR, the following factors were considered for each additional area:

- Extent of vegetation zones within the extended area
- Presence of any threatened ecological communities (TEC)
- Presence of important fauna habitat features such as hollow-bearing trees or water bodies
- Whether the area is located within a species polygon for *Myotis macropus* (Southern Myotis) or *Meridolum corneovirens* (Cumberland Plain Land Snail)
- Whether the area is located within a mapped groundwater dependent ecosystem (GDE).

Data collected in the field and detailed in the methodology and results section of the BAR has been used to determine the likely impacts to these areas. No additional field survey was required as part of the addendum REF.

5.5.2 Existing environment

A summary of the existing environment in the additional areas is included in

Table 5-3.

Table 5-3 Environmental features of additional areas

Location	Area (ha)	Vegetation (ha)	Threatened fauna species habitat
Western end of Auld Avenue	0.011	• 0.002 ha PCT 835	Yes (Southern Myotis and Cumberland Plain Land Snail)
West of Keys Parade	0.053	 0.032 ha PCT 1800 0.020 ha exotic vegetation 	Yes (Southern Myotis)
East of the Henry Lawson Drive / Keys Parade intersection	0.021	• 0.016 ha exotic vegetation	No
South-west of Keys Parade	0.063	0.041 ha PCT 18000.022 ha exotic vegetation	Yes (Southern Myotis)
Driveway tie-in to Milperra Sports Centre	0.003	• 0.003 ha exotic vegetation	No
Raleigh Road	0.069	 0.005 ha PCT 725 0.001 ha PCT 835 0.010 ha exotic vegetation 	Yes (Southern Myotis)
M5 on-ramp	0.037	Overhanging canopy of PCT 835, no vegetation affected	No

Fauna habitat features within the REF proposal area are discussed in section 3.5.2 of the BAR. There were no important habitat features recorded within the additional areas. Additionally, no threatened flora species were recorded within the REF proposal area, and none are expected to occur in the additional areas.

5.5.3 Potential impacts

Native vegetation and threatened ecological communities

An additional 0.082 hectares of native vegetation (also associated with TECs) would be impacted by the revised proposal area. This includes an additional 0.005 hectares of PCT 725 near the tie-in works on Raleigh Road, 0.003 hectares of PCT 835 on Auld Avenue and near the tie-in works on Raleigh Road, and 0.074 hectares of PCT 1800 to the northwest and southwest of Keys Parade. An additional 0.071 hectares of exotic vegetation would be impacted under the revised proposal area.

All of these TECs are listed endangered ecological communities (EEC) under the BC Act. As discussed in Section 3.3 of the BAR, the condition criteria for listing of equivalent TECs under the EPBC Act is not met within the REF proposal area. The additional areas do not affect this outcome and there are no EPBC Act listed TECs within the revised proposal area.

A comparison of the impacts assessed under the REF and updated values as assessed in the addendum BAR is shown in Table 5-4.

Table 5-4 Revised impacts to native vegetation

PCT	PCT Name	Condition	TEC	REF impact area (ha)	Revised impact area (ha)
725	Broad-leaved Ironbark - Melaleuca decora shrubby open forest on clay soils of the Cumberland Plain, Sydney Basin Bioregion	Low	Cooks River/Castlereagh Ironbark Forest in the Sydney Basin Bioregion, (BC Act listed EEC)	0.14	0.145
781	Coastal freshwater lagoons of the Sydney Basin Bioregion and South East Corner Bioregion	Good	Sydney Freshwater Wetlands in the Sydney Basin Bioregion, (BC Act listed EEC)	0.08	0.08
835	Forest Red Gum - Rough- barked Apple grassy woodland on alluvial flats of the Cumberland Plain, Sydney Basin Bioregion	Moderate	River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions (BC Act listed EEC)	2.16	2.163
1067	Parramatta Red Gum woodland on moist alluvium of the Cumberland Plain, Sydney Basin Bioregion	Moderate	Castlereagh Swamp Woodland Community (BC Act EEC)	0.00	0.00
1800	Swamp Oak open forest on riverflats of the Cumberland Plain and Hunter valley	Moderate	Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions (BC Act listed EEC)	0.68	0.754
N/A	Planted Native Vegetation	-	-	2.62	2.62
		Total vegeta	ted areas	5.68	5.762

Fauna and aquatic habitat

The revised proposal area to the northwest of Keys Parade is located close to the Milperra Drain, which was assessed under the REF (refer to Section 2.6 and 3.6 of the BAR). No additional impacts beyond those discussed in the REF are anticipated through this additional area. All other additional areas would have no impacts to fauna and aquatic habitat.

Threatened species habitat

Threatened fauna species with a moderate likelihood of occurrence within the REF proposal area are outlined in Table 5-2 of the BAR. Revised impacts to threatened fauna habitat under the revised proposal area are included in

Table 5-5.

Table 5-5 Revised summary of direct impacts on threatened fauna habitat

Species name	EPBC Act	BC Act	Potential occurrence	Associated habitat in revised proposal area	REF impact (ha)	Revised impact (ha)
Artamus cyanopterus cyanopterus (Dusky Woodswallow)	-	Vulnerable	Moderate	PCT 725 PCT 781 PCT 835 PCT 1800	3.06	3.15
Daphoenositta chrysoptera (Varied Sittella)	-	Vulnerable	Moderate	PCT 725 PCT 835 PCT 1800	2.98	3.06
<i>Falsistrellus tasmaniensis</i> (Eastern False Pipistrelle)	-	Vulnerable	Moderate	PCT 725 PCT 781 PCT 835 Planted Native Vegetation	5.68	5.77
<i>Glossopsitta pusilla</i> (Little Lorikeet)	-	Vulnerable	Moderate	PCT 725 PCT 781 PCT 835 PCT 1800 Planted Native Vegetation	5.68	5.77
Haliaeetus leucogaster (White-bellied Sea-Eagle)	-	Vulnerable	Moderate	PCT 725 PCT 781 PCT 835 PCT 1800	3.06	3.15
Hirundapus caudacutus (White-throated Needletail)	Migratory	Vulnerable	Moderate	PCT 725 PCT 781 PCT 835 PCT 1800	3.06	3.15
<i>Meridolum corneovirens</i> (Cumberland Plain Land Snail)	-	Vulnerable	Moderate	PCT 835 containing leaf litter	1.02	1.01

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Species name	EPBC Act	BC Act	Potential occurrence	Associated habitat in revised proposal area	REF impact (ha)	Revised impact (ha)
<i>Micronomus norfolkensis</i> (Eastern Coastal Free-tailed Bat)	-	Vulnerable	Moderate	PCT 725 PCT 781 PCT 835 PCT 1800 Planted Native Vegetation	5.68	5.77
Miniopterus australis (Little Bent-winged Bat)	-	Vulnerable	Moderate	PCT 725 PCT 781 PCT 835 PCT 1800 Planted Native Vegetation	5.68	5.77
<i>Miniopterus orianae oceanensis</i> (Large Bent-winged Bat)	-	Vulnerable	Moderate	PCT 725 PCT 781 PCT 835 PCT 1800 Planted Native Vegetation	5.68	5.77
Myotis macropus (Southern Myotis)	-	Vulnerable	Moderate	All native vegetation within 200 m of water bodies	2.11	2.21
Ninox strenua (Powerful Owl)	-	Vulnerable	Moderate	PCT 725 PCT 835 PCT 1800	2.98	3.06
Pandion cristatus (Eastern Osprey)	-	Vulnerable	Moderate	PCT 781 PCT 835 PCT 1800	2.92	3.00
<i>Pteropus poliocephalus</i> (Grey-headed Flying-fox)	Vulnerable	Vulnerable	Moderate	PCT 725 PCT 781 PCT 835 PCT 1800 Planted Native Vegetation	5.68	5.77

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Species name	EPBC Act	BC Act	Potential occurrence	Associated habitat in revised proposal area	REF impact (ha)	Revised impact (ha)
Saccolaimus flaviventris	-	Vulnerable	Moderate	PCT 725	5.68	5.77
(Yellow-bellied Sheathtail-bat),				PCT 781		
				PCT 835		
				PCT 1800		
				Planted Native Vegetation		
Scoteanax rueppellii	-	Vulnerable	Moderate	PCT 725	5.60	5.68
(Greater Broad-nosed Bat)				PCT 835		
				PCT 1800		
				Planted Native Vegetation		

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Species polygons

The REF discusses the need for offsetting of two threatened species, being the Southern Myotis and the Cumberland Plain Land Snail.

Areas of potential habitat for Cumberland Plain Land Snail includes unmown areas of PCT 835 (Moderate condition) as it contains a good cover of leaf litter and logs. The extension of the REF proposal area near Auld Avenue contains 0.002 hectares of PCT 835 that meet these conditions. The 0.001 hectares of PCT 835 near the tie-in works on Raleigh Road, however, do not meet these conditions.

The extension to the REF proposal area has resulted in an increase to impacted area for Southern Myotis. The REF identified a total of 2.11 hectares of Southern Myotis habitat which has increased to 2.21 hectares in the revised proposal area.

Groundwater dependent ecosystems

The revised proposal area to the northwest of Keys Parade intersects land mapped as having high potential for GDEs. The vegetation associated with terrestrial GDEs within this extension is PCT 1800 Cumberland Swamp Oak Riparian Forest, which is associated with fresh water. The revised proposal area northwest of Keys Parade would not increase the extent or degree of potential impacts to GDEs compared to that assessed under the REF.

Assessments of significance

Overall, the additional impact areas are very small (between 0.005 to 0.080 hectares), and there would be no change to the conclusions reached in the assessments of significance assessed under the REF.

5.5.4 Biodiversity offsets

The REF identified that no EECs required offsetting under Transport's No Net Loss Guidelines. The revised proposal area would not alter this conclusion.

As discussed in section 5.5.3, the species polygons for both species credit species (Cumberland Plain Land Snail and Southern Myotis) were updated based on the revised proposal area. The species polygon for the Cumberland Plain Land Snail was amended slightly to 1.01 hectares, which does not affect the number of credits required under the REF (18). The updated species polygon for the Southern Myotis of 2.21 hectares did, however, require an increase in the credit offset requirement from 32 credits to 34 credits.

5.5.5 Revised safeguards and management measures

All biodiversity safeguards and management measures identified in the REF are applicable to the revised design. No additional safeguards and management measures would be required.

5.6 Socio-economic, property and land use

The impacts associated with the design refinements would be mostly consistent with the socio-economic section of the REF. Some additional property acquisition would be required to accommodate the extensions of the REF proposal area. However these extensions are only minor and would not result in a change to land use near the proposal area. There would also be negligible changes to amenity, including traffic, noise air and visual impacts, from the design refinements.

5.6.1 Potential impacts

The refined design would provide socio-economic benefits through improved active transport infrastructure, allowing better connectivity through the proposal area, and through improved amenity as a result of adjusted intersection layouts and the reduction in the number of trees proposed for removal. The only adverse socio-economic, property and land use impacts to those outlined in section 6.7.3 of the REF would be minor increases in property acquisition requirements at the Raleigh Road works and along the Keys Parade alignment. Partial property acquisition near the Milperra Sports Centre would be required to accommodate the refined driveway tie-in and additional areas of acquisition would be required to accommodate works along Keys Parade on the north-western side of the road alignment, as is outlined in Figure 4-1a. The properties required for acquisition are listed in Table 5-6.

Lot and DP	Total area (square metres)	Acquisition area (square metres)	Acquisition or lease	Current owner	Land use zone (LEP)
Lot 41 DP7304	12019	43	Partial acquisition	Private	RU4
Lot 42 DP7304	12019	3	Partial acquisition	Private	RU4
Lot 43 DP7304	11154	525	Partial acquisition	Private	RU4
Lot 101 DP603087	79157	27	Partial acquisition	Private	RU4

Table 5-6 Additional proposed property acquisition compared to the REF

In addition, some properties highlighted in the REF as being leased for the proposal would now require partial property acquisition, including near the link road and along Henry Lawson Drive south of the Flower Power complex. The properties requiring partial property acquisition are outlined in Table 5-7. The remainder of these properties would still be leased for the proposal.

Table 5-7 Add	itional proposed	property acquisition	for properties p	roposed to be	leased in the REF
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Lot and DP	Total area (square metres)	Acquisition area (square metres)	Acquisition or lease	Current owner	Land use zone (LEP)
Lot 45 DP7304	5269	1030	Partial acquisition	Private	RU4
Lot 1 DP572468	3441	77	Partial acquisition	Private	RE1
Lot 5 DP583916	779	8	Partial acquisition	Private	RE1

As is outlined in section 5.2.1 and section 5.3.1, the traffic and noise impacts of the design changes and REF proposal area extensions would largely be consistent with those assessed in the REF. As such, impacts to the amenity for residents near the proposal would be minimal, with an additional seven parking spaces being removed (total of 15) impacting amenity and access to Gordon Parker Reserve. Investigations into and consultation with key stakeholders, including Council, about the provision of additional parking on Auld Avenue would be carried out during detailed design.

The shared path alignment and surface type adjustments would improve amenity through the retention of additional trees and access and connectivity through the proposal area would be enhanced. In particular, the conversion of the footpath south of the Henry Lawson Drive / Pozieres Avenue intersection to a shared path would improve access for cyclists and pedestrians. Pedestrian and cyclist safety would also be improved near the M5 Motorway on-ramp where kerb extensions and existing traffic island modification would be carried out to improve sight lines for vehicles approaching the on-ramp.

5.6.2 Revised safeguards and management measures

All socio-economic safeguards and management measures identified in the REF are applicable to the revised design. No additional safeguards and management measures would be required.

5.7 Surface water

The impacts associated with the design refinements are consistent with the surface water section of the REF (Section 6.8). The inclusion of a kerb with pit and pipe drainage on the south-eastern side of Keys Parade near the Raleigh Road roundabout is the only design change that may result in additional impacts to surface water quality.

5.7.1 Potential impacts

During construction of the proposal, the key activities in the extended sections of the proposal area which may impact surface water quality include:

- soil erosion from vegetation removal and earthworks, including sediment-laden runoff draining to Milperra Drain and the Georges River from work in the northern section of the revised proposal area
- concrete and asphalt activities leaks, spills and waste from construction plant and activities.

As the revised proposal area includes only small extensions adjacent to the REF proposal area, the potential impacts of the revised design on surface water would be similar to those described in Table 6-57 in the REF.

During operation, the installation of the 50-metre-long pit and pipe drainage on the south-eastern side of Keys Parade would result in a worsening of the water quality of run-off from Keys Parade. This is because drainage in this area was proposed to be retained in a bioretention swale prior to discharge as part of the REF proposal, but stormwater would now be captured and discharged without retention and treatment. As this is a small extent within the proposal's broader water quality strategy (as outlined in Section 3.3.1 of the REF), these impacts are anticipated to be minor and localised. In accordance with additional safeguard SW10, MUSIC modelling would be re-run during detailed design to confirm that the Neutral or Beneficial Effect criteria are still achieved.

During detailed design, Transport would continue to optimise the water quality strategy for the proposal including along Keys Parade to minimise potential impacts to water quality.

5.7.2 Revised safeguards and management measures

All surface water safeguards and management measures identified in the REF are applicable to the revised design. Safeguard SW10 has been added due to the design changes on Keys Parade (refer to Table 5-1).

No.	Impact	Environmental safeguards	Responsibility	Timing
<u>SW10</u>	<u>Keys</u> <u>Parade</u> <u>water</u> <u>quality</u> <u>discharge</u>	Transport will continue to optimise the water quality strategy for the proposal including along Keys Parade to minimise potential impacts to water quality. As part of this, MUSIC modelling will be re-run during detailed design to confirm that the Neutral or Beneficial Effect criteria are still achieved.	<u>Transport</u>	<u>Detailed</u> <u>design</u>

Table 5-8 Additional safeguard and management measure - arboriculture

5.8 Non-Aboriginal heritage

The impacts associated with the design refinements are consistent with the non-Aboriginal heritage section of the REF (Section 6.10). The extensions to the REF proposal area required due to the revised design are not within the curtilage of any listed non-Aboriginal heritage items or any potential heritage items identified in the SOHI.

However, consistent with the REF, the sections of the revised design south and east of Amiens Avenue are within the curtilage of the Milperra Soldier Settlement (former) locally listed heritage item (refer to Figure 6-33 in the REF). The design changes within the curtilage of this heritage item are as follows:

- adjustments to lane alignment at the Henry Lawson Drive / Bullecourt Avenue intersection
- adjustments to shared path design, including changes to the shared path surface type to retain trees
- adjustments to the left-turn slip lane from Henry Lawson Drive onto the M5 Motorway eastbound.

5.8.1 Potential impacts

While there are design changes within the curtilage of the Milperra Soldier Settlement (former) locally listed heritage item, the overall magnitude of work associated with the revised design, including road, services and drainage upgrades, and vegetation removal, would be similar to that assessed as part of the REF proposal. There would be no extension to the REF proposal area within the curtilage of this heritage item. Similar to the REF proposal, the revised design would extend into areas that have been subject to more contemporary development and the changes are consistent with the use of the existing use of the road corridor, meaning they would have minimal impact on the heritage significance of the item. The impacts of the revised design to this heritage item would remain minor adverse (direct and physical) as identified in Section 6.10.3 of the REF.

There would be no further changes to impacts to other heritage items outlined in the REF,

5.8.2 Revised safeguards and management measures

All non-Aboriginal heritage safeguards and management measures identified in the REF are applicable to the revised design. No additional safeguards and management measures would be required.

5.9 Other impacts

Other impacts of the revised design would be largely consistent with those outlined in the REF. Only in the areas where the REF proposal area would be extended would there be potential additional soils and air quality impacts. All other design refinements would not result in additional impacts, including waste and bushfire impacts.

5.9.1 Potential impacts

The other impacts as a result of design changes or extensions to the REF proposal area would be generally consistent with those identified in the REF.

During construction, there would be additional ground disturbance in the extended sections of the REF proposal area. The increased excavation and soil mobilisation may encounter contamination, however impacts would be in line with what was considered in the REF.

Conversely, ground disturbance would be reduced along the shared path alignment where FRP grating rather than traditional excavation and concrete would be used.

To minimise contamination impacts of the revised design, a Contaminated Land Management Plan would be prepared and if contaminated areas are encountered during construction, appropriate control measures would be implemented to manage the immediate risks of contamination (Safeguard O1).

The additional ground disturbance in the extended areas of the REF proposal area could also result in a minor increase in localised dust impacts compared to the REF. However, due to the lack of sensitive receivers in the area, this is anticipated to be a negligible impact. An Air Quality Management Plan would also be implemented to minimise air quality impacts in accordance with Safeguard O3.

5.9.2 Revised safeguards and management measures

All safeguards and management measures identified for other impacts in the REF are applicable to the revised design. No additional safeguards and management measures would be required.

6. Environmental management

The REF for the Henry Lawson Drive Upgrade Stage 1B identified the framework for environmental management, including safeguards and management measures that would be adopted to avoid or reduce environmental impacts (section 7 of the REF).

After consideration of the issues raised in the public submissions and changes to the proposal, the safeguard and management measures have been revised. Only three safeguards have been amended (Safeguard A1, T12 and SW10). No new safeguards have been proposed.

Should the proposal proceed, environmental management will be guided by the framework and measures outlined below.

6.1 Environmental management plans (or system)

A number of safeguards and management measures have been identified in order to minimise adverse environmental impacts, including social impacts, which could potentially arise as a result of the proposal. Should the proposal proceed, these management measures would be incorporated into the detailed design and applied during the construction and operation of the proposal.

A Construction Environmental Management Plan (CEMP) will be prepared to describe safeguards and management measures identified. The CEMP will provide a framework for establishing how these measures will be implemented and who would be responsible for their implementation.

The CEMP will be prepared prior to construction of the proposal and must be reviewed and certified by environment staff, Central River region, prior to the commencement of any on-site works. The CEMP will be a working document, subject to ongoing change and updated as necessary to respond to specific requirements. The CEMP would be developed in accordance with the specifications set out in the QA – Specification G36 - Environmental Protection (Management System), QA – Specification G38 - Soil and Water Management (Soil and Water Plan), QA – Specification G40 - Clearing and Grubbing and QA – Specification G10 - Traffic Management.

6.2 Summary of safeguards and management measures

The REF for the proposal title identified a range of environmental outcomes and management measures that would be required to avoid or reduce the environmental impacts.

After consideration of the additional assessment carried out in Chapter 5 of this report, three environmental management measures for the proposal (refer to Section 7 of the REF) have been revised. Should the proposal proceed, the environmental management measures in Table 6-1 will guide the subsequent phases of the proposal. Additional and/or modified environmental safeguards and management measures to those presented in the REF have been underlined and deleted measures, or parts of measures, have been struck out.

Table 6-1 Summary of environmental safeguards and management measures

No.	Impact	Environmental safeguards	Responsibility	Timing
GEN1	Minimise environmental impacts during construction	 A CEMP would be prepared and submitted for review and endorsement of the Transport for NSW Senior Manager Environment and Sustainability prior to commencement of the activity. As a minimum, the CEMP would address the following: any requirements associated with statutory approvals details of how the proposal would implement the identified safeguards outlined in the REF issue-specific environmental management plans, including management actions to avoid inadvertently causing additional impacts to those described in the BAR, an appropriate erosion and sedimentation control plan, and weed control activities 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 would be implemented during the carrying out of the activity. 	Contractor / Transport	Pre-construction / detailed design
GEN2	Notification	All businesses, residential properties and other key stakeholders (e.g., schools, local councils) affected by the activity would be notified at least five working days prior to commencement of the activity.	Contractor / Transport	Pre-construction
GEN3	Environmental awareness	 All personnel working on site would receive training to ensure awareness of the environment protection requirements to be implemented during the proposal. This would include up-front site induction and regular "toolbox" style briefings. Site-specific training would be provided to personnel engaged in activities or areas of higher risk. These include: Threatened species habitat Unexpected finds procedure Adjoining residential areas requiring noise awareness, behavioural practices and mitigation measures. 	Contractor	Construction
GEN4	Utilities	Prior to the commencement of works, the location of existing utilities and relocation details would be confirmed following consultation with affected utility owners. Further assessment would be carried out if the scope or location of proposed utility relocation works falls outside of the assessed proposal scope and footprint.	Contractor	Pre-construction

No.	Impact	Environmental safeguards	Responsibility	Timing		
Arboriculture						
A1	Tree removal	During detailed design, opportunities to reduce the number of trees impacted by the proposal will continue to be explored. Where possible, consideration will be given to refining the proposal's alignment and shared path design options to avoid or minimise impact on root zones. <u>An updated arboricultural impact assessment will be carried out against the detailed design to confirm the total number of trees to be retained and removed by the proposal.</u>	Transport	Detailed design		
Α2	TPZ Encroachment	 Where minor encroachment with the Tree Protection Zone (TPZ) occurs, the following measures would be implemented: the area lost to this encroachment would be compensated for elsewhere near the TPZ tree protection would be installed. For any works within the TPZ of protected trees, the proposal arborist must be present. Where major encroachment with the TPZ occurs, the following measures would be implemented: the proposal arborist must demonstrate that the tree(s) would remain viable root investigations by non-destructive methods may be required for any trees proposed to be retained the area lost to this encroachment would be compensated for elsewhere near the TPZ the proposal arborist would be required to supervise any work within the TPZ tree protection would be installed. 	Contractor	Pre-construction / construction		
A3	Tree removal, pruning and excavation impacts	All tree removal and pruning work is to be carried out by an arborist with a minimum AQF Level 3 qualification in Arboriculture, in line with Australian Standard AS4373-2007, Pruning of Amenity Trees (AS4373), the Work Health and Safety Act 2011, and Work Health and Safety Regulations 2017. The proposal arborist must supervise and certify that all excavations and root pruning are in line with AS4373 and AS4970. All excavations (including root investigations) within the TPZ must be carried out using tree-sensitive methods and be supervised by the proposal arborist.	Contractor	Pre-construction		
A4	Construction clearance impacts on trees	 Minor vegetation trimming may be required to accommodate construction clearances. Vegetation trimming would follow the following guidelines: pruning must not exceed 10 per cent of the overall canopy volume no limbs greater than 100 millimetres in diameter are to be removed the final pruning cut shall be at the branch collar or growth point in line with AS4373. 	Contractor	Pre-construction		
A5	Tree protection fencing	 Where tree protection is required, tree protection fencing must follow the following guidelines: temporary mesh panel fencing (minimum height of 1.8 metres) installed prior to site set up and remain intact until the completion of the proposal protective fencing must not be removed or altered without the approval of the proposal arborist 	Contractor	Pre-construction		

No.	Impact	Environmental safeguards	Responsibility	Timing
		 prominently signposted with 300 millimetre by 450 millimetre boards stating, "NO ACCESS – TREE PROTECTION ZONE." 		
		• certified and inspected by the proposal arborist.		
		If tree protection fencing is not practical due to site constraints, tree protection delineation must be installed as an alternative. Specifications for tree protection barriers are as follows:		
		star pickets spaced at 2 metre intervals		
		connected by a continuous high-visibility barrier/hazard mesh or flagging rope		
		• maintained at a minimum height of 1 metre.		
		Another alternative where tree protection fencing is not practical would be trunk protection. Specifications for trunk protection are as follows:		
		• a thick layer of carpet underfelt, geotextile fabric, or similar wrapped around the trunk to a minimum height of 2 metres		
		• 1.8 metre lengths of softwood timbers aligned vertically and spaced evenly around the trunk (with a small gap of around 50 millimetres between the timbers)		
		• the timbers must be secured using galvanised hoop strap (aluminium strapping).		
A6	Restricted activities in the TPZ	Activities not allowed in the TPZ (unless otherwise approved under the development consent) include:	Contractor	Pre-construction /
		machine excavation and trenching		Construction
		ripping or cultivation of the soil		
		storage of building materials, waste, and waste receptacles		
		• disposal of waste materials and chemicals including paint, solvents, cement slurry, fuel, oil, and other toxic liquids		
		movement and storage of plant, equipment, and vehicles		
		soil level changes, including the placement of fill material		
		mechanical removal of vegetation		
		affixing of signage or hoardings to trees		
		• other physical damage to the trunk or root system		
		• any other activity that is likely to cause damage to the tree.		
Α7	Root and ground impacts	If temporary access for vehicle, plant or machinery is required within the TPZ, ground protection should be installed. Where possible, areas of the existing pavement should be used as ground protection.	Contractor	Pre-construction / construction
		The area within the TPZ should be mulched during construction (where practical) with good-quality composted wood chip/leaf mulch and should be maintained at a depth of 150 millimetres to 200 millimetres. Mulching around		

No.	Impact	Environmental safeguards	Responsibility	Timing			
		the base of the tree would provide nutrients and organic matter to the soil as it breaks down, improving and maintaining the overall health of the trees.					
A8	Demolition	The demolition of all existing structures inside or directly next to the TPZ of trees to be retained must be carried out in consultation with the proposal arborist. Any machinery is to work from inside the footprint of the existing structures or outside the TPZ, to minimise soil disturbance and compaction. If it is not feasible to locate demolition machinery outside the TPZ of trees to be retained, ground protection would be required. The demolition should be carried out inwards into the footprint of the existing structures, sometimes referred to as the 'top-down, pull back' method.	Contractor	Construction			
A9	Underground services	Where possible, the re-location of services underground should be carried out outside of the TPZ of trees. If underground services need to be installed within the TPZ, they must be installed using tree-sensitive excavation methods under the supervision of the proposal arborist. Boring methods such as horizontal directional drilling may be used for underground service installation, provided the installation is at a minimum depth of 800 millimetres below grade. Excavations for entry/exit pits must be located outside the TPZ. Any conflicting roots greater than 50 millimetres in diameter identified during the relocation of underground services shall be pruned using clean, sharp secateurs or a pruning saw to ensure a clean cut, free from tears. All root pruning (greater than 50 millimetres) must be documented and carried out by the proposal arborist.	Contractor	Construction			
A10	Ongoing impacts	Site inspections would be carried out by the proposal arborist around every 12 weeks during the construction phase. A final site inspection would also be carried out by the proposal arborist after all major construction has ceased, following the removal of tree protection.	Contractor	Construction			
Traffic	Traffic and transport						
T1	Traffic and transport	A Traffic Management Plan (TMP) would be prepared and implemented as part of the CEMP. The TMP would be prepared in line with the Transport <i>Traffic Control at Work Sites Manual</i> (RTA, 2010) and <i>QA Specification G10 Control of Traffic</i> (Transport for NSW, 2008). The TMP would include:	Contractor	Pre-construction / construction			
		 swept path analysis of haulage vehicles using the Bullecourt Avenue / Ashford Avenue intersection 					
		 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, including disruptions to parking 					
		• 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					

No.	Impact	Environmental safeguards	Responsibility	Timing
		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.		
T2	Construction site access	Construction site access would be designed and implemented with consideration of:	Contractor	Pre-construction /
		road design guidelines and turning paths for heavy vehicles		construction
		appropriate sight distances to allow traffic to safely enter and exit		
		visibility of compliant warning and wayfinding signs		
		use of accredited traffic controllers, where appropriate and/or other controls to separate, slow down or temporarily stop traffic for safe entry/exit		
		minimising use of local roads, where practical		
		• provision of deceleration lanes at accesses next to highly trafficked roads.		
Т3	Traffic impacts	Further traffic modelling would be carried out during detailed design following confirmation of the construction methodology and traffic staging to confirm the potential for traffic impacts and identify whether any additional mitigation measures or traffic control measures would be required.	Contractor	Detailed design
T4	Impact on bus stops or routes	Temporary and permanent bus stop relocation would be discussed with the relevant bus operator and the community would be notified.	Transport / contractor	Detailed design / pre-construction
Т5	Temporary access changes	Detours during temporary access changes would be implemented with directional signage along alternate routes.	Contractor	Construction
Т6	Heavy vehicle movements	Heavy vehicle movements would be limited during peak traffic periods (i.e., between 7:45 AM to 08:45 AM and 3:30 PM to 5:30 PM on weekdays, and 11:30 AM to 1:30 PM on weekends), where practical.	Contractor	Construction
Τ7	Traffic management measures	Any temporary traffic diversions, clearways and road closures would be implemented in line with Transport Management Centre (TMC) and Canterbury Bankstown City Council requirements.	Contractor	Construction
Т8	Property access	• Property access would be maintained where feasible and reasonable and property owners would be consulted well in advance of work starting that may temporarily restrict or control access.	Transport / contractor	Detailed design / construction
		• Consultation would be carried out with the community regarding alternate access arrangements during operation associated with the provision of left-in left-out intersections.		
		• Notification would be issued to emergency services about changes in traffic conditions.		
		• <u>Transport would consult with Council and affected property owners about investigations to assess whether</u> <u>driveway access from 553A Henry Lawson Drive to Hermies Avenue can be safely provided and confirm the</u> <u>outcome of these investigations during detailed design.</u>		

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No.	Impact	Environmental safeguards	Responsibility	Timing
Т9	Local road or shared path closures	Relevant councils would be consulted with prior to any local road or shared path closures to identify suitable mitigation measures such as detour routes.	Contractor	Construction
T10	Parking	Off-road parking for construction vehicles would be provided within the ancillary facility and construction areas.	Contractor	Construction
T11	Damage to local roads	Any damage to the local road network identified to be caused by construction vehicles for the proposal would be remediated by the contractor to be similar to the existing road condition.	Contractor	Construction
T12	Auld Avenue parking	During detailed design, Transport will consider opportunities to minimise the number of parking spaces that need to be removed on Auld Avenue Transport would carry out investigations into and consultation with key stakeholders, including Council, about the provision of additional formalised parking on Auld Avenue.	Transport	Detailed design
Noise a	nd vibration			
NV1	Noise and vibration	 A Construction Noise and Vibration Management Plan (CNVMP) should be prepared before any work begins which would include: identification of nearby sensitive receivers description of works, construction equipment and hours that work would be completed in criteria for the proposal and relevant licence and approval conditions requirements for noise and vibration monitoring details of how community consultation would be completed procedures for handling complaints details on how respite would be applied where ongoing high impacts are seen at certain receivers preparation of an out of hours works assessment and application. 	Contractor	Pre-construction / construction
NV2	Noise and vibration	 Location and activity specific noise and vibration impact assessments should be carried out prior to activities: with the potential to result in noise levels at or above 75dBA at any receiver required outside standard construction hours likely to result in noise levels greater than the relevant Noise Management Levels (NMLs) with the potential to exceed relevant criteria for vibration. The assessments should confirm the predicted impacts at the relevant receivers near activities to aid the selection of appropriate management measures, consistent with the requirements of the Construction Noise and Vibration Guideline (CNVG). 	Contractor	Pre-construction
NV3	Noise and vibration	Notification should be given to noise-affected residents in the form of letterbox drops or equivalent. The notification would detail work activities, time periods over which these would occur, impacts and mitigation measures. Notification should be a minimum of 5 working days prior to the start of works.	Contractor	Pre-construction

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No.	Impact	Environmental safeguards	Responsibility	Timing
NV4	Noise and vibration	A record of all complaints received, and the subsequent action taken, should be maintained.	Contractor	Construction
NV5	Construction noise exceedances	Where noise-intensive equipment is to be used near sensitive receivers, the work should be scheduled for standard construction hours, where possible. If it is not possible to restrict the work to the daytime then it should be completed as early as possible in each work shift.	Contractor	Construction
		Appropriate respite should also be provided to affected receivers in line with the CNVG and/or the proposal's conditions of approval.		
		Monitoring should be carried out at the start of noise and/or vibration intensive activities to confirm that actual levels are consistent with the predictions and that appropriate mitigation measures from the CNVG have been implemented.		
NV6	Ancillary facilities with long term work	Hoarding, or other shielding structures, should be used where receivers are impacted near ancillary facilities with long durations. To provide effective noise mitigation, the barriers should break line-of-sight from the nearest receivers to the work and be of solid construction with minimal gaps.	Contractor	Pre-construction / construction
NV7	Construction traffic	The potential impacts from construction traffic should be reviewed at a later stage when more information is available, particularly where it is required to access local roads.	Transport	Detailed design / construction
NV8	Vibration work within minimum working distance	 Where work is within the minimum working distances and considered likely to exceed the cosmetic damage criteria: different construction methods with lower source vibration levels should be investigated and implemented where feasible 	Contractor	Pre-construction / construction
		• vibration measurements should be carried out at the start of construction to determine actual vibration levels throughout the proposal area. Work should be ceased if monitoring indicates that vibration levels do, or are likely to, exceed the relevant criteria.		
		The potential human comfort impacts should also be reviewed as the proposal progresses. Dilapidation reports should also be prepared for properties identified as being within the minimum working distances for cosmetic damage.		
NV9	Out of hours work	Out of hours works will be undertaken in accordance with the Construction Noise and Vibration Guideline (for road and maritime works) (Transport, 2022b). This includes:	Contractor	Construction
		• Offer respite and/or restricted construction hours where noise intensive works are planned over extended periods, especially where they occur outside of standard hours. This may include moving the construction work front to different areas so that sensitive receivers are not impacted for longer than two consecutive days		
		• No more than two consecutive nights of noise with special audible characteristics and/or vibration generating work may be undertaken in the same Noise Catchment Area (NCA) over any seven-day period, unless otherwise negotiated with affected receivers.		
NV10	Out of hours work	Noisiest activities will be limited to standard construction hours, where practicable.	Contractor	Construction

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No.	Impact	Environmental safeguards	Responsibility	Timing
NV11	Operational road traffic	 Appropriate noise mitigation measures should be implemented where receivers are likely to exceed NMLs. This could include: at-source mitigation (quieter road pavement surfaces) in-corridor mitigation (noise mounds, noise barriers) at-receiver mitigation (at-property treatments). Appendix D of the RNCG contains road traffic noise assessment criteria to guide this mitigation. 	Contractor	Detailed design / construction
NV12	Operational road traffic	Further assessment of operational road traffic noise impacts would be carried out to inform consideration of appropriate noise mitigation during detailed design.	Transport	Detailed design
Hydrol	ogy and flooding			
H1	Overall flood risk	Further flood impact assessment would be carried out to quantify the flood risk to construction activities and to surrounding areas from the proposal.	Contractor	Detailed design / pre-construction
H2	Overall flood risk	 A Flood Management Plan would be developed for the construction area and would include details and procedures to minimise the potential for construction activities to adversely impact on flood behaviour in neighbouring properties. Measures to manage residual flood impacts would include: staging construction to limit the extent and duration of temporary works on the floodplain ensuring construction equipment and materials are removed from floodplain areas at the completion of each work activity or when a weather warning of impending flood-producing rain is issued providing temporary flood protection to properties identified as being at risk of adverse flood impacts during any stage of construction of the proposal developing flood emergency response procedures to remove temporary works during periods of heavy rainfall. For the ancillary facilities located within the floodplain, the Flood Management Plan would include the following additional requirements: limits to the extent of works located in floodway areas a procedure to monitor weather conditions (existing and forecast conditions), including minor rain events, local weather warnings and river water level data a communication protocol to disseminate warnings to construction personnel of impending flood producing rain or predicted flooding in the Georges River or Milperra Drain and actions required to make construction areas stable and safe an evacuation plan for construction personnel should a severe weather warning or flood alert for the Georges River or Milperra Drain be issued. 	Contractor	Construction

No.	Impact	Environmental safeguards	Responsibility	Timing
H3	Overall flood risk	Transport would continue to consult with the NSW SES around any anticipated flood risks throughout the detailed design and construction phases of the proposal.	Transport	Detailed design / construction
H4	Location of construction activities and materials	To the extent practicable, construction compounds, site sheds, stockpiles and laydown areas would be located outside flood prone areas.	Contractor	Pre-construction / construction
H5	Location of construction activities and materials	Placement of stockpiles, fuels, contaminating material and loose equipment would be avoided within the ancillary facilities affected by flood waters or would be located as far away as is practicable. At ancillary facilities which have the greatest potential to be affected by floodwaters (i.e., the 439 Henry Lawson Drive, Milperra, Auld Avenue, Milperra and Milperra Sports Centre, Milperra ancillary facilities), only materials and buildings which can easily be relocated should be stored, and materials should be stored towards the front of the properties or as far away from potential floodwaters as possible.	Contractor	Pre-construction / construction
H6	Construction activities in flood prone land	The timing and duration of the construction activities in the vicinity of waterways would be planned, where possible, to occur at times of year when the chance of major flood events is low.	Contractor	Detailed design
H7	Construction activities in flood prone land	Where ancillary facilities are located on flood prone land and adverse flood impacts are not acceptable, the use of elevated site sheds that are designed to allow the passage of floodwater beneath the structures should be considered.	Contractor	Detailed design / pre-construction
H8	Management of impacts to existing environment	To the extent practicable, the ground surface slopes and imperviousness at the construction sites would be maintained close to existing conditions.	Contractor	Construction
H9	Management of impacts to existing environment	Flood impacts would be minimised and managed through documentation and implementation of an approved environmental management plan.	Contractor	Detailed design / construction
H10	Milperra Drain bridge impacts	Further design would be carried out to consider alternatives to the Milperra Drain bridge design to reduce the bridge deck depth to minimise flood impacts.	Transport	Detailed design
H11	Milperra Drain bridge impacts	Further design would be carried out to consider approaches to the Milperra Drain bridge to be reduced where possible to maintain existing ground levels.	Transport	Detailed design

No.	Impact	Environmental safeguards	Responsibility	Timing
Landso	ape character and	visual impacts		
V1	Visual amenity and urban	Development of the proposal's urban design would continue through to detailed design. Urban design would be integrated into project development processes to ensure the proposal aligns with the urban design objectives.	Transport	Detailed design
	design	The following policy/guidelines would guide future design development of the proposal:		
		Transport Urban Design Policy (Beyond the Pavement)		
		Transport Urban Design Guidelines		
		• the urban design objectives, principles and concept design strategy presented in the urban design report for the proposal would form the basis for future design development and consultation with stakeholders.		
V2	Revegetation	Revegetation as well as biodiversity tree and hollow replacement would be carried out in line with the landscaping principles, urban design concept outlined in the LCVIA and Transport's Biodiversity Guidelines. Revegetation strategies would include but not be limited to:	Contractor	Detailed design
		• planting trees at regular intervals to reinstate the existing characteristic avenue treatment parallel to Henry Lawson Drive		
		• planting feature trees, shrubs and ground cover planting to provide visual interest and a sense of place		
		• introducing varied plant species combinations including through type, scale and density of spacing, and with height variations along the length of the road corridor through median planting		
		• restoring ancillary facility areas of the proposal disturbed by major work with appropriate native vegetation		
		selecting plant species to soften hard elements within the corridor		
		• selecting plant species that are robust and which can survive for the life of the design		
		replacing existing trees where possible to provide urban cooling		
		• making sure planting complies to sight lines and clear zone requirements with the use of a low height planting mix at intersections.		
V3	Revegetation	In consultation with Council, opportunities to develop potential 'pocket' and 'linear parks' will be considered during detailed design.	Transport	Detailed design
V4	Road signage and connectivity	Develop the shared path design to contribute to the existing network and linear identity through appropriate connectivity with existing footpaths and roads.	Transport	Detailed design
V5	Road signage and connectivity	Provide appropriate locations for wayfinding and signage along the upgraded road corridor.	Transport	Detailed design
V6	Lighting	Minimise lighting and potential for light spill.	Transport	Detailed design

No.	Impact	Environmental safeguards	Responsibility	Timing
V7	Earthworks and landscape character	Landscape treatments are to adhere to the guidelines for designated bush fire prone land.	Contractor	Detailed design / pre-construction / construction
V8	Tree management and removal	Minimise the removal of existing roadside remnant vegetation where possible to sustain the existing character of the surrounding suburb. Appropriate vegetation retention areas would include the creek area next to the new link road and the existing trees next to the bioretention basin.	Contractor	Pre-construction / construction
V9	Road signage and connectivity	Existing signage and art is to be protected and preserved in existing locations or reinstated in a suitable location if works require them to be moved.	Contractor	Pre-construction / construction
V10	Road signage and connectivity	Consolidate signage structures to minimise the impact of sensitivity receptors within the upgraded precinct.	Contractor	Pre-construction / construction
V11	Lighting	Minimise night works and provide lighting which minimises light spill	Contractor	Construction
V12	Visual amenity and ancillary facilities	 The layout of the ancillary facility sites would be designed to minimise visual amenity impacts. The design would consider: screening of boundaries facing sensitive receivers or views careful placement of structures and buildings to maintain viewpoints or provide additional screening of site activities. 	Contractor	Pre-construction/ Construction
V13	Visual amenity and ancillary facilities	The ancillary facilities would be maintained, kept tidy and well-presented including sorting regular removal of excess materials to reduce visual impact.	Contractor	Pre-construction/ Construction
V14	Visual amenity and ancillary facilities	Ancillary facility sites and temporary construction areas would be progressively restored to at least their pre- construction conditions or in line with Landscaping Plans, when no longer required.	Contractor	Construction
Biodive	ersity			
B1	Removal of native vegetation	Native vegetation and threatened flora removal would be minimised through detailed design and construction.	Transport	Detailed design
B2	Removal of native vegetation	Pre-clearing surveys would be carried out in line with Guide 1: Pre-clearing process of the Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects (RTA 2011a).	Transport	Pre-construction

No.	Impact	Environmental safeguards	Responsibility	Timing
ВЗ	Removal of native vegetation	Vegetation removal would be carried out in line with Guide 4: Clearing of vegetation and removal of bushrock of the Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects (RTA 2011a) and native vegetation would be re-established in line with Guide 3: Re-establishment of native vegetation of the Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects (RTA 2011a).	Transport	Construction
B4	Removal of native vegetation	The unexpected species find procedure would be followed under <i>Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects</i> (RTA 2011a) if threatened ecological communities, not assessed in the biodiversity assessment, are identified in the proposal site.	Transport	Construction
В5	Removal of native vegetation	The impacts of the proposal to vegetation and threatened species habitat would be offset in line with Transport's Biodiversity Policy (Transport, 2022a), including consideration of no net loss to biodiversity and tree and hollow replacement. A Biodiversity Offset Strategy would be prepared for vegetation zones requiring offsetting.	Transport	Detailed design
B6	Removal of native vegetation	A Tree and Hollow Replacement Plan would be prepared for any residual biodiversity impact that does not require offsets in line with the Biodiversity Policy. Where suitable land is not available for replacement, payment would be made to the Transport Conservation Fund.	Transport	Detailed design
B7	Removal of native vegetation	Vegetation clearance would only occur within the vegetation clearance boundary.	Contractor	Pre-construction / construction
B8	Removal of threatened fauna habitat	Threatened fauna habitat removal would be minimised through detailed design and construction.	Transport	Detailed design
B9	Removal of threatened fauna habitat	Fauna would be managed in line with Guide 9: Fauna handling of the Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects (RTA 2011a).	Transport	Construction
B10	Removal of threatened fauna habitat	Habitat removal would be carried out in line with Guide 4: Clearing of vegetation and removal of bushrock of the Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects (RTA 2011a) and habitats would be replaced or re-instated in line with Guide 5: Re-use of woody debris and bushrock and Guide 8: Nest boxes of the Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects (RTA 2011a).	Transport	Construction
B11	Removal of threatened fauna habitat	The unexpected species find procedure would be followed under Guide 1: Pre-clearing process of the Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects (RTA 2011a) if threatened fauna, not assessed in the biodiversity assessment, are identified in the proposal area.	Transport	Construction
B12	Removal of threatened fauna habitat	 Targeted surveys for Cumberland Plain Land Snail would be carried out during detailed design to determine the presence of any locally occurring populations. If populations are not present during targeted surveys, the BAR should be revised and liabilities should be offset. If populations are present during targeted surveys, pre-clearing surveys should be carried out for the Cumberland Plain Land Snail. Any individuals found should be relocated to areas of retained native vegetation. In addition, all large woody debris should be removed from impact areas and relocated to areas of retained native vegetation. 	Transport / Contractor	Detailed design / Construction

No.	Impact	Environmental safeguards	Responsibility	Timing
B13	Aquatic impacts	Impacts to aquatic habitat would be minimised through detailed design and construction.	Transport	Detailed design
B14	Aquatic impacts	Aquatic habitat would be protected in line with Guide 10: Aquatic habitats and riparian zones of the Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects (RTA 2011a) and Section 3.3.2 Standard precautions and mitigation measures of the Policy and guidelines for fish habitat conservation and management Update 2013 (DPI (Fisheries NSW) 2013).	Transport	Construction
B15	GDEs	Depending on the final design, a permit may be required from DPI for dredging and reclamation and obstruction to fish habitat.	Transport	Construction
B16	GDEs	Interruptions to water flows associated with groundwater dependent ecosystems would be minimised through detailed design.	Transport	Detailed design
B17	Changes to hydrology	Changes to existing surface water flows would be minimised through detailed design. New drainage infrastructure and water quality controls would be installed within the proposal area. This includes upgrading drainage pits and pipes, and the installation of bioretention basins and swales.	Transport	Detailed design
B18	Fragmentation of identified habitat corridors	For landscape scale connectivity impacts, a Wildlife Connectivity Strategy would be prepared as part of final design in line with the requirements of the Transport Biodiversity Policy. Connectivity measures would be implemented in line with the <i>Draft Wildlife Connectivity Guidelines for Road Projects</i> (RTA 2011b) or equivalent updated NSW Guidelines. Connectivity measures would be considered for impacts which are not considered a landscape scale connectivity impact in line with <i>the Draft Wildlife Connectivity Guidelines for Road Projects</i> (<i>RTA 2011b</i>) or equivalent updated NSW Transport Guidelines.	Transport	Detailed design / pre-construction / construction
B19	Edge effects on adjacent native vegetation and habitat	Any connectivity measures implemented would be installed under the supervision of an experienced ecologist.	Transport	Construction
B20	Edge effects on adjacent native vegetation and habitat	Exclusion zones would be set up at the limit of clearing in line with Guide 2: Exclusion zones of the Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects (RTA 2011a).	Transport	Construction
B21	Injury and mortality of fauna	Fauna would be managed in line with Guide 9: Fauna handling of the Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects (RTA 2011a).	Transport	Construction
B22	Invasion and spread of weeds	Weed species would be managed in line with Guide 6: Weed management of the Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects (RTA 2011a).	Transport	Construction

No.	Impact	Environmental safeguards	Responsibility	Timing
B23	Invasion and spread of pests	Pest species would be managed within the proposal area.	Transport	Construction
B24	Invasion and spread of pathogens and disease	Pathogens would be managed in line with Guide 2: Exclusion zones of the Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects (RTA 2011a).	Transport	Construction
B25	Noise, light, dust and vibration	Shading and artificial light impacts would be minimised through detailed design.	Transport	Detailed design
Socio-e	economic, property	and land use		
SE1	Community impacts during construction including noise, visual, amenity impacts	 A Community Liaison Plan (CLP) would be prepared and implemented as part of the construction environmental management plan (CEMP) to help provide timely and accurate information to the community during construction. The CLP would 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 CLP would be prepared in line with Transport's stakeholder engagement toolkit and the Transport for NSW Stakeholder and Community Engagement Policy 2019. Continued consultation with the community, recreational groups, businesses, and other stakeholders until the completion of the proposal would be carried out. Discussions would include design changes and construction activities, the nature and timing of construction works, and mitigation measures. 	Transport / Contractor	Detailed design / pre-construction
SE2	Property impacts due to temporary access changes and property acquisition	Continued consultation with affected property owners and land occupiers until the completion of the proposal would be carried out. Discussions including the nature and timing of construction works would be required to identify relevant mitigation measures for noise, traffic, access, and visual impacts. Property acquisition would align with property acquisition requirements including private and crown land acquisition, in line with the Land Acquisition (Just Terms Compensation) Act 1991 and Land Acquisition Reform 2016.	Contractor	Pre-construction / construction
SE3	Noise wall relocation	Consultation would be carried out during detailed design with property owners potentially affected by the relocation of the noise wall near the Henry Lawson Drive / M5 Motorway intersection.	Transport	Detailed design
SE4	Access disruptions and access impacts	Continued consultation with emergency services would be carried out to understand access requirements so that access can be maintained during construction. Communication with the community regarding alternate access arrangement and notification for emergency services due to changes traffic conditions would also be carried out.	Transport / contractor	Detailed design / construction

No.	Impact	Environmental safeguards	Responsibility	Timing
SE5	Changes in access for all road users	The local community would be notified of temporary changes to local road intersections prior to works at those intersections commencing. Consultation would continue during construction should arrangements change.	Contractor	Pre-construction / construction
SE6	Traffic impacts for all road users, including pedestrians and cyclists	A Traffic Management Plan (TMP) would be developed prior to construction. Active transport should be addressed as part of this TMP. Alternative routes for active transport users would be clearly identified by signage and the use of traffic controllers where required. This includes areas along Henry Lawson Drive and close to Gordon Parker Reserve, which is frequented by school children and families, and near Western Sydney University.	Transport	Pre-construction / construction
SE7	Construction traffic impacts on local businesses' operations and patronage	Continued consultation with businesses within the direct study area about timing and scheduling of construction activities would be carried out.	Contractor	Pre-construction / construction
SE8	Social infrastructure impacts including access and amenity impacts	Wayfinding and the location of signage during construction would be based on the construction staging and where room is available.	Transport / contractor	Detailed design / construction
SE9	Social infrastructure impacts including access and amenity impacts	Consultation with Council would be carried out to make sure that construction activities mitigate potential impacts to Council run events that may be occurring in the proposal area at the same time.	Contractor	Pre-construction / construction
SE10	Relocation of bus stops during construction	Consultation with operators of the golf courses, educational facilities, public transport providers and Council in reference to construction activities and mitigation measures during busy periods and events at these facilities would be carried out.	Contractor	Pre-construction / construction
SE11	Relocation of bus stops during construction	Public transport providers and users would be notified in advance of any temporary or permanent changes to bus stop locations through signage at the existing bus stops. Adequate way finding signage would be installed.	Transport / contractor	Detailed design / construction

No.	Impact	Environmental safeguards	Responsibility	Timing
SE12	Cumulative impacts	Consultation with Council, relevant developers and other stakeholders would be conducted to minimise cumulative impacts. Opportunities would be explored to coordinate construction activities with other construction projects in the area to reduce risk of cumulative impacts.	Transport / contractor	Detailed design / construction
Surface	e water			
SW1	Soil erosion and water pollution	A Soil and Water Management Plan (SWMP) would be prepared and implemented as part of the CEMP. The SWMP would identify all reasonably foreseeable risks relating to soil erosion and water pollution and describe how these risks would be addressed during construction.	Transport / Contractor	Detailed design / pre-construction
		The SWMP would be reviewed by a soil conservationist on the TfNSW list of Registered Contractors for Erosion, Sedimentation and Soil Conservation Consultancy Services. The SWMP would then be revised to address the outcomes of the review.		
SW2	Soil erosion and water pollution	Where possible, permanent drainage structures would be installed as early as possible to facilitate effective separation of clean offsite and dirty onsite water.	Contractor	Construction
SW3	Soil erosion and water pollution	The preliminary Erosion and Sedimentation Management Plan (ESMP) and Erosion and Sedimentation Control Plans (ESCP) produced for the proposal would be updated during the detailed design phase to refine the erosion and sedimentation controls for the proposal. Final ESCP will be developed by the construction contractor and would include the need to implement progressive ESCPs and the continual updating of these plans during construction.	Transport / Contractor	Detailed design / construction
SW4	Contamination of surface water	Regular visual water quality checks (including for turbid plumes and hydrocarbon spills or slicks) would be carried out when working in or near waterways. Construction water quality monitoring would be carried out upstream and downstream of the proposal to ensure that controls and site practices are effective at maintaining current water quality conditions. Monitoring would be carried out in line with the Guideline for Construction Water Quality Monitoring (RTA, undated).	Contractor	Construction
SW5	Water pollution due to stockpiles	Stockpile site locations would be confirmed during detailed design and where applicable managed in line with Environmental Procedure Management of Wastes on Roads and Maritime Services Land (RMS, 2014) and the Stockpile Site Management Guideline (RMS, 2015). This would consider measures to manage cross contamination within a stockpile area. Further consideration of how to manage stockpiles, material laydown and chemical storage with respect to floodwaters would be carried out by the construction contractor.	Transport / Contractor	Detailed design / pre-construction
SW6	Water pollution from accidental spills	A site-specific emergency spill plan would be developed and include spill management measures in line with the Transport for NSW Code of Practice for Water Management (RTA, 1999) and relevant EPA guidelines. The plan would address measures to be implemented in the event of a spill, including initial response and containment, and notification of emergency services and relevant authorities (including TfNSW and EPA officers).	Contractor	Detailed design / pre-construction
SW7	Water pollution from accidental spills	An emergency spill kit would be kept on site at all times. Spill kits would be located at all ancillary facilities and main construction work areas. All staff would be made aware of the location of spill kits and trained in their use. The refuelling and maintenance of plant and equipment would be carried out in a designated sealed bunded area at ancillary facilities, where possible.	Contractor	Construction

No.	Impact	Environmental safeguards	Responsibility	Timing
		Vehicle wash downs and concrete washouts would be carried out within designated sealed bunded areas at construction ancillary facilities or carried out off-site.		
SW8	Stormwater discharges leading to pollution	A Construction Water Quality Discharge Assessment would be completed during detailed design in line with the EPA's Assessing and managing water pollution from road works and the Draft Guideline for Assessing the Impacts of Treated Water Discharge from Water Quality Treatment Controls (Transport, 2020).	Transport	Detailed design
SW9	Works on waterfront land	Works within Milperra Drain to construct the culvert would be carried out with consideration to the design and construction considerations in the Guidelines for instream works on waterfront land, Department of Primary Industries, Office of Water, July 2012, Guidelines for watercourse crossings on waterfront land, Department of Primary Industries, Office of Water, July 2012 and in line with relevant Transport specifications and guidelines.	Transport / Contractor	Detailed design / pre-construction
<u>SW10</u>	Keys Parade water quality discharge	Transport will continue to optimise the water quality strategy along Keys Parade to minimise potential impacts to water quality. As part of this, MUSIC modelling will be re-run during detailed design to confirm that the Neutral or Beneficial Effect criteria are still achieved.	<u>Transport</u>	Detailed design
Ground	lwater			
G1	Overall groundwater impacts	Further investigations would be carried out at the detailed design stage to gain an understanding of site-specific potential interactions with groundwater during construction and operations.	Transport	Detailed design
G2	Groundwater dewatering during excavation	In the event that groundwater/aquifer dewatering must occur to lower the groundwater table and reduce or prevent groundwater ingress into excavations, potential impacts on GDEs would be quantitatively assessed prior to dewatering along with the implementation of appropriate management measures and documentation in a site dewatering management plan. Quantitative assessment would include assessment of the magnitude and duration of drawdown and whether impacts are likely to adversely affect the habitat conditions and ecological communities within the GDEs.	Contractor	Pre-construction
G3	Encountering acid sulphate	An Acid Sulphate Soil Management Plan (ASSMP) would be prepared and implemented to manage acid sulphate soils exposed by excavations of soils between 2-4 metres, changes to groundwater levels and stockpiling.	Contractor	Detailed design
	soils	The ASSMP would be informed by the results of the Detailed Site Investigation that would include the identification of presence and extent of acid sulphate soils, particularly around the culvert works over Milperra Drain.		
G4	Disposal of groundwater	 Should off-site disposal be selected by the contractor as the primary method of water management then the following measures must be implemented: Site Environmental Coordinator or representative must contact the waste disposal contractor and receiving facility to determine the correct analytical suite and documentation required before water is transported. All liquid waste must be characterised with the documentation made available to both the waste disposal contractor and receiving facility All produced water must be collected and stored in a sealed, bunded or similar storage vessel 	Contractor	Construction

No.	Impact	Environmental safeguards	Responsibility	Timing
		Daily inspections of the stored water must be made and include the following items:		
		 Date/ time and location of dewatering 		
		 Estimated inflow rate 		
		– pH		
		– Turbidity		
		 Signs of visible oil or fuel (hydrocarbon) sheen on the water 		
		 Any unusual odour colour slime or foamy scum. 		
Non-Ab	ooriginal heritage			
NA1	Non-Aboriginal heritage	A Non-Aboriginal Heritage Management Plan (NAHMP) would be prepared and implemented as part of the CEMP. It would provide specific drafting guidance on measures and controls to be implemented to avoid and mitigate impacts to non-Aboriginal heritage. The NAHMP would be prepared in consultation with the Office of Environment and Heritage.	Contractor	Pre-construction
NA2	Non-Aboriginal heritage	The Transport for NSW Unexpected Heritage Items Procedure – EMF-HE-PR-0076 (Transport, 2022c) would be followed in the event that any unexpected heritage items, archaeological remains or potential relics of non-Aboriginal origin are encountered. Work would only re-commence once the requirements of that Procedure have been satisfied.	Contractor	Construction
NA3	Non-Aboriginal heritage	If potential future changes occur to the concept design resulting in works extending further into the Local Environment Plan (LEP) listed Milperra Soldier Settlement (former), further assessment would be required to address potential heritage impacts.	Contractor	Detailed design / pre-construction
NA4	Non-Aboriginal heritage	Further investigation into interpretation opportunities should be explored in the detailed design stage of the proposal by a qualified heritage interpretation specialist. This should take form of a Heritage Interpretation Plan (HIP). Recommendations for ideal locations for interpretation include along the shared path aligning with Ganmain Crescent, near the location of the Milperra Solider Tree, and in the small reserve to the south of the Bullecourt Avenue and Henry Lawson Drive intersection.	Contractor	Detailed design
NA5	Milperra Soldier Tree	Design change should be considered to look at how to minimise impacts to the Milperra Soldier Tree structural root zone to allow retention of the tree.	Contractor	Detailed design
NA6	Milperra Soldier Tree	If the Milperra Soldier Tree and Commemorative Plaque cannot be avoided during works, it is recommended the former location of the tree is marked by the existing plaque, which should, at a minimum, be reinstated and refurbished. Heritage interpretation associated within this tree must be investigated within the HIP to be prepared for the proposal. It is also recommended that a re-planting strategy along this side of Henry Lawson Drive occur which would include the planting of a new tree as close to the original location of the former tree, or within the vicinity of its original location, to symbolise the tree's former location and mitigate the loss of the mature tree.	Contractor	Pre-construction / construction

No.	Impact	Environmental safeguards	Responsibility	Timing
NA7	Street signage	All local street signage is to be retained and relocated once the proposal is completed to ensure that the character of the former soldier settlement is retained, and to mark the former alignments of significant streets	Contractor	Pre-construction / construction
NA8	Street signage	The Milperra suburb road sign must be retained and relocated to a similar vantage point along Henry Lawson Drive once the proposal is completed.	Contractor	Pre-construction / construction
NA9	Milperra Drain Bridge	Should works be undertaken on the existing Milperra Drain Bridge superstructure or pre-cast concrete parapets, further heritage assessment would be required.	Contractor	Detailed design
NA10	Archaeological impacts	A qualified NSW historical archaeologist should be engaged during detailed design to provide a historical archaeological assessment for subsurface archaeological potential in the Milperra Soldier Settlement footprint and any archaeological potential associated with any other eras of development in the Milperra area.	Contractor	Detailed design / pre-construction
Aborig	inal cultural heritag	ze		
AH1	Aboriginal heritage	An Aboriginal Heritage Management Plan (AHMP) would be prepared in line with the Procedure for Aboriginal cultural heritage consultation and investigation (Transport, 2012) and Transport for NSW Unexpected Heritage Items Procedure – EMF-HE-PR-0076 (Transport, 2022c) and implemented as part of the CEMP. It would provide specific drafting guidance on measures and controls to be implemented for managing impacts on Aboriginal heritage. The AHMP would be prepared in consultation with all relevant Aboriginal groups.	Contractor	Detailed design / Pre-construction
AH2	Aboriginal heritage	The Transport for NSW Unexpected Heritage Items Procedure – EMF-HE-PR-0076 (Transport, 2022c) would be followed in the event that an unknown or potential Aboriginal object/s, including skeletal remains, is found during construction. This applies where Transport does not have approval to disturb the object/s or where a specific safeguard for managing the disturbance (apart from the Procedure) is not in place. Work would only re-commence once the requirements of that Procedure have been satisfied.	Contractor	Detailed design / Pre-construction
Other i	mpacts			
01	Soils	• A Contaminated Land Management Plan would be prepared in line with the Guideline for the Management of Contamination (Transport for NSW, 2013) and implemented as part of the CEMP. The plan would include, but not be limited to:	Contractor	Detailed design / pre-construction
		 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 		
		 measures to ensure the safety of site personnel and local communities during construction. 		

No.	Impact	Environmental safeguards	Responsibility	Timing
		 If contaminated areas are encountered during construction, appropriate control measures would be implemented to manage the immediate risks of contamination. All other works that may impact on the contaminated area would 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 Transport for NSW Senior Manager Environment and Sustainability and/or EPA. A site-specific emergency spill plan would be developed and include spill-management measures in line 		
		with the Transport Code of Practice for Water Management (RTA, 1999) and relevant EPA guidelines. The plan would address measures to be implemented in the event of a spill, including initial response and containment, notification of emergency services and relevant authorities (including Transport EPA officers).		
02	Contamination	• A detailed site investigation (DSI) should be carried out during detailed design in the areas showing a moderate risk of COPCs to assess if concentrations are above the tier 1 screening values, as described in the National Environmental Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) Schedules B1 and B2 (NEPM, 2013). These include:	Transport / Contractor	Detailed design / construction
		 the onsite area in the northwest section with historical agricultural uses 		
		 the current BP petrol station 		
		 the former landfills and current Flower Power complex and Kelso Waste Facility 		
		 the general filling of ground 		
		 the current Bankstown and Riverland Golf Courses 		
		 the southern ancillary facility. 		
		• The scope of the DSI should be detailed in a sampling analysis and quality plan (SAQP) which should include collection of soil, groundwater and landfill gas samples near associated moderate risk areas. Since the southern ancillary facility would be used as a storage facility with no intrusive works, a licenced asbestos assessor should conduct a walkover to assess the impact of asbestos containing material onsite and to assess the need for an asbestos management plan and a management plan to contain soil material brought onsite and minimise cross-contamination with asbestos. It should also be in accordance with the NEPM 2013 and analytical results compared to the applicable Tier 1 screening values in Schedule B2 of the NEPM 2013.		
		• If deeper excavation is required based on the detailed design, further site investigation would be required for the area next to the BP petrol station within the proposal area. The site investigation would need to assess soil, groundwater and vapour risks to the proposal area.		
		• Analytical results from any spoil requiring off-site disposal should be compared to the concentrations in the NSW EPA Waste Classification Guidelines Parts 1 to 4 and Addendum 1. If natural soil is disturbed, it may meet the definition of ENM for reuse and the analytical data should be compared to the concentrations and requirements in the ENM Resource Recovery Order and Exemption under the Protection of Environmental Operations (Waste) Act 2000.		

No.	Impact	Environmental safeguards	Responsibility	Timing
		• If soils between two and four metres are disturbed with the proposal area, an ASSMP should be included in the CEMP. The ASSMP should be informed by the results of the DSI that would include the identification of presence and extent of ASS/PASS, particularly around the northern section of the proposal area.		
03	Air quality	 An Air Quality Management Plan (AQMP) would be prepared and implemented as part of the CEMP. The AQMP would include, but not be limited to: potential sources of air pollution air quality management objectives consistent with any relevant published EPA and/or Office of Environment and Heritage (OEH) guidelines mitigation and suppression measures to be implemented methods to manage work during strong winds or other adverse weather conditions a progressive rehabilitation strategy for exposed surfaces. 	Contractor	Detailed design / pre-construction
04	Waste	 A Waste Management Plan (WMP) would be prepared and implemented as part of the CEMP. The WMP would include but not be limited to: measures to avoid and minimise waste associated with the proposal classification of wastes and management options (re-use, recycle, stockpile, disposal) statutory approvals required for managing 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 would align with the <i>Environmental Procedure - Management of Wastes on Transport for NSW Land</i> (Transport, 2014) and relevant Transport Waste fact sheets. 	Contractor	Pre-construction
05	Waste	 A Material Re-use and Management Plan (MRMP) would be prepared to: identify strategies to avoid, reduce, reuse and recycle all materials identify the type, classify and estimate volumes of all materials to be generated and used. Identify storage, treatment, transport and disposal options and pathways 	Transport	Detailed design
06	Bushfire risk	 The CEMP would include a bushfire management plan prepared in line with the Planning for Bush Fire Protection 2019 (Rural Fire Service 2019). Measures to be implemented to manage bushfire risk include: monitoring of weather and local bushfire ratings consultation requirements for community notifications in the event of a bushfire 	Contractor	Pre-construction / Construction

No.	Impact	Environmental safeguards		Timing
		maintaining equipment in good working order		
		ensuring plant and equipment are fitted with appropriate spark arrestors, where practicable		
		• ensuring site workers are informed of the site rules including designated smoking areas and putting rubbish in designated bins.		
		obtaining hot work permits and implementing total fire bans as required		
		• implementing adequate storage and handling requirements for potentially flammable substances in line with the relevant guidelines.		
07	Consultation with emergency services	Consultation with emergency services, including the Rural Fire Service and Fire and Rescue NSW to:	Contractor	Construction
		ensure emergency access is maintained during construction		
		• co-ordinate any bush fire emergency actions as outlined in the proposal's Bushfire Management Plan.		
Cumula	ative impacts			
C1	Cumulative impacts	Ongoing consultation would be carried out between proponents and construction contractors of surrounding projects to identify the potential for cumulative impacts to occur should construction occur concurrently with the proposal.	Transport / contractor	Detailed design / pre-construction / construction
		Co-ordination of traffic management controls would be considered to minimise cumulative traffic impacts, particularly during peak holiday periods.		
		Co-ordination of out of hours work would be considered to minimise cumulative noise impacts to sensitive receivers and to ensure respite periods are achieved for sensitive receivers.		

6.3 Licensing and approvals

Table 6-2 outlines the relevant licenses and other approval requirements needed to construct and operate the proposal.

Table 6-2 Summary of licensing and approval required

Instrument	Requirement	Timing
Roads and work permits	All impacts to the road network would be carried out in line with a Road Occupancy License (ROL) to be obtained from the Traffic Management Centre	Pre-construction

7. Sustainability

In 2020, Transport developed eight focus areas which address the most important sustainability aspects associated with the activities of Transport, each supported by the United Nations Sustainable Development Goals. The Transport Sustainability Plan 2021 outlines how Transport intends to address each of these focus areas.

Table 7-1 details the sustainability themes and objectives of the plan and describes how the proposal meets those objectives.

Sustainability focus area	Sustainability goal	Proposal response
Respond to climate change	 Net zero emissions by 2050 Consider climate change risks in all decisions 	 Transport's G36 Environmental Protection specifications for construction will require contractors to demonstrate energy-efficiency and time-efficient methods for handling and transporting materials and operation of plant. This would typically include reducing idling time, reducing the length of haulage routes by sourcing material locally and considering using a sustainable energy alternative for temporary lighting during night-work. This would minimise energy use and reducing greenhouse gas emissions during construction of the proposal. As noted in Section 6.2.3 of the REF, during operation, the proposal would reduce delays and congestion, thereby reducing idling time and consumption of fuel in vehicles. Ongoing energy consumption for the proposal would be for the street lighting. Street lighting will use energy efficient luminaries (e.g. LED technology) in accordance with Transport's Luminaries for Road Lighting Specification TSI-SP-041. Flooding impacts associated with climate change and sea level rise have been assessed during the preparation of this REF. Refer to Section 6.4 of the REF for further details. Potential impacts have been identified and these will be further investigated during detailed design with consideration of road levels and the surrounding existing and proposed terrain levels. Revegetation of the road corridor will be undertaken in accordance with Landscaping Plans (refer to Appendix G of the REF). These plans will identify tree species suitable to provide canopy cover to minimise urban heat effects.
Protect and enhance biodiversity	• No net loss of biodiversity	The development of the design has avoided and minimised impacts on threatened biodiversity, by largely remaining within the existing road infrastructure corridor. Ongoing design development will further investigate potential opportunities to reduce direct footprint impacts. Residual impacts of the proposal to vegetation and threatened species habitat would be offset in line with Transport's Biodiversity Policy (Transport, 2022a), including consideration of no net loss to biodiversity and tree and hollow replacement.
Improve environmental outcomes	Develop a circular economy for Transport by designing waste	The cut and fill earthwork requirements for this proposal are relatively minor. Transport's detailed design process under specification PS311 Environment Design and Compliance involves the development of a Material Re-use

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Table 7-1 Alignment of the	proposal with the Transp	port Sustainability Plan	ZUZI TOCUS areas and goals

Sustainability focus area	Sustainability goal	Proposal response
Procure responsible	 and pollution out and keeping products and materials in use Reduce environmental impacts of projects and operations All suppliers meet that standards in Transport Supplier Sustainability Charter Social and environmental outcomes included in all procurement decisions Go beyond minimum compliance targets in Aboriginal 	 and Management Plan to identify strategies of 'avoid', 'reduce', 'reuse' and 'recycle' materials. The proposal would also rehabilitate the existing pavement, where possible, rather than removing it to go to landfill and requiring importation of new pavement materials. Re-use of other 'waste' materials could include reusing vegetation cleared on site in mulch. Sustainable procurement will be carried out adopting the following initiatives: All tendered procurement would include non-price selection criteria that assesses relevant sustainability and social procurement measures. Implementing the Aboriginal Participation in Construction Policy. Where possible, procuring from small and mediumsized enterprises Aboriginal Business and Australian Disability enterprises. Monitoring the supply chain to identify and address issues related to poor labour practices. Supporting local suppliers to minimise haulage
Partner with communities	 Procurement Policy Always leave a positive legacy for communities as a result of projects Enable, apply and report on community engagement 	 Supporting local suppliers to minimise nadage distances of construction materials when feasible. Transport has formally engaged with the community about this proposal during the Have Your Say consultation period and REF display period. Transport has responded to issues raised as part of the Have Your Say consultation in the consultation report (Appendix C to the REF) and the REF display in this report. Engagement with the community has resulted in the following design decisions, including: shared path design during the current phase and into the detailed design phase to minimise impacts to street trees. The inclusion of the link road between Auld Avenue and Keys Parade to address concerns about the conversion of the Henry Lawson Drive / Auld Avenue intersection to left-in, left-out as part of the Henry
		 Lawson Drive Upgrade Stage 1A. Continual design refinement, including into the detailed design stage, to address concerns about turning movement restrictions from driveways due to the introduction of the central median on Henry Lawson Drive. Access to properties is being considered in relation to sight distances, setbacks, and gradients in accordance with the Australian Standards, Austroads Road Design Guides, RMS (Transport for NSW) Supplements and Council Standard Drawings.
Respect culture and heritage	 Aboriginal culture is integrated and preserved Acknowledging and incorporating 	The proposal area includes the locally listed former Milperra Soldier Settlement and the Milperra soldier tree and commemorative plaque, located opposite 41 Ingram Avenue. Section 6.10.3 of the REF outlines the minor adverse impact that the proposal would have on the former Milperra Soldier Settlement given the already disturbed

Sustainability focus area	Sustainability goal	Proposal response
	culture through stories, examples, and best practice	nature of the item. Signage throughout the proposal area associated with the solider settlement would be reinstated, including in the case of the Milperra Soldier Sign, which would be reinstated in a similar location following the proposal's construction. The proposal would have a major adverse effect on the soldier tree as this is proposed for removal during the proposal's construction. As is outlined in section 6.10.4, design changes would be considered to look at how to minimise impacts to the Milperra Soldier Tree structural root zone to allow retention of the tree. The Aboriginal cultural heritage of the proposal area was also assessed for the proposal area. The proposal area was assessed as containing no known Aboriginal heritage items, including archaeological objects due to the highly disturbed nature of the area from historical activities. As such, the proposal is anticipated to have no impacts to Aboriginal heritage during construction or operation. However, if unknown or potential Aboriginal heritage items are uncovered, the <i>Transport for NSW Unexpected Heritage</i>
Align spend and impact	 All decisions consider value created from sustainability alongside financial analysis Reduce whole of life costs for the transport network 	The proposal would upgrade Henry Lawson Drive to provide two lanes in each direction, which would increase capacity, reduce intersection delays and reduce congestion. As a result, economic activity in the Canterbury Bankstown local government area and in Greater Sydney would be improved. The proposal would improve traffic flow during peak periods and during emergencies by providing safe and continuous access to transport services.
Empower customers to make sustainable choices	Use customer journeys to inform, engage and inspire more sustainable practices and demonstrate Transport's progress	The proposal would provide improved active transport connectivity through the proposal area and would provide appropriate access to existing bus stops. In doing so, it would encourage customers to use active and public transport when travelling within Milperra and to other surrounding suburbs.

8. Definitions

Term	Definition
AEP	Annual exceedance probability
AHMP	Aboriginal heritage management plan
AQMP	Air quality management plan
ASSMP	Acid sulphate soils management plan
CBC	Canterbury Bankstown Council
CEMP	Construction environmental management plan
CLP	Community liaison plan
CNVMP	Construction noise and vibration management plan
DPE	Department of Planning and Environment
DSI	Detailed site investigation
EES	Environment, Energy and Science
ESCP	Erosion and sediment control plan
ESMP	Erosion and sediment management plan
FRP	Fibre reinforced plastic
HIP	Heritage interpretation plan
LOS	Level of service
MRMP	Material re-use and management plan
NAHMP	Non-Aboriginal heritage management plan
NorBE	Neutral or beneficial effect
OEH	Office of Environment and Heritage
REF	Review of environmental factors
RMS	Roads and Maritime Services
ROL	Road occupancy licence
RTA	Roads and Traffic Authority
SAQP	Sampling analysis and quality plan
SES	State Emergency Service
SWMP	Soil and water management plan
ТМС	Traffic Management Centre
ТМР	Traffic management plan
TPZ	Tree protection zone
Transport	Transport for NSW
WMP	Waste management plan

9. References

DPI Office of Water (2012a) Guidelines for instream works on waterfront land.

DPI Office of Water (2012b) Guidelines for watercourse crossings on waterfront land.

DPI (Fisheries NSW) (2013) Policy and guidelines for fish habitat conservation and management update 2013.

NEPM (2013) National Environmental Protection (Assessment of Site Contamination) Measure 1999 (as amended 2013) Schedules B1 and B2.

NSW Rural Fire Service (2019) Planning for Bushfire Protection 2019.

Roads and Maritime Services (2015) Stockpile Site Management Guidelines.

Roads and Traffic Authority (1999) Code of Practice for Water Management.

Roads and Traffic Authority (2010) Traffic Control at Work Sites Manual.

Roads and Traffic Authority (2011a) Protecting and managing biodiversity on RTA projects.

Roads and Traffic Authority (2011b) Draft Wildlife Connectivity Guidelines for Road Projects.

Roads and Traffic Authority (undated) Guideline for Construction Water Quality Monitoring.

Transport for NSW (2012) Procedure for Aboriginal Cultural Heritage Consultation and Investigation.

Transport for NSW (2013) Guideline for the Management of Contamination.

Transport for NSW (2014) Environmental Procedure - Management of Wastes on Transport for NSW Land.

Transport for NSW (2020) Draft Guideline for Assessing the Impacts of Treated Water Discharge from Water Quality Treatment Controls.

Transport for NSW (2021) Henry Lawson Drive Upgrade Stage 1A Submissions Report.

Transport for NSW (2022a) Biodiversity Policy.

Transport for NSW (2022b) Construction Noise and Vibration Guideline.

Transport for NSW (2022c) Unexpected Heritage Items Procedure - EMF-HE-PR-0076.

Transport for NSW (2023) Henry Lawson Drive Upgrade Stage 1B Review of Environmental Factors.

REF submissions report		

Appendix A – Letter to Bullecourt Avenue residents (September 2023)

Appendix B – Addendum Biodiversity Assessment Report



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