



Transport
Roads & Maritime
Services

Alfords Point Road Upgrade

Brushwood Drive to the Georges River

Review of environmental factors

FEBRUARY 2013

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**Roads and Maritime
Services**

Alfords Point Road Upgrade -
Brushwood Drive to the
Georges River
Review of Environmental
Factors

February 2013

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Executive summary

The proposal

The NSW Roads and Maritime Services (RMS) propose to upgrade about 2.1 kilometres of Alfords Point Road from Brushwood Drive to the Georges River at Alfords Point (the proposal).

The key features of the proposal include:

- Upgrade about 2.1 kilometres of Alfords Point Road from a four lane undivided carriageway to a six lane divided carriageway. Alfords Point Road would be widened on the eastern side to accommodate three lanes in each direction
- Install a continuous concrete type F median barrier from the southern abutment of Alfords Point Bridge to about 1.8 kilometres south to separate the northbound and southbound lanes
- Provide emergency vehicle access via an opening in the central median barrier at the southern abutment to Alfords Point Bridge
- Widen the Brushwood Drive northbound on ramp to accommodate the relocated bus bay
- Relocate the existing bus stop on the Brushwood Drive on ramp to about 80 metres south of the existing location
- Realign and extend the existing footpath to the new bus stop location. To provide pedestrian access to the realigned footpath the existing noise wall opening at Eucalyptus Street would be reorientated from its current north facing direction to a south facing direction (ie the opening would be repositioned seven metres south and current opening closed)
- Widen the single lane section of the Illawong/Alfords Point southbound off ramp to two lanes for a length of about 300 metres. This would provide additional vehicle storage capacity on approach to the roundabout intersection and prevent queuing onto Alfords Point Road southbound lanes
- Replace the temporary bitumen shared path with a permanent off-road shared path on the eastern side of Alfords Point Road. The shared path would extend the length of the proposal from Alfords Point Bridge to the roundabout at the end of the Illawong/Alfords Point off ramp. Where the grades are steep the shared path would be converted into separate cyclist and pedestrian paths for safety reasons. A concrete type F barrier would be installed along the western side of the shared path to separate it from the southbound carriageway
- Relocate and reinstate the existing pedestrian path between Maxwell Close and the shared path on the eastern side of Alfords Point Road
- Relocate the existing heavy vehicle inspection bay to a permanent location beneath Old Illawarra Road overbridge (900 metres south of Brushwood Drive on the southbound side of Alfords Point Road). This would include permanent boundary fencing, lockable gates and lighting
- Provide a vehicle breakdown bay on the southbound carriageway at the location of the existing heavy vehicle inspection bay. The breakdown bay would be an extension of the road pavement and be about 20 metres long and five metres wide
- Subject to an assessment of feasible and reasonable noise mitigation options:
 - Potentially provide a noise barrier on the western roadside edge of Alfords Point Road for about 700 metres to the north of the existing noise wall

- Potentially provide a noise barrier on the eastern side of Alfords Point Road for about one kilometre between Maxwell Close and Brushwood Drive
- Relocate the existing variable message sign located at the existing heavy vehicle inspection bay to about 500 metres south of the existing location
- Adjust the pavement drainage along the eastern side of Alfords Point Road and within the median
- Construct a permanent swale drain and rock check dam at culvert outlets (300 metres and 1620 metres south of Alfords Point Bridge) and a permanent water quality basin 870 metres south of Alfords Point Bridge
- Relocate the optic fibre cables, light poles and underground electricity on the eastern and western sides of Alfords Point Road to the outside edge of the widened Alfords Point Road. Provide a new utility installation to supply power from Old Illawarra Road to the proposed heavy vehicle inspection bay.

Need for the proposal

The proposal forms part of a broader plan to improve traffic flow along Alfords Point Road and through the southern region of Sydney. Alfords Point Road is a key arterial road in southern Sydney, providing access across the Georges River for motorists, cyclists and freight vehicles travelling between the commercial and employment areas of Miranda and Bankstown. Alfords Point Road is currently operating at capacity during peak periods and considerable delays are experienced at the Illawong/Alfords Point off ramp and Brushwood Drive on ramp. RMS has been working to reduce congestion, improve travel times and improve road safety on the route by completing the duplication of Alfords Point Bridge in 2008 and the widening of Alfords Point Bridge northern approach in late 2011. The proposal would complement these upgrades.

Alfords Point Road has a steep 9.7 per cent gradient immediately south of the existing heavy vehicle inspection bay. Trucks leaving the inspection bay are unable to accelerate to a sufficient speed to merge safely and efficiently with existing traffic on Alfords Point Road. This is causing a safety hazard as vehicles slow down or change lanes to avoid slow moving trucks. The proposal would relocate the heavy vehicle inspection bay to a safer location with a less steep grade and improved sight distances.

Options considered

A number of options within the existing Alfords Point Road corridor were considered for the proposal. The options included widening Alfords Point Road to a six lane carriageway, widening Alfords Point Road to a five lane carriageway and the 'do nothing' option. A number of design refinements were also considered including the location of the heavy vehicle inspection bay, the location of the bus stop on Brushwood Drive on ramp, and increasing the capacity of the Illawong/Alfords Point off ramp. The preferred option that was selected would widen Alfords Point Road to a six lane carriageway including an upgrade of the Brushwood Drive on ramp and the Illawong/Alfords Point off ramp. The selection of the preferred option took into account social, environmental and economic factors as well as stakeholder input and is considered to best achieve the proposal objectives.

Statutory and planning framework

Clause 94 of *State Environmental Planning Policy (Infrastructure) 2007* permits development on any land for the purpose of a road or road infrastructure facilities to be carried out by or on behalf of a public authority without consent.

As the proposal is for the purpose of a road and is to be carried out by RMS, development consent from council is not required and it is assessed under Part 5 of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

Community and stakeholder consultation

During development of the proposal, consultation has been undertaken with the community and relevant Government agencies and stakeholders. In July and August 2012, a community update brochure was delivered to local residents and community information session and displays were held. The purpose of the community consultation was to display the preliminary concept design and allow local residents and road users to provide feedback. Feedback received from the community during consultation has been used to refine the concept design.

In accordance with the RMS Procedure for Aboriginal Cultural Heritage Consultation and Investigation (PACHCI), consultation was undertaken with Gandangara Local Aboriginal Land Council. This included inviting them to participate in the archaeological survey of March 2012 and providing them with a copy of the draft Aboriginal Archaeological Survey Report to comment.

In April and June 2012, a number of government agencies and stakeholders were contacted by letter and provided with preliminary details of the proposal. The letters invited the agencies and stakeholders to comment on the issues they would like addressed in the REF.

RMS will continue to undertake community and stakeholder consultation throughout development of the proposal. In particular, the REF is placed on public display and comments invited. Submissions received as a result of the REF display will be addressed in a formal submissions report and, if appropriate, considered when finalising the concept design and during development of the detailed design.

Environmental impacts

Beneficial effects of the proposal would include:

- Providing additional road capacity to accommodate the forecast traffic growth for the route
- Improving operational efficiency and travel times on Alfords Point Road
- Improving safety for heavy vehicles and through traffic
- Traffic noise reductions for acutely noise affected residents
- Improving safety and congestion at the Illawong/Alfords Point off ramp and Brushwood Drive on ramp
- Improving safety for buses accessing the bus stop on Brushwood Drive on ramp and reducing conflict with other vehicles
- Providing a permanent shared path between Brushwood Drive and Alfords Point Road
- Improving pedestrian access to the bus stop on Brushwood Drive on ramp.

A number of adverse environmental effects are likely to occur during construction and operation of the proposal, including:

- Removal of 6.68 hectares of vegetation including 2.71 hectares of native vegetation
- Traffic impacts, due to increased heavy vehicle movements on the existing road network during construction
- Noise and vibration impacts to properties adjacent to the proposal site during construction

- Disruptions to traffic flow and access during construction
- Increased risk of degradation of water quality and drainage lines during construction
- Increased risk for spills and contamination during construction
- Increased risk of occurrence of erosion and sedimentation during construction
- Potential temporary decline in air quality during construction
- Increased potential for introduction of weed species during construction.

Adverse environmental effects would be adequately minimised, managed and mitigated through the implementation of safeguards outlined in this review of environmental factors. This would include a construction noise and vibration management plan, biodiversity management plan, soil and water management plan and traffic management plan.

Justification and conclusion

The proposal is considered to be consistent with national, state and local strategies and plans as it would address congestion issues on Alford's Point Road leading to improved efficiency, travel times and safety. The proposal would also complement the upgrade of Alford's Point Bridge in 2008 and the northern bridge approach in 2011, which would contribute to an improved strategic bus and freight route between Miranda and Bankstown.

While there would be some environmental impacts as a consequence of the proposal, they have been avoided or minimised wherever possible through design and site-specific safeguards. The beneficial effects are considered to outweigh the mostly temporary adverse impacts and risks associated with the proposal.

The proposal is subject to assessment under Part 5 of the EP&A Act. This REF has examined and taken into account to the fullest extent possible all matters affecting or likely to affect the environment by reason of the proposed activity. This has included consideration of conservation agreements and plans of management under the *National Parks and Wildlife Act 1974* (NPW Act), joint management and biobanking agreements under the *Threatened Species Conservation Act 1995* (TSC Act), wilderness areas, critical habitat, impacts on threatened species, populations and ecological communities and their habitats and other protected fauna and native plants.

The environmental impacts of the proposal are not likely to be significant and therefore it is not necessary for an environmental impact statement to be prepared and approval to be sought for the proposal from the Minister for Planning and Infrastructure under Part 5.1 of the EP&A Act. The proposal is unlikely to affect threatened species, populations or ecological communities or their habitats, within the meaning of the TSC Act or *Fisheries Management Act 1994* (FM Act) and therefore a Species Impact Statement is not required. The proposal is also unlikely to affect Commonwealth land or have an impact on any matters of national environmental significance and therefore a referral to DSEWPaC for a decision by the Commonwealth Minister for the Environment on whether assessment and approval is required under the EPBC Act, is not required.

Display of the review of environmental factors

This review of environmental factors is on display for comment during March 2013 until April 2013. You can access the documents in the following ways:

Internet

The documents would be available as pdf files on the RMS (former RTA) website at www.rms.nsw.gov.au/roadprojects

You can request a copy by contacting the project team on 02 8849 2585.

Display

The documents can be viewed at the following locations until 5 April 2013:

- Sutherland Library
30-36 Belmont Street, Sutherland
Monday to Friday 9am – 9pm
Saturday 9am – 4pm
Sunday 12pm – 4pm
- Menai Library
34-40 Allison Crescent, Menai
Monday, Tuesday, Thursday 9.30am – 8pm
Wednesday and Friday 9.30am – 5pm
Saturday 9am -12pm
- Padstow Motor Registry
Shop 1, 11 Cahors Road, Padstow
Monday to Friday 8.30am – 5pm
Saturday 8.30am – 12pm

How can I make a submission?

To make a submission on the proposal, please send your written comments to:

Alfords Point Road Southern Approach Upgrade project team:

Development Sydney

Roads and Maritime Services

PO Box 973

Parramatta NSW 2124

Email: AlfordsPoint@rms.nsw.gov.au

Fax: 02 8849 2817

Submissions must be received by 5 April 2013.

Privacy information

All information included in submissions is collected for the sole purpose of assisting in the assessment of this proposal. The information may be used during the environmental impact assessment process by relevant Roads and Maritime Services staff and its contractors.

Where the respondent indicates at the time of supply of information that their submission should be kept confidential, Roads and Maritime Services will attempt to keep it confidential. However there may be

legislative or legal justification for the release of the information, for example under the *Government Information (Public Access) Act 2009* or under subpoena or statutory instrument.

The supply of this information is voluntary. Each respondent has free access at all times to the information provided by that respondent but not to any identifying information provided by other respondents if a respondent has indicated that the representation should be kept confidential.

Any respondent may make a correction to the information that they have provided by writing to the same address the submission was sent.

The information will be held by RMS, 27-31 Argyle Street, Parramatta.

What happens next?

Following the submissions period, Roads and Maritime Services will collate submissions. Acknowledgement letters will be sent to each respondent. The details of submission authors will be retained and authors will be subsequently advised when project information is released.

After consideration of community comments Roads and Maritime Services will determine whether the proposal should proceed as proposed, or whether any alterations to the proposal are necessary. The community will be kept informed regarding this Roads and Maritime Services determination.

If the proposal is approved, Roads and Maritime Services proceeds with final design and tenders are called for construction of the project. The timing of these subsequent activities has not been confirmed.

If you have any queries, please contact Deanne Forrest (RMS Project Manager) on 02 8849 2585.

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- C Consultation material
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- F Noise and vibration assessment
- G Hydrology and drainage assessment
- H Aboriginal heritage
- I Non-Aboriginal heritage
- J Traffic impact assessment
- K Landscape character, visual impact assessment and urban design
- L Greenhouse gas assessment

1. Introduction

1.1 Proposal identification

The NSW Roads and Maritime Services (RMS) proposes to upgrade about 2.1 kilometres of Alfords Point Road from Brushwood Drive to the Georges River (the proposal). The proposal is located at Alfords Point about 30 kilometres south-west of the Sydney central business district (refer Figure 1-1). Alfords Point is within the Sutherland Shire local government area and the RMS Sydney region.

The proposal is needed to improve traffic capacity and address congestion issues and would complement the upgrade of Alfords Point Bridge (RTA, 2006) and its northern approach (RTA, 2007).

The key features of the proposal are shown in Figure 1-2 and include:

- Upgrade about 2.1 kilometres of Alfords Point Road from a four lane undivided carriageway to a six lane divided carriageway. Alfords Point Road would be widened on the eastern side to accommodate three lanes in each direction
- Install a continuous concrete type F median barrier from the southern abutment of Alfords Point Bridge to about 1.8 kilometres south to separate the northbound and southbound lanes
- Provide emergency vehicle access via an opening in the central median barrier at the southern abutment to Alfords Point Bridge
- Widen the Brushwood Drive northbound on ramp to accommodate the relocated bus bay
- Relocate the existing bus stop on the Brushwood Drive on ramp to about 80 metres south of the existing location
- Realign and extend the existing footpath to the new bus stop location. To provide pedestrian access to the realigned footpath the existing noise wall opening at Eucalyptus Street would be reorientated from its current north facing direction to a south facing direction (ie the opening would be repositioned seven metres south and current opening closed)
- Widen the single lane section of the Illawong/Alfords Point southbound off ramp to two lanes for a length of about 300 metres. This would provide additional vehicle storage capacity on approach to the roundabout intersection and prevent queuing onto Alfords Point Road southbound lanes
- Replace the temporary bitumen shared path with a permanent off-road shared path on the eastern side of Alfords Point Road. The shared path would extend the length of the proposal from Alfords Point Bridge to the roundabout at the end of the Illawong/Alfords Point off ramp. Where the grades are steep the shared path would be converted into separate cyclist and pedestrian paths for safety reasons. A concrete type F barrier would be installed along the western side of the shared path to separate it from the southbound carriageway
- Relocate and reinstate the existing pedestrian path between Maxwell Close and the shared path on the eastern side of Alfords Point Road
- Relocate the existing heavy vehicle inspection bay to a permanent location beneath Old Illawarra Road overbridge (900 metres south of Brushwood Drive on the southbound side of Alfords Point Road). This would include permanent boundary fencing, lockable gates and lighting
- Provide a vehicle breakdown bay on the southbound carriageway at the location of the existing heavy vehicle inspection bay. The breakdown bay would be an extension of the road pavement and be about 20 metres long and five metres wide
- Subject to assessment of feasible and reasonable noise mitigation options:

- Potentially provide a noise barrier on the western roadside edge of Alfords Point Road for about 700 metres to the north of the existing noise wall
- Potentially provide a noise barrier on the eastern side of Alfords Point Road for about one kilometre between Maxwell Close and Brushwood Drive
- Relocate the existing variable message sign located at the existing heavy vehicle inspection bay to about 500 metres south of the existing location
- Adjust the pavement drainage along the eastern side of Alfords Point Road and within the median
- Construct a permanent swale drain and rock check dam at culvert outlets (300 metres and 1620 metres south of Alfords Point Bridge) and a permanent water quality basin 870 metres south of Alfords Point Bridge
- Relocate the optic fibre cables, light poles and underground electricity on the eastern and western sides of Alfords Point Road to the outside edge of the widened Alfords Point Road. Provide a new utility installation to supply power from Old Illawarra Road to the proposed heavy vehicle inspection bay.

The start and end points of the proposal include tie-ins to the existing alignment of Alfords Point Road. Activities to tie the proposal into the existing alignment would be determined during detailed design and may include pavement works where required to create consistent levels between existing and new pavement.

To minimise traffic disruptions, the proposal is anticipated to be constructed in five main stages. This would include staging construction on Brushwood Drive on ramp and the Illawong/Alfords Point off ramp, as well as staging works on the eastern and western sides of Alfords Point Road. Further detail regarding construction staging is provided in Section 3.4.2.

Construction of the proposal would require two temporary construction site compounds and a stockpile site. The main construction site compound would be located on the triangle piece of land adjacent to the Illawong/Alfords Point off ramp (refer Figure 1-2). This site would be about 2500 square metres and accessed from the Illawong/Alfords Point Road off ramp. The secondary site compound would be located 400 metres south of the Old Illawarra Road overbridge (refer Figure 1-2). This site would be about 6000 square metres and accessed from Old Illawarra Road. Construction site compounds would be used to stockpile materials, store plant and equipment, provide construction staff parking, toilets and amenities. An additional stockpile and equipment storage area would also be required on the eastern side of Alfords Point Road underneath the Old Illawarra Road overbridge.

Temporary construction sedimentation basins, if required, would be located within the road pavement corridor. Construction of the proposal is anticipated to take about 24 months to complete (weather permitting).

Construction of Alfords Point Road and the original Alfords Point Bridge (prior to 1973) included clearing an additional area to cater for potential future widening of Alfords Point Road. As a result, the existing Alfords Point Road corridor has sufficient width to cater for the proposal without substantial changes to the landscape through cut and fill works or vegetation clearing.

Alfords Point Road is primarily used as an arterial road for commuters and freight between Miranda and Bankstown, as well as a strategic bus corridor. An on ramp and off ramp at Brushwood Drive provide local access to the residential areas of Padstow Heights, Alfords Point and Illawong.

For the purpose of this report, the 'proposal site' refers to the area that would be directly impacted by the proposal, including the construction footprint.

The proposal site is largely within an existing road corridor and the Georges River is a dominant feature to the north of the proposal (refer Figure 1-2). Two minor culverts cross Alfords Point Road at 300 metres and 1620 metres south of Alfords Point Bridge respectively. Road overbridges cross Alfords Point Road at Brushwood Drive and Old Illawarra Road, and Alfords Point Bridge is located immediately north of the proposal site.

The main surrounding land uses consist of low density residential properties at Alfords Point and Illawong, and the Georges River National Park. The Sir Thomas Mitchell Aged Care Facility is located adjacent to the proposal at the Illawong/Alfords Point Road off ramp.

1.2 Purpose of the report

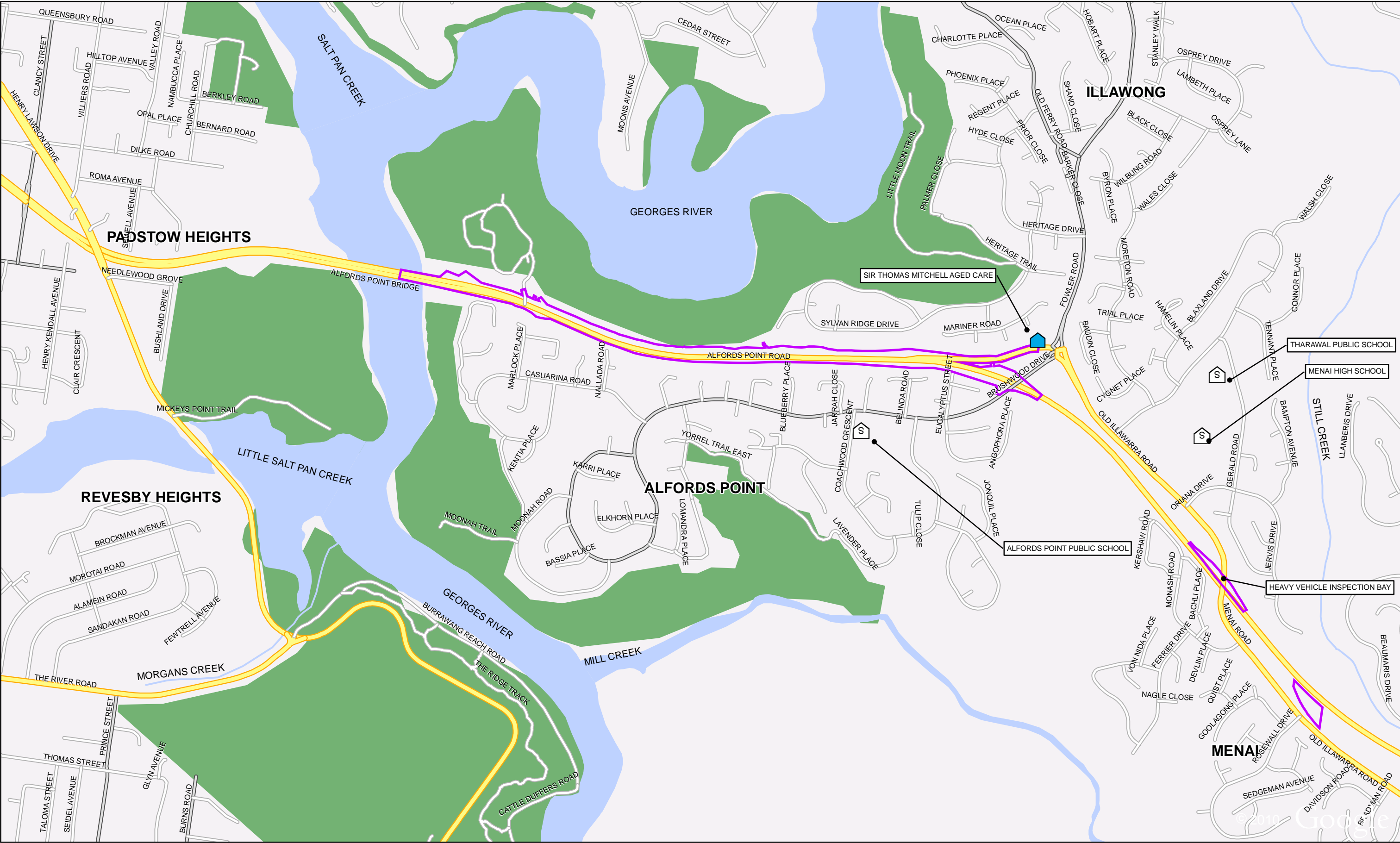
This review of environmental factors (REF) has been prepared by GHD Pty Ltd on behalf of RMS Project Development Sydney. For the purposes of these works, RMS is the proponent and the determining authority under Part 5 of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

The purpose of the REF is to describe the proposal, to document the likely impacts of the proposal on the environment, and to detail protective measures to be implemented.

The description of the proposed works and associated environmental impacts have been undertaken in context of clause 228 of the *Environmental Planning and Assessment Regulation 2000*, the *Threatened Species Conservation Act 1995* (TSC Act), the *Fisheries Management Act 1994* (FM Act), and the Australian Government's *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). In doing so, the REF helps to fulfil the requirements of section 111 of the EP&A Act, that RMS examine and take into account to the fullest extent possible, all matters affecting or likely to affect the environment by reason of the activity.

The findings of the REF would be considered when assessing:

- Whether the proposal is likely to have a significant impact on the environment and therefore the need for an environmental impact statement to be prepared and approval to be sought from the Minister for Planning and Infrastructure under Part 5.1 of the EP&A Act
- The significance of any impact on threatened species as defined by the TSC Act and/or FM Act, in section 5A of the EP&A Act and therefore the requirement for a Species Impact Statement
- The potential for the proposal to significantly impact a matter of national environmental significance or Commonwealth land and the need to make a referral to the Australian Government Department of Sustainability, Environment, Water, Population and Communities for a decision by the Commonwealth Minister for the Environment on whether assessment and approval is required under the EPBC Act.



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070140280420560

Metres

Map Projection: Transverse Mercator

Horizontal Datum: Geocentric Datum of Australia (GDA)

Grid: Map Grid of Australia 1994, Zone 56

S

Education Facility

Community Facility

Proposal site

Highways

Major Roads

Secondary Roads

Other Roads

Waterways (lines)

Watercourse

Georges River National Park

GHD

CLIENTS|PEOPLE|PERFORMANCE

Roads and Maritime Services

Alford's Point Road Upgrade

Job Number

21-21268

Revision

A

Date

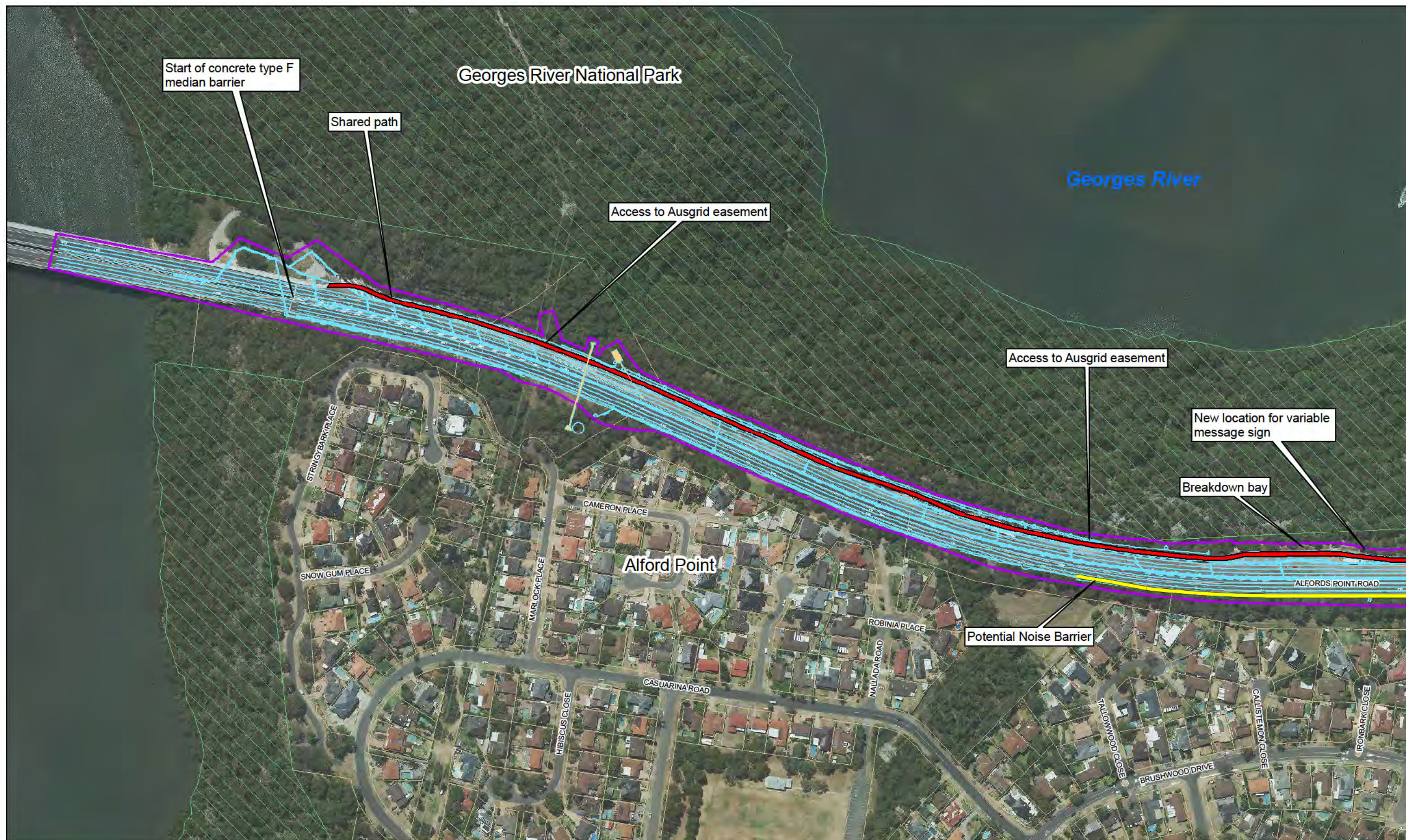
18 Feb 2013

Regional context

Figure 1.1

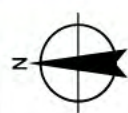
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Metres

Map Projection: Transverse Mercator
Horizontal Datum: Geocentric Datum of Australia (GDA)
Grid: Map Grid of Australia 1994, Zone 56



LEGEND					
	Existing noise barrier		Footpath to bus stop		Proposal site
	Potential noise barrier		Bus only lane		Shared path
	Brushwood drive on ramp		Illawong/Alford Point Road Off Ramp		The proposal
			Construction compound		Georges River National Park
			Cross drainage features		



Roads and Maritime Services
Alford's Point Road Upgrade

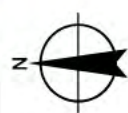
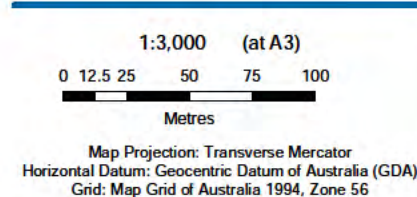
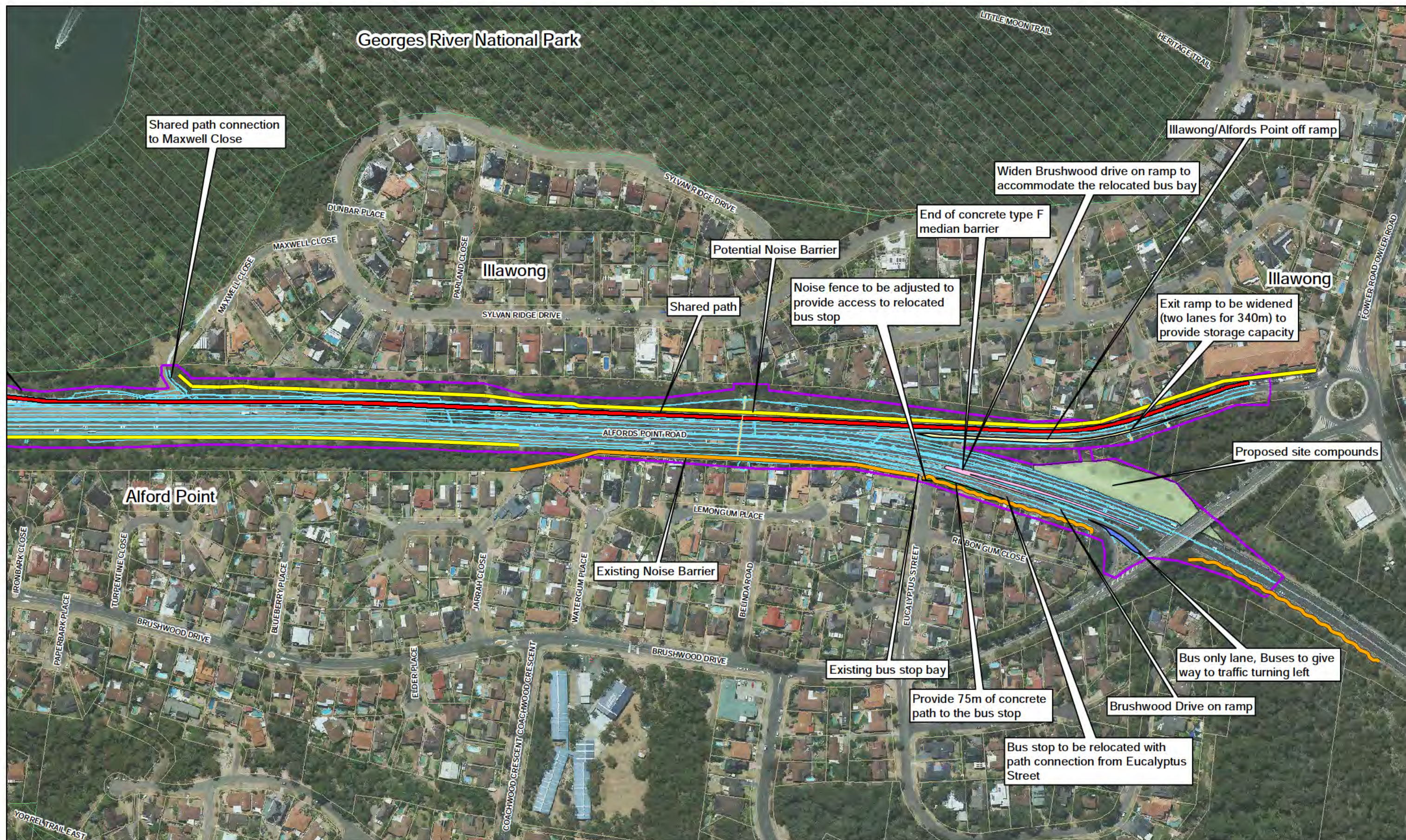
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Revision B
Date 18 Feb 2013

The proposal

Figure 1.2(a)

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LEGEND			
Existing noise barrier	Footpath to bus stop	Proposal site	
Potential noise barrier	Bus only lane	Shared path	
Brushwood drive on ramp	Illawong/Alford Point Road Off Ramp	The proposal	
	Construction compound	Georges River National Park	
	Cross drainage features		



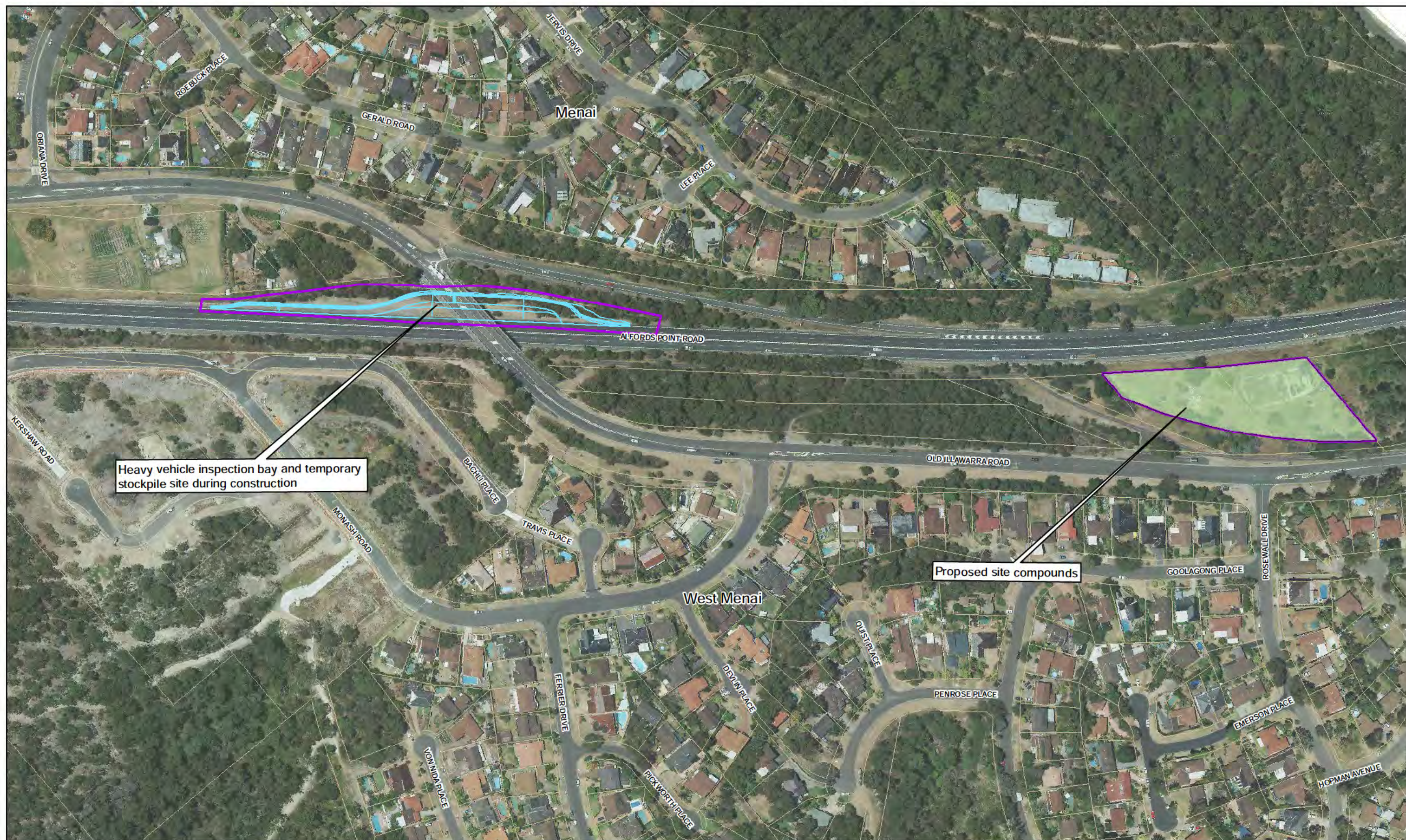
CLIENTS | PEOPLE | PERFORMANCE

Roads and Maritime Services
Alford Point Road Upgrade

Job Number 21-21268
Revision B
Date 18 Feb 2013

The proposal

Figure 1.2 (b)



1:2,300 (at A3)
0 10 20 40 60 80
Metres

Map Projection: Transverse Mercator
Horizontal Datum: Geocentric Datum of Australia (GDA)
Grid: Map Grid of Australia 1994, Zone 56



LEGEND

- | | | |
|-------------------------|-------------------------------------|-----------------------------|
| Existing noise barrier | Footpath to bus stop | Proposal site |
| Potential noise barrier | Bus only lane | Shared path |
| Brushwood drive on ramp | Illawong/Alford Point Road Off Ramp | The proposal |
| Construction compound | Cross drainage features | Georges River National Park |



CLIENTS | PEOPLE | PERFORMANCE

Roads and Maritime Services
Alford's Point Road Upgrade

Job Number 21-21268
Revision B
Date 18 Feb 2013

The proposal

Figure 1.2 (c)

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2. Need and options considered

2.1 Strategic need for the proposal

The proposal forms part of a broader plan to improve traffic flow along Alfords Point Road and through the southern region of Sydney. Alfords Point Road is a key arterial road in southern Sydney, providing access across the Georges River for motorists, cyclists and freight vehicles travelling between the commercial and employment areas of Miranda and Bankstown. RMS has been working to reduce congestion, improve travel times and improve road safety on the route by completing the duplication of Alfords Point Bridge in 2008 and the widening of Alfords Point Bridge northern approach in late 2011.

Alfords Point Road, between Alfords Point Bridge and Brushwood Drive, is currently a four lane undivided road with two northbound and two southbound lanes. This section of Alfords Point Road is currently operating at capacity during peak periods and considerable delays are experienced at the Illawong/Alfords Point off ramp and the Brushwood Drive on ramp.

The on ramp from Brushwood Drive merges with Alfords Point Road and is not capable of efficiently clearing the morning peak traffic. As a result, congestion occurs in the morning peak causing queues along Brushwood Drive. The Illawong/Alfords Point off ramp from Alfords Point Road is primarily a single lane which widens to two lanes about 200 metres before the intersection with Fowler Road, Old Illawarra Road and Brushwood Drive. This off ramp becomes congested in the afternoon peak and queues extend onto Alfords Point Road.

Between 2006 and 2010 there were 62 crashes along the three kilometre section of Alfords Point Road between the Georges River and Menai Road. The majority of crashes (69.4 per cent) were rear-end collisions, with a substantial number occurring at merge points at the Brushwood Drive on ramp and the southern approach to Alfords Point Bridge.

Another safety issue on this section of Alfords Point Road is the location of the heavy vehicle inspection bay. Alfords Point Road has a steep 9.7 per cent gradient immediately south of the existing heavy vehicle inspection bay. This means trucks leaving the inspection bay are unable to accelerate to a sufficient speed to merge safely and efficiently with existing traffic on Alfords Point Road. This is causing a safety hazard as vehicles slow down or change lanes to avoid slow moving trucks.

2.1.1 Relevant strategies and plans

All relevant strategies and plans have been reviewed to determine the consistency of the proposal with their aims and objectives. The review found that the proposal would contribute to achieving the aims and objectives of the relevant strategic plans through the upgrade of a major transport route (Alfords Point Road). The proposal would further contribute to the objectives of the various strategic plans by improving road safety, reducing traffic congestion and improving alternate transport modes through the provision of a shared path for pedestrians and cyclists.

National Road Safety Strategy 2011-2020

The *National Road Safety Strategy 2011-2020* (Australian Transport Council, 2011) aims to reduce death and serious injury on Australian roads. A target of this strategy is to reduce fatalities and crashes on our roads by at least 30 per cent between 2011 and 2020.

The proposal would contribute to achieving this target by upgrading Alfords Point Road, reducing congestion at merge points and improving operation of the road network, thereby reducing vehicle accidents.

The proposal has been designed in accordance with Austroads Guides and RMS supplements to Austroads Guides for safe road operation. During construction, traffic management measures such as reduced speed limit on Alfords Point Road would be implemented to ensure safe conditions for passing motorists and workers on site.

NSW 2021: A plan to make NSW number one

NSW 2021 (NSW Government, 2011) is a 10 year plan with goals and targets to rebuild the economy, provide quality services, renovate infrastructure, restore government accountability, and strengthen the local environment and communities. It replaces the *State Plan* as the NSW Government's strategic business plan, setting priorities for action and guiding resource allocation. *NSW 2021* lists a number of actions to achieve these goals and targets including:

- Reduce travel time
- Improve road safety
- Protect our natural environment.

The proposal would assist in achieving the goal of reducing travel times by increasing the capacity of Alfords Point Road thereby reducing congestion (refer Section 6.7). Easing transport congestion and reducing travel times is also one of the priority actions in *NSW 2021* for improving the efficiency of Sydney's road network during peak times.

The proposal would improve road safety by improving merge points and thereby reducing the likelihood of rear-end collisions. Road safety would also be improved by relocating the heavy vehicle inspection bay to a location on Alfords Point Road with a reduced grade. A reduced grade would allow heavy vehicles to re-enter traffic flows on Alfords Point Road at safer speeds.

The proposal has also been designed to minimise impacts on the natural environment as documented in this REF.

The proposal is therefore consistent with *NSW 2021*.

Transport for NSW - Long Term Transport Master Plan

The *Long Term Transport Master Plan* was released by Transport for NSW in December 2012. It identifies the key transport challenges for NSW over the next 20 years to support NSW development and outlines specific actions to address these challenges. Though not addressed specifically, the proposal supports one of the key measures identified by the master plan for 'congestion management across greater Sydney's road network with targeted measures to reduce congestion, better use existing road capacity and improve road safety'.

NSW Government State Infrastructure Strategy

The *NSW Government State Infrastructure Strategy*, released by the NSW Department of Premier and Cabinet in December 2012, assists in understanding NSW infrastructure needs for the next 20 years, particularly in light of key drivers for infrastructure demand in NSW including increased Sydney region population and demand for freight movement. The strategy recognises that major arterial roads across the wider Sydney road network will require improvement and that there will be value in addressing peak hour congestion 'hotspots'. Though the proposal is not specifically listed in the strategy, it is considered to be consistent with this goal.

The previous strategy by NSW Government for 2008-09 to 2017-18 identified the duplication of Alfords Point Bridge and the upgrade of the northern approach as key infrastructure projects within the Sydney region. The proposal would complement these completed upgrades by upgrading the southern approach

to Alford's Point Bridge and therefore providing continuity for the bridge duplication and northern approach works.

NSW Bike Plan

The *NSW Bike Plan* (RTA and DECCW, 2010) is a comprehensive plan to encourage people to ride more often and more safely in NSW. It details a 10 year plan for new bicycle infrastructure to be funded by the NSW Government commitment of \$158 million in the *Metropolitan Transport Plan: Connecting the City of Cities*.

The *NSW Bike Plan* includes a number of actions to promote and improve cycling which are relevant to the proposal. One of these actions includes providing shared pedestrian and cycle off-road facilities in all appropriate locations as part of State road projects in the Greater Metropolitan Region.

The proposal would provide a permanent shared off-road pedestrian and cycle path.

RMS Corporate Delivery Plan - 2012 to 2013

The *RMS Corporate Delivery Plan 2012-2013*, released in August 2012, supersedes the previous RTA Blueprint document and outlines specific project deliverables in line with strategy statements made in the overarching *RMS Corporate Strategy 2012 to 2016*. The *RMS Corporate Delivery Plan* specifically mentions the proposal in its deliverables;

- Strategy: Deliver key infrastructure to support the safe, efficient and reliable movement of people and goods
- Deliverable: Complete the environmental impact assessment determination for Alford's Point Road, Brushwood Drive to Georges River.

Sutherland Shire Guide for Shaping the Shire to 2030

The *Guide for Shaping the Shire to 2030* is the strategic plan for the Sutherland Shire Council. It sets out the goals and aspirations of the community for the future of the Shire including:

- Well maintained and efficient critical infrastructure which meets current and future needs
- Improved transport options, including well integrated cycling paths and footpaths.

The proposal is designed to provide additional capacity along Alford's Point Road and to improve traffic efficiency. The proposal would also provide a permanent shared off-road pedestrian and cycle path and therefore is consistent with the *Guide for Shaping the Shire to 2030*.

The Georges River Catchment Regional Planning Strategy

Strategic planning for the Georges River catchment includes a range of government initiatives to:

- Embrace the diversity of the catchment – its natural diversity, social diversity and economic diversity
- Identify, protect and provide for the improvement of significant natural and cultural heritage values
- Improve natural resource management
- Promote interest in catchment resources – improving management of and access to areas of natural and cultural significance
- Forge stronger communities – bringing community and government together through more effective partnerships and catchment improvement projects.

A number of action plans have been developed to achieve these initiatives, including the *Sydney Metropolitan Catchment Action Plan 2009* (which incorporates the *Southern Sydney Catchment Blueprint 2003* (DIPNR 2003)). The proposal supports a number of objectives of the Catchment Blueprint by

upgrading the existing road drainage system and ensuring the existing spill containment devices and gross pollutant traps have sufficient capacity to cater for the additional surface water runoff generated by the proposal. The proposal also includes implementation of the safeguards and management measures outlined in Section 7.2 which aim to protect water quality of the adjacent Georges River.

2.2 Existing road and infrastructure

2.2.1 Alfords Point Road

Alfords Point Road is a main arterial road connecting New Illawarra Road and Menai Road in the south to Davies Road and Henry Lawson Drive in the north. The section of Alfords Point Road that is proposed to be upgraded is immediately south of Alfords Point Bridge and is undivided with two 3.3 metre wide lanes in each direction. Alfords Point Bridge crosses the Georges River in a north/south direction via two lanes in each direction, providing continuity in the lane configuration between the northern and southern bridge approaches.

The section of road corridor from Alfords Point Bridge to about 700 metres south is characterised by a steep 9.7 per cent gradient and is enclosed by deep cuttings in several locations. A large area of fill exists on the western side of Alfords Point Road between 700 and 1500 metres south of Alfords Point Bridge. On the eastern side a smaller area of fill is located between 1500 and 1750 metres south of Alfords Point Bridge. The corridor width varies from 35 to 40 metres within cuttings and between 80 to 90 metres where no cuttings exist. The posted speed limit is 80 km/h and access is restricted to the following on and off ramps:

- Illawong/Alfords Point off ramp (allows southbound vehicles to exit Alfords Point Road)
- Brushwood Drive on ramp (allows vehicles to enter the northbound lanes of Alfords Point Road).

The exit lane for the Illawong/Alfords Point off ramp begins about 1.4 kilometres south of Alfords Point Bridge. The exit lane allows vehicles to exit Alfords Point Road onto Fowler Road, Old Illawarra Road and Brushwood Drive. This off ramp is a single lane before widening into two lanes about 60 metres before the intersection with Fowler Road, Old Illawarra Road and Brushwood Drive.

The Brushwood Drive on ramp to Alfords Point Road is accessed by vehicles travelling in both directions along Brushwood Drive. Vehicles entering the on ramp from both directions merge into a single lane about 200 metres after entering. This single lane then merges with the existing two northbound lanes on Alfords Point Road. A Veolia Transport bus stop is located half way down the western side of the Brushwood Drive on ramp (service between Sutherland and Parramatta). The bus stop is accessed via a pedestrian footpath at the end of Eucalyptus Street (Alfords Point). A 3.2 metre high noise wall is located on the western boundary of the road corridor from the Brushwood Drive on ramp to a distance about 600 metres north. A gap in the noise wall at the end of Eucalyptus Street allows pedestrian access to the bus stop. Vegetation has been planted between the noise wall and Alfords Point Road for the entire length.

An off-road temporary bitumen shared path is located adjacent to the southbound carriageway of Alfords Point Road and provides a pedestrian and cyclist connection between Alfords Point Bridge and Brushwood Drive. The shared path is relatively new (constructed in 2010) and in good condition. It runs the length of the proposal, about 2.1 kilometres, and connects the local pedestrian networks in Alfords Point and Illawong with the pedestrian network north of the Georges River. No lighting is provided along the shared path. A pedestrian connection between the shared path and Maxwell Close is provided about one kilometre south of Alfords Point Bridge.

A heavy vehicle inspection bay is located 900 metres south of Alfords Point Bridge in the southbound shoulder. The heavy vehicle inspection bay is 140 metres long and 20 metres wide. The grade of slope

along the section of Alfords Point Road south of the heavy vehicle inspection bay is very steep at 9.7 per cent. A variable message sign is also located on the southbound shoulder of Alfords Point Road about 300 metres north of the heavy vehicle inspection bay.

About one kilometre south of the Illawong/Alfords Point off ramp and Brushwood Drive on ramp, Alfords Point Road passes beneath the Old Illawarra Road overbridge. At this point there is a large area of cleared road verge on the southbound side of Alfords Point Road.

There are no creek crossings or major cross drainage structures present in the proposal site. Minor cross drainage for overland flow is provided through a 1050 millimetre diameter pipe culvert about 300 metres south of Alfords Point Bridge and a 600 millimetre diameter pipe culvert about 1620 metres south of Alfords Point Bridge. A gross pollutant trap/spill containment system is located at the southern abutment of Alfords Point Bridge on the eastern side. The existing drainage infrastructure along Alfords Point Road is shown in Figure 3-7. The Georges River is located immediately north of the proposal site. Longitudinal drainage along Alfords Point Road discharges into Georges River National Park via several discharge points. Longitudinal drainage infrastructure and drainage patterns are discussed further in Table 6-28.

Two Ausgrid overhead transmission lines and associated easements cross Alfords Point Road at about 300 and 720 metres south of Alfords Point Bridge. Vehicle access is provided to each easement via gated fences from Alfords Point Road.

2.2.2 Brushwood Drive

Brushwood Drive is a two lane, two way local road with a posted speed limit of 50 km/h. It runs in a north-south direction through Alfords Point before crossing Alfords Point Road and the proposal site via a road overbridge. The road overbridge is located about two kilometres south of Alfords Point Bridge and provides an east-west link between Alfords Point and Illawong. Brushwood Drive terminates on the eastern side of the road overbridge at a roundabout controlled intersection with Old Illawarra Road and Fowler Road. Brushwood Drive also provides left-turn and right-turn access to the northbound lanes of Alfords Point Road via the Brushwood Drive on-ramp. Land use along Brushwood Drive is primarily residential.

2.2.3 Fowler Road

Fowler Road is a two lane, two way local road with a posted speed limit of 50 km/h. From the intersection with Brushwood Drive and Old Illawarra Road (roundabout), it runs east through the suburb of Illawong. The predominant land use along Fowler Road is residential.

2.2.4 Old Illawarra Road

Old Illawarra Road is a two lane, two way local road, with a posted speed limit of 50 km/h. From the intersection with Brushwood Drive and Fowler Road, it runs south-west, providing a link between Illawong and Menai. Old Illawarra Road crosses Alfords Point Road via a road overbridge 900 metres south of the Brushwood Drive road overbridge. From this point Old Illawarra Road becomes Menai Road and continues in an east-west direction towards Menai and Sutherland. Old Illawarra Road also provides access to the southbound lanes of Alfords Point Road via an on ramp where it crosses Alfords Point Road.

2.3 Proposal objectives

The key objectives of the proposal are to:

- Improve safety for all road users

- Reduce road crashes
- Improve travel times and reduce congestion along Alfords Point Road
- Minimise community issues
- Improve the urban design and visual aspects of Alfords Point Road
- Improve the drainage system on Alfords Point Road
- Minimise environmental impacts.

2.4 Alternatives and options considered

2.4.1 Methodology for selection of preferred option

A number of options for the upgrade of Alfords Point Road were considered by RMS including the 'do nothing' option. All of the options considered follow the existing Alfords Point Road alignment and are within the existing road corridor. This allows the proposal to utilise the existing wide road corridor that was originally constructed to cater for widening Alfords Point Road.

Each option was assessed against the proposal objectives outlined in Section 2.3. A risk management workshop was held in June 2012 to identify potential risks associated with the proposal and the findings considered during development of the various options.

The options that were considered are described in Section 2.4.2.

An analysis of the options against the proposal objectives is provided in Section 2.4.3.

In July and August 2012, community update brochures were delivered to residents in Alfords Point, Menai and Illawong outlining the key features of the preliminary concept design. Community information sessions and public displays were also held to display the preliminary concept design. The concept design was refined based on this community feedback.

2.4.2 Identified options

The following options were considered.

Option 1 – Six lane carriageway

This option involves upgrading Alfords Point Road to three northbound and three southbound lanes for two kilometres. This would provide an additional southbound and northbound lane between the southern abutment of Alfords Point Bridge and Brushwood Drive. The northbound and southbound lanes would be divided by a concrete type F barrier. This option would adopt a 3.3 metre lane width with a 0.5 metre offset from the central median. The existing heavy vehicle inspection bay would be relocated south of Brushwood Drive beneath the Old Illawarra Road overbridge.

Option 2 – Five lane carriageway

This option involves upgrading Alfords Point Road to:

- Three northbound lanes for two kilometres from the southern abutment of Alfords Point Bridge to Brushwood Drive
- Two southbound lanes from the southern abutment of Alfords Point Bridge expanding to three lanes at the heavy vehicle inspection bay to Brushwood Drive (about 800 metres in length).

The northbound and southbound lanes would be divided by a concrete type F barrier. This option would retain the heavy vehicle inspection bay at its present location.

Option 3 – Do nothing

The do nothing option involves not undertaking the proposal and retaining the existing four lane undivided road. The heavy vehicle inspection bay would remain in its current location. Ongoing safety and maintenance works on Alfords Point Road would be undertaken as required.

2.4.3 Analysis of options

Each of the options identified in Section 2.4.2 has been assessed against the proposal objectives. The results of this assessment are provided in Table 2-1.

Table 2-1 Analysis of options

Objective	Option 1 (six lane option)	Option 2 (five lane option)	Option 3 (do nothing)
Improved safety and reduced road crashes	<p>This option would improve safety and reduce road crashes by increasing sight distances and removing the merge point at Brushwood Drive on ramp including the conflict between buses and vehicles. The concrete barrier separating the northbound and southbound lanes would contribute to a reduction in head on collisions.</p> <p>This option would also move the heavy vehicle inspection bay to a location where trucks exiting the bay could accelerate to higher speeds before merging with traffic. This would remove the need for trucks having to make an unsafe lane change to merge with through traffic travelling at a speed differential of more than 20 km/h.</p>	<p>This option would improve safety and reduce road crashes by increasing sight distances and removing the merge point at Brushwood Drive on ramp including the conflict between buses and vehicles. The concrete barrier separating the northbound and southbound lanes would contribute to a reduction in head on collisions.</p> <p>The merge point south of Alfords Point Bridge would remain unchanged and southbound vehicles would merge from three lanes to two lanes when leaving Alfords Point Bridge. This merge point causes congestion resulting in potential nose to tail collisions.</p> <p>This option would retain the heavy vehicle inspection bay at its current location. Trucks exiting the bay would therefore be required to accelerate up a steep grade and change lanes to make a potentially unsafe merge with through traffic travelling at a speed differential of more than 20 km/h.</p>	<p>Currently there is no dividing barrier between the northbound and southbound lanes. The risk of head on collisions is high as this section of road is a high speed, steep gradient road, with a high percentage of heavy vehicles.</p> <p>No improved safety or reduction in road crashes would be achieved.</p>

Objective	Option 1 (six lane option)	Option 2 (five lane option)	Option 3 (do nothing)
Reduced congestion on Alfords Point Road and local roads	<p>This option would remove the merge point between the Brushwood Drive on ramp and Alfords Point Road, alleviating congestion for northbound traffic.</p> <p>This option would also increase storage capacity on the Illawong/Alfords Point off ramp preventing queuing on the ramp from extending back to Alfords Point Road and causing congestion for southbound traffic.</p> <p>With Option 1, the morning and afternoon peak period level of service for both the on ramp and off ramp in 2026 would improve from level of service F to a level of service B or better.</p>	<p>This option would improve the merge point between the Brushwood Drive on ramp and Alfords Point Road, alleviating congestion for northbound traffic.</p> <p>This option would increase storage capacity on the Illawong/Alfords Point off ramp preventing queuing on the ramp from extending back to Alfords Point Road and causing congestion for southbound traffic.</p> <p>The merge point south of Alfords Point Bridge would remain unchanged and southbound vehicles would continue to merge from three lanes to two lanes when leaving Alfords Point Bridge. Option 2 would not improve congestion at this merge point.</p>	<p>A reduction in congestion would not be achieved. Congestion on Alfords Point Road is predicted to continue to increase as road traffic volumes increase into the future.</p>
Minimise community issues	<p>Option 1 would result in less than a two dB(A) increase in noise at residential receivers however a number of residential receivers are already exposed to acute noise impacts from Alfords Point Road.</p> <p>Removal of vegetation on the Illawong/Alfords off ramp and along the eastern side of Alfords Point Road would result in potential loss of privacy or visual amenity at some residential properties and Sir Thomas Mitchell Aged Care Facility.</p>	<p>Option 2 would have similar noise impacts as Option 1 (ie less than a two dB(A) increase at residential receivers).</p> <p>Removal of vegetation on the Illawong/Alfords off ramp and along the eastern side of Alfords Point Road would result in potential loss of privacy or visual amenity at some residential properties and Sir Thomas Mitchell Aged Care Facility.</p>	<p>Existing acute noise affected premises would continue to be assessed and treated through the RMS Noise Abatement Program.</p> <p>There would be no change to privacy or visual amenity at adjacent residential receivers or Sir Thomas Mitchell Aged Care Facility.</p>

Objective	Option 1 (six lane option)	Option 2 (five lane option)	Option 3 (do nothing)
Improve urban design	This option would improve the urban design of Alfords Point Road by upgrading the shared path on the eastern side of Alfords Point Road. This option would also improve access to the bus stop on Brushwood Drive on ramp.	This option would improve the urban design of Alfords Point Road by upgrading the shared path on the eastern side of Alfords Point Road. This option would also improve access to the bus stop on Brushwood Drive on ramp.	No change in urban design would occur.
Minimise environmental impacts	<p>This option would require removal of about 6.68 hectares of vegetation along the eastern side of Alfords Point Road (refer Figure 6-5). This includes about 2.71 hectares of native vegetation of which about 0.14 hectares is Hinterland Sandstone Gully Forest listed under the TSC Act.</p> <p>No Aboriginal and non-Aboriginal heritage impacts are anticipated.</p>	<p>This option would require removal of about 6.68 hectares of vegetation along the eastern side of Alfords Point Road (refer Figure 6-5). This includes about 2.71 hectares of native vegetation of which about 0.14 hectares is Hinterland Sandstone Gully Forest listed under the TSC Act.</p> <p>No Aboriginal and non-Aboriginal heritage impacts are anticipated.</p>	There would be no environmental impacts associated with the do nothing option.
Improve drainage	This option would improve road surface drainage for the full length of the proposal.	This option would improve road surface drainage for the full length of the proposal.	No improvement in road drainage would be achieved.

The 'do nothing' option would not meet the proposal objectives and would not improve the existing congestion experienced at the Illawong/Alfords Point off ramp and Brushwood Drive on ramp. The 'do nothing' option would not reduce road crashes, improve road safety or improve travel times and therefore was discounted.

Option 2 would remove the existing merge issue at the Brushwood Drive on ramp however, would not address:

- Southbound congestion at the merge from three lanes to two lanes directly south of Alfords Point Bridge
- Southbound congestion at the Illawong/Alfords Point off ramp
- The existing safety issue associated with trucks exiting the heavy vehicle inspection bay having to change lanes and merge at low speeds with the faster travelling traffic on Alfords Point Road.

This option was therefore discounted.

2.5 Preferred option

The preferred option selected is Option 1, which involves upgrading the existing four lane undivided road to a six lane divided carriageway for about 2.1 kilometres between Alfords Point Bridge and Brushwood Drive, Alfords Point. Widening would be on the eastern side of Alfords Point Road and would result in three lanes in each direction. Providing three lanes from the Alfords Point Bridge to Brushwood Drive would provide continuity with the three southbound lanes on the northern approach to Alfords Point Bridge. This would remove the requirement for traffic to merge into two lanes across the bridge then back into three lanes south of the heavy vehicle inspection bay as per Option 2. The preferred option would best meet the objectives of the proposal by:

- Reducing congestion on Alfords Point Road by removing the merge point between Brushwood Drive on ramp and Alfords Point Road. Increasing storage capacity on Illawong/Alfords Point off ramp would also reduce congestion on Alfords Point Road
- Improving road safety by increasing sight distances and removing the merge point at Brushwood Drive on ramp including the conflict between buses and vehicles. The concrete barrier separating the northbound and southbound lanes would also contribute to improved road safety
- Improving road safety by relocating the heavy vehicle inspection bay to a location where trucks exiting the bay can merge more safely with through traffic
- Improving safety for pedestrians/cyclists through the provision of a formal shared path including a continuous concrete barrier separating pedestrians and cyclists from vehicles
- Improving urban design through landscaping
- Minimising environmental impacts such vegetation clearing
- Improving the road surface drainage on Alfords Point Road.

The principles of ecologically sustainable development as defined in Schedule 2 of the NSW Environmental Planning and Assessment Regulation 2000 and Section 3A of the *Environment Protection Biodiversity Conservation Act 1999*, were taken into consideration during selection of the preferred option. In particular the 'integration' principle was considered to ensure the decision-making process took into account long-term and short-term economic, social and environmental issues.

2.6 Design refinements

Within the preferred option, a number of design refinements were investigated and assessed against the proposal objectives. The design refinements are discussed below.

2.6.1 Relocation of the heavy vehicle inspection bay

The preferred option includes relocating the southbound heavy vehicle inspection bay to a new location on Alfords Point Road. When exiting the heavy vehicle inspection bay, the steep gradient south of the existing heavy vehicle inspection bay prevents heavy vehicles from reaching a safe speed (relative to through traffic) before merging with traffic to change lanes before the southbound off ramp. Two locations for the heavy vehicle inspection bay were considered.

Relocate to under Brushwood Drive

This option would provide a safe exit from the heavy vehicle inspection bay either by means of a high entry angle left turn or an acceleration lane which would involve earthworks and pavement widening along Alfords Point Road for 700 metres. However, due to the crest being about 120 metres south of the Illawong/Alfords Point off ramp, there would be insufficient sight distance on approach to the site for the safe operation of the inspection bay.

This location would allow restricted access to the heavy vehicle inspection bay via fencing, gates and no stopping signage. This location would also be visible to motorists however would require minimal vegetation clearing. Sensitive receivers would be exposed to traffic noise as they are located at a similar elevation to Alfords Point Road. This location is also close to Sir Thomas Mitchell Aged Care Facility which is a sensitive noise receiver.

Relocate to under Old Illawarra Road

This location would improve safety on Alfords Point Road as it would allow vehicles exiting the heavy vehicle inspection bay on to Alfords Point Road to accelerate on a slight down grade without the need to change lanes.

Locating the heavy vehicle inspection bay under Old Illawarra Road would allow widening of Alfords Point Road for the entire length of the proposal site, facilitating the six lane option and improving travel times.

This location would allow restricted access to the heavy vehicle inspection bay via fencing, gates and no stopping signage. Sensitive noise receivers are located at a higher elevation behind rock cuttings which would minimise construction and operation noise impacts. This location would be visible to motorists, however would require minimal vegetation clearing.

Assessment of heavy vehicle inspection bay locations

The heavy vehicle inspection bay locations were assessed against the objectives for the proposal. The preferred location for the heavy vehicle inspection bay is under Old Illawarra Road as it provides better sight distances than under Brushwood Drive and therefore would provide a better location in terms of road safety and reduced road crashes. This location would also have a lesser impact on sensitive noise receivers.

2.6.2 Increase capacity of the Illawong/Alfords Point off ramp

Currently, the Illawong/Alfords Point off ramp has insufficient storage capacity on the approach to the roundabout intersection during the afternoon peak period. Queuing at the intersection can often extend back to Alfords Point Road causing congestion and unacceptable delays for southbound motorists. Furthermore, queues that extend onto Alfords Point Road are a safety hazard for southbound traffic.

Do nothing

Not increasing the capacity of the Illawong/Alfords Point off ramp would not address the current congestion issues. Traffic queues would continue to extend from the off ramp onto Alfords Point Road during peak periods and the risk of vehicle crashes would remain. Travel times would remain unchanged in the short-term and increase in the long-term as traffic volumes on Alfords Point Road increase. Potential construction noise and temporary traffic delays would be avoided as no construction is required. There would be no improvement to urban design or road drainage on Alfords Point Road. There would be no environmental impacts.

Expand to two lanes

Expanding the Illawong/Alfords Point off ramp to two lanes would increase the storage capacity of the off ramp and minimise the risk of queuing extending back onto Alfords Point Road. This would minimise the incidence of road crashes. The increased capacity of the off ramp would also reduce congestion at the off ramp exit and therefore improve travel times.

Expanding to two lanes would require total rebuild of the existing road pavement resulting in construction noise and temporary traffic delays. Operational noise would also require mitigation at some premises within the Sir Thomas Mitchell Aged Care Facility. About 0.17 hectares of vegetation clearing would be required which may result in a visual impact.

New roadside drainage including the upgrade of the exiting pipes and pits would improve surface water drainage on the off ramp.

Assessment of increasing capacity on the Illawong/Alfords Point off ramp

Increasing the capacity of the Illawong/Alfords Point off ramp was assessed against the proposal objectives.

Increasing the capacity of the Illawong/Alfords Point off ramp by expanding it to two lanes is the preferred design refinement. This refinement would reduce congestion at the off ramp, thereby improving travel times and reducing the risk of road crashes. Expanding the Illawong/Alfords Point off ramp to two lanes would also improve surface water drainage on the off ramp.

2.6.3 Relocation of the bus stop

The existing bus stop on Brushwood Drive on ramp is in a location with poor sight distances. Buses are required to stop in the off ramp merge lane to pick up and set down passengers. This is causing congestion, particularly during the morning peak period. Pedestrians accessing the bus stop are required to walk for a short length on the road pavement adjacent to the off ramp merge lane.

Do nothing

The safety hazard caused by poor sight distance to the bus stop would persist if the bus stop is not relocated. Congestion issues related to buses merging with northbound vehicles on the Brushwood Drive on ramp would remain unchanged. The visual setting would remain unchanged. There would be no improvement in safety for pedestrian access to the bus bay.

Relocate 90 metres north of its current location

A bus bay at this location would allow buses to stop without blocking on ramp traffic. It would also provide safe access for pedestrians. However, there would be limited sight distance for buses exiting the bus bay and merging with traffic travelling at the through traffic speed. Intermittent operational noise from bus activity would be experienced by nearby sensitive receivers (refer Section 6.1). About 0.05 hectares of vegetation would require clearing.

Relocate 80 metres south of its current location

This location would greatly increase safety for pedestrians and motorists due to improved visibility and a slower speed environment. Relocation of the bus stop would make it easier for buses to merge with other vehicles and would therefore reduce congestion issues. Intermittent operational noise from bus activity would be experienced at nearby sensitive receivers. About 0.02 hectares of ornamental vegetation would require clearing. New roadside drainage would improve surface water flow on Alfords Point Road.

Assessment of bus stop locations

Relocating the bus stop to a location 80 metres south of its current location is the preferred refinement. This would reduce congestion on the Brushwood Drive on ramp and reduce the likelihood of vehicle crashes. Relocating the bus stop would also improve road safety for motorists and pedestrians.