3 Description of the proposal

This chapter describes the proposal and provides descriptions of existing conditions, the design parameters including major design features, the construction method and associated infrastructure and activities.

3.1 The proposal

It is proposed to construct a new four lane bridge over the Sydney to Melbourne Rail Line (the new bridge) between Sydney and Melbourne. The proposal would include realigning about 2.7 kilometres of the Olympic Highway. The proposal would also include upgrading the Olympic Highway/Camp Access Road intersection. An overview of the proposal is shown in Figure 1.2 and Figure 3.1.

Key features of the proposal would include:

- Construction of a new four-lane road-over-rail bridge on the Olympic Highway. The new bridge would span the Sydney to Melbourne Rail Line about 460 metres north of the existing bridge. It would have three spans. It would be 21 metres wide and 99 metres in length. The bridge would provide a minimum clearance of 7.1 metres above the rail line.
- Construction of about two kilometres of realigned Olympic Highway south of the proposed bridge. This would realign the Olympic Highway to the east of the existing highway.
- Construction of about 700 metres of realigned Olympic Highway between the proposed bridge and the northern extent of the proposal. This realigned section of the Olympic Highway would be immediately west of the existing highway for about 300 metres north of the proposed bridge before matching the existing alignment for about 400 metres.
- Construction of an upgraded Olympic Highway/Camp Access Road intersection.
- Realignment of Camp Access Road at the new Olympic Highway intersection.
- Joining the new road with the existing Olympic Highway at the southern and northern extents of the proposal.
- Joining the new road with the existing Camp Access Road.
- Construction of about 560 metres of off-road shared bicycle and pedestrian pathway crossing the proposed bridge. The shared pathway would connect the Wiradjuri Walking Track to Camp Access Road.
- Construction of a temporary road east of the existing Olympic Highway for about 400 metres north of the proposed bridge.
- A large cutting about 18 metres deep, 180 metres wide and 400 metres long south of the proposed bridge.
- Construction of two large earthen embankment approaches to the bridge, including two major reinforced earth retaining wall structures.
- Establishment of sediment control basins, drainage controls, boundary fencing and traffic controls.
- Modification of existing property accesses and access roads.
- Construction of two hard stand areas for crane and piling activities adjacent to the new bridge.
- Relocation and protection of public utilities.
- Establishment of construction compounds and provision of access to the site.

- Construction of highway crossings for Squirrel Gliders to maintain connectivity.
- Landscaping of areas disturbed by construction and plantings for biodiversity impact mitigation.
- Installation of a temporary automatic weather station. The station would gather weather condition data to be used in construction management. The weather station would have an area of 15 metres by 15 metres. It would be removed at the end of works.

There would be no works associated with the existing road-over-rail bridge as part of the proposal.

Temporary site compounds would be likely be located at each of the following sites (see Figure 1.2):

- At the proposed main site compound on agricultural land south of the decommissioned fuel depot.
- North of the existing bridge (smaller temporary bridge site compound).
- Adjoining the temporary stockpile site proposed at the northern end of the proposal on land owned by the NSW Soil Conservation Service.
- Within the stockpile site proposed west of Camp Access Road on agricultural land owned by the Australian Government Department of Defence.
- In the stockpile site proposed east of and adjacent to the existing Olympic Highway at the southern end of the proposal.

The proposal includes five sediment basins. The two sediment basins at the southern end of the proposal would be temporary with the remaining three basins being permanent structures. The permanent basins would be used for storm water detention and spill containment during operation.

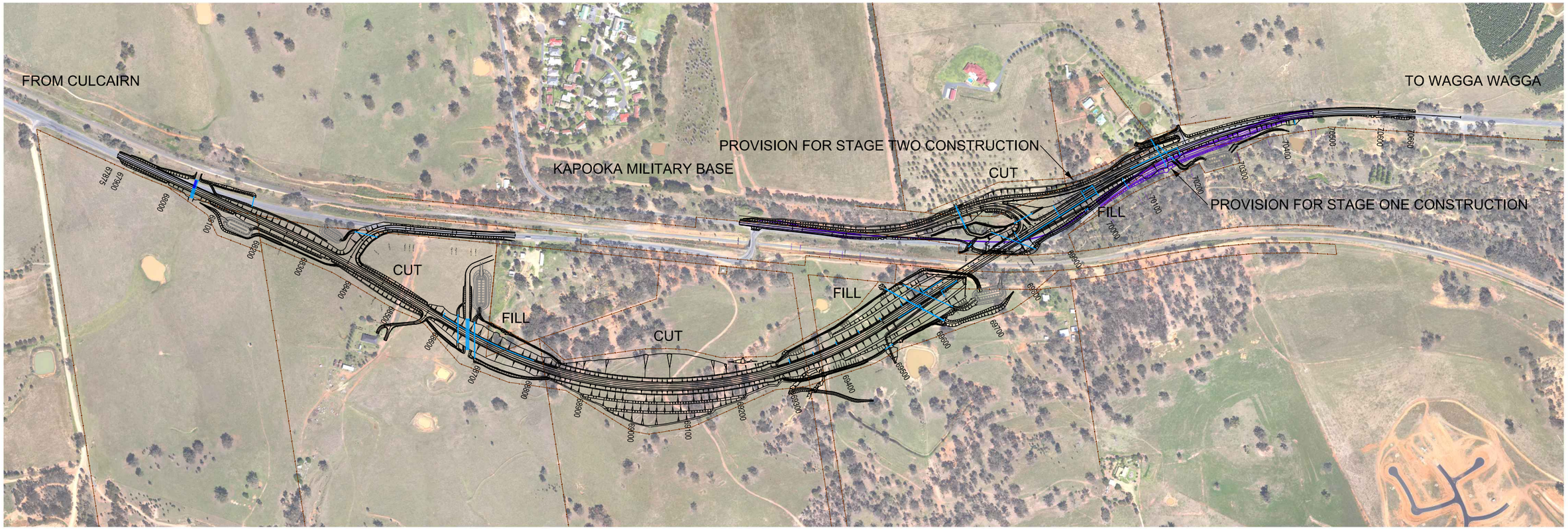
The Olympic Highway and Camp Access Road would remain operational during the construction period.

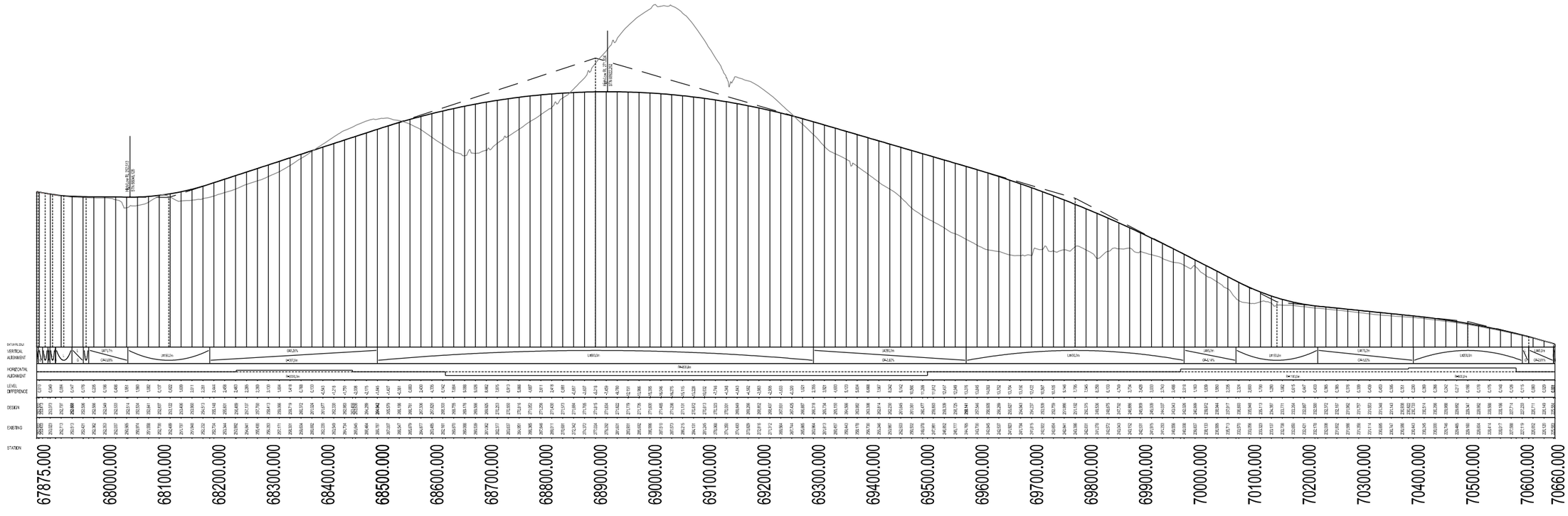
It is anticipated that construction would occur over a period of 18 months.

3.2 Design

A detailed description of the concept design completed to date is included below and concept plans are presented in Figure 3.1 to Figure 3.6. The concept design would be further refined during the detailed design phase.

Figure 3.1: Proposal concept design





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Transport for NSW GOVERNMENT — Roads & Maritime Services

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ROADS AND MARITIME SERVICES

CITY OF WAGGA WAGGA
MR - 78 OLYMPIC HIGHWAY
REALIGNMENT TO REPLACE KAPOOKA OVERBRIDGE
67.875 KM to 70.660 KM NORTH OF CULCAIRN
FIGURE 3.1: PROPOSAL CONCEPT DESIGN

FILE No.	DRAWING NAME	VOL	AMEND
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3.2.1 Design criteria

Specific design criteria have been developed for the proposal. The key criteria include:

- Road-over-rail bridge:
  - Design speed of 100 kilometres per hour.
  - Width of 21 metres including two 3.5 metre through-traffic lanes, a 3.5 metre southbound acceleration lane, a 3.5 metre northbound turning lane and two outside shoulders that would safely accommodate cyclists.
  - The bridge would be a minimum of 7.1 metres above the rail line.
  - Designed to accommodate B-Double heavy vehicles travelling in each direction.
- Realigned Olympic Highway:
  - Design speed of 100 kilometres per hour.
  - A sealed road width of 12 metres, including two 3.5 metre travel lanes and two 2.5 metre shoulders.
  - An additional 3.5 metre auxiliary lane in the vicinity of the Olympic Highway Camp Access Road intersection to allow traffic movements between the two roads.
  - Road surface grades of less than five per cent.
  - The grade of cut and fill batters would be a maximum of two horizontal to one vertical.
  - Designed to accommodate B--Double heavy vehicles travelling in each direction.
- Realigned Camp Access Road
  - Design speed of 60 kilometres per hour.
  - A sealed road width of 11 metres, including two 3.5 metre travel lanes and two outside shoulders each two metres wide.

3.2.2 Engineering constraints

Engineering constraints identified for the proposal include:

- Use of the existing bridge at Kapooka throughout construction to maintain access over the rail line until the proposal is in operation.
- Continued use of the Sydney to Melbourne Rail Line with unimpeded safety or operation for trains.
- Existing utilities including high and low pressure gas pipelines, overhead electricity, fibre optic cable, rail line signalling and water pipelines with limited or no interruption to supply.
- Topography, including gullies and steep hills.
- Soils and erosion - soils in the area are known to be strongly acidic and prone to erosion because they are dispersible (SEEC 2011). They are mapped as a moderate to high erosion hazard (Chen and McKane 1997).
- Property access for three residential properties.

3.2.3 Major design features

The major design features of the proposal are described in this section and are shown in Figure 3.1.

Proposed road-over-rail bridge

The proposed new bridge on the Olympic Highway would span the Sydney to Melbourne Rail Line, about 460 metres north of the existing bridge at Kapooka. The new bridge would be about 103 metres in length. A pier and abutment would be constructed on either side of the rail line.

The proposed new bridge would have four lanes, including two through lanes (one in each direction), a deceleration lane for northbound vehicles turning left into Camp Access Road and an acceleration lane for vehicles turning right (southbound) from Camp Access Road. The southbound acceleration lane would continue to form an overtaking lane extending to the top of the hill.

A preliminary cross section of the bridge is provided in Figure 3.2.

The bridge deck would be a concrete structure 21 metres wide including:

- Two 3.5 metre travel lanes.
- A 3.5 metre northbound turning lane for vehicles turning left into Camp Access Road.
- A 3.5 metre southbound overtaking lane.
- A 1.5 metre northbound shoulder.
- A two metre southbound shoulder.
- A two metre shared pathway on the northern side of the bridge.
- Bridge barriers with a height of about 1.5 metres.

The characteristics of the bridge and abutments may be subject to change during detailed design.

The new bridge would provide a minimum 7.1 metres clearance above the rail line.

The bridge would consist of three spans each 33 metres in length, including one central span over the rail line and two approach spans. The two bridge piers for the central span would be located within the rail line easement.

The abutments and piers of the bridge would be on an angle to the road and parallel with the rail line. The bridge has been designed to provide both the vertical and horizontal clearances required by rail authorities.

Retaining walls would be constructed on the batters of the approach roads either side of the rail line, adjacent to the bridge abutments. The retaining walls would comprise reinforced soil walls.

Olympic Highway realignment (including temporary road)

At the southern end of the proposal (between chainage 67900 and the southern bridge abutment), the highway would be realigned to the east of the existing road. North of the new bridge, the Olympic Highway would be slightly realigned to the west of the existing road. The crest of the new road alignment would be at about chainage 68900 with maximum grades of about 5.1 per cent to the north and 3.5 per cent to the south. The crest would be located in a large cut. The new alignment would include high fill embankments on the approaches to the new bridge. A description of cut and fill is provided in the section titled ‘Cut and fill’ below.

The new Olympic Highway alignment would have a sealed width of 12 metres, including two 3.5 metre travel lanes with 2.5 metre shoulders. An extra 3.5 metre

lane would be constructed between chainage 68880 and the Olympic Highway Camp Access Road intersection to allow for southbound overtaking. Indicative cross sections of the realigned Olympic Highway (including the auxiliary lane) are provided in Figure 3.3 (cutting) and Figure 3.4 (fill embankment).

A new temporary road would be constructed at the northern end of the proposal between chainages 69990 and 70440. This alignment would impact on Silvalite Reserve east of the existing highway. It would have two 3.5 metre lanes with two metre shoulders. The temporary road would initially be used as a traffic diversion and subsequently as a construction access road to the new bridge site. This alignment would be removed before the completion of works.

Cut and fill

The locations of cut and fill are shown in Figure 3.1.

The proposed alignment of the southern 640 metres (between chainages 67900 and 68540) would generally follow the existing land formation, with cuts and fills of less than 2.5 metres.

Between chainages 68540 and 68850 (800 metres south of the proposed new bridge) the road formation would be a fill embankment for about 310 metres. The maximum width of the fill embankment in this section would be about 50 metres. The maximum height of this fill would be nine metres.

Between chainages 68850 and 69270 (410 metres south of the new bridge) the road would be constructed in a 420 metre long cutting. The maximum depth of this cut would be 18 metres. The maximum width of the top of the cutting would be about 180 metres. The lower section of each cut embankment would comprise a bench (see Figure 3.3). The bench would have a maximum height of seven metres. The bench surface would be exposed rock.

Between the new bridge and 410 metres south of the new bridge (between chainages 69270 and 69660) the road formation would be a fill embankment. The maximum height of the fill in this location would be 14 metres. The maximum width of the fill embankment would be about 80 metres. The upper section of each fill embankment would comprise a bench (see Figure 3.4). The bench would have a maximum height of seven metres.

The road embankments would be revegetated where appropriate.

North of the new bridge for a distance of 360 metres (between chainage 69760 and chainage 70140), the new alignment would be constructed on fill embankment.

The northern 500 metres of the new alignment (between chainage 70140 and chainage 70640) would generally follow the existing land formation.

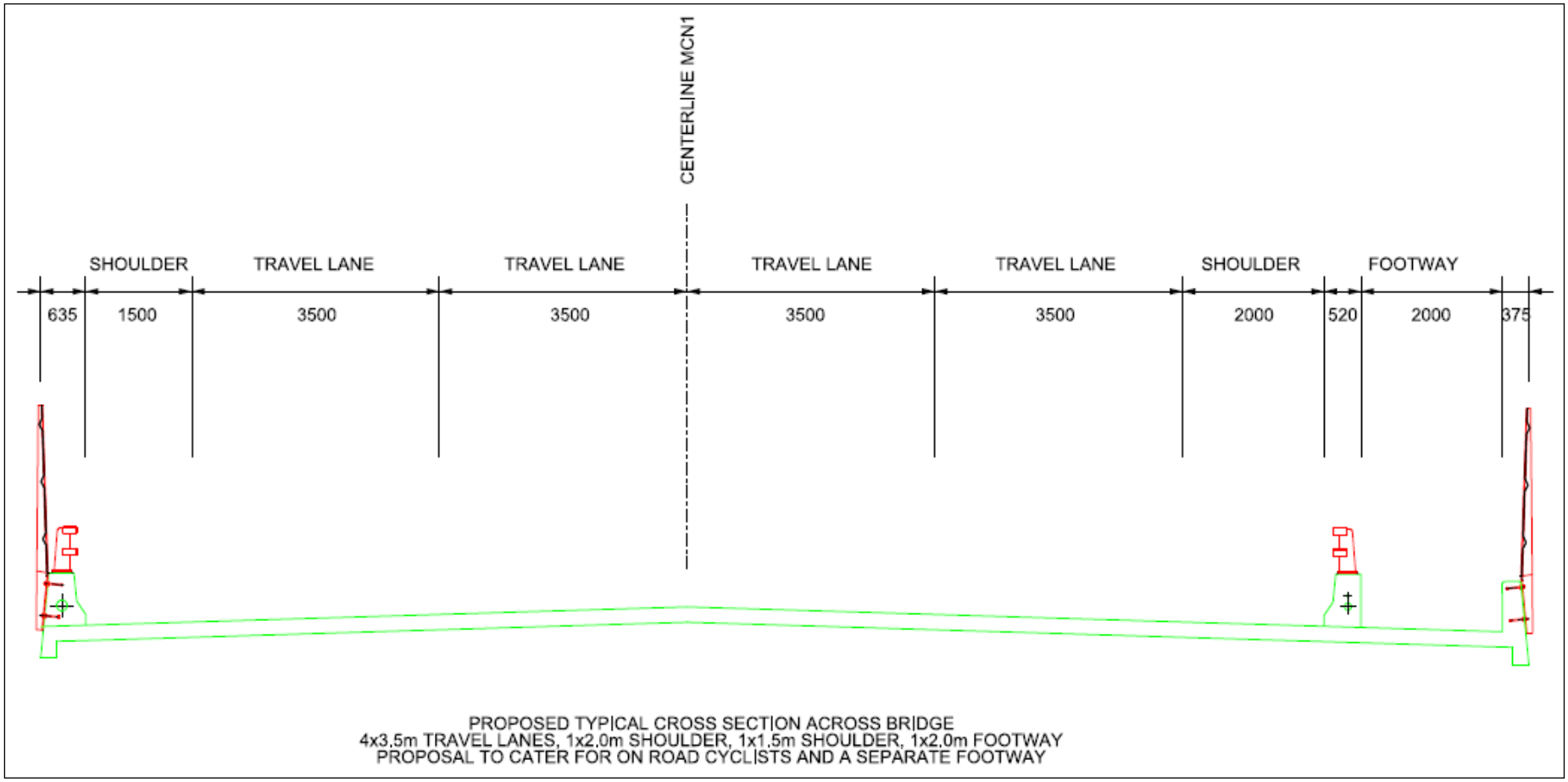

Figure 3.2: Preliminary cross section of the proposed road-over-rail bridge at Kapooka

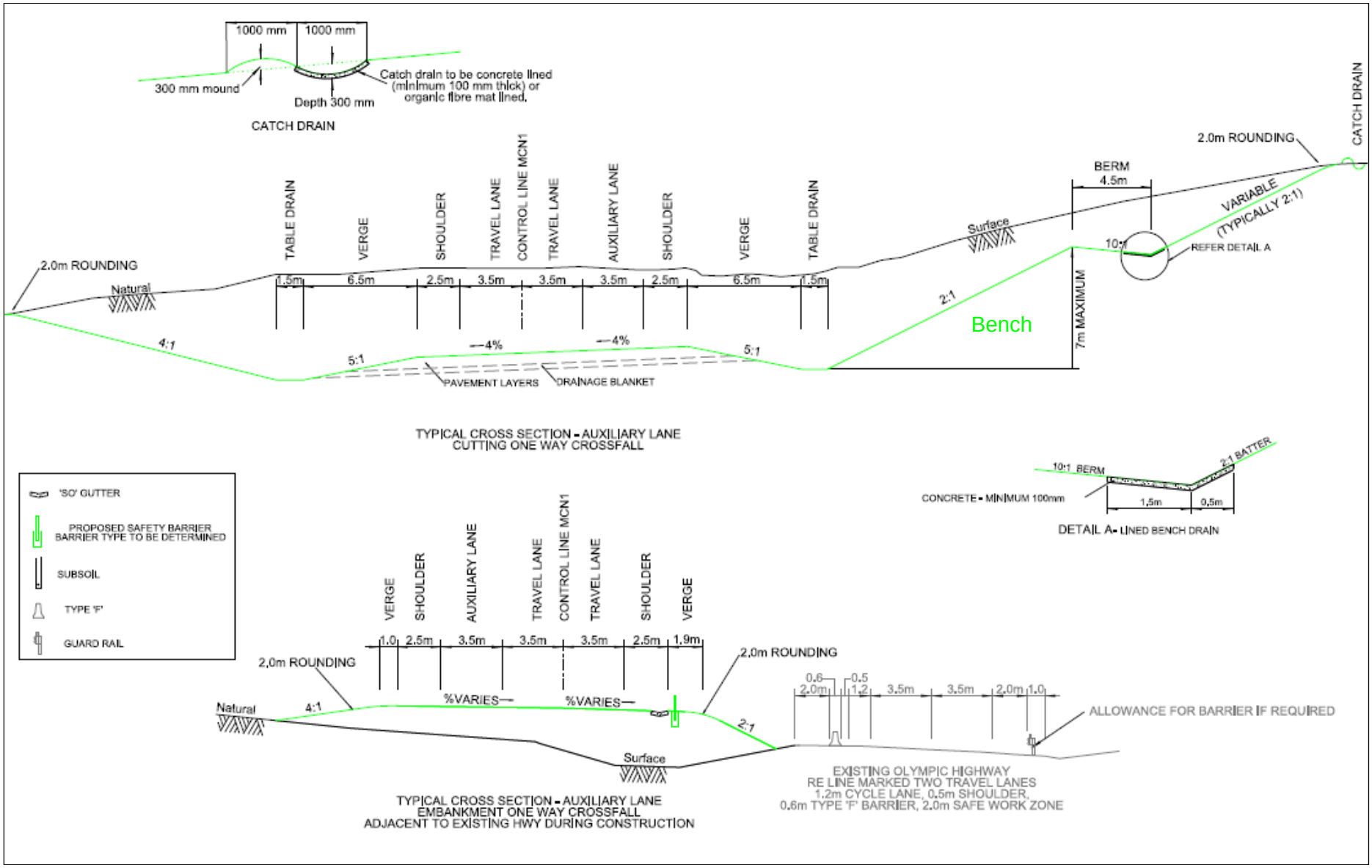

Figure 3.3: Typical cross section of proposed new Olympic Highway in cutting, including auxiliary lane

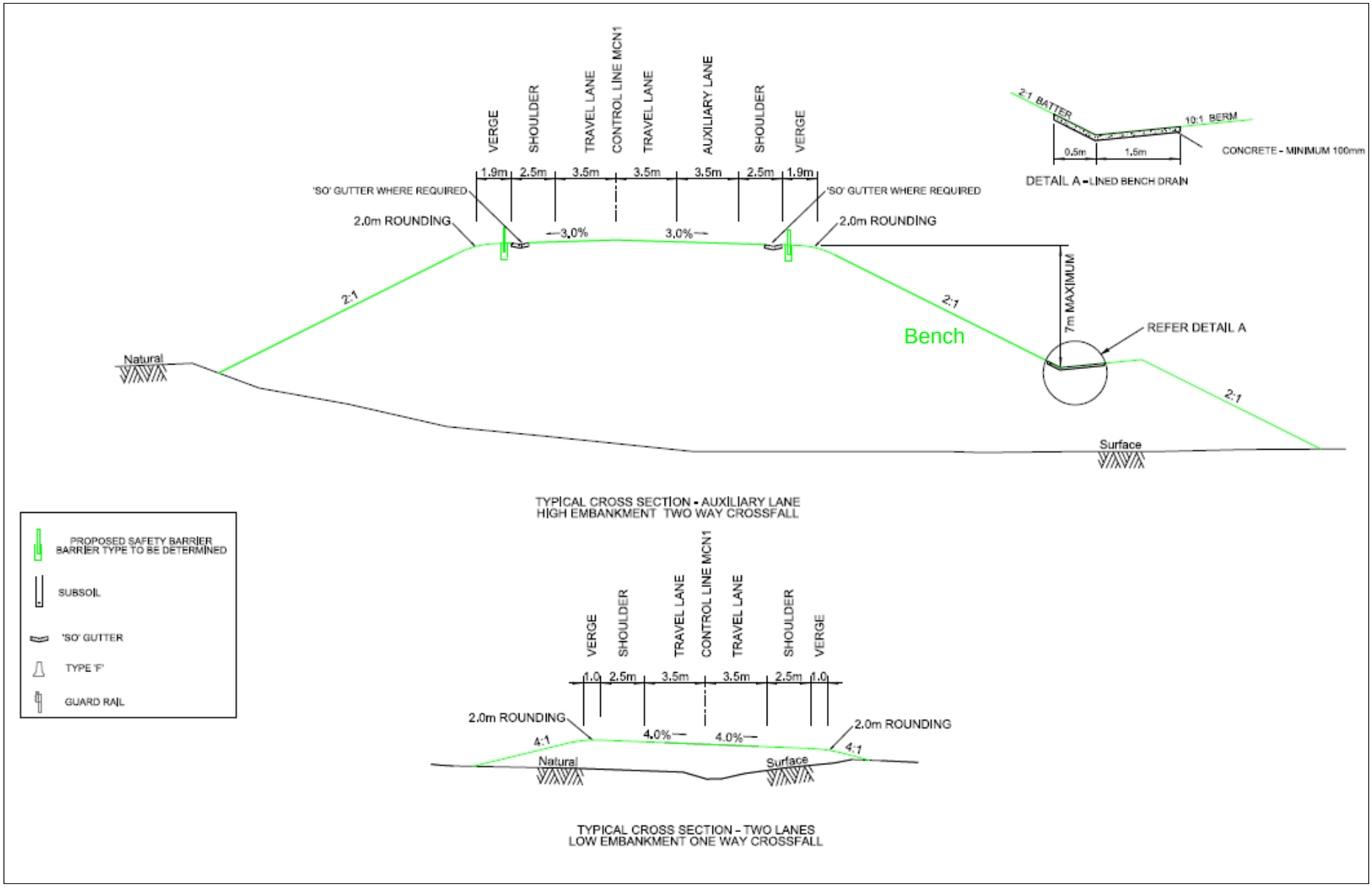

Figure 3.4: Typical cross section of proposed new Olympic Highway on embankment, including auxiliary lane

Olympic Highway/Camp Access Road intersection

The proposal would involve construction of a new Olympic Highway Camp Access Road intersection (Figure 3.5). This would be a 'channelised right turn' intersection incorporating:

- Channelised right and left turns for traffic entering Camp Access Road from the Olympic Highway.
- A left-turn slip lane for north-bound traffic entering the Olympic Highway from Camp Access Road.
- A southbound passing lane on the eastern side of the proposed intersection.

Southbound and northbound vehicles on the Olympic Highway would have separate turn lanes for turns into Camp Access Road. Southbound vehicles would stop in a sheltered lane waiting for a break in traffic before turning right into Camp Access Road. Vehicles turning north onto the Olympic Highway from Camp Access Road would use a left-turn slip lane when travelling to Wagga Wagga. Vehicles turning south onto the Olympic Highway from Camp Access Road would use a right-turn sheltered lane to wait for a break in traffic.

Drivers would have sight distance to oncoming traffic greater than the road design standards require.

The intersection would have raised concrete medians to direct traffic flow and improve safety. Lighting would be provided around the intersection.

Shared bicycle and pedestrian pathway

A shared bicycle and pedestrian pathway would be constructed across the proposed bridge to connect the Wiradjuri Walking Track with the Kapooka Military Area (see Figure 1.2). On the southern side of the proposed bridge, the path would commence at an existing track that connects to the Wiradjuri Walking Track. The path would travel up the eastern side of the fill embankment before crossing the bridge. At the northern side of the bridge, the path would travel down the eastern side of the fill embankment to natural ground level. It would then travel underneath the proposed northern bridge abutment to connect to the proposed new alignment of Camp Access Road.

Crossings for Squirrel Gliders and other arboreal fauna

One of the measures incorporated into the proposal to minimise environmental impacts is to construct rope bridges at two locations (see Figure 6.4 in Section 6.1.4):

- North of the proposed bridge from Silvalite Reserve to freehold land to the west.
- Within the Planning Agreement Areas south of the proposed bridge, at the transition between the large cut and fill areas.

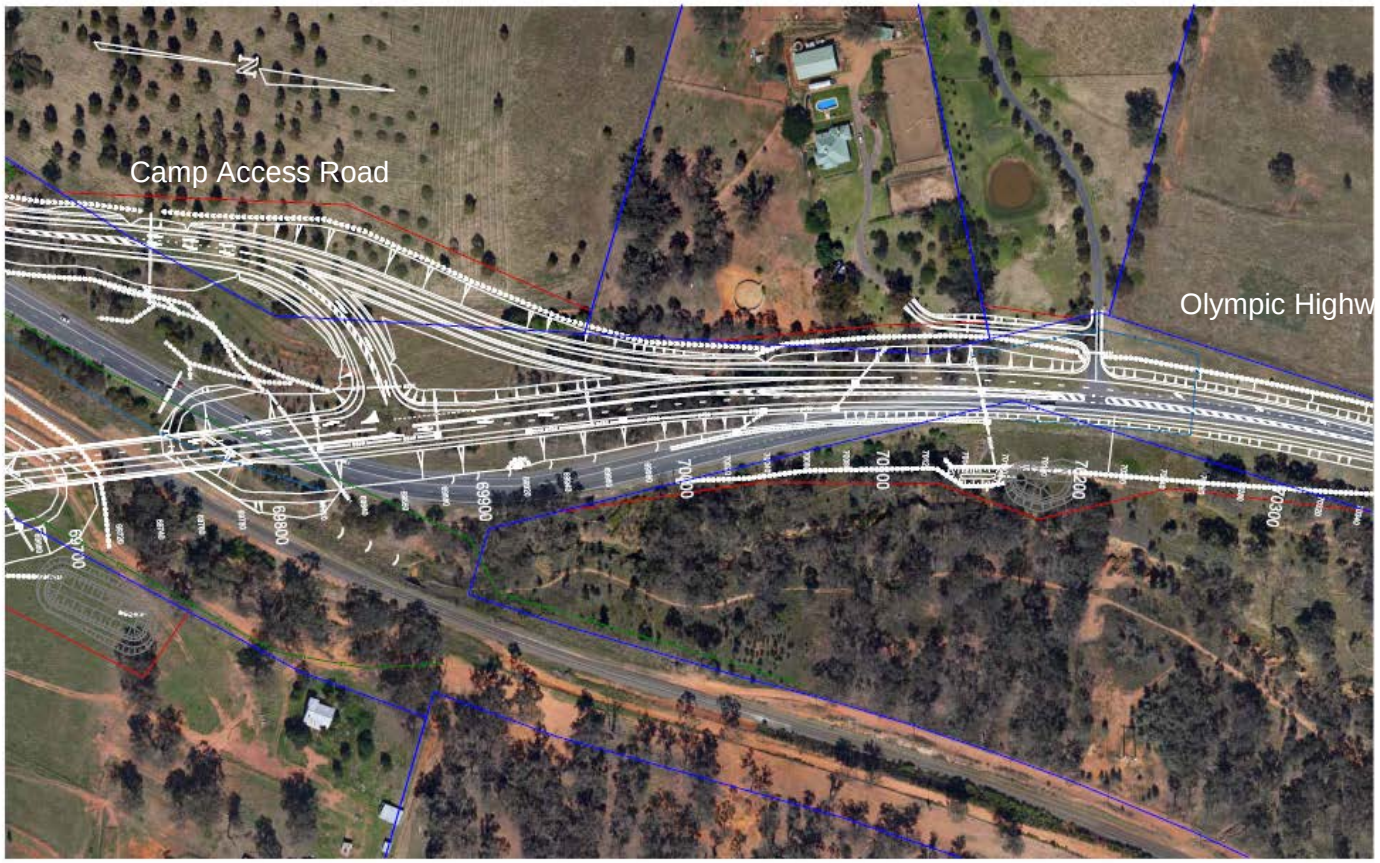

Figure 3.5: Olympic Highway/Camp Access Road intersection design

3.3 Construction activities

3.3.1 Work methodology

Staging

Before commencement of the proposed road works, activities such as adjusting utilities and installing fencing would be completed, as detailed in the section titled '*Pre-construction activities*' below.

The proposed road works would be constructed in four stages. The general methodology and construction staging is outlined below. The final work methodology would be determined during detailed design or before construction.

- Stage one (Figure 3.6): Construct a temporary diversion road parallel to the Olympic Highway at the northern end of the proposal. This road would be on the eastern side of the existing highway and partly within Silvalite Reserve. It would have two lanes and would initially be used as a traffic diversion in stage two. In stage three it would be used as a construction access road to the new bridge site. Following proposal completion, this road would be decommissioned. Olympic Highway traffic would continue to use the existing bridge and highway south of the proposed bridge site during stage one.

  Works on the proposed bridge and road south of the rail line would also commence in stage one. The proposed relocation of utilities (see Section 3.5) would be completed in stage one.
- Stage two (Figure 3.6): Divert Olympic Highway traffic to the temporary road constructed in stage one. Construct the northbound slip lane for Camp Access Road. The northbound slip lane would cater for two-way traffic in stage three and would revert to one lane for northbound traffic at project completion.
- Stage three: Divert Olympic Highway traffic to the new Camp Access Road alignment. Construct the new bridge and Olympic Highway alignment east of the rail line.
- Stage four: Divert all Olympic Highway traffic onto the new bridge and highway alignment. Re-mark the northbound slip lane from Camp Access Road for one-way traffic, and construct the new Camp Access Road and Olympic Highway intersection. Remove the stage one temporary road and rehabilitate disturbed areas. During stage four, Kapooka Military Area traffic would use the existing bridge via a new access near the southern end of the proposal.

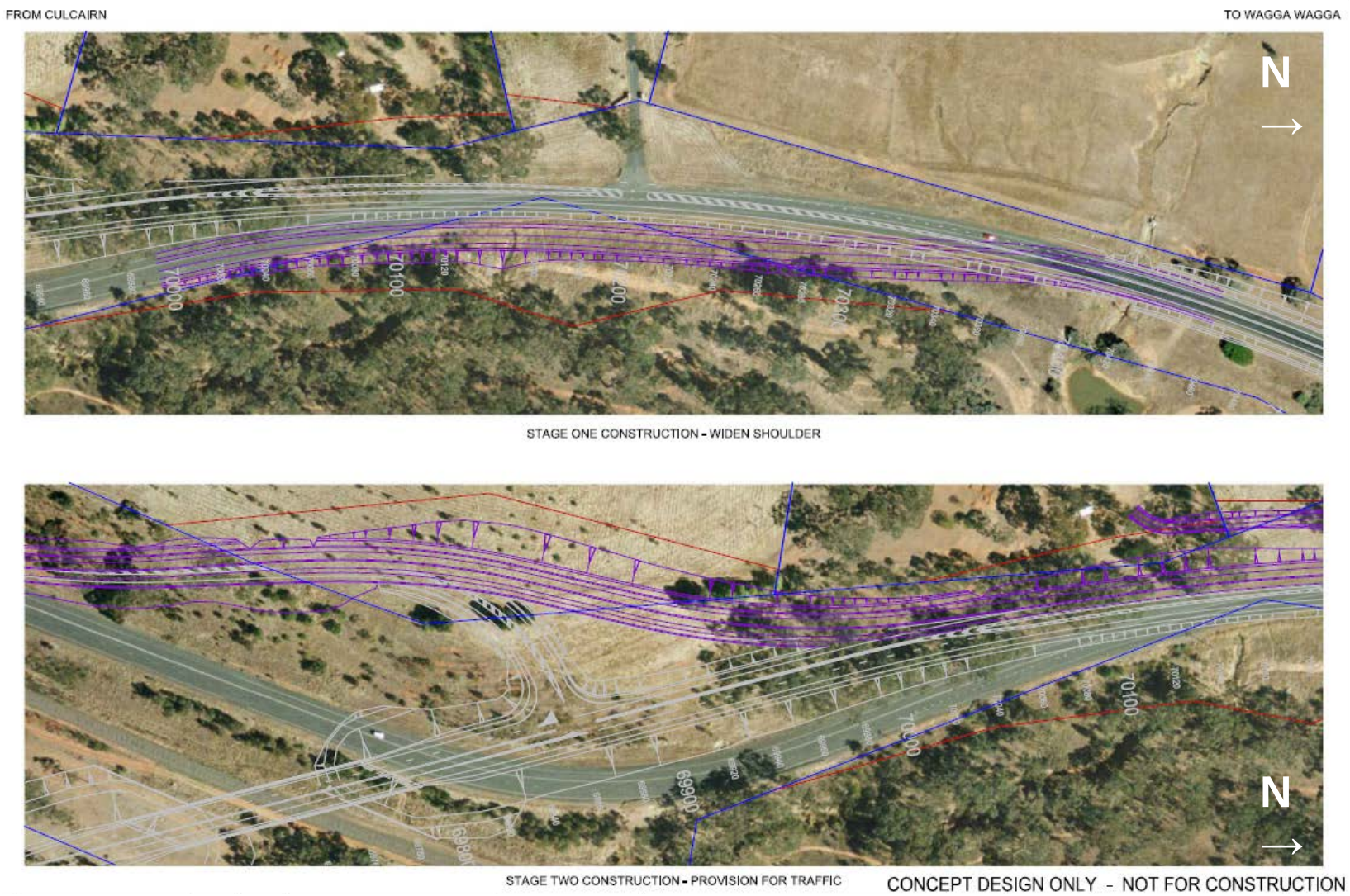

Figure 3.6: Stage 1 and Stage 2 designs

Pre-construction activities

- Collect seed from tree species locally native to the area before construction commencing.
- Adjust utilities as required (see Section 3.5).
- Install permanent boundary fencing.
- Install the automatic weather station.
- Establish the temporary construction compound site(s) (see locations in Figure 1.2).
- Install temporary fencing to prevent access to dangerous areas (for example the proposed blasting site where heavy cut would occur between chainages 68850 and 69270).
- Install permanent and temporary fencing to prevent access to environmentally sensitive areas (for example Silvalite Reserve) where necessary.
- Progressively install temporary and permanent erosion, sedimentation and drainage controls.
- Establish stockpile sites at the main compound site and in designated areas (see locations in Figure 1.2).
- Provide noise attenuation measures, including architectural building treatments.

Construction activities

- Clear and grub vegetation.
- Progressively strip, stockpile and manage topsoil across the site.
- Adjust private property access for the two private properties at the northern end of the proposal and the private property at the southern end to allow for safe access throughout construction.
- Construct cross-roadway culverts used for clean water diversion.
- Construct the road formation using bulk earthworks. This would include winning transporting placing and compacting fill material in defined lots and layers.
- Hard rock-blasting in the section of cut between chainages 68850 and 69270, and crushing and processing of excavated rock.
- Construct bridge piles.
- Construct retaining walls and bridge abutments.
- Construct bridge piers and head stocks.
- Install concrete bridge girders and pour concrete bridge deck. Pre-cast concrete bridge girders would be transported to site and lifted into place by crane. The bridge deck would be formed up on top of the girders, steel tied in place and concrete poured to form the deck.
- Import gravel materials, compact and prepare the final road surface.
- Recycle suitable excavated material and incorporate unsuitable material in earthworks.
- Construct the roadside batters to the final shape.
- Construct roadside gutters and berms.
- Install flexible asphalt pavement.
- Install poles and/or overhead rope crossings for Squirrel Gliders to move

across the highway.

- Progressively landscape and re-vegetate the proposal.
- Install line marking, signs and guide posts.
- Block access to the existing bridge using fences and gates or earth mounds.
- Decommission and remove redundant road pavement.
- Clean up the site including removal of temporary site compound(s) and dispose of all surplus waste materials.

3.3.2 Construction hours and workforce

It is anticipated that most of the work for the proposal would be completed in accordance with the Office of Environment and Heritage's (OEH) recommended standard hours for construction work (DECC 2009b):

- Monday to Friday: 7am to 6pm.
- Saturday: 8am to 1pm.
- Sundays and public holidays: no work.

Blasting would be conducted during the following hours (DECC 2009b):

- Monday to Friday: 9am to 5pm.
- Saturday: 9am to 1pm.
- Sundays and public holidays: no blasting.

The majority of works would be carried out during standard hours. Certain activities would be required to be carried out during the evening and night time periods due to:

- Technical considerations (such as the need to meet particular quality specifications for the construction of concrete works).
- The climatic environment (cold winters and hot summers).

Concrete works would be carried out during standard hours. Hot weather affects the quality of concrete and associated sealing of joints or decking in this climate. The concrete and sealing works wound need to be carried out in the early evening and into the night to take advantage of cool night temperatures. For cold weather concrete or sealing works, early morning is recommended.

Noise issues in relation to concrete and sealing works mainly result from trucks delivering concrete, asphalt and other associated materials.

The highest quality of concrete works is achieved by the timing of concrete cutting. This is governed by the hydration rate of the concrete. The concrete may require cutting at any time within four and 24 hours after pouring, with a 'cutting window' as short as 30 minutes. This period between pouring and cutting can vary due to weather conditions. The timing of cutting is critical to the quality of the concrete. This means that concrete saw cutting would be needed at any time, including outside the daytime construction hours.

Any out of hours work would be undertaken in accordance with the Roads and Maritime *Environmental Noise Management Manual 2001*, *Practice Note vii – Road works Outside of Normal Working Hours* (RTA, 2001). This would include notifying any nearby residents in advance of out of hours work.

At the current stage of planning, the number of workforce personnel is unknown. The

number of personnel would be likely to be up to 40 at any given time.

3.3.3 Plant and equipment

Plant and equipment needed for the proposal would be determined during the construction planning phase. It is anticipated that the required plant and equipment would include:

General

- Excavators
- Bulldozers
- Graders
- Water carts
- Semi-trailers and large delivery trucks
- Air compressors
- Light vehicles
- Generators
- Water pumps
- Hand tools
- Welding equipment
- Haulage trucks
- Backhoes
- Front-end loader
- Bobcats
- Jackhammers

Road embankment and drainage construction

- Scrapers
- Graders
- Vibrating and static rollers
- Crushers
- Articulated trucks
- Backhoes
- Trenching machines
- Excavators
- Screens

Road pavement construction

- Milling machine
- Compactor
- Vibrating and static rollers
- Concrete agitator trucks
- Spray sealing equipment
- Line marking plant
- Bitumen spraying cart and asphalt paver
- Bitumen trucks
- Kerb extruding machine

Bridge

- Piling rigs
- Concrete pumps
- Cranes
- Trucks
- Concrete vibrators
- Concrete drills
- Concrete saws
- Concrete trucks

3.3.4 Earthworks

Earthworks for roads

Earthworks would occur over an area of about 20 hectares. Where possible, the proposal has been designed to achieve an overall balance of earthworks to minimise

spoil and or the need to import large quantities of fill.

It is estimated that about 310,000 cubic metres of material would be excavated from cut areas within the proposed road alignments.

The volume of material excavated that would be suitable for use as general fill is estimated to be about 90 per cent of the total volume of material excavated. It is therefore estimated that of the material excavated, 279,000 cubic metres would be suitable for use as fill and 31,000 cubic metres would be unsuitable for use as fill.

Material suitable for use as general fill would be reused on site for the construction of new roads. The total volume of fill material required for constructing new roads is 232,000 cubic metres.

It is therefore anticipated that 78,000 cubic metres of surplus material would be excavated from the proposal. Surplus material, including material unsuitable for use as fill, may be used for flattening fill batters, constructing noise mounds or in landscaping. Any material remaining after construction would be disposed of off-site at an appropriately licensed or approved facility.

The locations of cut and fill are shown in Figure 3.1 and described in Section 3.2.3.

Blasting would be required where hard rock is encountered within the large cut between chainages 68850 and 69270 described in Section 3.2.3. Blasting would be conducted using pre-drilled sequential explosive charges to break up the hard rock in the deepest part of the cut. It would be supervised by licensed blasting technicians and would be designed to minimise vibration impacts on surrounding infrastructure. Hard rock from blasting may need to be further processed through crushing and screening.

Earthworks for utilities

The relocation of the water pipeline and gas pipelines would require the excavation of about 5,550 cubic metres of soil. Most of this would be used to backfill the trenches after installation of the pipes.

3.3.5 Source and quantity of materials

Fill, sub-base and base materials and aggregates for bitumen sealing and concrete works would consist of:

- Soil.
- Gravel and sand.
- Crushed and screened rock.

Imported material that would be required for the proposal is commercially available. All imported material would be sourced from licensed commercial quarries.

The quantities of these materials required for the proposal are estimated to be:

- Sub-base – about 10,600 cubic metres.
- Base – about 11,200 cubic metres.
- Select materials – about 19,000 cubic metres. These materials may be sourced from excavation on site depending on quality. Select materials have specific

size and moisture characteristics and are of a high grade for use in construction activities. Select materials would be used to form a high quality base for the construction of the road pavement layers.

- Specialised material for the reinforced soil wall – about 11,600 cubic metres.
- Spray seal – about 49,000 square metres.
- Asphalt – up to about 200 cubic metres for the bridge sealed surface.

These volumes are indicative and may change as a result of the detailed design.

Steel and pre-cast concrete structures would be required for the bridge. Concrete would be required for the bridge deck and piers. Pre-cast bridge elements would be procured from certified suppliers. Concrete would be sourced locally.

Road drainage structures would either be pre-fabricated offsite at an approved and licensed facility, or would be constructed on-site (for example energy dissipaters, pit modifications and kerb and gutter).

Water would be required during construction to achieve required earthworks moisture content and to suppress dust. The construction contractor may source water from existing farm dams or sediment ponds constructed as part of the proposal. The volume of water required would be influenced by climatic conditions and the level of moisture in excavated rock, which would be used to construct the new highway. The volume of water required for the proposal is not expected to exceed 15 megalitres. If sufficient water cannot be obtained from dams and sediment ponds it may be sourced from Riverina Water County Council water supply mains in the area or another alternative water source. This would be subject to further environmental assessment as required.

3.3.6 Traffic management and access

Vehicle movements

The proposal would generate heavy vehicle movements through the transport of machinery, fuel, general provisions and materials. Construction vehicles would access the site via the Olympic Highway. The fill for the proposal would be sourced from the cut on site, so haulage routes would be along the proposed alignment. Heavy vehicles would transport base and sub-base materials to the site.

Light vehicles would be required to transport staff to and from the site. Light vehicles would also be used in various roles on site. Light vehicles would generally be parked at the main site compound (Section 3.4.1).

The total number of vehicle movements is not expected to exceed 30,000 over the construction period. Construction vehicle movements would comprise on average about 30 heavy vehicles accessing the site per day (60 movements per day). This number may increase during peak times of material transport. Light vehicle movements would comprise on average about 30 light vehicles accessing the site per day for the transportation of staff (60 movements per day). The existing bridge at Kapooka currently carries about 4500 vehicles per day.

Traffic management

A Traffic Management Plan would be prepared in accordance with the *Traffic Control*

at Work Sites Manual (RTA 2010a) and Roads and Maritime *Specification G10 – Control of Traffic before commencement of construction*. The traffic management plan would provide details of traffic management to be implemented during construction, to maintain traffic flow on the Olympic Highway and Camp Access Road and to manage driving conditions during construction. The plan would include details of construction staging. All traffic management would be in accordance with current Roads and Maritime standards.

Traffic would be managed during the construction period as described in the section titled 'Staging' in Section 3.3.1.

Throughout the construction period, two lanes of traffic would be maintained on the Olympic Highway and Camp Access Road. On the Olympic Highway traffic speed would be maintained at 80 kilometres per hour for the majority of construction.

For short periods of time during construction of the proposal, traffic would be restricted to one lane on the Olympic Highway, with the following conditions:

- At least one 3.5 metre lane with a 1.5 metre shoulder would remain open to traffic during the day.
- The length of single way carriageway would be restricted to a maximum length of one kilometre.
- At least two 3.5 metre lanes with two 1.5 metre shoulders would remain open to traffic outside work hours.

Traffic control in accordance with the publication "RTA Traffic Control at Worksites" Ver3 Sept 2003, including speed restrictions of 40 kilometres per hour, would be implemented in these situations for the safety of workers and traffic.

Pavement would be removed from the approaches to the existing bridge at Kapooka. Appropriate barriers would be installed to prevent public road access.

Construction access management

Proposed construction access roads are shown in Figure 1.2.

Access to the proposal for all works would be via the Olympic Highway and Camp Access Road. The main access points for construction vehicles would be located at:

- The site compound south of the proposed bridge, which would be the primary access point to the work site (chainage 68380).
- The temporary road north of the proposed bridge, which would be used for access to the proposed bridge site following the switch of traffic to the new Camp Access Road alignment.
- The access track from the existing highway east of the existing bridge.
- The existing quarry access road south of the proposed stockpile site at the southern end of the proposal. This is an unnamed council-owned road.
- The existing access track west of, and parallel to, Camp Access Road, which would be used to access the proposed stockpile site west of Camp Access Road. This access route would require the use of part of Camp Access Road.
- The proposed stockpile site at the far northern end of the proposal.

All of these follow existing tracks or roads, except the access point for the stockpile

site at the far northern end of the proposal. This access point would require the construction of a 30 metre access road through the existing highway road reserve.

Other access points may be required. This would be determined during the detailed design of the proposal. All construction access roads would be included in the traffic management plan.

Construction access would also be provided along the proposed alignment.

Private property access management

Three private property accesses are affected by the proposal. All of these would be impacted during construction. Access to all properties would be maintained during construction using temporary accesses. New permanent accesses to all three residences would be provided as part of the proposal. A combined access point to the Olympic Highway is proposed for the properties north of the proposed bridge (see Figure 1.2).

3.4 Ancillary facilities

3.4.1 Site compound and stockpile sites

Site compounds

Proposed temporary site compounds are shown in Figure 1.2. These include:

- The proposed main site compound on agricultural land south of the decommissioned fuel depot. This land is privately owned and would be part of the land acquired for the proposal.
- North of the existing bridge (smaller bridge site compound). The site would be located close to the proposed bridge to service construction activities.
- Within the stockpile site proposed at the northern end of the proposal on land owned by the NSW Soil Conservation Service, west of the existing Olympic Highway.
- Within the stockpile site proposed west of Camp Access Road on agricultural land owned by the Australian Government Department of Defence.
- Within the stockpile site proposed east of and adjacent to the existing Olympic Highway at the southern end of the proposal, on agricultural land.

In general, the main facilities at the site compounds would include portable buildings with meeting rooms, offices, lunch rooms and toilet facilities. The compounds would also contain secure bunded areas for the storage of fuels and chemicals, and designated parking and waste management areas.

A secondary temporary compound for bridge works would include site office buildings, toilets, and storage areas for equipment and materials used during the bridge works.

Stockpile sites

Proposed stockpile sites are shown in Figure 1.2.

Stockpile sites would be temporary for the period of construction and would be rehabilitated before the completion of construction. These areas would generally be

leased from adjacent property owners for the period of construction.

The stockpile sites would include:

- A site at the southern end of the proposal on land currently used for cropping and grazing.
- A site west of the existing Camp Access Road on land currently used for cropping and grazing.
- A site west of the existing Olympic Highway currently used for cropping and grazing.
- Five smaller sites located along the proposed highway realignment.

The stockpile sites would be subject to the criteria set out in Roads and Maritime's Stockpile Site Management Guideline (RTA 2011a):

- Located in areas not prone to flash flooding (ie drainage line in Silvalite Reserve north of the proposal) and more than 40 metres from a watercourse.
- Located more than 100 metres from occupied residences.
- Located in areas previously disturbed that do not require the clearing of native vegetation where possible.
- Located in plain view of the public to deter theft and illegal dumping.
- Stockpiles would be located outside the drip line of trees and would be on level ground wherever possible.

3.4.2 Batch plant and casting yard

An on-site concrete batch plant and casting yard are not proposed. It is expected that existing commercial suppliers would provide concrete for the works. Imported concrete would be required mostly for the bridge deck, the bridge piers and the bridge piles. Small amounts of concrete would also be required for signposts, kerb and gutter, concrete lined drains and other structures. Pre-cast concrete elements would include the bridge parapets, the bridge beams, concrete panels, pipe culverts and culvert headwalls. Should the contractor propose a batch plant, the contractor would be responsible for undertaking a separate environmental assessment.
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3.4.3 Sediment basins and drainage

Proposed sediment basins and drainage are shown in Figure 1.2.

Five sediment basins are proposed to be constructed. One of these is located in Silvalite Reserve, one is located near the site of the proposed bridge and three are located at the southern end of the proposal in the vicinity of the proposed temporary site compound.

The southern two basins would be temporary basins for use during construction. The remaining three would be retained as permanent stormwater detention and spill containment basins after construction.

The sediment basins would capture runoff from disturbed areas. The captured runoff would be treated to settle suspended silt. Clean water from the basin would then be discharged. This process would minimise the discharge of sediment off site or to adjacent drainage lines. Sediment basins would also reduce flow velocities and potential scouring.

Clean water from upstream of the proposal would be diverted around, away from, or through the proposal. The sediment basins would only contain runoff generated from the proposal.

The sediment basins have been designed based on the volumes calculated for sediment control using the '*Blue Book - Soils and Construction - Managing Urban Stormwater Volume 1*' (Landcom 2004) and Volume 2D (DEC 2008a). The design standard for sediment basins adopted for the proposal is the five-day 80th percentile rain depth of 18.8 millimetres (Wagga Wagga, from Landcom 2004). Sediment basins would capture all runoff from a rainfall event of this magnitude. The sediment basins have also been designed to capture any spills of fuels or chemicals that could potentially occur during construction.

Sediment basins would be designed for dispersible soils. If discharge from these basins is necessary, flocculating (removal of sediment from water) may be necessary to achieve adequate discharge water quality.

Permanent and temporary drainage would:

- Drain clean water around, away from, or through the proposal.
- Drain most dirty water generated on-site to sediment basins.

Most surface water flows would be diverted around the decommissioned fuel depot.

Due to site constraints at the northern 280 metres of the proposal and southern 220 metres of the proposal, dirty water runoff cannot be captured using sediment basins. This runoff would occur from a likely total area of about 1.2 hectares. Minimal earthworks are required at these locations due to construction works following the existing alignment. Strategies detailed in Blue Book Volume 1 (Landcom 2004) would be implemented. Dirty water runoff would be managed using clean and dirty water separation, progressive revegetation, soil stabilisers and sediment controls.

The proposed drainage has been designed to direct water away from existing soil erosion where possible.

3.5 Public utility adjustment

Existing utilities in the vicinity of the proposal to be adjusted or protected include:

- High and low pressure gas pipelines managed by APA Group, including the Australian Pipeline Trust.
- Fibre optic cable and minor telephone lines managed by Telstra.
- Water pipeline managed by Riverina Water County Council.
- 11 kilovolt and low voltage power lines managed by Essential Energy.
- Rail line signalling managed by Australian Rail Track Corporation.

Utilities are shown in Figure 3.7. Rail line signalling is located at the site of the proposed bridge.

Roads and Maritime has conducted initial consultation with all utility providers regarding the relocation and protection of utilities for the proposal. Relocation and protection of utilities would be designed by the service providers during the detailed

design phase. Proposed realignments of utilities are shown in Figure 3.8. The utility owners affected by the proposal area would determine the work methodology for the relocation or protection of their assets. Relocation and protection of utilities would be carried out by the service providers before construction.

Further details about each of the utilities in the vicinity of the proposal are provided in the following sections.

3.5.1 Gas pipelines

A high pressure gas pipeline is located on the eastern side of the existing Olympic Highway. This pipeline provides gas for towns south of Wagga Wagga and connects to the Uranquinty gas power station. The gas pipeline would be temporarily shut down to facilitate its relocation.

The proposed alignment of the new high pressure gas pipeline is shown in Figure 3.8. In the vicinity of the proposed bridge the pipeline would be realigned by APA Group to pass under the bridge. At the southern end of the proposal the pipeline would be realigned to cross the proposed Olympic Highway and follow its eastern edge before reconnecting to the existing pipeline.

Near the decommissioned fuel depot a new low pressure gas pipeline would be constructed by APA Group. The new pipeline would run from the existing high pressure gas pipeline south-west of the depot to the existing low pressure gas pipeline on the western side of Camp Access Road. The new low pressure gas pipeline would run along the road reserve of the existing Olympic Highway before crossing under the highway, the Sydney to Melbourne Rail Line and Camp Access Road (see Figure 3.8). The new low pressure gas pipeline would service the Kapooka Military Area. The existing low pressure gas pipeline would be decommissioned north of the point where the new pipeline would be connected.

The length of new high pressure gas pipeline proposed to be constructed is up to about 945 metres. The length of the new low pressure gas pipeline proposed to be constructed is about 220 metres.

The width of the proposed easement, which would be required for the construction and maintenance of the gas pipelines, varies from five metres to 10 metres. Disturbance of soils and vegetation would not occur outside the proposed easement.

Construction of the gas pipelines would include:

- A trench construction width of about 90 centimetres for the high pressure gas pipeline, and about 40 centimetres for the low pressure gas pipeline.
- The depth of the trenches for both the high pressure and low pressure gas pipelines would be about 1.2 metres.
- The pipe to be installed would have an external diameter of 20 centimetres.

Where the proposed low pressure gas pipeline would cross the existing Olympic Highway, Sydney to Melbourne Rail Line and Camp Access Road, the pipeline would be underbored. Both the high pressure and low pressure gas pipelines would be underbored wherever they cross utilities. Underboring would occur at a depth of about two metres.

A new in-ground regulator would be installed near Camp Access Road, as shown in

Figure 3.8. This proposed site is preliminary. The exact location of the regulator would be determined during detailed design. The installation of the in-ground regulator would require the excavation of a pit within a maximum disturbance area of 25 square metres. The pit would be installed to a depth of up to five metres.

The volume of earthworks required for the relocation of the gas pipelines is described in Section 3.3.4.

Access to the proposed realignment of the gas pipelines would be from the proposed road alignment and from access points identified in the section titled 'Construction access management' in Section 3.3.6.

Decommissioned sections of both the high and low pressure gas pipelines would be removed by APA Group where they occur within the proposal boundary. Decommissioned sections of these pipelines outside the proposal boundary would be retained in situ.

3.5.2 Fibre optic cable

A customer access network fibre optic cable is located east of the rail line. The proposal would fill over the line to a depth of about eight metres. The customer access network fibre-optic cable would be encased in concrete by a certified Telstra contractor before construction. The current alignment of the fibre optic cable would be maintained.

Encasing the optic fibre-optic cable in concrete would require excavation. Excavation would be confined within the new road corridor alignment.

3.5.3 Water pipeline

A water main is located west of the rail line. The line is a major connection to the south and is under high pressure. The main is able to be moved, but due to the pressure in the line, the realignment cannot have sharp turns.

The main would be relocated by Riverina Water to the west of the proposal before construction. The proposed alignment of the new water main is shown in Figure 3.8. At the northern end of the proposal it crosses under the Olympic Highway. It runs south along the western edge of the proposal to a point past the existing bridge where it connects to an existing water main.

The length of the new water pipeline proposed to be constructed is about 1650 metres.

The width of the proposed easement, which would be required for the construction and maintenance of the pipeline, varies from five metres to 10 metres. Disturbance of soils and vegetation would not occur outside the proposed easement.

The construction of the water pipeline would involve the construction of trenches. Within the easement, a trench would be constructed with a width of about 90 centimetres and a depth of about 1.5 metres. The pipe to be installed would have an external diameter of 70 centimetres.

Where the proposed water pipeline would cross the Olympic Highway at the northern end of the proposal, the pipeline would be underbored. Underboring would occur at a

depth of about two metres.

The volume of earthworks required for the relocation of the water pipeline is described in Section 3.3.4.

Access to the proposed realignment of the water pipeline would be from the proposed road alignment and from access points identified in the section titled 'Construction access management' in Section 3.3.6.

Decommissioned sections of the water pipeline would be removed where they occur within the proposal boundary. Decommissioned sections of the pipeline outside the proposal boundary would be retained in situ.

3.5.4 11 kilovolt and low voltage powerlines

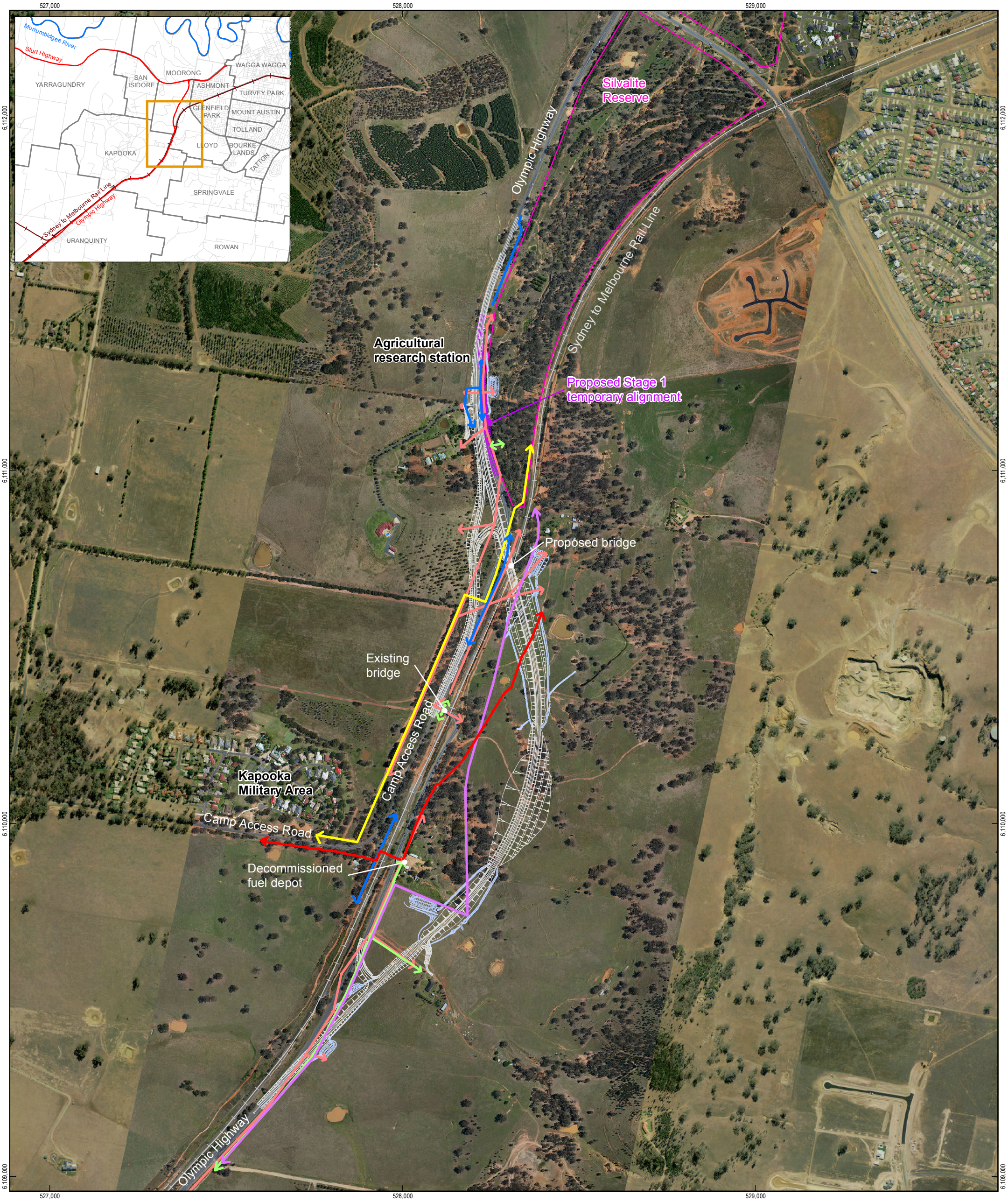
Six power poles would need to be moved for the proposal. These are located at the northern end of the proposal. The realigned powerline would be located within the proposed new road corridor. There are no underground electricity services in the area.

3.5.5 Telephone lines

Telephone lines exist in the vicinity of the proposal at a number of locations. These would be moved in consultation with Telstra.

3.5.6 Rail line signalling

Overhead and underground rail line signal lines exist within the rail line corridor where the new bridge would be constructed. The majority of bridge works would be located away from the rail line; however rail line signalling infrastructure may be impacted. During detail design, bridge piers would be placed so as to avoid impacting rail line signalling where possible. Should impacts to signals be unavoidable they would be relocated within the rail line corridor.



LEGEND

- Optical fibre
- Water main
- High pressure gas pipeline
- Low pressure gas pipeline
- Telephone line
- Power line
- Proposed road
- Proposed Stage 1 temporary alignment
- Proposed drainage and sediment detention basins
- Railway line
- Silvalite Reserve

Note: Figure only shows utilities in the vicinity of the proposal. The full extent of utilities in the mapped area is not shown.

Paper size A3

0 100 200 400

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

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Roads and Maritime Services
Kapooka bridge replacement REF

Job Number	23-14107
Revision	0
Date	25 Oct 2013

Existing utilities

Figure 3.7

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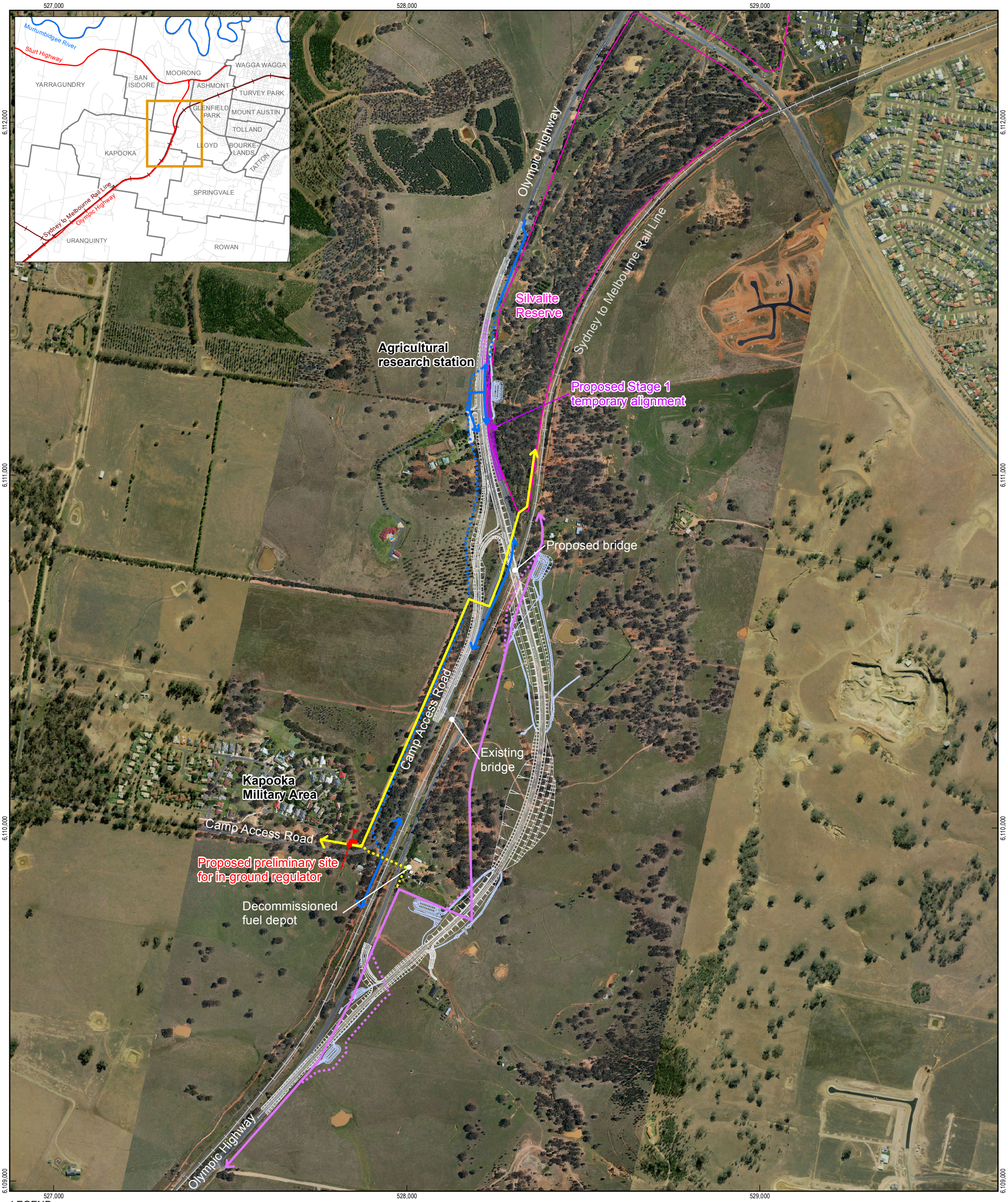
Data source: NSW LPI: Roads, railway lines, rivers, drainage lines, Silvalite Reserve boundary and suburbs - 2005; NSW Roads and Maritime Services: Road design and proposal features - 2011, aerial photography - 2011 & 2006. Created by:rtrobinson



LEGEND

- Proposed preliminary site for in-ground regulator
- Existing water main
- Proposed new water main
- Existing low pressure gas pipeline
- Proposed new low pressure gas pipeline
- Existing high pressure gas pipeline
- Proposed new high pressure gas pipeline
- Proposed road
- Proposed Stage 1 temporary alignment
- Proposed drainage and sediment detention basins
- Railway line
- Silvalite Reserve

Note: Figure only shows utilities in the vicinity of the proposal. The full extent of utilities in the mapped area is not shown.

Paper size A3

0 100 200 400

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
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Roads and Maritime Services
Kapooka bridge replacement REF

Job Number 23-14107
Revision 0
Date 25 Oct 2013

Utilities proposed to be relocated

Figure 3.8

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3.6 Property acquisition

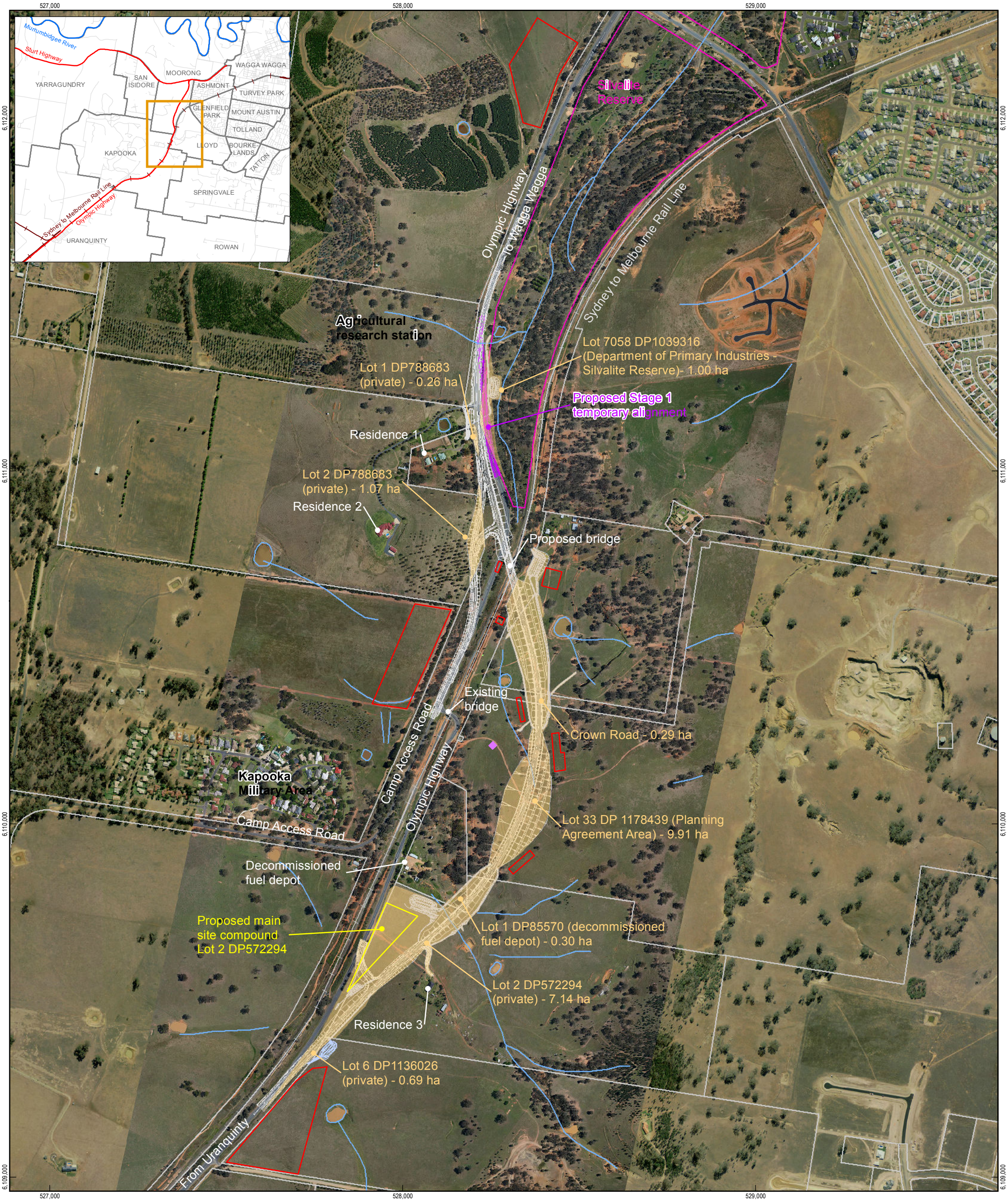
Details of land to be acquired for the proposal are provided in Table 3.1 and are shown in Figure 3.9. These areas are indicative only and may change once boundaries are finalised as part of the detailed design.

Table 3.1: Areas of land to be acquired for the proposal

Lot and DP	Ownership	Area to be permanently acquired (hectares)	Area of property (hectares)	Residual area (hectares)	Area to be leased (hectares)
Lot 7058 DP 1039316	NSW Trade & Investment (Silvalite Reserve) (managed by Wagga Wagga City Council)	1.00	59.92	58.92	
Lot 2 DP 788683	Private	1.07	59.90	58.83	
Lot 1 DP 788683	Private	0.26	3.29	3.03	
Lot 33 DP 1178439	Planning Agreement Areas –Wagga Wagga City Council	9.91	160.18	150.39	1.58
Lot 1 DP 85570	Private	0.30	4.86	4.56	
Lot 2 DP 572294	Private	7.14	47.35	40.21	
Lot 6 DP 1136026	Private	0.69	47.99	47.30	
Crown Road	State of New South Wales	1.37			
Lot 257 DP 757249	NSW Soil Conservation Service				3.26
Lot 1 DP 534820	Australian Government Department of Defence				3.04
	Total	**21.62**			**7.88**

In addition to the land to be permanently acquired for the proposal, land would be leased for the southernmost temporary sediment basin (about 0.2 hectares), the stockpile sites (about 11 hectares), the bridge site compound (about 0.2 hectares), and the weather station (about 0.02 hectares). Lease areas would be required for the period of construction only.

All property valuations, lease fees and acquisition payments would be carried out in accordance with the Roads and Maritime *Land Acquisition Information Guide* (RTA 2011d) and the *Land Acquisition (Just Terms Compensation) Act 1991*. Property acquisition plans would be prepared for each of the properties to be acquired as part of the detailed design. The impacts of property acquisition and leasing are assessed in Section 6.5.



LEGEND

- Proposed road
- Proposed Stage 1 temporary alignment
- Proposed drainage and sediment detention basins
- Existing drainage
- Railway line
- Land to be acquired
- Proposed weather station - to be leased
- Proposed bridge site compound - to be leased
- Proposed stockpile/compound site - to be leased
- Proposed main site compound - to be acquired
- Lot boundary
- Silvalite Reserve

Paper size A3

0 100 200 400

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

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Roads and Maritime Services
Kapooka bridge replacement REF

Land to be acquired and leased for the proposal

Job Number	23-14107
Revision	0
Date	21 Oct 2013

Figure 3.9

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