5.3.3 Intersections and property accesses

Intersections

The project would include three at-grade intersections. These are:

- Construction of an intersection at the northern end of the project between the proposed bypass and the existing Hume Highway. This would provide access to Woomargama village and the local road network.
- Construction of an intersection at the southern end of the project between the proposed bypass and the existing Hume Highway. This would provide access to Woomargama village and the local road network.
- Upgrade of the intersection between Fairbairn Road and the Hume Highway.

Design objectives

The intersections have been designed with consideration to the following objectives:

- Maintaining a high standard of vehicle access to and from Woomargama village and onto Fairbairn Road.
- Providing appropriate intersection arrangements for the number of vehicles predicted to use the existing highway and Fairbairn Road.
- Avoiding impact on culturally significant Aboriginal areas.
- Minimising impact on native vegetation.
- Facilitating nearby property access.

Design arrangements

The intersections would all provide full cross median access and facilitate left, right and U-turn movements for vehicles up to a 26 metre long B-double. All intersections would include acceleration/deceleration lanes, be 'give way' controlled and allow for a two-stage right turn.

At-grade intersections would be provided as the number of vehicles that are predicted to use the existing highway and Fairbairn Road do not warrant the construction of grade-separated interchanges.

Property access

Around 10 property accesses, including acceleration/deceleration lanes, would be constructed along the project. The principal property access would be provided with access to both carriageways with appropriate median breaks. Other property access would be limited to left-in left-out. The design of the property accesses has been developed in consultation with landowners and would be finalised during detailed design.

Access to the existing communications tower on Mount McKenzie would also be maintained.

5.3.4 Bridges, culverts, creek realignments and drainage

Sandy Creek bridges

Bridges would be constructed to cross Sandy Creek, approximately 800 metres from the north of the project. The bridges would comprise two 3.5 metre wide traffic lanes with shoulders. The final configuration of the bridge structures would be confirmed during detailed design.

Prior to the finalisation of the concept design for the environmental assessment, culverts were considered for the crossing of Sandy Creek. The construction of bridges has been favoured as they would better facilitate the retention and rehabilitation of the riparian corridor.

Mountain Creek twin bridges

Twin bridges would provide a crossing over Mountain Creek and its floodplain. The bridges would comprise two 3.5 metre wide traffic lanes with shoulders. The final configuration of the bridges would be confirmed during the detailed design phase and would ensure that flooding impacts are minimised.

The approximate location of the Mountain and Sandy creek crossings are shown in Figure 5-4. An indicative cross-section of the Mountain Creek bridges is shown in Figure 5-5.

Surface water management including culverts

The project would cross Mountain and Sandy creeks and their tributaries. Culverts would be located at existing watercourse crossings to convey run-off across the project. Culverts would be located and aligned to follow natural depressions to ensure minimal changes to existing flow paths. There would be minimal excavation and channel work at the inlet and outlet of the culverts.

In a number of locations, channels or catch drains would be provided to direct flows from the culvert outlet to an existing natural watercourse where possible. Where flow velocities within this channel are high, the channel would be protected against scour using a rock or concrete channel lining, or other suitable material.

Structural and non-structural measures would be used to ensure that the waterways of Mountain and Sandy creeks are protected. This may include swales and spill containment basins.

Creek diversions and realignments

The concept design does not indicate a requirement for diversion and/or realignment of Mountain and Sandy creeks.

If it is determined, following more extensive geotechnical investigation and detailed design development, that realignment or diversion of Mountain or Sandy creeks is required, the need for, and design of the diversion or realignment, would be determined in consultation with the Department of Environment Climate Change and Water, Department of Industry and Investment and other relevant stakeholders.

Excavating or reclaiming the beds or banks of waterways

Some excavation or reclamation works would likely be required in Mountain and Sandy creeks. Excavation or reclamation would be related to the construction of temporary creek crossings and bridge and/or culvert works (including the provision of scour protection) in both Mountain and Sandy creeks. Excavation or reclamation works would be minimised as far as practical, and areas would be rehabilitated upon completion of construction works. The Department of Industry and Investment would be notified of any excavation or reclamation works.

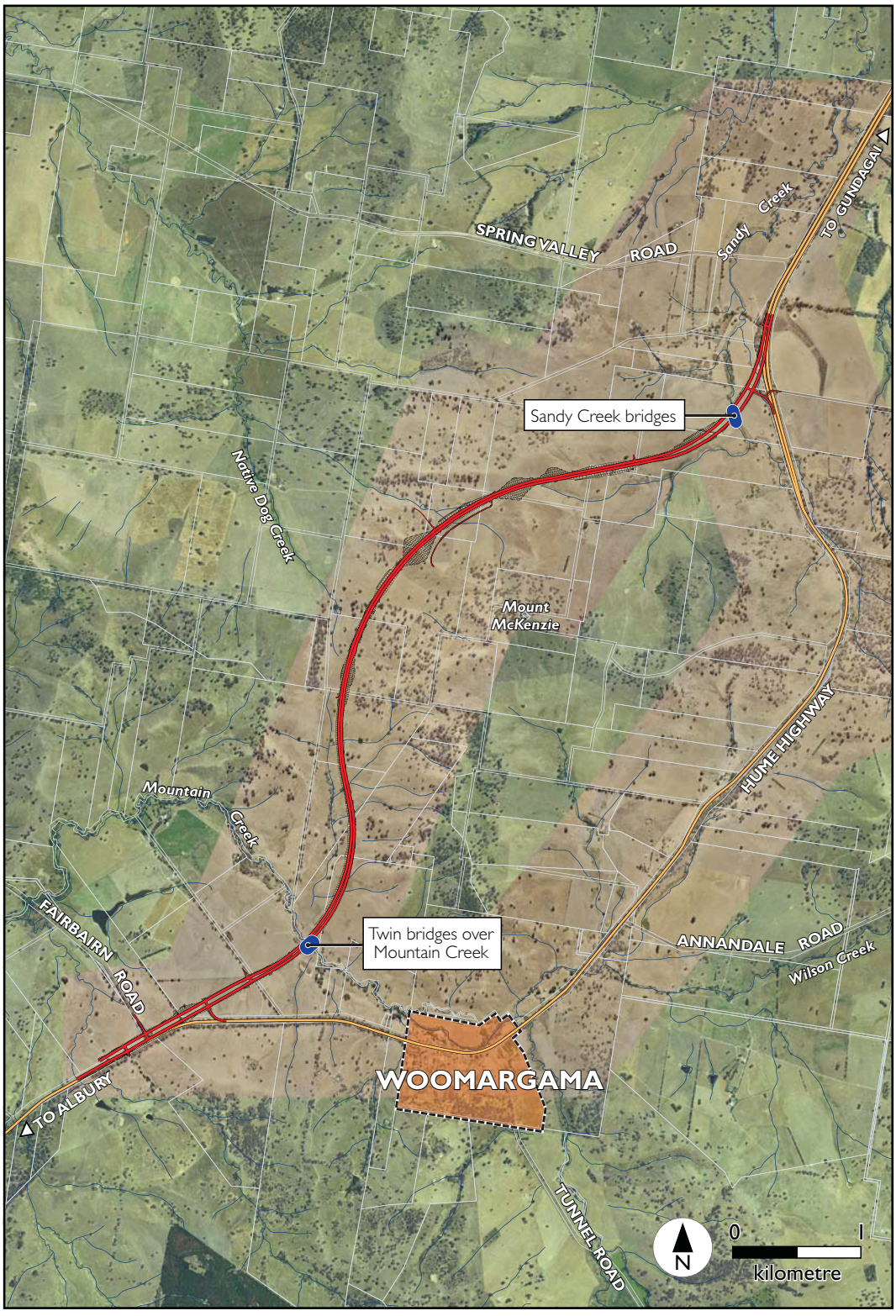


Figure 5-4 **Mountain and Sandy creek crossings**

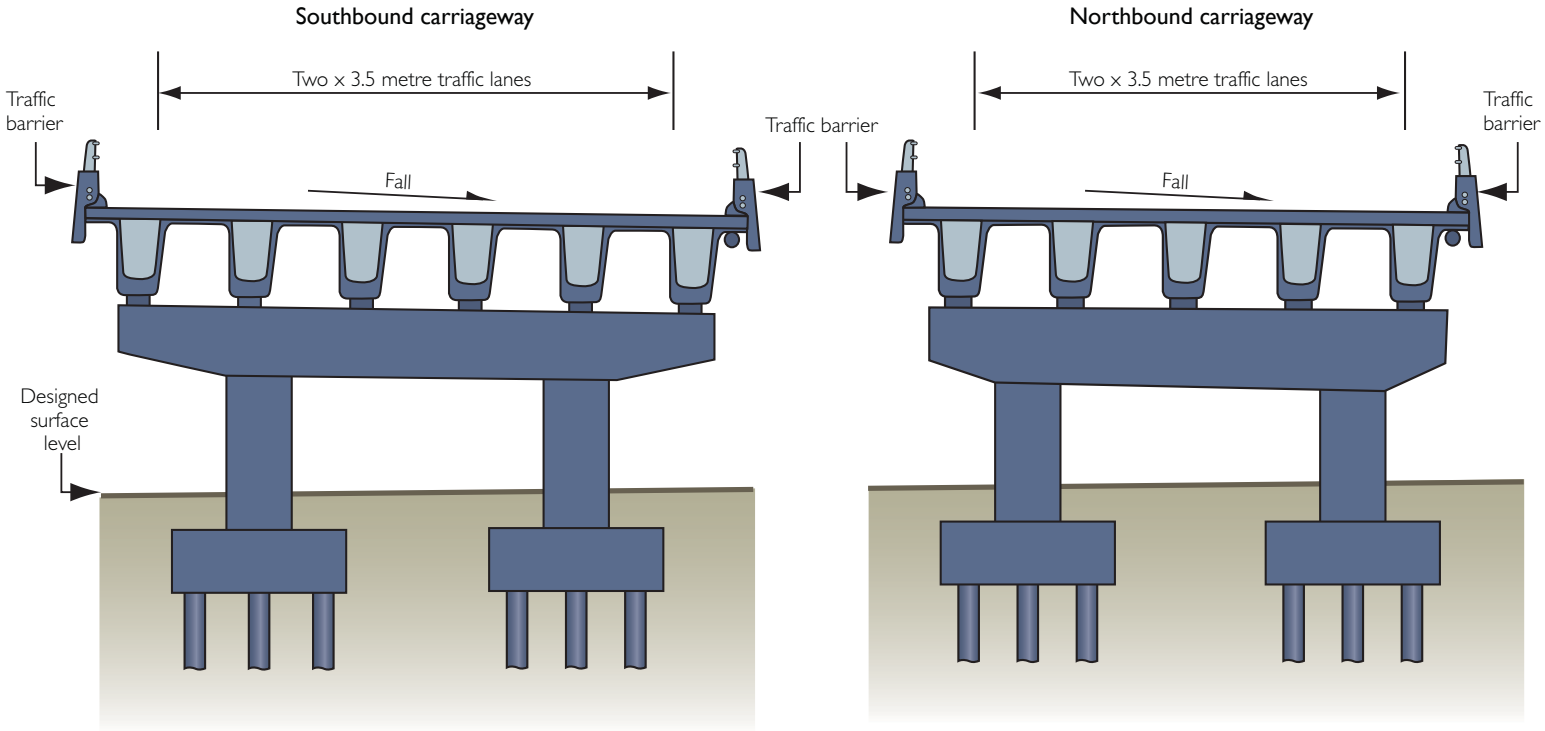


Figure 5-5 **Indicative cross-section – Mountain Creek bridges**

5.3.5 Geotechnical investigations

Details on geotechnical investigations are not included in the environmental assessment as they do not form part of the declared project (see Appendix A Minister's Orders).

Geotechnical investigations to date have consisted of a review of published geological data, consideration of existing geotechnical information collected on adjacent Hume Highway duplication projects, and site visits. It should be noted that investigative drilling has not yet commenced as a result of restricted property access.

5.3.6 Earthworks

The project has been designed with the aim of achieving an overall balance of earthworks to minimise excess spoil and/or the need to import large quantities of fill. A number of cuttings and embankments would be required along the project, which are discussed below. Indicative cross-sections of the alignment are shown in Figures 5-6, 5-7 and 5-8.

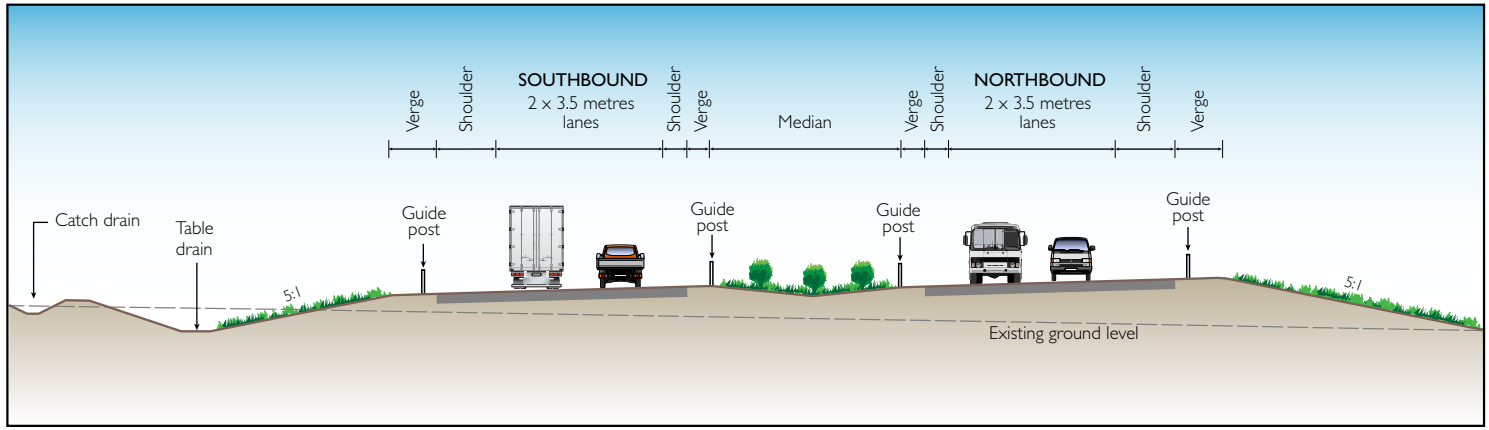
As the terrain traversed by the project includes a number of rocky saddles of Mount McKenzie and other undulating terrain, six deep cuts would potentially be required (between approximately 15 and 40 metres deep). Some shallower cuts may also be required.

As geotechnical information is not currently available, a conservative design has been adopted for the cuts. This includes incorporating batter slopes of around 60 degrees. However, as granite is likely to be encountered in the majority of cuts, it may be possible to steepen the lower batter slopes and this would be determined during detailed design. Depending on the depth of the cutting, batter slopes and geotechnical conditions, berms may be included within the batters to minimise rock falls and provide drainage.

Most of the remainder of the alignment would be built on fill embankments (between five and 20 metres high).

Any embankments higher than around 10 metres may be designed with a bench or berm to improve slope stability and provide drainage. Relevant geotechnical, urban design and environmental criteria and constraints would be considered in design of batter slopes. Batters on shallow embankments would be gently graded to provide a safe road user environment.

MAIN CARRIAGEWAY – LOW FILL < 2.5 METRES



MAIN CARRIAGEWAY – HIGH FILL > 2.5 METRES

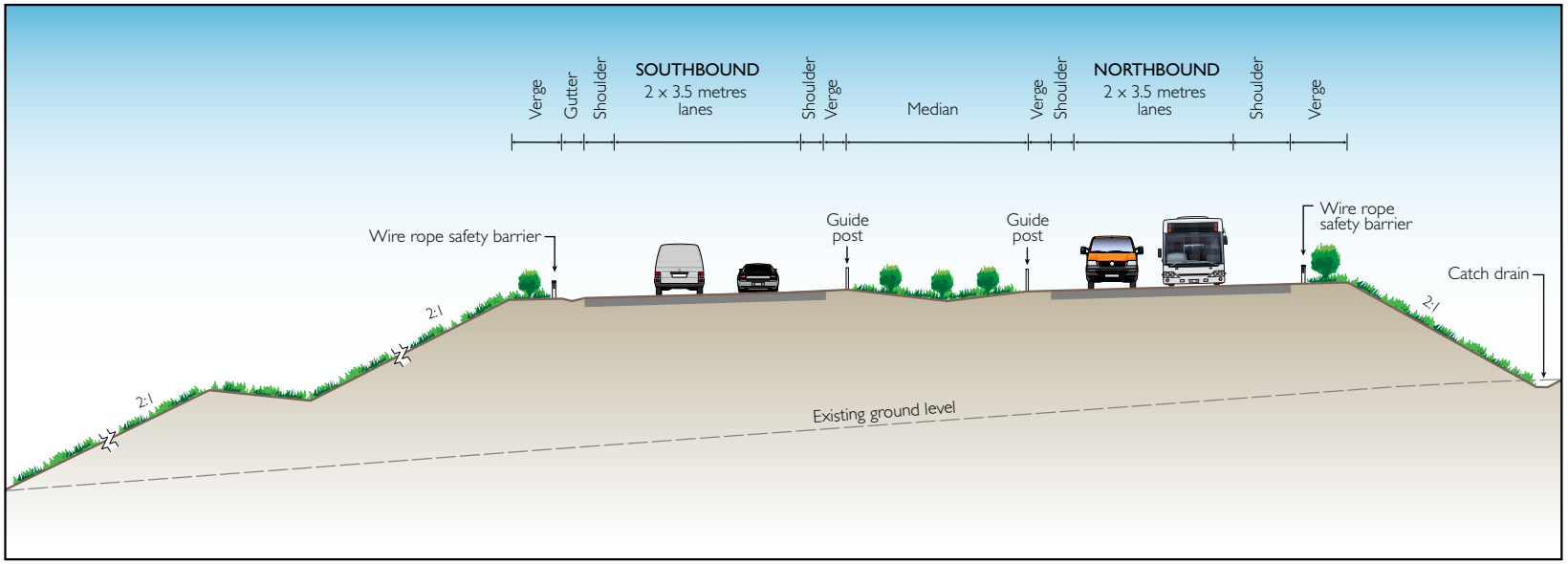
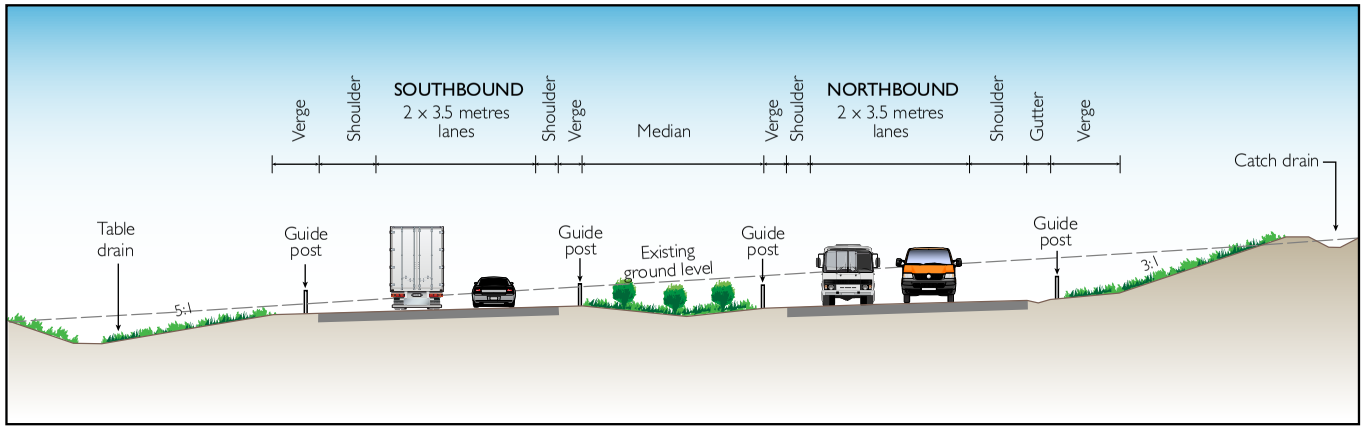


Figure 5-6 **Indicative alignment cross-sections - low and high fills**

MAIN CARRIAGEWAY – SHALLOW CUTTING < 2.5 METRES



MAIN CARRIAGEWAY – DEEP CUTTING > 2.5 METRES < 14 METRES

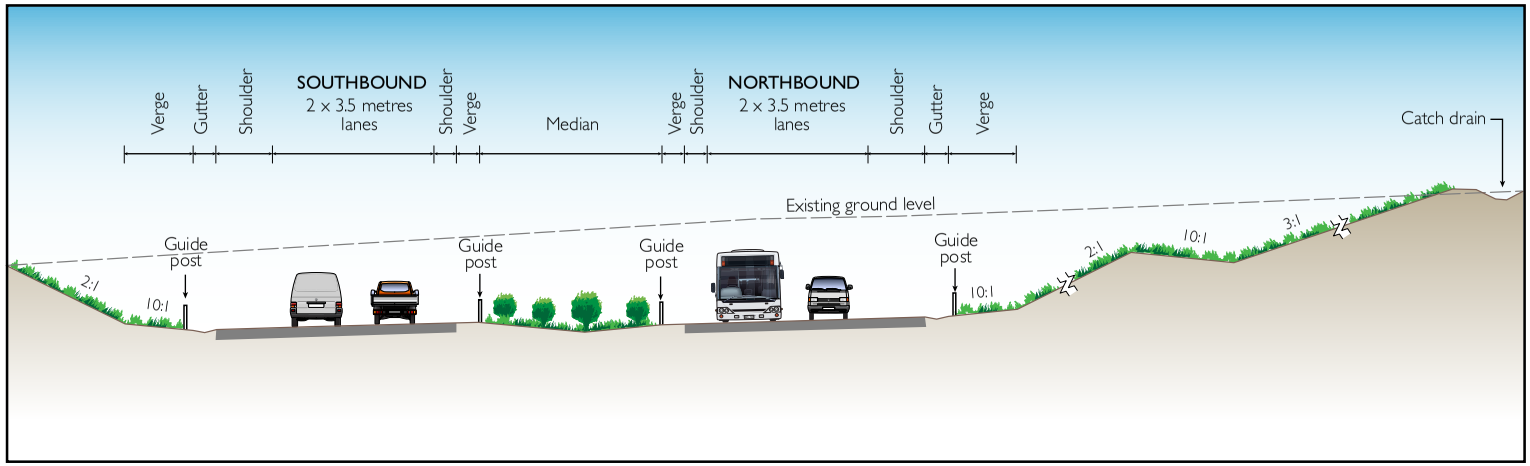


Figure 5-7 **Indicative alignment cross-sections - shallow and deep cuttings**

MAIN CARRIAGEWAY – DEEP CUTTING > 14 METRES

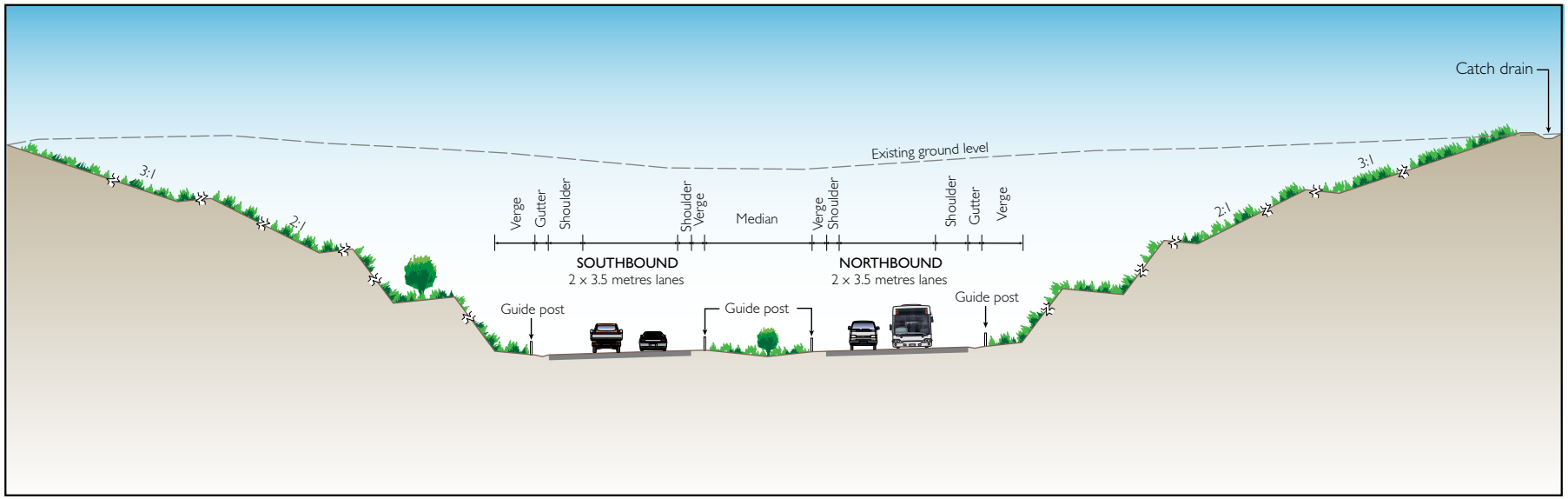


Figure 5-8 **Indicative alignment cross-sections - deep cutting**

5.3.7 Pavement

New sections of the main carriageway would have a design life of 40 years for concrete pavements and 30 years for flexible pavement (asphalt). It is likely that the project would use rigid concrete pavement for the main carriageway and the bridge deck pavements would be surfaced with asphalt layers in accordance with RTA specifications. Connections to local roads would comprise full depth asphalt, asphalt overlays or sealed granular pavements, depending on local traffic conditions.

Where existing roads are being retained, existing pavements may require reconstruction or upgrading depending on the intended use of the road and its current condition. The pavement type used at connections to existing pavements would depend on expected traffic volumes and existing conditions.

All pavement designs would be undertaken in accordance with RTA specifications and Austroads guidelines.

5.3.8 Emergency and rest area facilities

A temporary construction traffic switch would be constructed at the northern end of the project, which would be converted to an emergency crossing for operation. An existing construction traffic switch is located at the southern end of the project and would be utilised for the project and converted to an emergency crossing for operation. A new formal emergency crossover may also be provided mid-way along the project.

A shoulder about 2.5 metres wide would be provided along the main carriageway of the project (except on bridges), allowing vehicles to pull over to the left in the event of sudden breakdowns and emergencies.

The project would not provide separate rest area facilities due to the short length of the project and the desire to encourage drivers to stop, rest and revive in Woomargama village.

5.3.9 Pedestrian and cyclist facilities

There would be no specific provisions for cyclists and pedestrians as part of the project.

While cyclists could potentially use the proposed bypass, it is considered likely that most would choose to use the existing highway through Woomargama.

5.3.10 Lighting, fencing and signage

Road lighting for the project would be limited to the two intersections that provide access to Woomargama village. Lighting design would be in accordance with RTA requirements.

The project would be fenced to identify property boundaries and maintenance access routes. Some fencing may be required for internal property adjustments as part of the property acquisition process.

Permanent road signage for the project would provide clear guidance to local and through traffic. It would be considered further during detailed design in consultation with Greater Hume Shire Council. All road signage for the project would be in accordance with RTA requirements.

5.3.11 Utilities and services

Existing utilities and services

The project would affect a limited number of existing utilities and services. These would include:

- Telecommunications services provided by Telstra.
- Electricity (domestic supply) services provided by Country Energy.

No other services would likely be affected by the project. Table 5-2 identifies the existing utilities and services that may require minor adjustments for the project.

Table 5-2 Summary of existing utilities and services affected by the project

Approximate location[1]	Description	Provider
Chainage 123450	Direct buried pair of copper cables crosses project.	Telstra
Chainage 124250	Overhead electricity cable crosses project.	Country Energy
Chainage 126250	Overhead electricity cable crosses project.	Country Energy
Chainage 130600	Direct buried pair of copper cables crosses project.	Telstra
Chainage 131000	Overhead electricity cable crosses project.	Country Energy
Chainage 131600	Overhead electricity cable crosses existing Hume Highway and project.	Country Energy

Note: 1. Refer to Figures 5-2 and 5-3 for approximate chainage locations.

The nature and extent of utility relocations would be finalised in consultation with relevant authorities, organisations and landowners through the detailed design and construction of the project.

Provision for new services

No dedicated corridor would be provided along the project for additional utility services. Services required for operation of the project would only include power for lighting. The conduits for these services would be located within the road reserve of the project.