West Belconnen

Summary Traffic Report

West Belconnen

Summary Traffic Report

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Executive Summary

Background

Riverview Projects (ACT) Pty Limited have engaged AECOM to provide technical traffic advisory services on the likely impacts of the proposed West Belconnen urban development. The primary purpose of this report is to provide advice on the likely impacts of the development on existing roads and the planning for potential road upgrades to cater for expected traffic growth in the region.

The 2012 ACT Planning Strategy identifies the area of West Belconnen as a 'Future Urban Investigation Site'. It indicates that the location of the development will require careful consideration of the transport needs and requirements to facilitate a successful development.

A yield of approximately 11,500 residential dwellings, 30,000 residents, 4,400 jobs and 4,000 school enrolments is assumed at full development of West Belconnen. Access to the site will be via existing roads in the ACT, which will require upgrading over time as a result of expected traffic growth from the development. Previous traffic modelling has indicated that the primary area that will be impacted by traffic growth will be west of Kingsford Smith Drive and is therefore designated as the primary study area.

The key roads that will serve the proposed development are Southern Cross Drive, Drake Brockman Drive and Ginninderra Drive. William Hovell Drive and Florey Drive are also important. Currently, these roads are operating satisfactorily during peak periods, although there are some concerns regarding the number of crashes on William Hovell Drive.

It is anticipated that the completion of Ginninderra Drive will occur as part of the West Belconnen development. This will ensure better access to North Belconnen and Gungahlin. One of the key advantages of good access to North Belconnen is reduced travel times from the Emergency Services Centre in Charnwood to new housing and services in West Belconnen.

Outside of this project, there has been ongoing consultation with the local residents of Holt concerning the implementation of local area traffic management treatments (LATM) in the suburb. In the past, there has also been consultation for implementation of LATM in the nearby suburbs of Macgregor, Dunlop and Charnwood. There are concerns that the West Belconnen development could cause increased traffic in these suburbs. This is the subject of ongoing investigations. Some additional LATM treatments may be required pending the outcome of these investigations.

Key Outcomes

The analyses presented in this report highlight the future need to duplicate Stockdill Drive and Drake Brockman Drive (ie., construct an additional road carriageway to form a two-way two-lane road). Ultimately parts of William Hovell Drive, Southern Cross Drive and Ginninderra Drive will also need to be duplicated. This is based on a relatively significant shift to public transport in future, although the transport modelling indicates that this will be at lower levels than targeted in Transport for Canberra. The transport model predicts that by the year 2031 about 22% of non-walk trips will be made by public transport, bicycle and park and ride modes, which is 6% less than the Transport for Canberra target for 2031.

The Government is committed to achieving the Transport for Canberra outcomes as part of its broader strategy for a more sustainable Canberra and these outcomes are closely aligned with the sustainability objectives set for the West Belconnen development. The assumptions in the current model results in mode splits that fall a bit short of the Government "Transport for Canberra" policy, resulting in higher traffic flow predictions and potentially bringing forward some of the works that may be required.

The modelling showed that the highest public transport movements out of West Belconnen will occur in the Stockdill Drive, Drake Brockman Drive and William Hovell Drive corridors. The traffic volumes will also be highest in these corridors and this presents conditions for implementing bus priority treatments in these corridors. The major bus passenger flow will remain on Southern Cross Drive east of Kippax, justifying additional bus priority treatments in this section of road.

A key point is that about 40% of the demand on Drake Brockman Drive from West Belconnen is destined for Kippax and 60% to William Hovell Drive and onto City. Also, the majority of growth in bus passenger demand via Kippax will be due to growth in public transport use by existing residents and workers in the area.

Parts of Drake Brockman Drive, Southern Cross Drive and William Hovell Drive are candidates for bus priority treatments. It will be hard to justify bus or transit lanes, especially early on when bus numbers are just starting to grow. They may be justified on Southern Cross Drive by 2031 and on Drake Brockman Drive when West Belconnen is nearing full development.

There are a number of other local streets in the study area that could be impacted by the development, particularly collector roads. New link roads between Parkwood Road and Stockdill Drive, to the west of the Belconnen Golf Course, will be provided as part of the new development. These will relieve potential rat-running pressure on Spofforth Street and other local streets in Holt.

The works required to service the West Belconnen development will benefit new and existing users of the road system in the area. As an indication, some preliminary analyses of 2041 (ultimate) transport modelling results indicate that West Belconnen traffic will represent:

- 71% of vehicles using Drake Brockman Drive west of Kingsford Smith Drive
- 39% of vehicles using Southern Cross Drive east of Florey Drive
- 33% of vehicles using Ginninderra Drive east of Florey Drive
- 26% of vehicles using William Hovell Drive west of Glenloch Interchange

These results reflect a reduction in existing trips using these roads due to greater public transport use and a redistribution of trips, either to alternative destinations or alternative routes.

Some more specific comments with regards particular roads in the area follow.

Stockdill Drive

In the short-term (to 2021), Stockdill Drive between Spofforth Street and the Estate access will need to be upgraded to a suitable urban standard early in the development process. This will include the creation of a new intersection at the access to the development and realignment of Stockdill Drive to its final alignment. At the outset, bicycle and pedestrian facilities will need to be constructed along Stockdill Drive to link with existing facilities on Drake Brockman Drive and Spofforth Street.

Ultimately, at full development of West Belconnen, Stockdill Drive will carry about 24,000 veh/day and will require duplication. Consideration will need to be given for bus priority, in the form of transit lanes and/or bus queue jump lanes, subject to future more detailed investigations.

Drake Brockman Drive

By 2021, a service road and a new road carriageway would need to be built on Drake Brockman Drive between Spofforth Street and Macnaughton Street to cater for relatively large increases in traffic volumes. East of Macnaughton Street improvements to intersections via linemarking are likely to suffice in the short-term.

By 2031, Drake Brockman Drive east of Macnaughton Street should be duplicated and the intersection of Drake Brockman Drive with William Hovell Drive signalised. The duplication of the western section may be delayed till post-2031 based on forecast traffic volumes, but there may be preferable for this work to be completed concurrently with works east of Macnaughton Street. Consideration would also need to be considered for bus priority, in the form of transit lanes and/or bus queue jump lanes at Macnaughton Street, as peak hour bus passenger volumes could jump to 1,700 passengers per hour here in the long-term (about 30 buses per hour).

William Hovell Drive

William Hovell Drive is busy during the AM peak and it has had a high number of crashes between Drake Brockman Drive and Coulter Drive in recent years. There were 297 recorded crashes along William Hovell Drive between Drake Brockman Drive and Coulter Drive in the 10 year period 2004 to 2013, including intersection crashes. This highlights a pressing need for a review of safety and the identification of potential improvements; a need that exists independent of the West Belconnen project. One possible measure is to reduce the speed limit to 80 km/h (currently 90 km/h) and introduce speed cameras. Other measures include lighting and median barriers. The latter would involve some minor widening.

Traffic growth on William Hovell Drive is predicted to be slow, due to capacity constraints in this corridor and a shift to public transport. The real constraint is the Bindubi Drive intersection; this is planned to be upgraded post-2031. Coppins Crossing is likely to be signalised by 2021 and the timing of any upgrades here will influence decisions on widening William Hovell west of Coppins Crossing. It is likely that this would involve an additional eastbound lane between Deep Creek and Coulter Drive, extending the existing two-lane section just west of Deep Creek.

The implementation of bus priority treatments on William Hovell Drive is likely to be necessary post-2031. It is dependent on actual bus numbers and patronage that are achieved in this corridor in future. Duplication of William Hovell Drive may be justified by 2041 (ultimate), to provide extra capacity to enable improved bus operations. The timing and nature of these works are subject to ongoing investigations.

Parkwood Road

Residential development is not expected to occur along this road until post 2020, with the release of about 800 lots between 2020 and 2022, as well as possible commencement of development of the Centre. The existing road can cater for this increased traffic, but the bend in Parkwood Road west of Macfarlane Burnet Avenue should be realigned for safety reasons and as part of widening the road to provide facilities for on-road cycling. Off-road bicycle and pedestrian facilities will need to be constructed along Parkwood Road to link with existing facilities in West Macgregor.

Parkwood Road is expected to carry 14,000 veh/day at full development of West Belconnen, which can be serviced by a high standard two-lane two-way road. About 600 passengers per hour would also be carried on buses in the peak hours along this section of road, not sufficient to justify bus priority facilities nor light rail.

Southern Cross Drive

There will be small increases in traffic using Southern Cross Drive following commencement of development along Parkwood Road. By 2031 there will be a need for some improvements along Southern Cross Drive. Ultimately, consideration should be given to creating a service road on the southern side of Southern Cross Drive between Spofforth Street and Beaurepaire Crescent, requiring reconstruction of the existing road.

The section of Southern Cross Drive between Starke Street West and Moyes Crescent will be busiest and most congested, due to its two-lane two-way cross-section and proximity to the Kippax Centre. Local area traffic management (LATM) treatments may be necessary to ensure that traffic is not attracted to Starke Street to use it as a rat-run towards Drake Brockman Drive and avoid proposed LATM works on Beaurepaire Crescent. Southern Cross Drive may need to be duplicated from east of the Holt Oval underpass to the existing dual lane section at Moyes Crescent, assuming that the rat-running issue on Starke Street will be addressed and more traffic will use Southern Cross Drive.

Bus passenger flows will be very high east of Kippax by 2031, with about 2,700 passengers per hour being carried by buses towards Belconnen by then, representing about 50 buses per hour in the peak direction. This is likely to be sufficient to justify consideration of a bus lane or light rail between Kippax and Belconnen Town Centre. Consideration should also be given to an alternative access to Kippax via Moyes Crescent and a potential new road connection east of Kippax.

Ginninderra Drive

The completion of Ginninderra Drive for access to West Belconnen is expected to be provided post-2031. This will result in the need to duplicate Ginninderra Drive between Florey Drive and Tillyard Drive, but the section west of Florey Drive could continue to operate as a two lane two-way road.

The need for completion of Ginninderra Drive to provide access to West Belconnen could be brought forward if development in the vicinity of Parkwood Eggs occurs earlier in the development process than planned. It would also delay any potential needs for upgrading Southern Cross Drive.

Next Steps

The results and outcomes presented in this report are based on strategic transport modelling with the Canberra Strategic Transport Model (CSTM). More detailed micro-simulation traffic modelling for the primary study area will provide more definitive directions for intersection and public transport improvements. This will enable creation of preliminary concept plans for necessary road improvements and staging of works. It will also lead to refining the cost of works and guidance towards who should contribute to the cost of works.

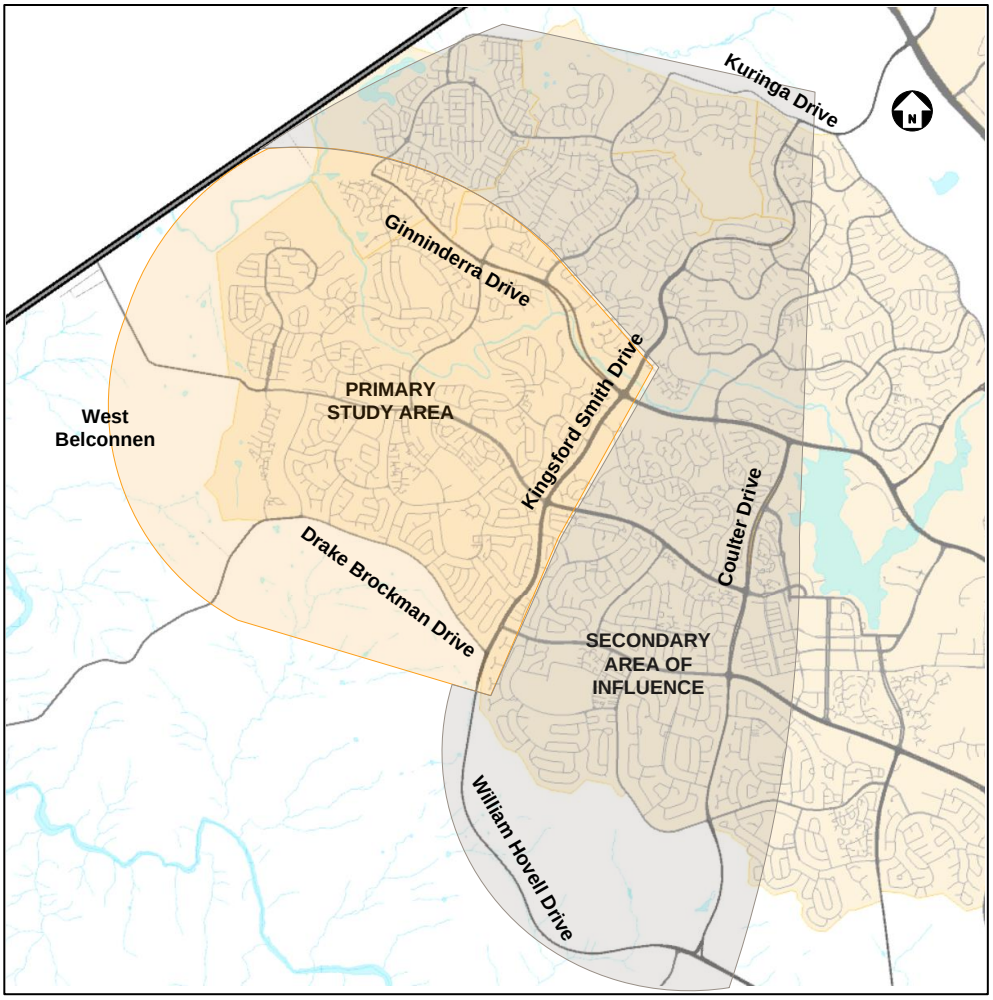
1.0 Introduction

Riverview Projects (ACT) Pty Limited, on behalf of the Land Development Agency and NSW land owners, have engaged AECOM to provide technical traffic advisory services on the likely impacts of the proposed West Belconnen urban development. The primary purpose of this report is to provide advice on the likely impacts of the development on existing roads and the planning for potential road upgrades to cater for expected traffic growth in the region.

The 2012 ACT Planning Strategy identifies the area of West Belconnen as a 'Future Urban Investigation Site'. It indicates that the location of the development will require careful consideration of the transport needs and requirements to facilitate a successful development.

A yield of approximately 11,500 dwellings and 30,000 people is assumed for the development. Access to the site will be via existing roads in ACT, which will require upgrading as a result of expected traffic growth from the development. Previous traffic modelling has indicated that the primary area that will be impacted by traffic growth will be west of Kingsford Smith Drive and is the primary study area in Figure 1. There is also a secondary area of influence that extends further east (see Figure 1). These areas are the focus of the traffic assessment.

Figure 1: Primary and secondary study areas



2.0 Purpose and Assumptions

2.1 Background

This report provides an outline of the external road improvements required as a result of expected traffic growth from development in the area. The primary influences on traffic growth will be West Belconnen, Kippax, Belconnen Town Centre and Molonglo.

The current master plan for West Belconnen is illustrated in Figure 2. The landuse estimates used in the modelling of West Belconnen are summarised in Table 1.

Figure 2: West Belconnen master plan (May 2014)

Table 1: West Belconnen landuse forecasts

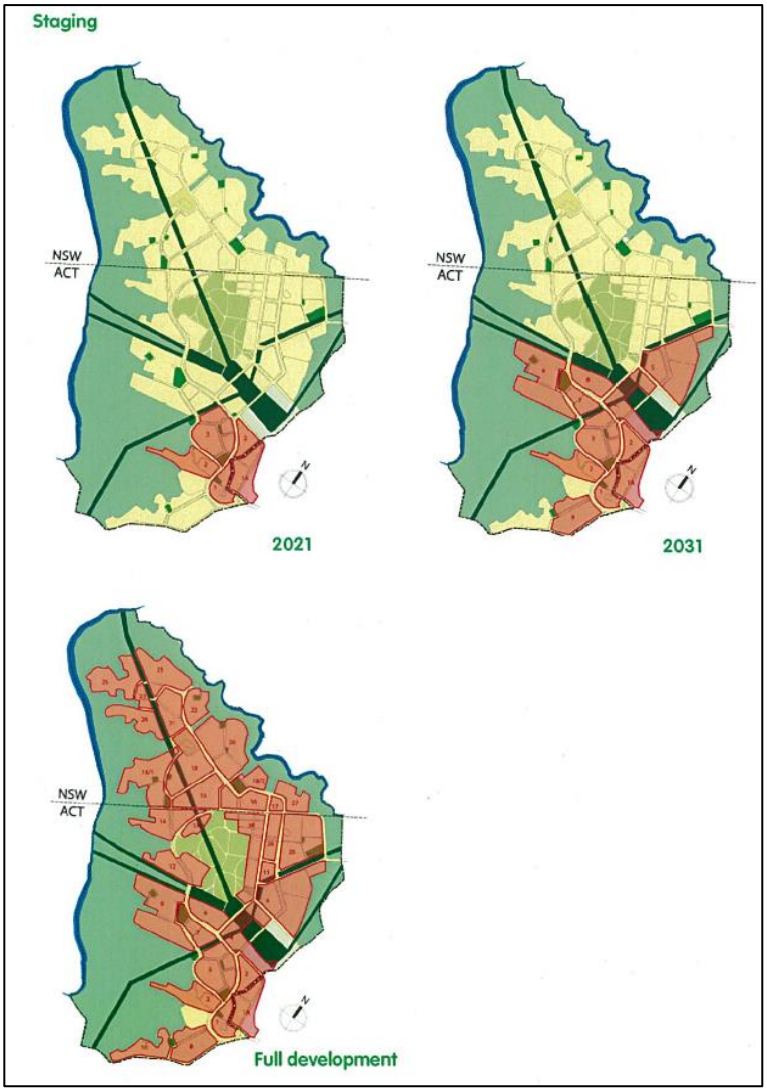
Use	2011	2016	2021	2031	2041 (Ultimate)
Population	0	0	4,680	11,700	29,900
Employment	320	350	438	1,624	4,380
Retail & services floorspace (m^2)	0	0	1,300	15,000	39,500
School enrolments	0	0	750	900	4,000

Note: 1. Retail & services includes retail, services, health, recreation and community uses (Urbis 2014)
2. School enrolments based on advice from Elton (2014)
3. Population estimates are based on 2.6 persons per dwelling

2.2 Staging Plan

The current plan for staging of development in West Belconnen is depicted in Figure 3. This formed the basis of the transport modelling for the various horizon years – 2021, 2031 and 2041 (ultimate or full development).

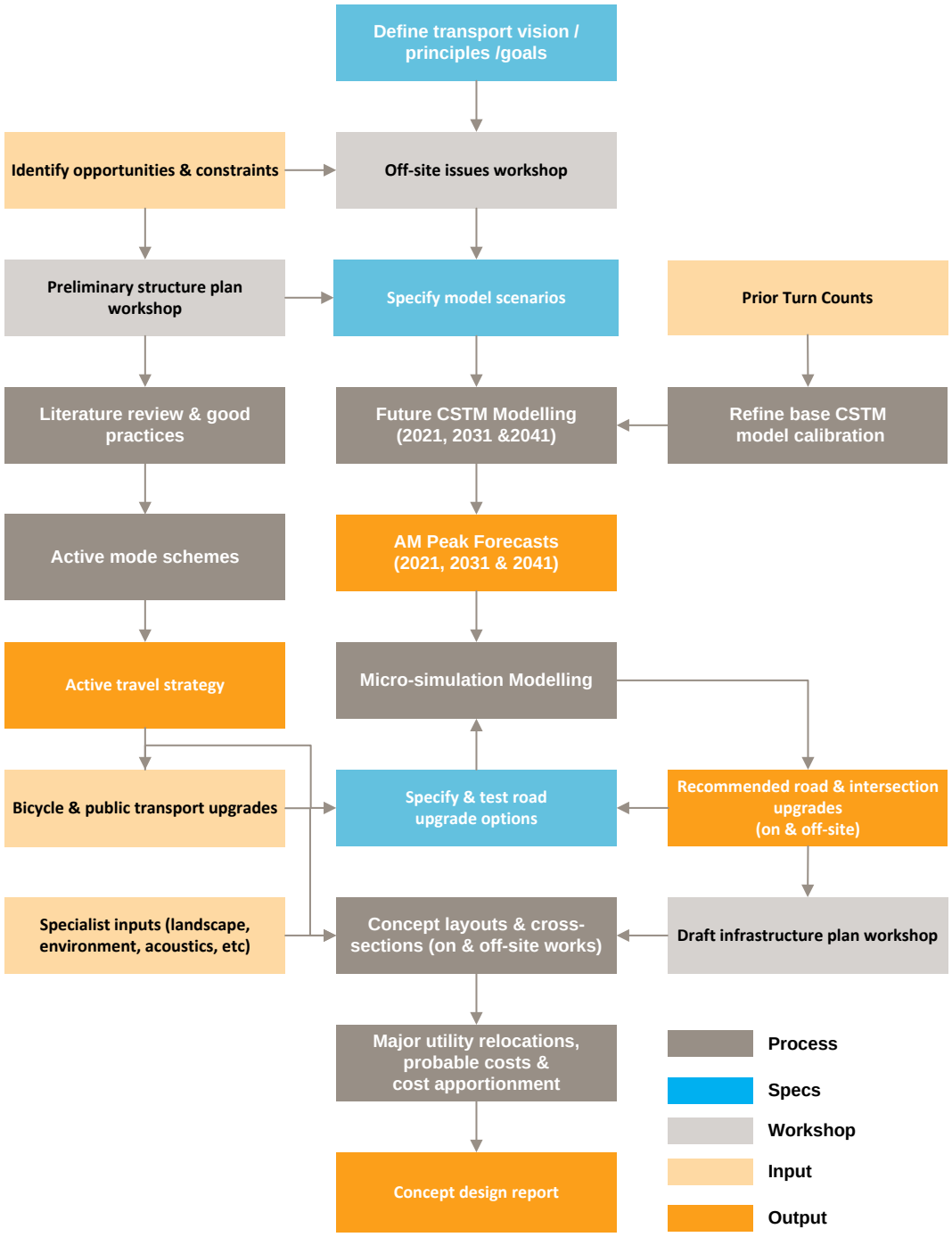
Figure 3: Staging of development



2.3 Overview of Approach

A summary of the primary tasks to be undertaken and their inter-relationships are shown in Figure 4. This report documents the results of the Canberra Strategic Transport Model (CSTM) modelling and broad expectations for arterial road upgrades in the study area. The micro-simulation modelling is currently being undertaken and this will be followed by the creation of road upgrade concepts for roads most impacted by the West Belconnen development, and subsequently costing of these works. The micro-simulation modelling will provide clarity on intersection and bus priority needs.

Figure 4: Summary of tasks



There has been ongoing consultation with the local residents of Holt concerning the implementation of traffic management treatments (LATM) in the suburb. In the past, there has also been consultation for implementation of LATM in the nearby suburbs of Macgregor, Dunlop and Charnwood. There are concerns that the West Belconnen development could cause increased traffic in these suburbs. This is the subject of ongoing investigations.

2.4 Mode Use

Transport for Canberra (ACT Government 2012) has a 23% target for bus, bike and walk trips for the journey to work by 2016 and 30% by 2026. This incorporates targets of 7% for walking, 7% for cycling and 16% for public transport. In 2011, these mode shares for the journey to work (JTW) are 5% walking, 3% cycling and 7% public transport. That is, bicycle and public transport trips are expected to double over the next 15 years, whilst walk trips would show slightly lesser growth.

Mode use is an output from the CSTM. It is largely dependent on relative travel times by car and bus, as well as parking charges. In 2031 the model estimates that about 21.6% of non-walk trips will be made by public transport, bicycle and park and ride modes. The equivalent 2031 target for these modes from Transport for Canberra is about 28% of non-walk trips. Hence, the current 2031 model is about 6% short of the intended mode use targets, so forecast traffic volumes will be higher.

The transport model predicts that for the ultimate scenario (2041) about 22.4% of non-walk trips will be made by public transport, bicycle and park and ride modes. The equivalent target for these modes from Transport for Canberra would be much higher.

The CSTM mode use forecasts are a function of the parameter values adopted in the model calibration, as well as assumptions such as parking charges, bus frequencies and road improvements that affect relative mode travel times. The parameter values do not vary much between the 2031 and 2041 (ultimate) models, resulting in an increased gap between target and forecast mode use. Also, the modelled estimates of future bicycle use are particularly low, which could be impacted by greater use of new technology that will enable higher speeds by minor modes and therefore greater use of minor modes (eg., electric bikes, electric mobility scooters and other mobility aids).

2.5 Strategic Model Version

The version of the Canberra Strategic Transport Model (CSTM) used in the production of traffic and public transport forecasts for this report was based on the model provided by ACT Government in March 2014 and the May 2014 master plan shown in Figure 2.

The Government is committed to achieving the Transport for Canberra outcomes as part of its broader strategy for a more sustainable Canberra and these outcomes are closely aligned with the sustainability objectives set for the West Belconnen development. The assumptions in the current model results in mode splits that fall a bit short of the Government “Transport for Canberra” policy, resulting in higher traffic flow predictions and potentially bringing forward some of the works that may be required.

2.6 Ginninderra Drive Completion

The assessment of roads provided in this report assumes that Ginninderra Drive is completed by 2041 (ultimate).

2.7 Road Design Standards

The road design standards adopted for recommended road improvements in this report comply with the provisions detailed within relevant ACT Government and Austroads guidelines and standards. The road design work is based upon available information, which includes:

- Information gathered from construction drawings and during site visits;
- Location of utilities (supplied in electronic format by utilities authorities);
- ACTMAPi 1 m digitised land contours;

3.0 Roads

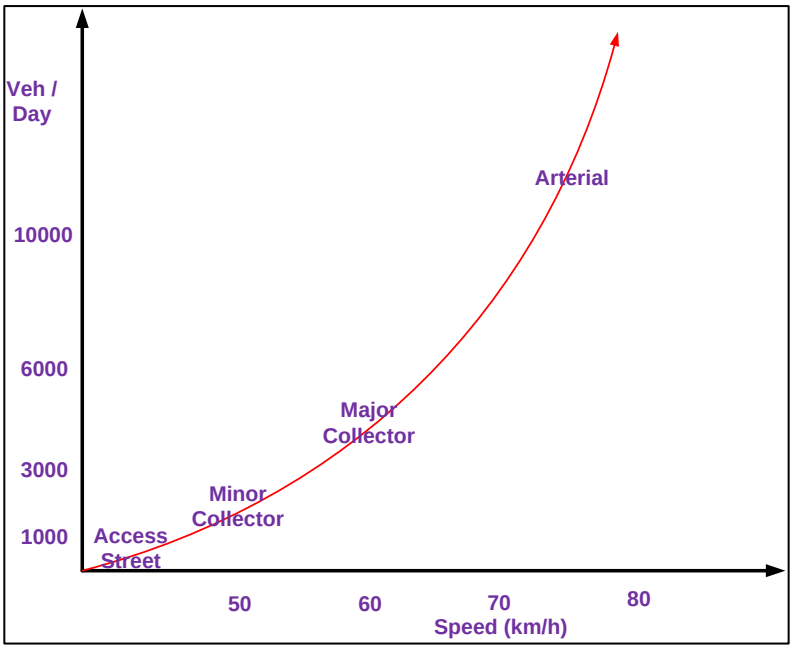
3.1 Road Hierarchy

The road hierarchy defines the primary purpose and function of the various roads in a road network. The ACT road hierarchy as defined in the ACT Estate Development Code has three broad categories:

- access streets (defined as rear lane, access street A and access street B),
- collector roads (defined as major or minor), and
- arterial roads.

The roads are described in terms of such variables as pavement and verge widths, traffic volumes, speed environment, property access, provision for pedestrians and intersection spacing. They carry different amounts of traffic at different speeds, as depicted in Figure 5. Access streets carry small amounts of traffic at low speed and primarily provide access to properties. Conversely, arterial roads carry large amounts of traffic at high speed and are the primary corridor for travel between different parts of the City. Collector streets connect the access streets to the arterial road network and provide a range of access and movement functions at moderate speeds.

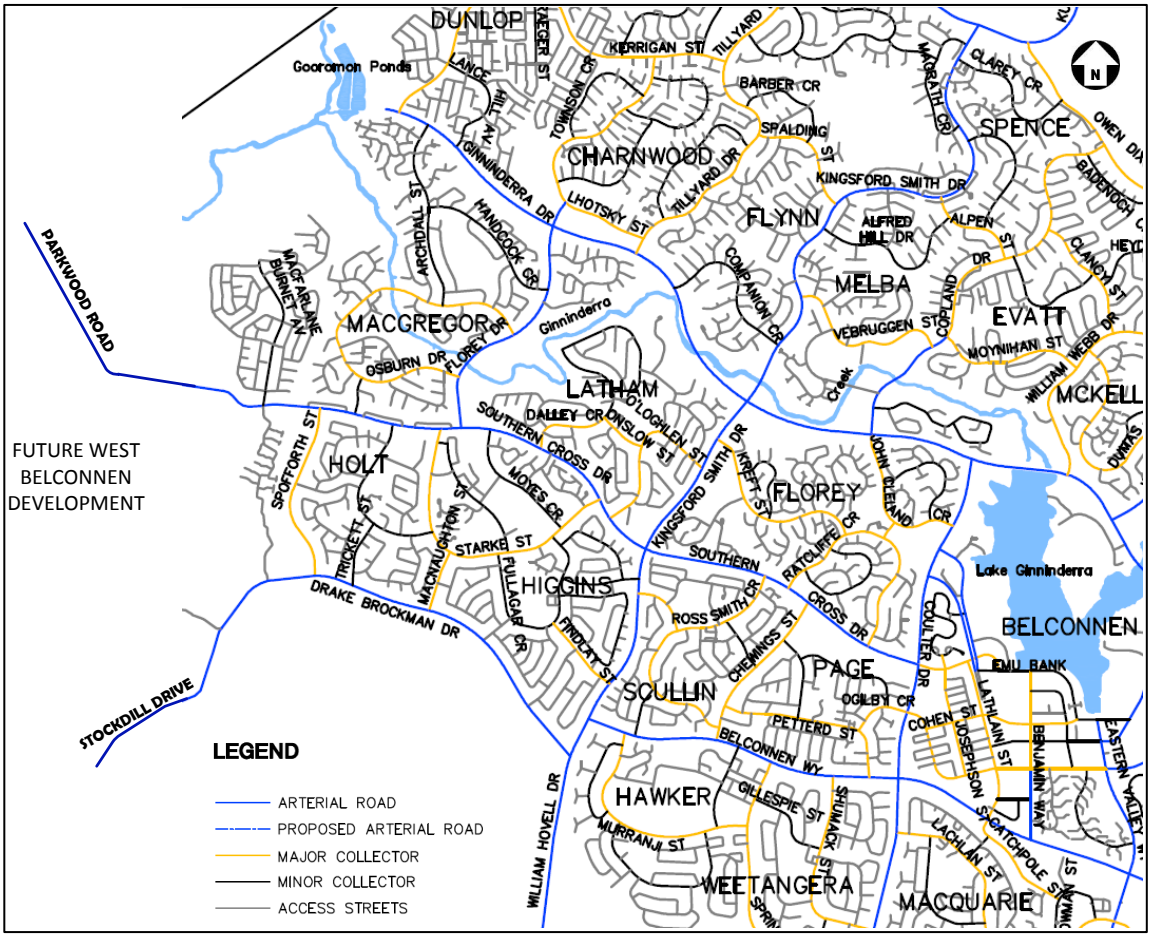
Figure 5: Road categories across traffic volume and speed ranges



The current road hierarchy in the area, as defined by TAMS, is shown in Figure 6. It shows the high importance of Ginninderra Drive, Southern Cross Drive, Drake Brockman Drive, Stockdill Drive and Florey Drive in the road hierarchy. They are all categorised as arterial roads. Macnaughton, Starke Streets and Spofforth Street are defined as major collectors.

The key roads that will serve the proposed development are Southern Cross Drive, Drake Brockman Drive and Ginninderra Drive. William Hovell Drive and Florey Drive are also important.

Figure 6: Existing road hierarchy



Source: TAMS 2013

3.2 Stockdill Drive

3.2.1 Existing Conditions

Stockdill Drive will provide the initial access to new development in West Belconnen. It is currently a relatively low standard 2-lane 2-way rural road with a speed limit of 60 km/h. It has a 6.6m pavement and a grassed shoulder. It currently serves the Belconnen golf club and existing residential development via Britten-Jones Drive, the Molonglo Sewerage Treatment Works and a number of rural leases. It is not a through road, ending in a cul-de-sac prior to the Molonglo Gorge, at the access to the Molonglo Sewerage Treatment Works.

The existing road carries only 1,000 veh/day between Spofforth Street and Britten-Jones Drive and less than 300 veh/day west of Britten-Jones Drive. The current design of this road is adequate for its purpose.

3.2.2 Future Conditions and Works

The planned access to the new development will be a short distance west of Belconnen Golf Course. In the first stage of the development the main access will be formed about 1km west of the existing intersection with Britten-Jones Drive. The road will be reconstructed so that the access to the new urban area will become the main road and the southern section of Stockdill Drive will tee off it.

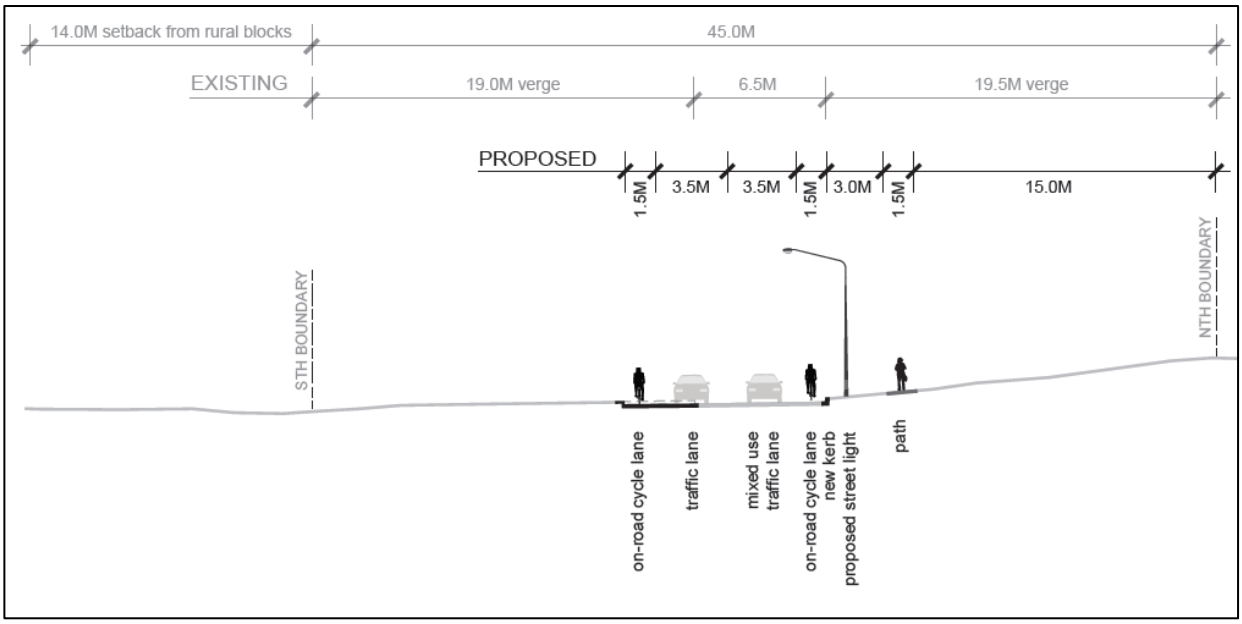
The first stage of development will incorporate about 680 residential lots and a possible school, representing a little over 2 years of expected housing demand. The existing road will be able to cater for the increased traffic due to the first stage of development (about 5,000 veh/day). At the outset, bicycle and pedestrian facilities will need to be constructed along Stockdill Drive to link with existing facilities on Drake Brockman Drive and Spofforth Street.

It is expected that both on-road and off-road bicycle facilities will need to be provided prior to the completion of the first stage of development, as the existing road has no sealed shoulders and the traffic lanes are too narrow for mixed traffic. Works proposed as part of first stage of work on Stockdill Drive are as follows:

- Proposed pavement width to accommodate 1.5 m wide on-road cycle lane in each direction[1]
- New 1.5 m wide concrete path on the northern verge to provide path connectivity from the estate to existing path east of Spofforth Street

The potential cross-section for the first stage of works on Stockdill Drive is shown in Figure 7. It is expected that these works will need to be completed prior to servicing any residential blocks in the proposed development.

Figure 7: Potential first stage road cross-section for Stockdill Drive



By 2021 it is assumed that about 1,800 lots would be developed, the school occupied and a local shopping centre formed on Parkwood Road. As part of the master plan, there would be a new road formed between Stockdill Drive and Parkwood Road. Traffic volumes on Stockdill Drive east of the Estate access will be approaching 10,000 veh/day by then. The existing road would still have the capacity to carry this amount of traffic, but intersection works would be necessary at Spofforth Street, partly to enable access to a proposed service road on Drake Brockman Drive (see Section 3.3).

Existing utilities that are likely to require relocation to enable this work are:

- 225 mm diameter main west of Spofforth Street
- 375 mm diameter main in the vicinity of Spofforth Street intersection
- Both overhead and underground power lines in the vicinity of Spofforth Street intersection

It is anticipated that these utilities are to be relocated to suit the ultimate proposed upgrade.

By 2031 about 4,500 lots would be developed, which represents a large proportion of the ACT portion of West Belconnen (63%). Traffic flows on Stockdill Drive east of the Estate access will then be about 13,000 veh/day and will be nearing capacity for the existing road. Intersections along Stockdill Drive will require upgrading to improve access and safety.

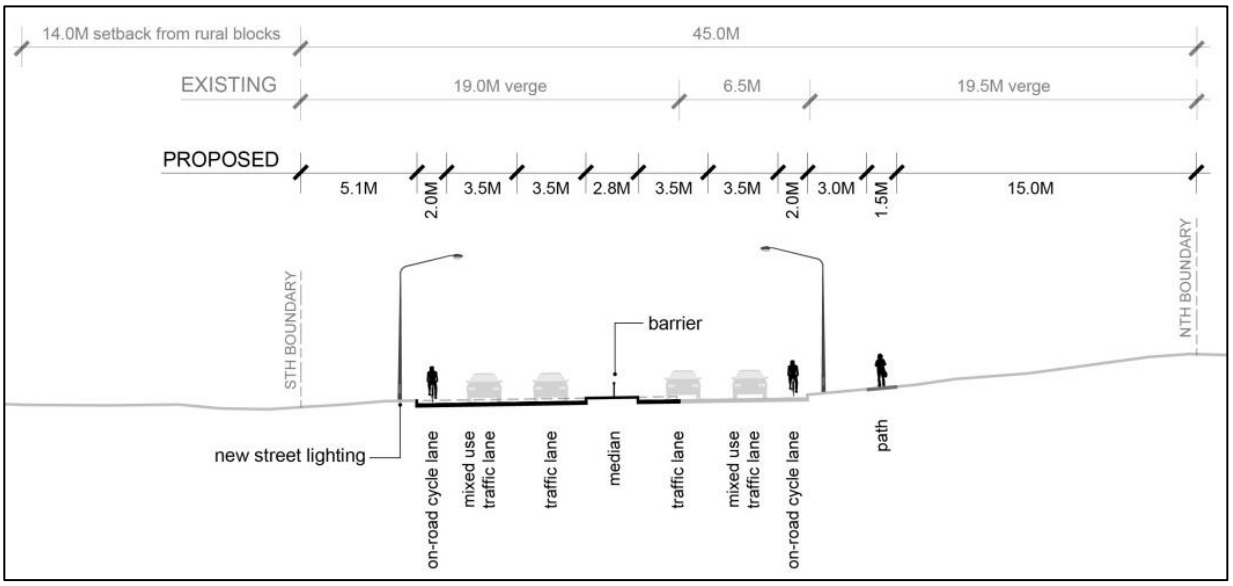
[1] The on-road cycle lane of 1.5 m wide assumes the 60 km/h posted speed limit is retained for this section of road.

Ultimately, at full development of West Belconnen, Stockdill Drive will carry about 24,000 veh/day east of the Estate access. It will require duplication by the latter part of the 2030's decade, assuming an average of 300 dwellings occupied each year from 2016. Consideration would also need to be given to bus priority, in the form of transit lanes and/or bus queue jump lanes, subject to future more detailed investigations.

Peak hour bus passenger flows will gradually grow along Stockdill Drive, from 800 passengers per hour in 2031 to over 1,700 passengers per hour ultimately. These flows reflect the need for between 15 and 30 buses per hour in the AM peak. Bus flows and traffic congestion will build sufficiently to justify bus priority facilities along Stockdill Drive in the early part of the 2030's decade.

The proposed cross-section for the ultimate works proposed along Stockdill Drive between Spofforth Street and the Estate entrance are shown in Figure 8.

Figure 8: Potential ultimate cross-section for Stockdill Drive between Spofforth Street and the Estate entrance



The works will include:

- Duplication on the southern side of the existing pavement
- 2.8 m wide median with safety barriers
- 2 x 3.5 m wide traffic lanes and 2.0 m wide on-road cycle lane in each direction (if 80 km/h, or 1.5 m if 60 km/h is retained for this section of road)
- Buses are expected to utilise the kerb side traffic lane and share with general traffic
- New 1.5 m wide concrete path on the northern verge to provide path connectivity from the estate to existing path east of Spofforth Street.
- Adjustment to a section of the southern side of the road reserve boundary where the existing road reserve width is narrower by approximately 14 m generally into the rural boundary, to be aligned with the road reserve boundary in adjacent sections so as to accommodate road duplication, batter work, relocation of existing utilities and installation of proposed water mains to supply the estate development.
- Intersection upgrades at Spofforth Street, Britten-Jones Drive and the access to the development.

It is anticipated that the relocated utilities in the first stage of works would suit the ultimate upgrade (i.e. minimal impacts to these utilities in the ultimate works).

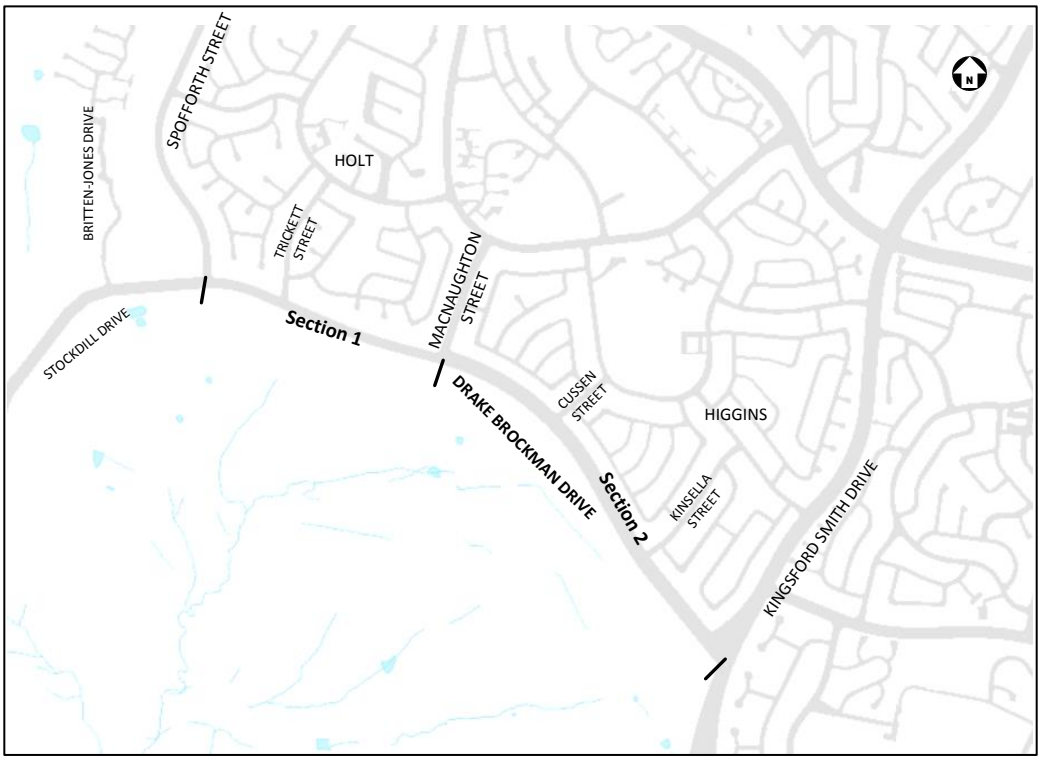
3.3 Drake Brockman Drive

3.3.1 Existing Conditions

Drake Brockman Drive is effectively an extension of Stockdill Drive, running from Spofforth Street in the west to the intersection of Kingsford Smith Drive and William Hovell Drive in the east. It is a 2-lane 2-way road and is classified as an arterial road (see Figure 6), but it varies in nature along its length.

It has two distinct sections either side of Macnaughton Street, as indicated in Figure 9. West of Macnaughton Street (Section 1 Figure 9), the posted speed limit is 60 km/h and there are direct driveway accesses to residential properties on the northern side of the road, whilst the southern side is rural land. Current traffic flows in this section of road vary from about 1,500 veh/day west of Trickett Street to 4,000 veh/day between Trickett Street and Macnaughton Street. The disparity in flows along here is partly due to the implementation of speed cushions on Spofforth Street and a diversion of traffic to other local streets in the area.

Figure 9: Drake Brockman Drive sections



East of Macnaughton Street (Section 2 Figure 9), the speed limit increases to 80 km/h, as there are no driveway accesses to residential properties. In this section of road the rear boundaries of homes are set back over 30 m from the northern side of the road. The southern side is primarily rural land. Current traffic flows in this section of road vary from about 6,000 veh/day west of Cussen Street to 8,800 veh/day west of Kingsford Smith Drive.

All intersections along Drake Brockman Drive are operating satisfactorily with minimal delays or queues. The most delays occur at the roundabout intersection with Kingsford Smith Drive and William Hovell Drive, but current traffic flows are well within the capacity of this roundabout. Average peak hour delays are only about 12 seconds per vehicle for Drake Brockman Drive traffic at this intersection.

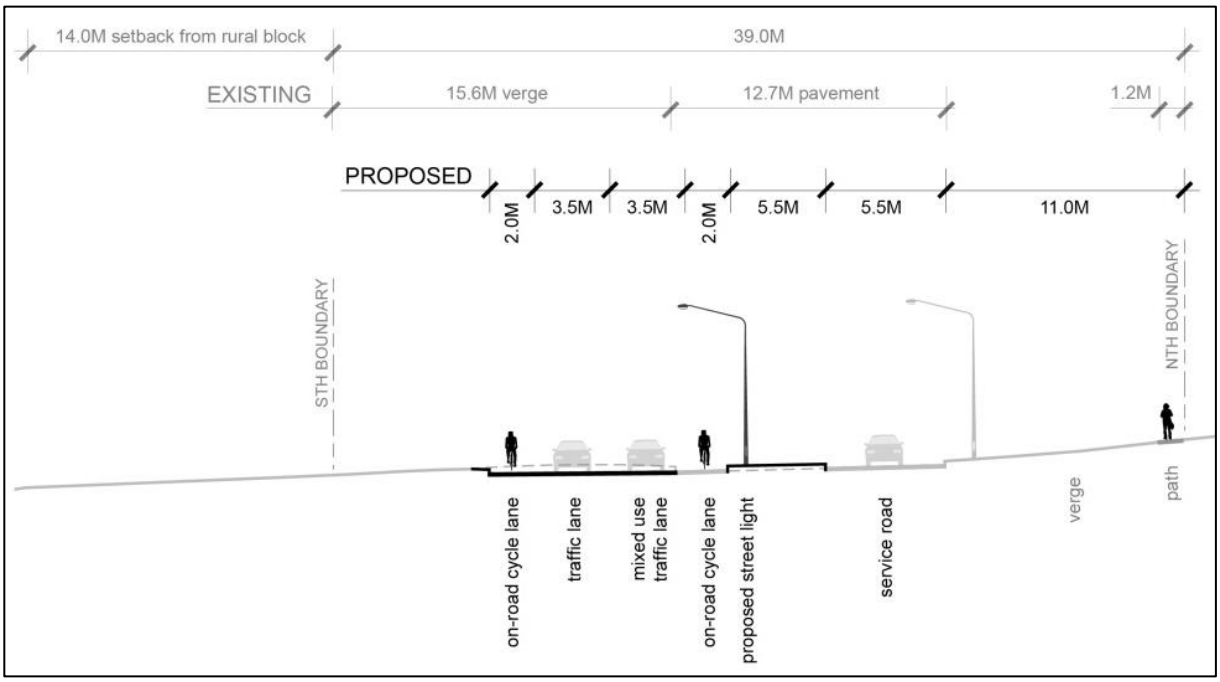
An analysis of recent crash data did not identify any locations with high crash incidence. There were 34 recorded crashes along Drake Brockman Drive in the period 2009 to 2013, with the majority of these (14) occurring at the intersection with Kingsford Smith Drive and William Hovell Drive. Most of the crashes involved property damage only (30) and rear-end collisions (23). Of the four crashes involving injury, there was one head-on near the intersection of Macnaughton Street and three other collisions at the intersection with Kinsella Street.

3.3.2 Future Conditions and Works West of Macnaughton Street (Section 1)

The first stage of development will cause a noticeable increase in traffic using Drake Brockman Drive. West of Macnaughton Street traffic volumes will increase to about 8,000 veh/day, roughly double current volumes in this section of road. This volume of traffic will create delays for residents accessing driveways and by 2021 consideration should be given to the construction of a proposed service road in this section of road and a new road carriageway, as well as local intersection works. A roundabout would be appropriate at Spofforth Street, to improve safety and enable U-turns for access to the service road.

The potential cross-section for the first stage of works on Drake Brockman Drive between Spofforth Street and Macnaughton Street is shown in Figure 10.

Figure 10: Potential first stage of road cross-section for Drake Brockman Drive between Spofforth Street and Macnaughton Street



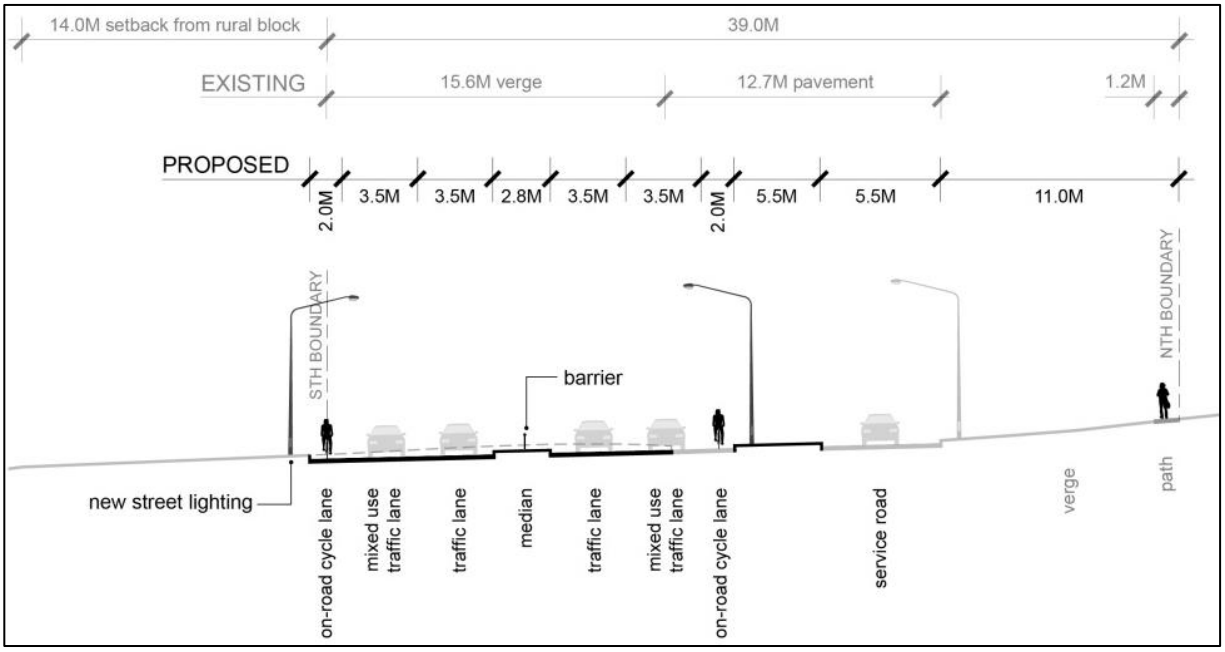
Traffic flows could increase to more than 12,000 veh/day by 2021 and 16,000 veh/day by 2031, which can be catered for by the proposed first stage of works. This section of road will be on the cusp of duplication by 2031, but capacity improvements at the intersection with Macnaughton Street and duplication east of there should suffice at that time.

Buses and bus passenger volumes will start to pick up by 2031, with buses carrying about 900 passengers per hour in peaks in this section of road. Bus priority facilities could be considered along here at about this time, subject to future more detailed investigations (eg., bus queue jump lanes at Macnaughton Street intersection).

Ultimately, at full development of West Belconnen, this section of road will carry about 26,000 veh/day. It will require duplication in the middle part of the 2030's decade. Consideration would also need to be considered for bus priority, in the form of transit lanes and/or bus queue jump lanes at Macnaughton Street, as peak hour bus passenger volumes could jump to 1,700 passengers per hour here in the long-term (about 30 buses per hour).

The section of Drake Brockman Drive between Spofforth Street and Macnaughton Drive currently has direct property access onto Drake Brockman Drive on the northern verge. In addition to this, there are mature trees and landscaping treatments and a number of existing utilities along the northern verge of Drake Brockman Drive from Spofforth Street to Kingsford Smith Drive. The proposed ultimate works are therefore generally located south of the existing pavement, as shown in Figure 11. As noted a minor adjustment to the 14.0 m road reserve would be required on the southern side to accommodate the proposed ultimate road configuration.

Figure 11: Potential ultimate cross-section for Drake Brockman Drive between Spofforth Street and Macnaughton Street



The ultimate works proposed along Drake Brockman Drive between Spofforth Street to Macnaughton Street include:

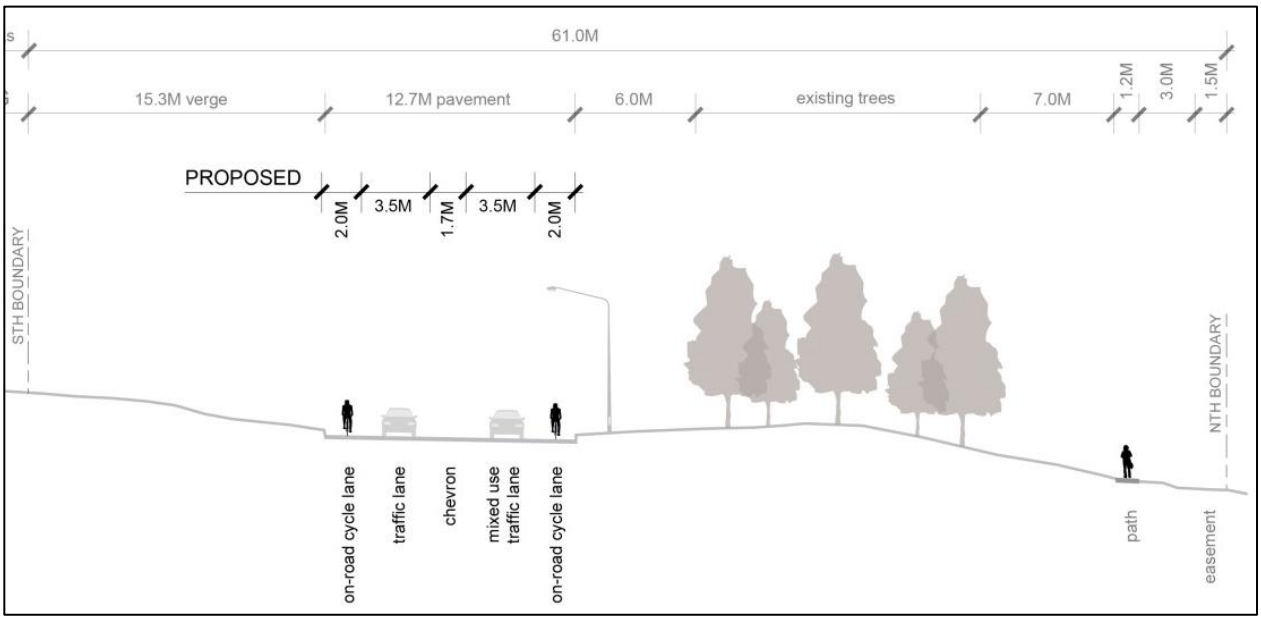
- 5.5 m wide service road on existing pavement to enable vehicles accessing these driveways safely. It is assume that the service road would be a one-way single lane, with an informal on-road parallel parking.
- 5.5 m outer separation between the carriageway and the service road
- New carriageways south of the existing pavement with a posted speed limit of 80 km/h
- 2.8 m wide median with safety barriers
- 2 x 3.5 m wide traffic lanes and 2 m wide on-road cycle lane on each direction
- Buses are expected to utilise the kerb side traffic lane and share with general traffic
- Adjustment to section of the southern side of the road reserve boundary where the existing road reserve width is narrower by approximately 14 m into the rural boundary, to be in lined with the road reserve boundary in adjacent sections to accommodate road duplication, batter work, relocation of existing utilities and installation of proposed water mains to supply the estate development.
- Intersection arrangement at Trickett Street and Macnaughton Street will depend upon the outcome of traffic modelling. It is expected Trickett Street to have access to the proposed service road and no direct access to Drake Brockman Drive.

3.3.3 Future Conditions and Works East of Macnaughton Street (Section 2)

As a consequence of the first stage of development traffic using Drake Brockman Drive east of Macnaughton Street will increase from about 9,000 veh/day west of Kingsford Smith Drive to 12,000 veh/day. This increase in traffic will cause a moderate increase in delays at intersections along this section of road, resulting in the need to improve access and safety at intersections.

In the short-term (to 2021), upgrade works in the section between Macnaughton Street and Kingsford Smith Drive would mostly involve line-marking and the use of the existing pavement. The channelisation of right turns can be created by means of chevron line marking. The proposed lane arrangement is illustrated in Figure 12.

Figure 12: Potential First stage of cross-section for Drake Brockman Drive between Macnaughton Street and Kingsford Smith Drive



Traffic flows could increase to more than 15,000 veh/day by 2021 and 18,000 veh/day by 2031, which can be catered for by the proposed first stage of works. Parts of this section of road could be widened then to reduce delays for buses in the AM peak. It is likely that the intersection with William Hovell Drive would need to be signalised by then and a queue jump lane provided for buses.

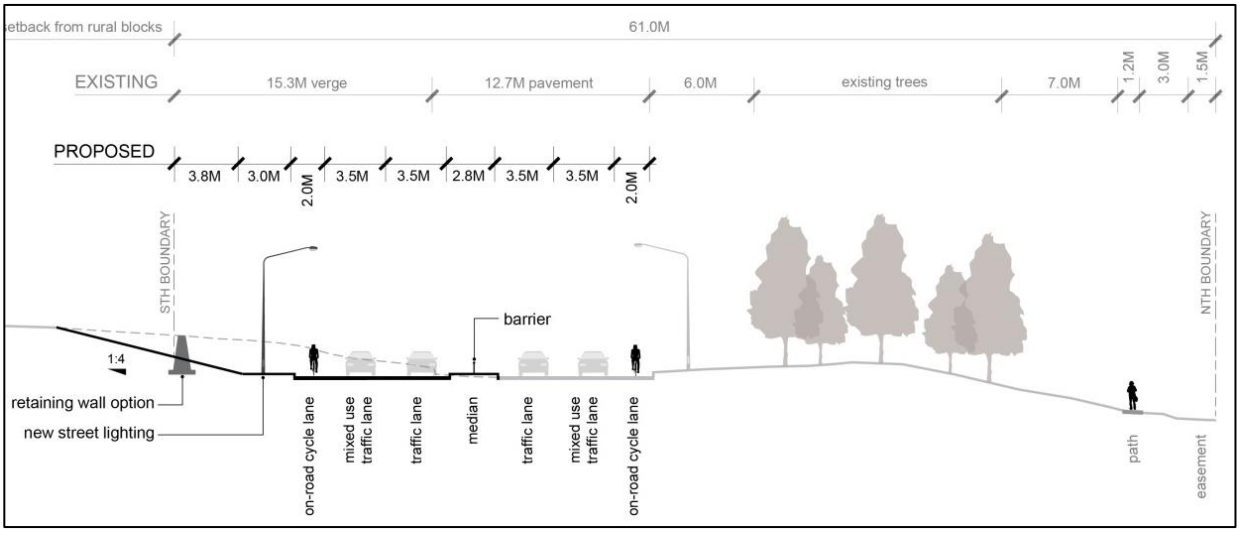
Ultimately, at full development of West Belconnen, this section of road could carry more than 28,000 veh/day. It will require duplication in the early part of the 2030's decade. Consideration would also need to be given to bus priority works, in the form of transit lanes and/or bus queue jump lanes at Macnaughton Street, subject to future more detailed investigations.

The ultimate works proposed along Drake Brockman Drive between Macnaughton Street and Kingsford Smith Drive include:

- Duplication on the southern side of the existing pavement
- 2.8 m wide median with safety barriers
- 2 x 3.5 m wide traffic lanes and 2 m wide on-road cycle lane on each direction. Buses are expected to utilise the kerb side traffic lane and share with general traffic
- Adjustment to section of the southern side of the road reserve boundary where the existing road reserve width is narrower by approximately 14 m into the rural boundary, to be in lined with the road reserve boundary in adjacent sections to accommodate road duplication, batter work, relocation of existing utilities and installation of proposed water mains to supply the estate development.
- Intersection arrangement at Cussen Street, Kinsella Street and Kingsford Smith Drive will depend upon the outcome of traffic modelling. It is expected Kingsford Smith Drive intersection to be signalised.

The proposed cross-section for these works is illustrated in Figure 13.

Figure 13: Potential ultimate cross-section for Drake Brockman Drive between Macnaughton Street and Kingsford Smith Drive



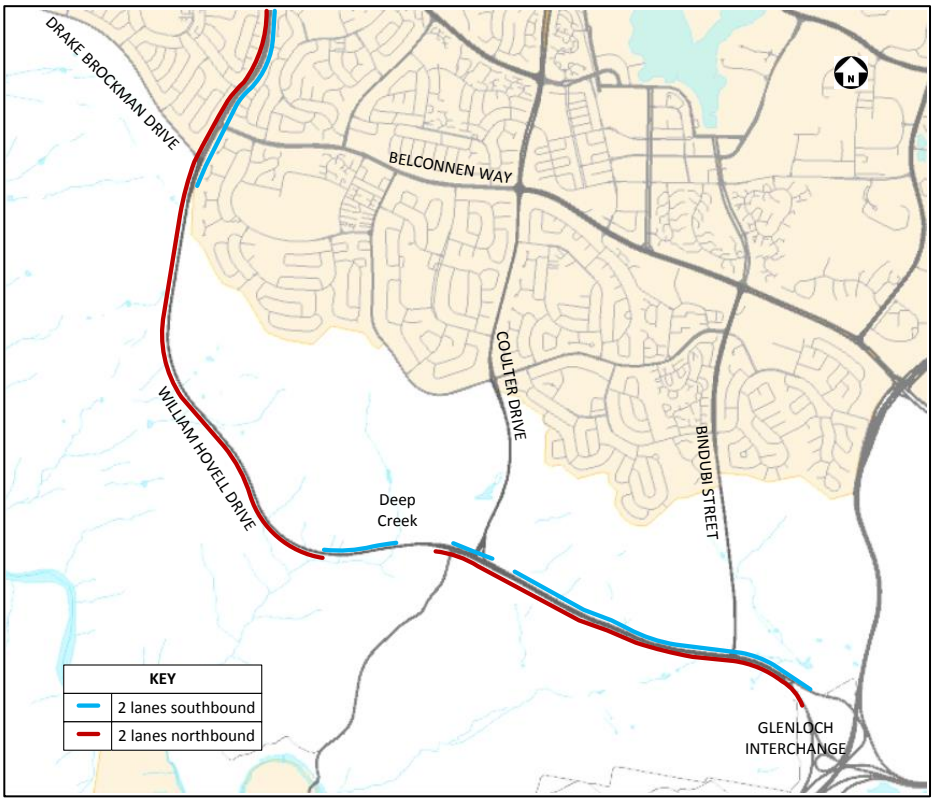
3.4 William Hovell Drive

3.4.1 Existing Conditions

William Hovell Drive is a busy arterial road with three traffic lanes for most of its length between Drake Brockman Drive and Coppins Crossing. The speed limit is generally 90 km/h and there is no median barrier between the opposing lanes. The paved carriageway is about 15 m wide, so there is potential to utilise some of this pavement for future widening if the speed limit is reduced.

Southbound it merges from two lanes to one lane about 250 m south of Drake Brockman Drive and remains as one lane until widening to two lanes in a short 600 m section just west of Coppins Crossing. Northbound it is two lanes for most of its length, other than a 1 km section west of Coppins Crossing. This is illustrated in Figure 14.

Figure 14: Two lane sections on William Hovell Drive



The two lane section west of Coppins Crossing is largely due to the need to provide a climbing lane. The terrain is quite steep, which would make widening the road relatively difficult and costly.

The road currently carries about 15,000 veh/day. The single lane southbound currently carries about 1,400 veh/h in the AM peak. This equates to about 74% of the theoretical capacity of this road, so it still has some spare capacity in peak periods. The real constraint is downstream intersections.

There were 297 recorded crashes along William Hovell Drive between Drake Brockman Drive and Coulter Drive in the 10 year period 2004 to 2013, including intersection crashes. Table 2 provides a breakdown of these crashes by general location and severity of crash. It highlights a relatively high number of serious crashes at mid-block locations, including one fatality. Only four of these crashes involved vehicles travelling in opposing directions and 66 (49%) involved only one vehicle.

Table 2: Recorded crashes on William Hovell Drive between Drake Brockman Drive and Coulter Drive – 2004 to 2013

Location	Property Damage	Injury	Fatality	Total
Drake Brockman intersection	37	1	0	38
Coppins Crossing intersection	53	7	0	60
Coulter Drive intersection	60	3	0	63
Mid-block	119	16	1	136
Total	**269**	**27**	**1**	**297**

The high volume of vehicles at high speeds on an undivided road through relatively steep terrain presents major concerns for safety along this section of road. The high number of crashes and the incidence of serious crashes points to the pressing need for a review of safety and the identification of potential improvements. One possible measure is to reduce the speed limit to 80 km/h (currently 90 km/h) and introduce speed cameras. Other measures include lighting and median barriers. The latter would involve some minor widening.

Additional lane capacity will be required eastbound on William Hovell Drive to cater for increased traffic. There are reasonable arguments to separate the eastbound and westbound movements now, for safety reasons. An extract from Austroads states:

> *A median is commonly provided to improve the safety and operation of major urban and rural roads with multiple lanes in each direction. Medians may be raised or depressed. The main functions of medians are:*
>
> - *to separate and reduce conflict between opposing traffic flows, effectively reducing the possibility of head-on collisions*
> - *to reduce the impact of headlight glare and air turbulence from opposing streams of traffic*
> - *to provide a safety barrier*
> - *to provide a recovery area for errant vehicles.*
> - *to prevent indiscriminate crossing and turning movements*
> - *to shelter right-turning and crossing vehicles at intersections*
> - *to shelter road furniture and traffic control devices, such as signs, traffic signals and street lighting*
> - *to provide scope for improvement of visual amenity by landscaping*
> - *to accommodate level differences between carriageways*
> - *to provide an emergency stopping area on multi-lane roads*
>
> *Median barriers will be used to reduce the incidence of head-on crashes on new freeways and divided highways with a proposed speed limit of 100 km/h or 110 km/h, as follows:*
>
> *(a) Where the AADT will be greater than 30,000 vpd within 5 to 10 years, a median barrier should be provided.*

(b) Where the AADT will be less than 30,000 vpd within 5 to 10 years, a risk assessment should be carried out to evaluate the safety implications and need for a median barrier. The risk assessment should include consideration of traffic volume and median width. Where the AADT will be between 20,000 and 30,000 within 5 to 10 years, a median barrier should be provided if the width between inner traffic lanes is less than 6 metres.

Existing flows on William Hovell Drive between Coppins Crossing and Drake Brockman Drive are currently less than 20,000 vpd, but will grow to exceed this volume post-2031. Although the speed limit is less than 100 km/h and thus this Austroads criterion does not strictly apply, the intent of the guide does apply and thus the duplication, median and barrier should be considered in future.

The main safety deficiency is the potential for crashes involving a kangaroo. Headlight glare is also an issue and slow downhill vehicles also leads to driver frustration with no overtaking permitted from the merge to south of Drake Brockman Drive and the climbing lane some 3.5 km away.

3.4.2 Future Conditions and Works

Traffic growth on this road is predicted to be slow, due to capacity constraints at downstream intersections and a shift to public transport. Traffic flows on William Hovell Drive are expected to increase from 15,000 veh/day to 16,500 veh/day by 2021 (ie., an increase of about 10%). The southbound lane will be nearing practical capacity because there is only one lane available southbound and traffic flows exceeding 1,700 veh/hr are predicted in this lane in the AM peak hour. The real constraint along William Hovell Drive is the Bindubi Street traffic signals and Glenloch interchange. Hence, any significant capacity improvements west of Bindubi Street along William Hovell Drive are difficult to justify in the short to medium term (to 2031), until such time as the downstream constraints are addressed. However, safety improvements are likely to be justified and should be the subject of more detailed investigations.

Coppins Crossing is likely to be signalised by 2021 and the timing of any upgrades here will influence decisions on widening William Hovell west of Coppins Crossing. It is likely that this would involve an additional southbound lane between Deep Creek and Coulter Drive, to extend the existing two-lane section of road (see Figure 14).

The implementation of public transport priority treatments is likely to be necessary post-2031. Initial transport modelling indicates that in the long-term (2041 (ultimate)) about 1,440 passengers per hour will be carried on buses in this corridor in peak hours (about 15 buses per hour). This is likely to justify the introduction of bus priority at key intersections.

Traffic flows on William Hovell Drive are expected to jump to about 24,000 veh/day by 2041 (ultimate). Extra lanes would be needed in both directions by then, which is likely to necessitate the construction of an additional carriageway. As in 2031, the extra capacity should enable improved bus operations. There will not be sufficient buses to justify a bus lane. The timing and nature of these works are subject to ongoing investigations.

3.5 Parkwood Road

3.5.1 Existing Conditions

Parkwood Road will provide an important access to West Belconnen, with the proposed commercial centre to be located along here. Currently, it is an arterial road with mostly rural frontages. It is a 2-lane 2-way rural road with a speed limit of 60 km/h. It has a 8.2m pavement and a grassed shoulder. There are occasional driveways to commercial developments. The alignment varies and the road has a relatively tight bend west of its intersection with Britten Jones Drive.

Parkwood Road currently serves existing residential development via Britten-Jones Drive and Macfarlane Burnet Avenue, an electricity sub station, Parkwood Eggs, landscape centres, animal shelters, various industrial uses and a number of rural leases. It is not a through road beyond its roundabout intersection at Britten-Jones Drive and Macfarlane Burnet Avenue. It continues as a paved road across the NSW border, but then reverts to a gravel road prior to a cul-de-sac before the Molonglo Gorge, with accesses to NSW rural properties.

The existing road carries only 4,000 veh/day between Spofforth Street and Britten-Jones Drive and less than 1,500 veh/day west of Britten-Jones Drive. The current design of this road is adequate for its purpose.

3.5.2 Future Conditions and Works

Residential development is not expected to occur along this road until post 2020, with the release of about 800 lots between 2020 and 2022, as well as possible commencement of development of the Centre. This is expected to add about 5,000 veh/day to traffic using Parkwood Road from the proposed development access west of Macfarlane Burnet Avenue; some of the 5,000 veh/day will divert through new internal roads to Stockdill Drive.

The existing road can cater for this increased traffic, but the bend in Parkwood Road west of Macfarlane Burnet Avenue should be realigned for safety reasons and as part of widening the road to provide facilities for on-road cycling. Off-road bicycle and pedestrian facilities will need to be constructed along Parkwood Road to link with existing facilities in West Macgregor. Bus stops will also need to be incorporated into the development with the first services providing a shuttle between the development and Kippax at 10 minute intervals during peak periods.

By 2031 about 8,500 veh/day will be using Parkwood Road west of Macfarlane Burnet Avenue and another 5,000 veh/day will use a new link from Parkwood Road to Stockdill Drive (west of the electricity substation). Traffic volumes on Parkwood Road will grow to about 9,000 veh/day west of Spofforth Street. The current design of this section of road is adequate to carry this volume of traffic.

Parkwood Road is expected to carry 14,000 veh/day at full development of West Belconnen, which can be serviced by a high standard two-lane two-way road. About 600 passengers per hour would also be carried on buses in the peak hours along this section of road, not sufficient to justify bus priority facilities nor light rail.

3.6 Southern Cross Drive

3.6.1 Existing Conditions

Southern Cross Drive between Spofforth Street and Florey Drive is a 2-lane 2-way road with direct driveway accesses to residential properties on the southern side and provision for on-street parking; the existing road pavement is relatively wide (12.4 m), allowing flexibility for on-road cycling and turn bays. Houses on the northern side are accessed via service roads. Traffic volumes using this section of Southern Cross Drive build up from west to east. At the western end (near Spofforth Street) volumes are about 4,500 veh/day, building to 7,500 veh/day east of Beaurepaire Crescent and 9,000 veh/day west of Florey Drive.

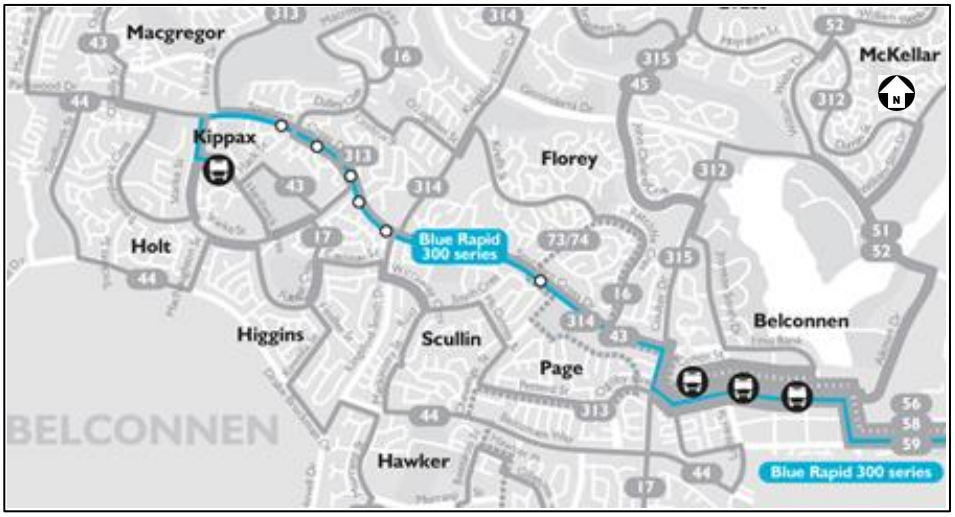
The road widens to a 4-lane divided carriageway to the east of Florey Drive, but the speed limit remains at 60 km/h. There are driveway accesses to local residential properties on northern side of the road, but properties are set-back a long distance from the road. Traffic volumes using this section of Southern Cross Drive also build up from west to east. At the western end (near Florey Drive) volumes are about 10,000 veh/day, building to about 15,000 veh/day west of Kingsford Smith Drive.

Southern Cross Drive is an important bus route, providing a number of connections between the Kippax Group Centre and Belconnen Town Centre. The Blue Rapid service between City and Belconnen will soon be extended to Kippax via Southern Cross Drive (see Figure 15). Bus stops are being upgraded and queue jump facilities are being provided at the intersection of Kingsford Smith Drive.

A new set of traffic signals have recently been installed at the intersection with Florey Drive, adjacent to the Kippax Group Centre. There have also been some improvements to the nearby intersection of Starke Street West, with provision for future traffic signals there.

All intersections along Southern Cross Drive are operating with significant spare capacity in peak periods, other than at Kingsford Smith Drive. The latter intersection is currently operating close to capacity in peak periods, with average delays of 42 to 46 seconds per vehicle in peak hours.

Figure 15: Extension of blue rapid bus service to Kippax Centre

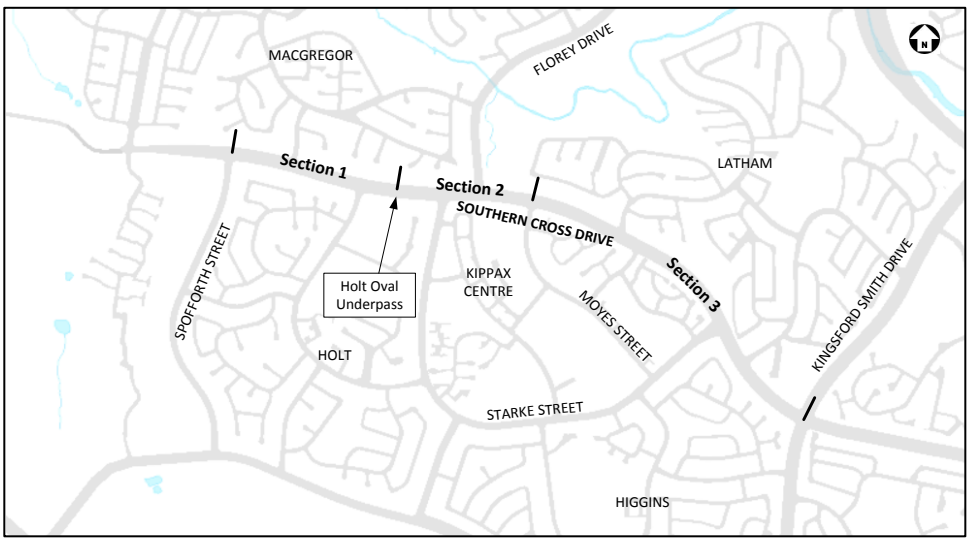


Source: ACTION (2013)

3.6.2 Future Conditions and Works

The discussion of future traffic conditions and proposed works to address potential traffic congestion along Southern Cross Drive is split into three distinct sections. These sections are illustrated in Figure 16.

Figure 16: Southern Cross Drive sections



Section 1: Spofforth Street to Holt Oval underpass

There will be small increases in traffic using Southern Cross Drive following commencement of development along Parkwood Road. By 2031 traffic using Southern Cross Drive between Spofforth Street and O'Reilly Street could increase by 3,000 veh/day to 7,500 veh/day. This can be readily accommodated by the current road design.

Traffic volumes will increase markedly east of O'Reilly Street. By 2031 traffic volumes on Southern Cross Drive crossing the Holt Oval underpass could increase to 12,000 veh/day; an increase of 4,500 veh/day from current levels. The increase would be partly due to an expected diversion of West Macgregor traffic to Starke Street and Macnaughton Street, previously using Beaurepaire Crescent prior to proposed traffic management planned for implementation on Beaurepaire Crescent. This points to the need to extend local area traffic management further east than currently planned in Holt.

This traffic volume is relatively high for a 2-lane urban road, but there will be a relatively even directional distribution of traffic on Southern Cross Drive. The forecast peak direction traffic would be about 700 veh/h eastbound. This can be accommodated in one lane. However, there will be problems turning right out of side roads east of O'Reilly Street during peak periods, which could lead to an increase in crashes unless intersections are upgraded.

There are expected to small increases in traffic beyond 2031. By 2041 (ultimate), traffic using Southern Cross Drive east of Beaurepaire Crescent could increase to 13,000 veh/day. Consideration should be given by then to creating a service road on the southern side of Southern Cross Drive between Spofforth Street and Beaurepaire Crescent, requiring reconstruction of the existing road.

Section 2: Holt Oval underpass to Moyes Crescent

This section of road includes two busy intersections – Starke Street West and Florey Drive. Traffic conditions vary here depending on activity at the nearby Kippax Centre. Both intersections carry a relatively high number of vehicles, buses and pedestrians and this will grow.

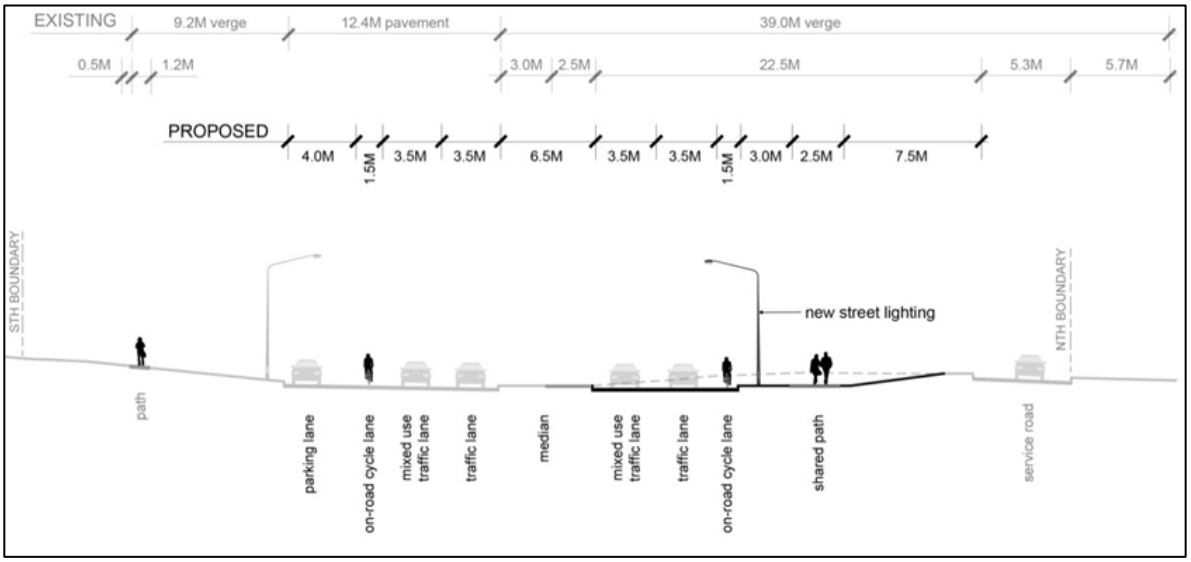
There will be little growth in traffic to 2021. By 2031, traffic between the Holt Oval overpass and Starke Street could increase to about 12,000 veh/day; 4,500 veh/day more than current levels. A significant proportion of this growth (about 50%) will be attracted to Starke Street resulting in the need to signalise this intersection. Part of the attraction to Starke Street will be growth in Kippax and part will be rat-running towards Drake Brockman Drive to avoid proposed traffic management works on Beaurepaire Crescent. LATM measures may be necessary to ensure that this traffic is not attracted to Starke Street.

By 2031 there will be a large increase in public transport trips via Kippax, using this section of road; in particular the intersection with Starke Street West. In peak hours, bus passenger movements are expected to increase to about 2,200 passengers per hour between Starke Street and Florey Drive (ie., about 40 buses per hour).

Traffic and public transport volumes will be even higher east of Florey Drive. At this location, traffic volumes will increase to 14,500 veh/day and bus passenger volumes to about 2,500 passengers per hour.

It is likely that Southern Cross Drive will need to be duplicated from east of the Holt Oval underpass to the existing dual lane section at Moyes Crescent, assuming that the rat-running issue on Starke Street will be addressed and more traffic will use Southern Cross Drive. A possible cross-section for road widening in this section of road is illustrated in Figure 17.

Figure 17: Potential ultimate cross-section for Southern Cross Drive between Holt Oval underpass and Moyes Crescent



A small increase in traffic is predicted on this section of road between 2031 and 2041 (ultimate), partly due to likely capacity constraints in this section of Southern Cross Drive. However, public transport trips will continue to climb. Consideration should be given to an alternative access to Kippax via Moyes Crescent and a potential new road connection east of Kippax.

Section 3: Moyes Crescent to Kingsford Smith Drive

There will be small increases in traffic using Southern Cross Drive following commencement of development. By 2031 traffic using Southern Cross Drive east of Moyes Crescent will increase to 16,000 veh/day. This can easily be accommodated by the existing road.

By 2031 there would be a 15% increase in traffic using the Kingsford Smith Drive intersection, which will result in this intersection operating near capacity in peak periods. Bus passenger flows would also be very high by 2031, with about 2,700 passengers per hour being carried by buses towards Belconnen by then, representing about 50 buses per hour in the peak direction. This is likely to be sufficient to justify consideration of a bus lane or light rail between Kippax and Belconnen Town Centre.

3.7 Ginninderra Drive

3.7.1 Existing Conditions

Ginninderra Drive is an arterial road with a 2-lane 2-way road cross-section between Kerrigan Street and Tillyard Drive. It widens to a 4-lane divided road just west of Tillyard Drive. The speed limit varies from 60 km/h at its western end to 80 km/h east of Lance Hill Avenue.

The road has a very wide reserve and has limited access. Residential areas adjoin the road, but are well set back and have the rear of properties facing the road. The road widens at its intersections with Florey Drive and Tillyard Drive. A two-lane roundabout at Florey Drive has significant spare capacity.

Traffic volumes along Ginninderra Drive build up from west to east. At the western end (near Kerrigan Street) volumes are about 4,500 veh/day, building to 12,000 veh/day east of Lance Hill Avenue and 15,000 veh/day east of Florey Drive. Ginninderra Drive and intersections along it currently have significant spare capacity.

3.7.2 Future Conditions and Works

Ginninderra Drive is a major road corridor, initially built to service the original Y-Plan for Canberra. The completion of a link from West Belconnen to Ginninderra Drive is important for several reasons, but is not expected to be constructed until post-2031, to correspond with development in the eastern parts of West Belconnen.

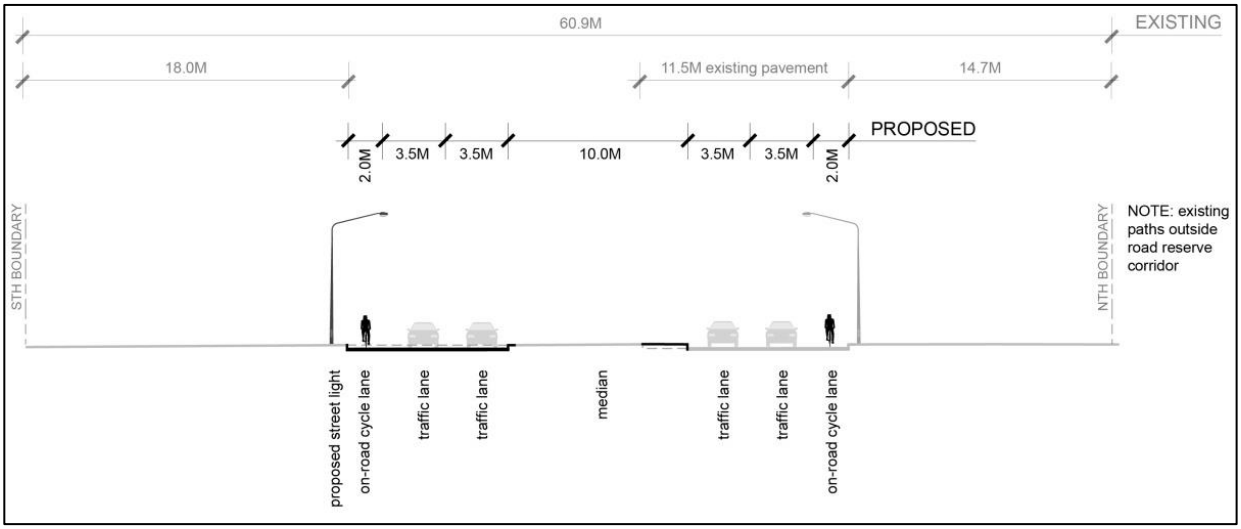
Access to the area will be greatly improved with a Ginninderra Drive Completion. It would enable better connections to North Belconnen and Gungahlin, for cars, buses and emergency vehicles. The amount of traffic attracted to the road when it is included in the network (about 10,000 veh/day) indicates that it is likely to be economically justified and will be serving important travel needs. One of the advantages of good access to North Belconnen is improved travel times from the Emergency Services Centre in Charnwood to future areas of West Belconnen located in NSW.

The need for completion of Ginninderra Drive to provide access to West Belconnen could be brought forward if development in the vicinity of Parkwood Eggs occurs earlier in the development process than planned. It would also delay any potential needs for upgrading Southern Cross Drive.

A new bus service to Charnwood and Gungahlin via the Ginninderra Drive Completion was included in the 2041 (ultimate) modelling. It was found to attract very few passengers from West Belconnen (about 30 passengers per hour in the AM peak). Hence, this new road connection would not provide much benefit for public transport services and no provision for bus priority will be needed along it.

Completion of the duplication of the section of Ginninderra Drive between Florey Drive and Tillyard Drive may be needed as a result of the Ginninderra Drive Completion and full development of West Belconnen, as it will come close to capacity by then. The proposed future cross-section is shown in Figure 18.

Figure 18: Potential ultimate cross-section for Ginninderra Drive between Florey Drive and Tillyard Drive



3.8 Florey Drive

Florey Drive is a two-lane two-way road with a 60 km/h speed limit. It has residential development and driveway access adjacent to the northbound lane. There are no driveway accesses and mostly open space adjacent to the southbound lane. It varies in width from about 12.2 to 12.8 m and includes on-road cycle lanes in each direction.

Florey Drive is currently carrying about 7,500 veh/day. It will experience a small increase in traffic between 2021 and 2031 (to 8,000 - 9,000 veh/day), but volumes will drop to below current levels when the Ginninderra Drive Completion is built.

3.9 Local Area Traffic Management

3.9.1 Spofforth Street

Spofforth Street is classified as a major collector. Major collectors form the link between the primary network and the roads within local areas and should carry only traffic originating or terminating in the area. The volume of traffic carried is constrained by environmental objectives – safety and traffic noise - rather than road geometry and reflects the limited area that they serve. Direct property access is still permissible but the level of traffic (desirably not greater than 6000 vpd) may dictate that access and egress arrangements should be such that vehicles can exit properties in a forward direction.

The posted speed limit along Spofforth Street is 50 km/h and there are direct driveway accesses to residential properties on the eastern side of the street, whilst the western side is Belconnen Golf Course. Current traffic flows are very light on Spofforth Street (about 300 veh/day), having been significantly reduced as a result of the introduction of speed cushions in December 2011 (by about 800 veh/day from 1,100 veh/day).

TAMS have been involved in ongoing consultation with the local residents of Holt concerning the implementation of traffic management treatments (LATM) in the suburb. As traffic grows, the West Belconnen project has the potential to impose further pressure on the local streets of Holt.

Earlier studies for TAMS showed that 15% of motorists on Spofforth Street travelled at 76 km/h or more in a 50 km/h zone. It was recommended that rubber speed cushions be installed on Spofforth Street at a maximum spacing of 100 metres to reduce travelling speeds and minimise its use as a short cut for traffic from West Macgregor. It was effective in reducing speeds but traffic volumes have increased on some side streets such as Beaurepaire Crescent and Trickett Street, by up to 600 veh/day. The community also expressed concerns about excessive traffic speeds, irresponsible driver behaviour and road safety on these streets.

TAMS has now completed a study of the traffic conditions on Messenger Street, Trickett Street and Beaurepaire Crescent in Holt. The aim of this project was to identify community concerns, develop options to improve traffic conditions and recommend a program of works for these streets and Spofforth Street. TAMS have decided that a number of speed cushions will be removed on Spofforth Street and replaced with chicanes to narrow the carriageway and require vehicles to reduce speeds to negotiate these devices. The removed cushions will be used elsewhere in Holt and as part of other traffic calming schemes in other ACT suburbs.

Recent traffic modelling with West Belconnen indicates that the early stages of development to 2021 will cause a small increase in traffic using Spofforth Street, with volumes still below the volume using the road in 2010. Traffic flows could increase to more than 2,000 veh/day by 2031 and to about 5,000 veh/day by 2041 (ultimate), as development along Parkwood Road occurs.

The modelling assumed that Spofforth Street would be upgraded by 2041 (ultimate), with a new 70 km/h carriageway and service road. This would attract some additional traffic to Spofforth Street and reduce rat running that currently occurs via Beaurepaire Crescent and Trickett Street. Traffic on this link would be attracted from both West Macgregor and West Belconnen.

Potential future works on Spofforth Street will be the subject of more detailed studies and may not be economically justified as money may be better spent on minor traffic management works elsewhere in Holt, such as in the vicinity of the Kingsford Smith School and Kippax. Ongoing consultation with this matter and other issues in the area will continue to occur with Holt residents.

3.9.2 Other residential streets

There are a number of other local streets in the study area that could be impacted by the development, particularly collector roads. These generally have direct access and residential frontages, although some sections of major collectors are limited access. Most local streets are signed as 50km/h, excepting major collectors signed as 60 km/h.

There has been ongoing consultation with the local residents of Holt concerning the implementation of traffic management treatments (LATM) in the suburb. In the past, there has also been consultation for implementation of LATM in the nearby suburbs of Macgregor, Dunlop and Charnwood. There are concerns that the West Belconnen development could cause increased traffic in these suburbs.

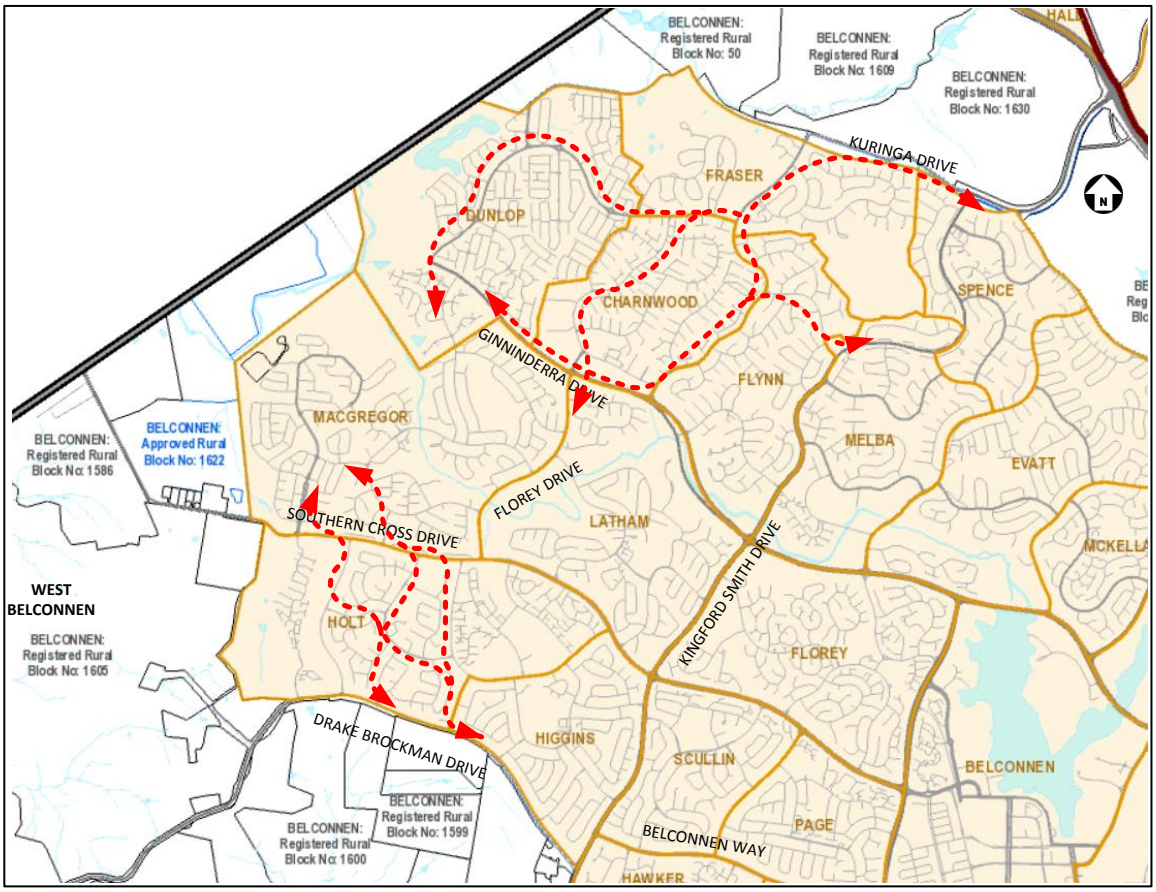
There is a number of existing ‘rat running’ issues on local streets in the area, with most concern being raised in Holt. Much of the existing problems in Holt are associated with the new suburb of West Macgregor which was commenced development in 2008 and consists of approximately 1,000 dwellings. Since its establishment localised and commuter traffic has been on the rise creating a number of ‘rat running ‘routes through the suburb of Holt as illustrated in Figure 19. There have also been some previous concerns regarding ‘rat running through Charnwood as a result of development in Dunlop. This is also illustrated in Figure 19.

The implementation of LATM works seems to have been quite successful in Dunlop and Charnwood, but there are concerns with those implemented in Holt. Whilst the measures implemented in Holt have been successful in reducing speeds and shifting traffic off Spofforth Street, residents indicate that the problem has just been shifted other streets.

Following the installation of speed cushions on Spofforth Street, Holt a post implementation evaluation study was completed in July 2012 to gauge the effectiveness of these traffic control devices. The study found that while the installation of speed cushions had been successful in the objective of reducing speed it also identified that a relatively large volume of traffic was being diverted onto other local side streets and in particular Beaurepaire Crescent, Messenger Street and Trickett Street. In addition, the community also expressed concerns about excessive traffic speeds, irresponsible driver behaviour and road safety on these streets. Cardno was subsequently commissioned by TaMSD to identify LATM measures needed on these streets.

The West Belconnen project has the potential to impose further pressure on the local streets of Holt, Dunlop and Charnwood as larger volumes of traffic move through the area if LATM measures are not implemented. Recent modelling has highlighted that Starke Street and Macnaughton Street may become a rat-run in future, unless Spofforth Street is upgraded and traffic management treatments implemented on Starke Street. This issue is subject to more detailed ongoing investigations along with other LATM issues.

Figure 19: Map showing potential rat-runs in local suburbs



4.0 Summary of Infrastructure Needs

A summary of the works needed to cater for increased traffic growth in the region are also depicted in the maps in Figure 20 to Figure 23, for the first stage of works, works by 2021, works by 2031 and ultimate works. Table 3 provides some more detailed descriptions of these works.

The works required to service the West Belconnen development will benefit new and existing users of the road system in the area. As an indication, some preliminary analyses of 2041 (ultimate) transport modelling results indicate that West Belconnen traffic will represent:

- 71% of vehicles using Drake Brockman Drive west of Kingsford Smith Drive
- 39% of vehicles using Southern Cross Drive east of Florey Drive
- 33% of vehicles using Ginninderra Drive east of Florey Drive
- 26% of vehicles using William Hovell Drive west of Glenloch Interchange

These results reflect a reduction in existing trips using these roads due to greater public transport use and a redistribution of trips, either to alternative destinations or alternative routes.

Figure 20: Overview of proposed first stage of off-site works

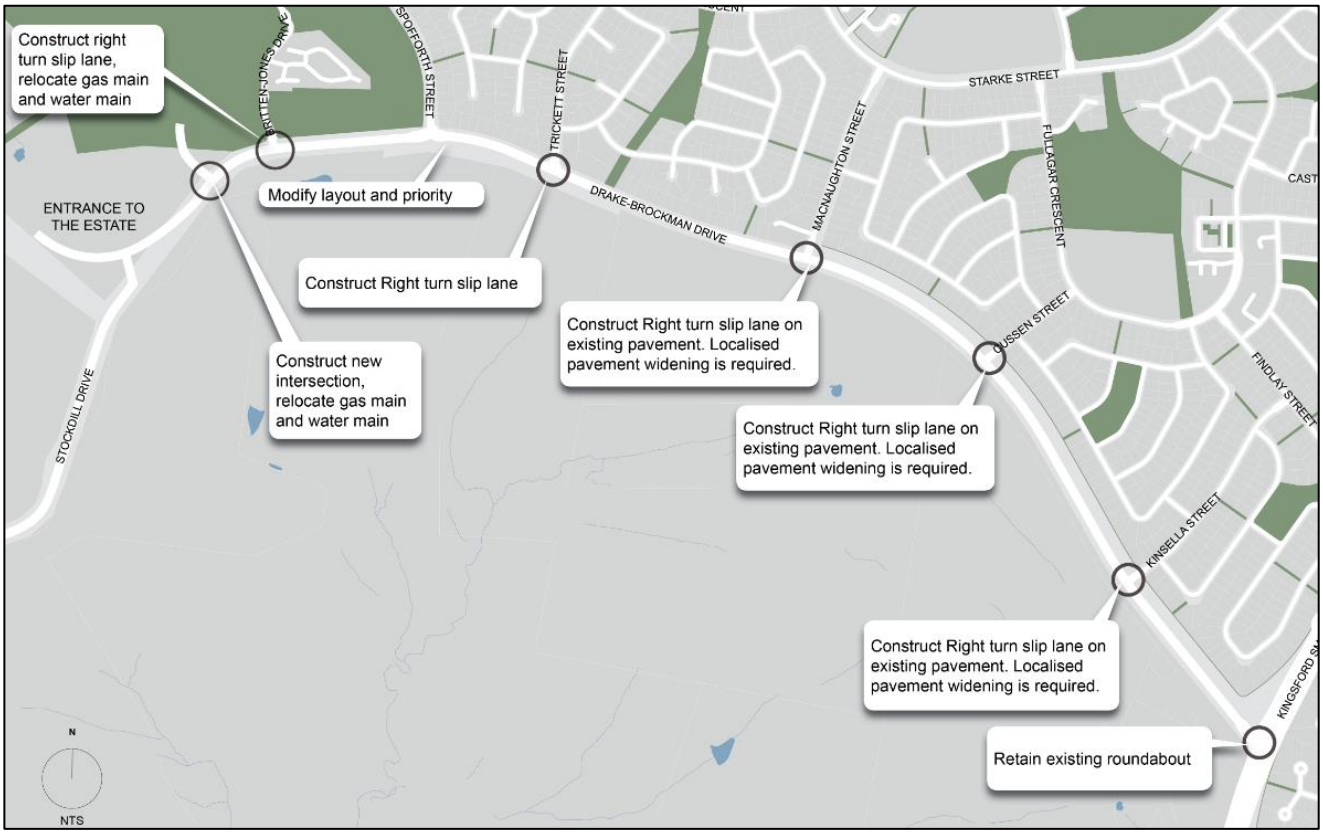


Figure 21: Overview of proposed 2021 off-site works

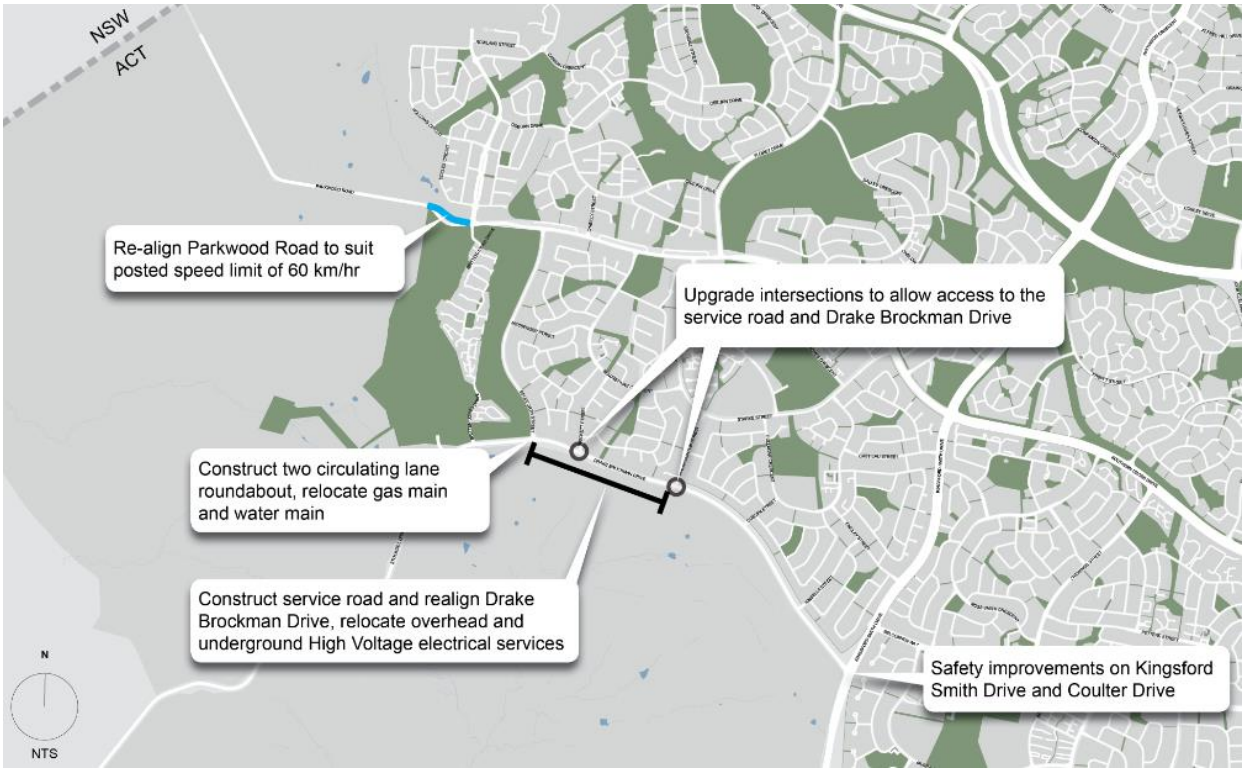


Figure 22: Overview of proposed 2031 off-site works

Figure 23: Overview of proposed ultimate off-site works

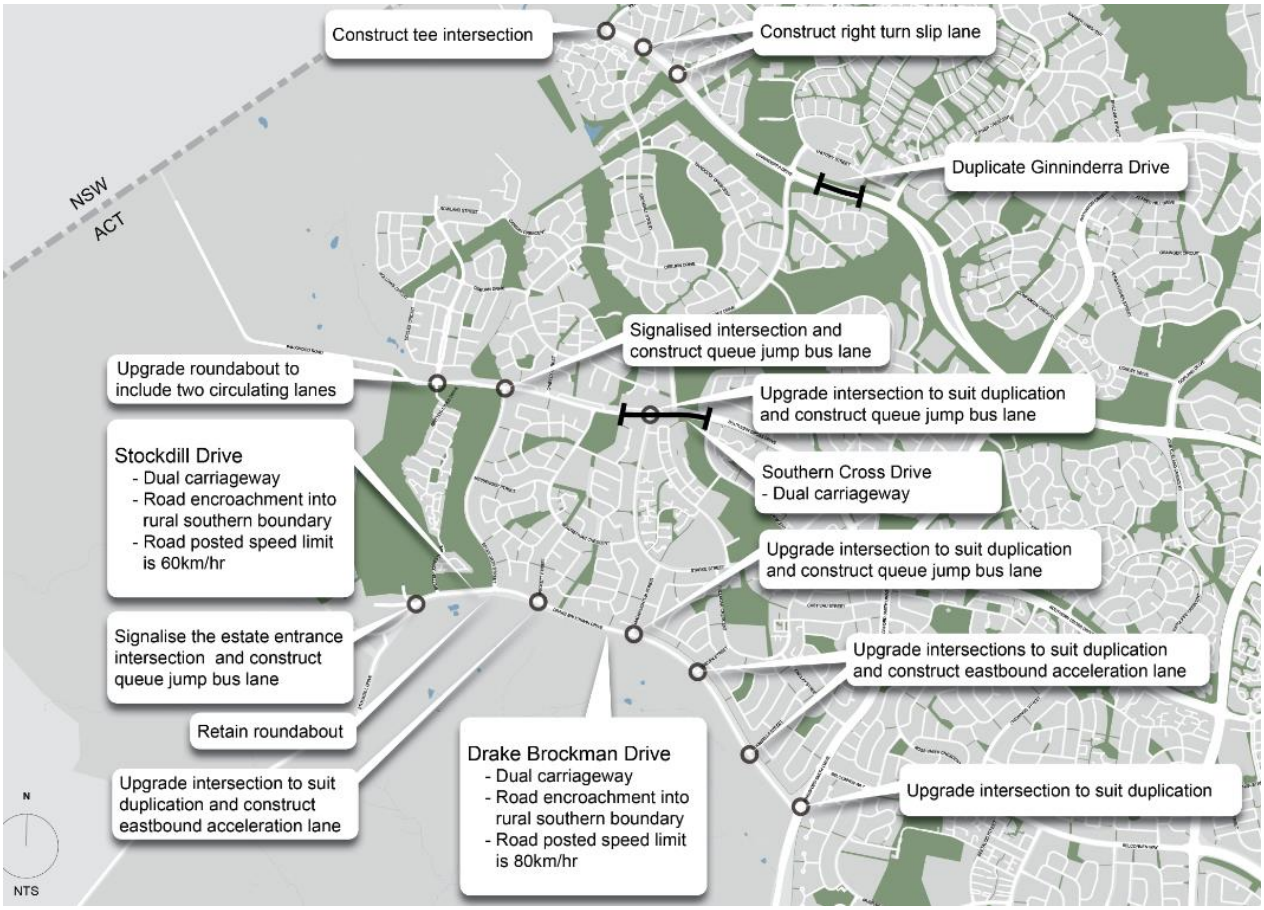


Table 3: Summary of major road works

Road	First stage of (680 lots)	By 2021 (1,800 lots)	By 2031 (4,500 lots)	By 2041 (ultimate) (11,500 lots)
Stockdill Drive – Spofforth Street to Estate Access	- Create new intersection at estate access and realign Stockdill Drive - Widen pavement to accommodate on-road cycling (Figure 7) - New 1.5m concrete path on northern verge to connect to existing path on Spofforth Street - Provide right turn storage at the intersection with Britten-Jones Drive - Change intersection arrangements at Spofforth Street to give priority to Stockdill Drive - Relocation of 375 mm water main and gas main south of Drake Brockman Drive included as part of First stage of works is limited to west of Britten-Jones Drive	- Construct two circulating lane roundabout at Spofforth Street - Relocation of 375 mm water main and gas main south of Drake Brockman Drive between Britten-Jones Drive and Spofforth Street are included in 2021 Spofforth St intersection upgrade. - Encroachment into the rural blocks on the southern side of Drake Brockman Drive	- Install metering at Stockdill Drive approach to Spofforth St roundabout	- Duplicate Stockdill Drive (Figure 8) - Signalised intersection (including queue jump lane doe buses) at the Estate entrance and Britten-Jones Drive - Controlled T intersection (unsignalised) at Britten-Jones Drive - Encroachment into the rural blocks on the southern side of Drake Brockman Drive
Drake Brockman Drive – Spofforth Street to MacNaughton Street	- Provide right turn storage at MacNaughton Street intersection and Trickett Street	- Construct a new Drake Brockman Drive carriageway and service road (Figure 10) - Upgrade Trickett Street and MacNaughton Street priority intersection allowing access to the service road and Drake Brockman Drive - Relocation of OH and UG HV cables - Encroachment into the rural blocks on the southern side of Drake Brockman Drive	- Signalise Macnaughton Street intersection and provide queue jump lane for buses	- Duplicate Drake Brockman Drive (Figure 11) - Upgrade Trickett Street intersection to suit duplication. Intersection remains unsignalised with eastbound acceleration lane. - Relocation of 375mm water main south of Drake Brockman Drive between Trickett Street and MacNaughton Street

Road	First stage of (680 lots)	By 2021 (1,800 lots)	By 2031 (4,500 lots)	By 2041 (ultimate) (11,500 lots)
		- Relocation of 375mm water main south of Drake Brockman Drive proposed in 2021 – Southern Cross Drive, Trickett St and MacNaughton St and the section between Spofforth and Trickett as these intersections are closer (based on distance)		- Encroachment into the rural blocks on the southern side of Drake Brockman Drive
Drake Brockman Drive – east of MacNaughton Street	- Provide right turn storage at Cussen Street and Kinsella Street (Figure 12)		- Signalise Kingsford Smith Drive intersection and provide queue jump lane for city bound buses	- Duplicate Drake Brockman Drive (Figure 12)[2] - Upgrade Cussen Street and Kinsella Street intersection to suit duplication. Intersections remain unsignalised with eastbound acceleration lane. - Upgrade Kingsford Smith Drive with additional left turn lane on northbound William Hovell Drive - Encroachment into the rural blocks on the southern side of Drake Brockman Drive
William Hovell Drive – Drake Brockman Drive to Coppins Crossing		- Safety improvements[3] - Signalise Coppins Crossing intersection		- Grade separate intersections with Coppins Crossing and Coulter Drive [3] - Add additional eastbound transit lane[5]

[2] Construct early in 2030's decade.
[3] This could include improvements to lines and signs, lighting, reduced speed limit (to 80 km/h), speed cameras and potentially median barrier and minor road widening. Further investigations are required to determine suitable improvements and thus the associated construction costs.

Road	First stage of (680 lots)	By 2021 (1,800 lots)	By 2031 (4,500 lots)	By 2041 (ultimate) (11,500 lots)
		- Widen eastbound approach to Coppins Crossing between Deep Creek and Coulter Drive (about 650 m) [4]		- Construct median barrier[6]
Parkwood Road – estate boundary to Spofforth Street		- Realign bend in road from Britten-Jones Drive roundabout to the eastern boundary of the existing substation - Widen road to accommodate on-road cycling - New 1.5m concrete path on northern verge to connect to existing paths in West Macgregor - Works will encroach adjacent block		- Increase capacity of the Macfarlane Burnet Avenue roundabout by constructing two circulating lane - Signalise Spofforth Street intersection and provide eastbound bus queue jump lane
Southern Cross Drive – Spofforth Street to Holt Oval underpass				- Construct southern service road and new two-lane road
Southern Cross Drive – Holt Oval underpass to Moyes Crescent			- Signalise Starke Street West intersection[7] - Provide eastbound bus queue jump lane	- Duplicate this section of road and upgrade intersections[8] - Include queue jump lane for busses at Start Street West intersection and Florey Drive intersection

[5] Construct early in 2030's decade.
[4] Works are assumed to be part of Molonglo 3 project.
[6] Construct early in 2030's decade.
[7] Construct early in 20's decade.
[8] Construct early in 2030's decade and assume new road connection to Kippax via Moyes Crescent and reduced bus movements through Starke Street West

Road	First stage of (680 lots)	By 2021 (1,800 lots)	By 2031 (4,500 lots)	By 2041 (ultimate) (11,500 lots)
Southern Cross Drive –Moyes Crescent to Kingsford Smith Drive			- Extend bus lanes from Kingsford Smith Drive to Moyes Crescent by converting one of the traffic lane into a transit lane	
Ginninderra Drive – Kerrigan Street to Florey Drive				- Provide right turn storage at intersections with Archdall Street and Lance Hill Avenue - Construct intersection with Kerrigan Street with right turn storage to Kerrigan St
Ginninderra Drive –Florey Drive to Tillyard Drive				- Complete duplication
Spofforth Street (other than noted above)				- Rebuild to create new road and service road - Provide right turn storage at the intersection with Messenger Street

Note: 1. Assumes Kippax Centre extended towards Moyes Crescent with a new bus terminal accessed via there

2. Some intersection improvements along Stockdill Drive, Drake Brockman Drive and William Hovell Drive will incorporate bus priority treatments, to be determined in ongoing investigations.

5.0 Next Steps

The results and outcomes presented in this report are based on strategic modelling with the ACT/Queanbeyan CSTM model. More detailed micro-simulation modelling for the primary study area, defined in Figure 1, will provide more definitive directions for intersection and public transport improvements. This will enable creation of preliminary concept plans for necessary road improvements and staging of works. It will also lead to refining costing of works and guidance for who should contribute to the cost of works, as noted in Figure 4.