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Red Hill Reserve Surrounds Update

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Executive Summary

Introduction

SMEC was commissioned by EPSDD to update earlier analysis using the Canberra Strategic Transport Model (CSTM) to evaluate the likely road network impacts of residential developments in Section 66 Deakin and Section 56 Red Hill on the surrounding road network.

The CSTM has recently been recalibrated to 2016 conditions and new road connection options for the proposed development in Section 56 Red Hill have also been developed. EPSDD has therefore requested an update to the earlier assessment.

Strategic Transport Modelling

The Red Hill Reserve Surrounds Traffic Study aims to determine the impact of various road network options alongside additional land use in both development areas. In addition to an updated base case using the recalibrated CSTM, two combinations of land use and road network changes were evaluated, using strategic transport modelling methods:

- **Base Case (CSTM 2011):** Land use and transport network assumptions for 2031 without the proposed developments using the previous CSTM calibrated to 2011 conditions
- **Base Case (CSTM 2016):** Current land use and transport network assumptions for 2031 using the CSTM calibrated to 2016 conditions. This scenario also assumes no developments in the Section 66 Deakin and Federal Golf Club sites
- **Scenario 6:** Base Case plus Mbark-Federal Golf Club Development and Section 66 Deakin Development, with access via a new road connecting to Birdwood Street, Hughes. Existing access to the Federal Golf Club via Gowrie Drive is removed.
- **Scenario 7:** Base Case plus Mbark-Federal Golf Club Development and Section 66 Deakin Development, with access via a new road connecting to Kitchener Street, Hughes. Existing access to the Federal Golf Club via Gowrie Drive is removed.

The strategic transport modelling analysis found the following:

- Section 56 Red Hill generates a minimal amount of additional traffic and thus its impact on the network is minor. Connecting to either Birdwood Street or Kitchener Street is unlikely to have any substantial impact on congestion.
- The CSTM suggests that Kent Street will already be close to its nominal capacity in 2031. The additional traffic generated by Section 56 Deakin results in some minor traffic diversions, particularly along Denison Street in the PM peak, as existing Kent Street traffic is displaced by the new development traffic. Some form of traffic calming and upgrades to intersections along Kent Street will likely be required in future.

Crash Analysis

A preliminary crash analysis was conducted using crash data records obtained from the dataACT Open Data Portal. Crashes around the key intersections in the study area were assessed and compared to the counted traffic volumes. For the nine intersections surveyed, crash rates range from 0.22 to 1.31 crashes per million vehicle movements. The analysis indicated that the intersection of Gowrie Drive with Red Hill Drive has the highest crash rate. For both scenarios tested in this report, Gowrie Drive is assumed to be closed, which would remove traffic from this dangerous intersection. The location with the next highest crash rate is the intersection of Carruthers Street and Kent Street with 0.55 crashes per million vehicle movements. This intersection has high traffic volumes and requires turning vehicles to cross multiple lanes of traffic. Interventions at this location should be considered.

A brief assessment of crashes over time by road condition, time of day and severity was also carried out. No intersection showed a clear trend of increases in the occurrence of crashes. The intersection of Kitchener Street and Birdwood Street appeared to show a decrease since 2012, with no crashes recorded since 2015. None of the intersections showed a clear increase in the occurrence of crashes during wet weather. The intersection of Kent Street and Kitchener Street showed an abnormally high proportion of crashes at night, which might indicate need for better lighting at this location. While

all other intersections had less than 10% of crashes resulting in injury or fatality, the intersection of Gowrie Drive with Red Hill Drive had 100% of crashes resulting in injury. This is an extremely small sample size, however the risks at this intersection are clearly demonstrated.

Public Transport and Active Travel Assessment

Access to public transport for the proposed development and surrounding areas was assessed using the new Network 19, which came into effect on 29 April, 2019. A bus stop is adjacent to the Section 66, Deakin development, providing access to Civic and Woden. Section 56, Red Hill has no access to public transport. The areas surrounding the development generally have reasonable access but the northern part of Brereton Street does not have any access.

The active travel network around the proposed developments is well connected. However, the footpath on Brereton Street providing access to Section 56, Red Hill is narrow and has many interruptions. It is recommended that good walking and cycling access be provided on either of the new roads proposed in Scenario 6 or 7.

Intersection Assessment

As part of this project, intersection turning movement counts were collected at nine intersections within the study area in 2018 and 2019:

1. Mugga Way/Stonehaven Crescent – Gowrie Drive/Melbourne Avenue
2. Gilmore Crescent – Brereton Street
3. Kitchener Street – Gilmore Crescent
4. Kent Street – Carruthers Street
5. Kent Street – Strickland Crescent
6. Gowrie Drive – Red Hill Drive
7. Kitchener Street – Birdwood Street
8. Kent Street – Birdwood Street
9. Kent Street – Kitchener Street

The surveys covered the weekday AM and PM peak periods and a qualitative analysis of the intersections and connected roads was conducted based on these traffic counts.

Intersection Analysis

- The Mugga Way/Stonehaven Crescent – Gowrie Drive/Melbourne Avenue intersection performance is unlikely to be affected by the proposed development and access in the scenarios tested in this report. Unbalanced flows at this intersection could lead to high delays for some approaches and further monitoring or assessment of this intersection might be required.
- The Gilmore Crescent – Brereton Street intersection currently has a low level of traffic and would experience no change in the scenarios tested in this report.
- The Kitchener Street – Gilmore Crescent intersection currently carries moderate levels of traffic and its volumes would increase only slightly in the scenarios tested in this report. No issues are expected at this location.
- The Kent Street – Carruthers Street intersection currently experiences a significant amount of traffic, with performance for low priority movements likely to be poor during the peak periods, potentially leading to increased risky behaviour. Austroads standards suggest that an intersection of this type should not be priority controlled and signalisation should be considered to better control the performance and safety at this intersection.
- The Kent Street – Strickland Crescent intersection also currently experiences a significant amount of traffic, especially considering its current roundabout configuration. It is likely operating close to its capacity during the peak periods and the additional traffic generated by Section 66, Deakin could be enough to push it to an unacceptable level of performance. Signalisation might be necessary to manage performance and improve access for pedestrians and cyclists in the area.
- The Gowrie Drive – Red Hill Drive intersection carries very little traffic. The busiest period is the Wednesday midday golf course peak of 81 vehicles per hour, of which only half are travelling to or from the golf course. This

very low level of traffic likely contributes to the low number of accidents, although the accident rate is very much higher than other intersections in the area. For the scenarios tested in this report, it is assumed that Gowrie Drive is closed. If this does not occur, interventions to improve safety at this location should be investigated.

- The intersection of Kitchener Street and Birdwood Street is generally low and only increases slightly for both scenarios tested. It is unlikely that any interventions would be required at this intersection.
- Traffic volumes at the intersection of Kent Street with Birdwood Street are moderate, and there could be some delays for traffic turning out of Birdwood Street, particularly in the PM peak. If Scenario 6 is adopted, some upgrades at this intersection might be necessary.
- Traffic at the intersection of Kent Street and Kitchener Street is moderate and a small amount of additional traffic would use this intersection in both scenarios. However, it is likely that the existing intersection has sufficient capacity.

Road Analysis

- Brereton Street carries very little traffic, currently fewer than 2,000 vehicles per day. No additional traffic would use this road in either scenario tested in this report.
- Gilmore Crescent between Brereton and Kitchener Streets currently carries just over 4,000 vpd, by which classification it operates as a major collector. No additional traffic would use this road in either scenario tested in this report.
- Kent Street carries a lot of traffic, with demand greatest between Carruthers Street and Strickland Crescent, due to the concentration of trip generators within this section. The additional land use at Section 66, Deakin accesses the network between these two points, adding traffic to a section of road that is likely already congested.
- Birdwood Street, while narrow, does not currently carry substantial traffic and the development scenarios would not significantly increase traffic. The volumes on this road do not suggest any capacity issues, except for the possible congestion at the intersection of Birdwood Street and Kent Street.
- Kitchener Street carries a moderate amount of traffic, with some traffic calming measures already implemented. In the scenarios tested in this report, there is a small increase in traffic but this is not expected to lead to any serious performance issues.

Summary and Conclusions

The findings of this report include:

- Additional traffic generated by the proposed developments at Section 66, Deakin and Section 56, Red Hill do not significantly impact on the local road network for either of the scenarios tested in this report.
- The intersection of Gowrie Drive with Red Hill Drive shows an accident rate and severity much higher than all other intersections in the area. This intersection should be closed (as in both Scenario 6 and 7) or upgraded.
- The intersection of Kent Street and Kitchener Street showed a higher than expected proportion of night time crashes. Further assessment of lighting at this location should be undertaken.
- Kent Street operates close to capacity and upgrades might be required, particularly at its intersections with Birdwood Street, Carruthers Street and Strickland Crescent.
- Birdwood Street or Kitchener Street each have sufficient capacity to carry the increased traffic from Section 56 Red Hill. However, the intersection of Birdwood Street and Kent Street is likely to perform worse than the intersection of Kitchener Street and Kent Street so Scenario 7 might be slightly preferable to Scenario 6.

The traffic analysis for these two proposed developments indicates that they have distinct impacts on the road network, and therefore further detailed traffic assessments for each development can be assessed independently.

Challenges

- Kent Street traffic is heavy, which is likely to cause problems at some intersections, particularly Carruthers Street and Strickland Crescent

- The Section 66, Deakin development would increase delay on Kent Street and lead to a small diversion in traffic onto Denison Street

Recommendations

The following actions are recommended:

- Investigation of upgrade options for intersections on Kent Street, to address both performance and safety concerns, including:
 - Assess lighting at the intersection of Kent Street and Kitchener Street
 - Assess capacity improvements at Birdwood Street, Carruthers Street, Strickland Crescent
- Investigation of options to improve the performance and/or reduce the attractiveness of Kent Street
- Closure or upgrade of the intersection of Gowrie Drive and Red Hill Drive (dependant on whether Scenario 6, 7 or another option is selected)
- Cost estimates for road and intersection upgrades

1 Introduction

SMEC was commissioned by the Environment, Planning and Sustainable Development Directorate (EPSDD) to extend modelling and assessment work for two land use developments adjacent the Red Hill Nature Reserve undertaken in 2018. These developments are in Section 66, Deakin and part Section 56, Red Hill. These developments have already been the subject of traffic impact studies, by Opus in 2017 and Graeme Shoobridge Advisory Services (GSAS) in 2018, respectively. In addition, an options analysis for critical safety upgrades to the intersection of Red Hill Drive and Gowrie Drive, which provides access to the Red Hill site, was conducted by AECOM in 2014.

The Section 66, Deakin adds a medium density residential development including 256 dwellings, preserving the existing office buildings.

The Section 56, Red Hill development is a redevelopment of the land currently occupied by the Federal Golf Club's existing clubhouse and will include a new clubhouse and facilities, along with an active seniors and retirement village containing 125 dwellings.

The previous studies undertaken by other consultants looked at largely localised traffic issues. SMEC then undertook an analysis of the wider area network implications and consequences of a number of road network options supporting the developments using the Canberra Strategic Transport Model (CSTM).

This study assesses two additional road network options using the most recent version of the CSTM and also includes a qualitative assessment of selected intersections, a crash analysis and a brief assessment of active travel and public transport coverage in the area.

The context and study areas covered by this study are shown in Figure 1.

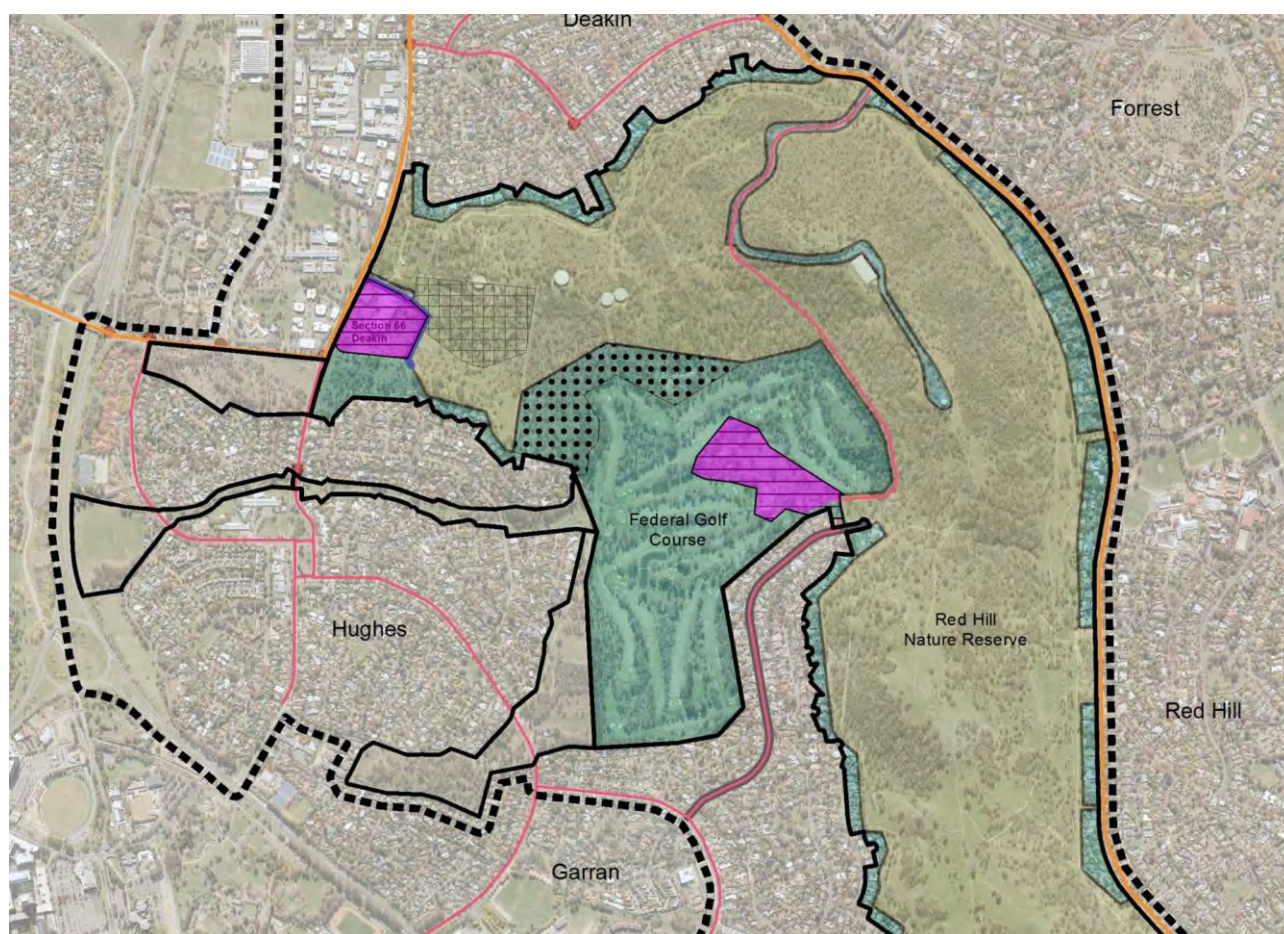


Figure 1: Context and Study Area

2 Strategic Transport Modelling

The analysis has been conducted using the Canberra Strategic Transport Model (CSTM), updated in 2018-19 using the 2016 Census and 2017 ACT Household Travel Survey. This model contains a complete representation of the urban road network including Canberra, Queanbeyan, Murrumbateman and Yass.

The model is an equilibrium model, in which travel decisions (origin/destination, mode, route etc.) are related to cost, where the cost of travel is minimised for every road user. As such, any changes to the model inputs and assumptions can have impacts far from where the change was made, the severity decreasing with distance, as the traffic adjusts and redistributes to minimise the individual user costs.

The modelling was conducted for the 2031 AM and PM peak periods and included modelling of the traffic impacts of both Section 56, Red Hill and Section 66, Deakin, assessing two new access options developed following the modelling works undertaken by SMEC in 2018.

2.1 Model Scenarios

The modelling considered land use developments in two locations:

1. **Mbark-Federal Golf Club Development in Block 1 Section 56, Red Hill**
Redevelopment of the club facilities and inclusion of an active seniors and retirement village
2. **Blocks 7 & 8 Section 66, Deakin**
Redevelopment of the existing site for mixed residential and commercial use (existing offices will be retained)

The following scenarios were modelled and are presented in this report:

- **Base Case (CSTM 2011):** Land use and transport network assumptions for 2031 using the CSTM calibrated to 2011 conditions (as used in SMEC's 2018 study). This scenario assumes no developments in the Section 66 Deakin and Federal Golf Club sites.
- **Base Case (CSTM 2016):** Current land use and transport network assumptions for 2031 using the CSTM calibrated to 2016 conditions. This scenario also assumes no developments in the Section 66 Deakin and Federal Golf Club sites.
- **Scenario 6:** Base Case plus Mbark-Federal Golf Club Development and Section 66 Deakin Development, with access via a new road connecting to Birdwood Street, Hughes. Existing access to the Federal Golf Club via Gowrie Drive is removed.
- **Scenario 7:** Base Case plus Mbark-Federal Golf Club Development and Section 66 Deakin Development, with access via a new road connecting to Kitchener Street, Hughes. Existing access to the Federal Golf Club via Gowrie Drive is removed.

For the modelling task, eight scenarios were tested using different versions of the CSTM, as shown in Table 1.

Table 1: Modelled Scenarios

SCENARIO	2031 AM	2031 PM
Base Case (CSTM 2011)	✓	✓
Base Case (CSTM 2016)	✓	✓
Scenario 6 (CSTM 2016)	✓	✓
Scenario 7 (CSTM 2016)	✓	✓

2.2 Model Assumptions

2.2.1 Zone Structure

The development areas within Section 66 Deakin and Section 56 Red Hill respectively fall within the existing CSTM Zones 050304 and 051001, as shown in Figure 2. The location of the development areas and proposed access routes are also shown.

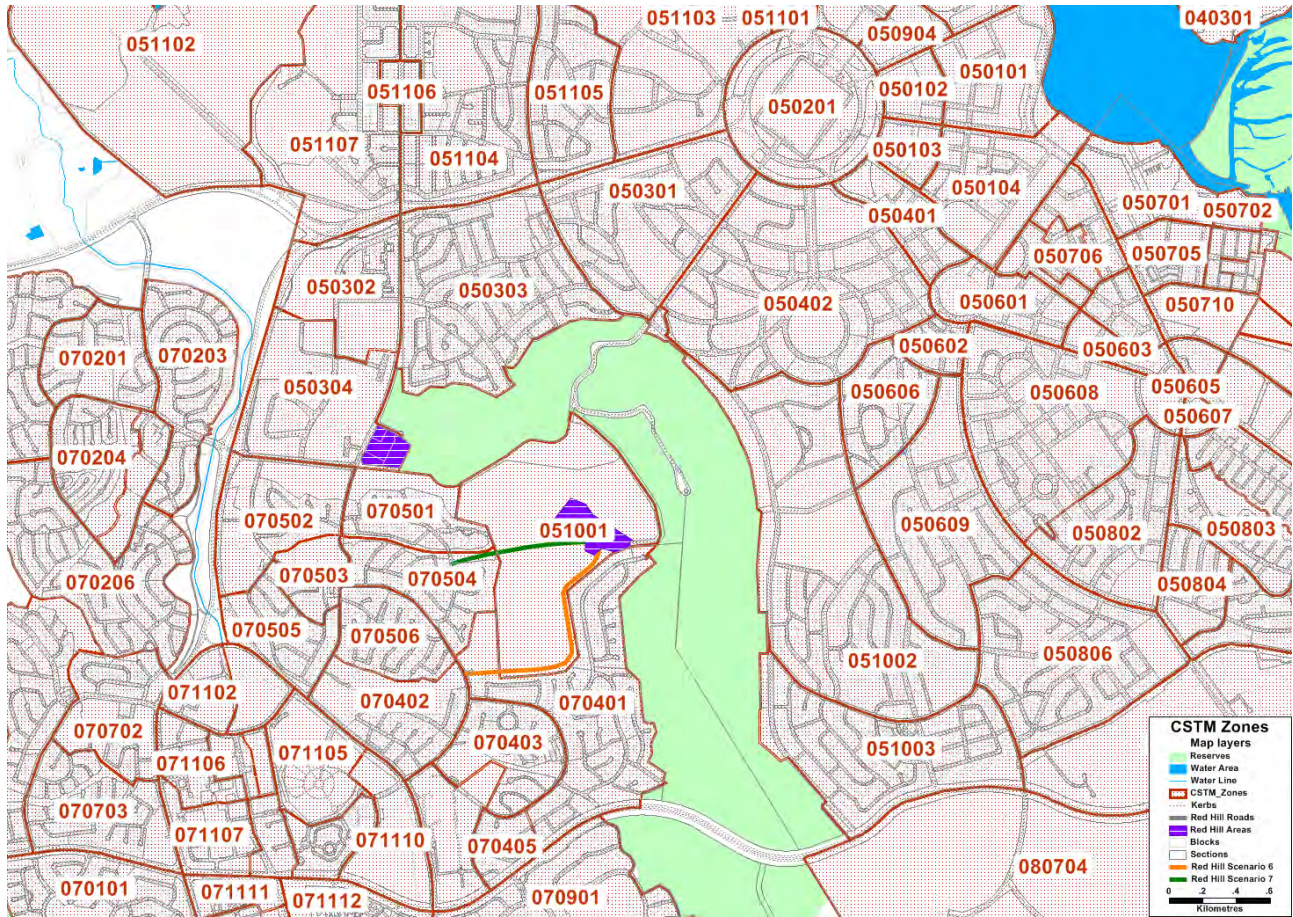


Figure 2: CSTM Zones in Development Areas

2.2.2 Road Network

The road network infrastructure improvements assumed to be present in each year from 2016 to 2041 have been confirmed with TCCS in 2018, when the current version of the CSTM was completed. Diagrams showing the upgrades in 2021 and 2031 are included in Appendix A.

Intersections are represented in the CSTM at a high level, with those that require vehicles to stop or give way being modelled through a reduction in capacity on the approaching roads. No discrimination is made by intersection control method.

A diagram showing the basic CSTM link attributes is included in Figure 3. The lane count is shown as line thicknesses, the signposted speed limit as shown as line colours and the hourly capacity is shown numerically.

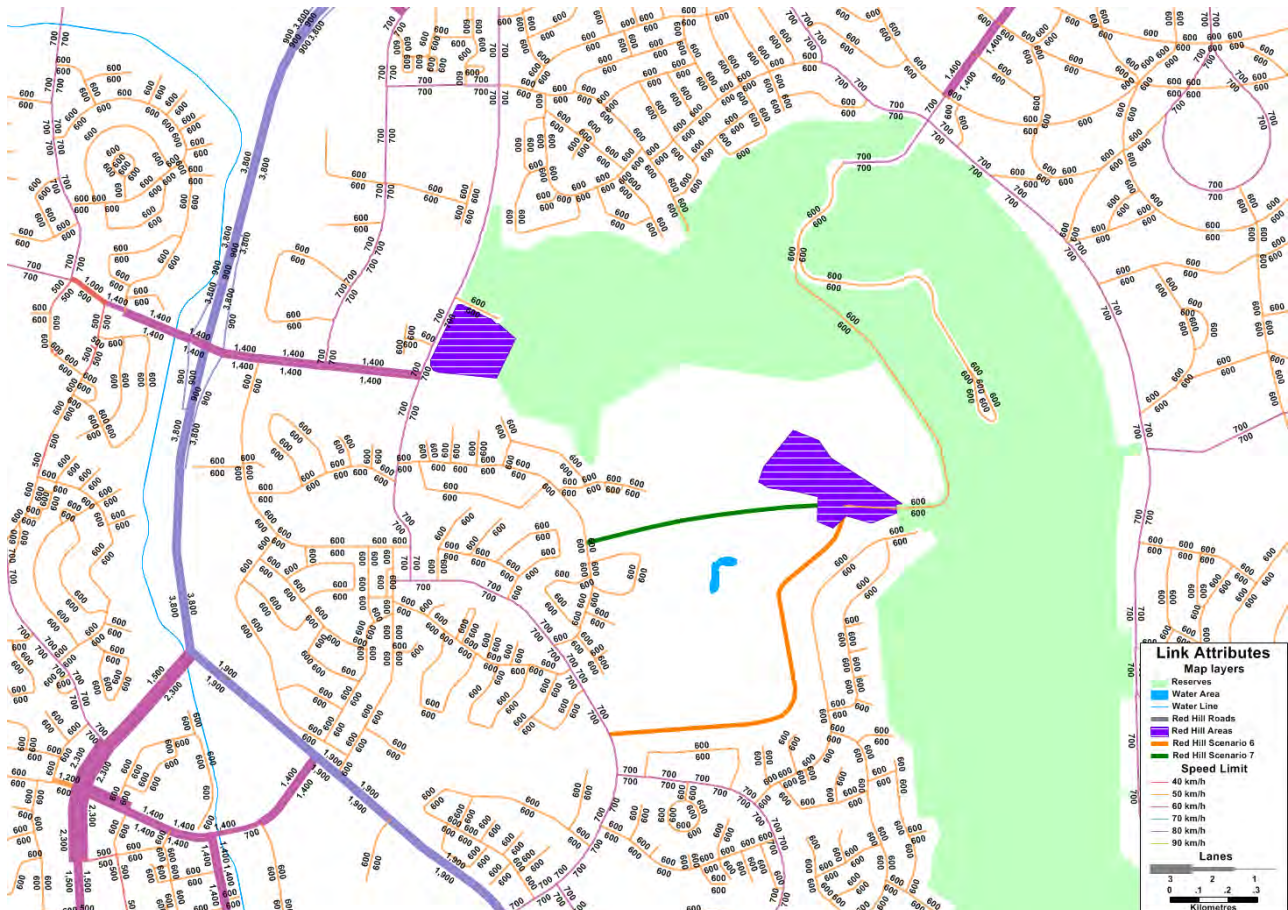


Figure 3: CSTM Basic Link Attributes

2.2.3 Public Transport

The public transport network in 2021 onwards is based on Transport Canberra's proposed Network 2018 provided to SMEC in March 2017, with the addition of Light Rail Stage 1 (LRS1) and the removal of bus routes operating along the LRS1 corridor. Light Rail Stage 2 (LRS2), assumed to be between Civic and Woden, is added in 2031.

2.2.4 Land Use

The base land use data was provided by TCCS and is dated 8 October 2018. The planned land use for 2031 (without the proposed developments) is shown in Table 2.

Table 2: CSTM 2031 Base Case Land Use

ZONE	DESCRIPTION	POPULATION	EMPLOYMENT	RETAIL SPACE	SCHOOL ENROLMENTS	TERTIARY ENROLMENTS
050304	Deakin	0	1,811	4,318	96	0
051001	Red Hill	0	42	0	0	0

The land use assumptions include the current understanding of the Yarralumla Brickworks development, as per the agreed land use in the CSTM.

2.3 Model Updates

2.3.1 Zone Structure

The developments within Section 56, Red Hill and Section 66, Deakin required the addition of Zones 050305 and 051004 to the CSTM, respectively. The updated zones are shown in Figure 4.

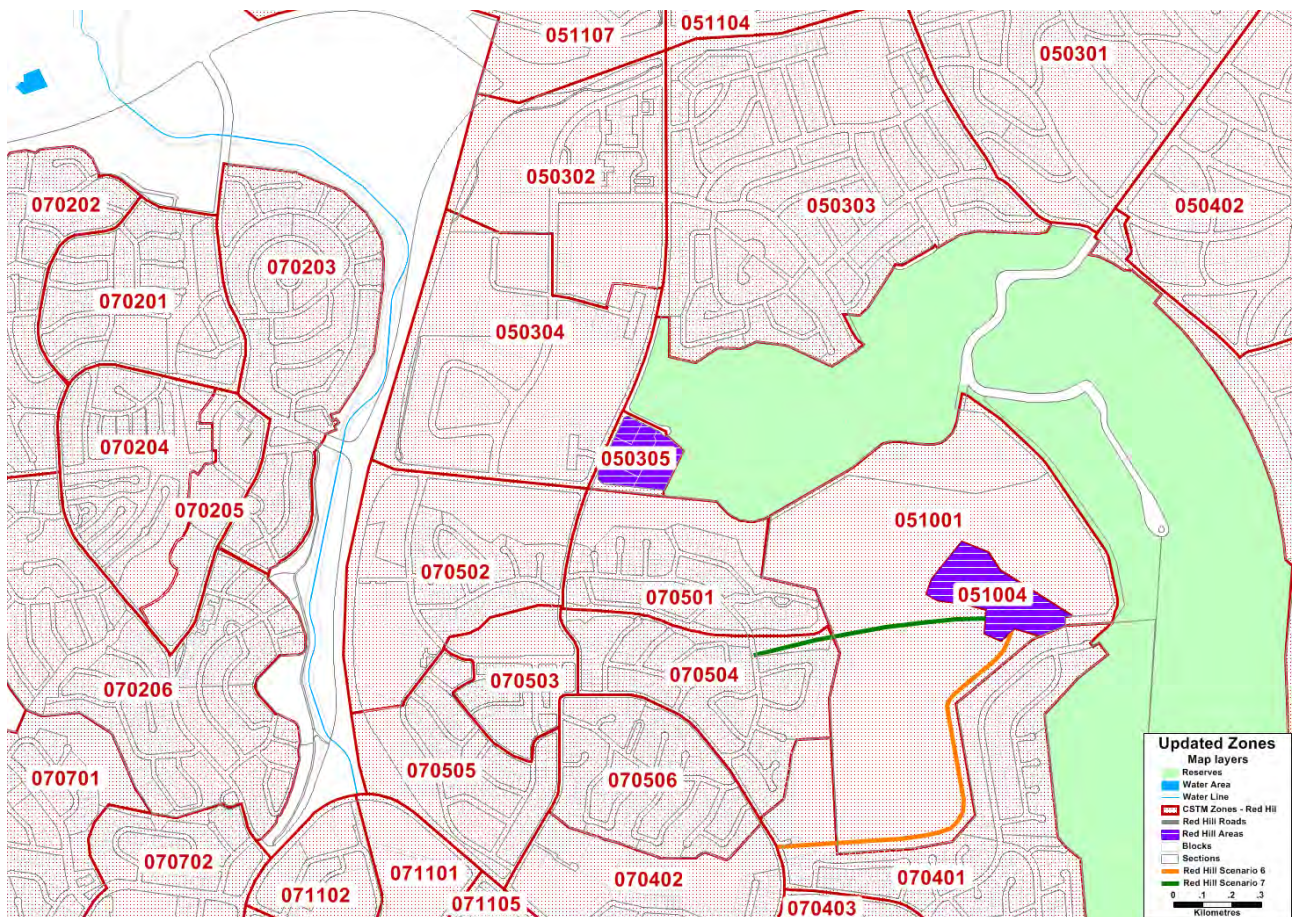


Figure 4: Updated Zone Layout

2.4 Land Use

The additional population in the new two zones was determined by calculating the average occupancy of each combination of dwelling type and size (number in bedrooms) for each suburb, using the 2016 Census records. The results of this process are shown in Tables 3 and 4. These values have been added to the CSTM, which has been allowed to conduct its standard trip generation and distribution procedures. In reality, the nature of the Section 56, Red Hill development (active seniors and retirees) is expected to generate less traffic than the average residential development. For this type of development, the RMS *Guide to Traffic Generating Developments* specifies 2 vehicle trips per day (250 total), 0.1 trips per AM peak (12.5 total) and 0.2 trips per PM peak (25 total). While this is a development for active seniors rather than an assisted care facility, the trip generation modelled by the CSTM should be treated as an upper limit to the expected traffic.

At the advice of EPSDD, the Section 66, Deakin development assumption shown in Table 3 has been reduced from 574 dwellings, as used by Opus, to 256 dwellings. The proportional distribution of dwelling types and sizes assumed by Opus has been retained.

Table 3: Section 66 Deakin Population Calculations

TYPE	BEDROOMS	COUNT	OCCUPANCY	POPULATION
Apartment	1	63	1.24	78
Apartment	2	175	1.90	332
Apartment	3	13	2.00	26
Townhouse	3	5	1.98	11
Total		256	1.74	447

Table 4: Section 56 Red Hill (Mbark) Population Calculations

TYPE	BEDROOMS	COUNT	OCCUPANCY	POPULATION
House	3	62	2.33	144
Apartment	1	9	1.18	11
Apartment	2	12	1.60	19
Apartment	3	18	2.89	52
Townhouse	2	12	1.47	18
Townhouse	3	12	2.83	34
Total		125	2.22	278

The population in Zones 050305 and 051004 in each scenario is given in Table 5. No changes have been made to the land use of any existing zones. This means that the trips generated by the proposed developments are added to the trips generated by the base land use forecasts for 2031.

Table 5: Zone Population by Scenario

ZONE	SCENARIO 6	SCENARIO 7
050305	278	278
051004	447	447

2.5 Strategic Transport Modelling Results

2.5.1 Aggregated Outputs

Tables 6 and 7 show bulk summary results for the Base case using the 2011 CSTM and the 2016 CSTM. After the recalibration to 2016 conditions and the updates to the 2031 scenario, there is a reduction in person trips of approximately 8%. However, there is a much larger reduction in HBW PT usage, and the forecast HBW PT mode share reduces to 12.8% from 16.8% in the AM peak. In the PM peak, HBW public transport usage increase from 7.7% to 13.4% in the recalibrated model. Recent changes to the bus network (implemented in April 2019) are not yet included in the CSTM and it is not yet known what impact these fundamental changes to PT travel in Canberra will have in the future. In both peak periods, the average car trip length increases from approximately 9.5 km to 12.5 km in the recalibrated model.

Table 6: 2031 AM Base Bulk Scenario Results

OUTPUT	BASE (CSTM 2011)	BASE (CSTM 2016)
Person Trips	200,612	183,461
PT Trips	22,476	19,104
Bicycle Trips	9,555	10,856
Car Trips	150,226	125,239
HBW PT Trips	8,266	9,416
HBW PT %	16.8%	12.8%
Car VKT	1,409,038	1,577,806
ΔVKT	-	+168,768
Car VHT	44,835	43,106
ΔVHT	-	-1,729

Table 7: 2031 PM Base Bulk Scenario Results

OUTPUT	BASE (CSTM 2011)	BASE (CSTM 2016)
Person Trips	174,833	166,815
PT Trips	9,155	14,961
Bicycle Trips	2,651	8,754
Car Trips	139,143	122,330
HBW PT Trips	3,345	11,359
HBW PT %	7.7%	13.4%
Car VKT	1,324,868	1,513,781
ΔVKT	-	+188,913
Car VHT	33,453	33,958
ΔVHT	-	+505

A summary of the bulk outputs of the models is included in Tables 8 and 9. The Red Hill and Deakin developments generate 216 additional person trips in the AM peak and 197 in the PM peak.

The change in Vehicle Kilometres Travelled (VKT) and Vehicle Hours Travelled (VHT) in each scenario is largely a reflection of the increased population. Of the 216 additional person trips in the AM peak, 8-9 use public transport and 16-17 use bicycle. The remainder travel by car. In the PM peak, of the 197 additional trips, 15-17 use public transport and 5-6 use bicycle.

In Scenario 6, there is an additional 1,210 car VKT and 62 car VHT in the AM peak with an additional 1,154 car VKT and 40 car VHT in the PM peak.

In Scenario 7, there is an additional 1,245 car VKT and 58 car VHT in the AM peak with an additional 1,221 car VKT and 40 car VHT in the PM peak.

Table 8: 2031 AM Bulk Scenario Results

OUTPUT	BASE (CSTM 2016)	SCENARIO 6	SCENARIO 7
Person Trips	183,461	183,677	183,677
PT Trips	19,104	19,112	19,113
Bicycle Trips	10,856	10,873	10,872
Car Trips	125,239	125,369	125,369
HBW PT Trips	9,416	9,415	9,416
HBW PT %	12.8%	12.8%	12.8%
Car VKT	1,577,806	1,579,016	1,579,051
ΔVKT	-	+1,210	+1,245
Car VHT	43,106	43,168	43,164
ΔVHT	-	+62	+58

Table 9: 2031 PM Bulk Scenario Results

OUTPUT	BASE (CSTM 2016)	SCENARIO 6	SCENARIO 7
Person Trips	166,815	167,012	167,012
PT Trips	14,961	14,978	14,976
Bicycle Trips	8,754	8,759	8,760
Car Trips	122,330	122,450	122,452
HBW PT Trips	11,359	11,371	11,370
HBW PT %	13.4%	13.4%	13.4%
Car VKT	1,513,781	1,514,936	1,515,002
ΔVKT	-	1,154	1,221
Car VHT	33,958	33,998	33,998
ΔVHT	-	40	40

2.5.2 Detailed Individual Scenario Results

Diagrams extracted from the CSTM showing hourly peak volumes and volume/capacity for each scenario, as well as peak volume differences for the scenarios, are shown below. Except for the Base Case, both the peak traffic and peak traffic difference (compared to the Base Case) are included for each scenario.

2.5.2.1 Base Case (CSTM 2011)

The Base Case hourly flow diagrams for 2031 AM and 2031 PM are shown below. Of the roads surrounding the development sites, significant traffic volumes can be seen on Adelaide Avenue, Kent Street and Stonehaven Crescent in both peak periods. The performance on Kent Street in particular suggests that intervention will be required at some of the intersections along its length. Currently, all are priority controlled, with two low-speed roundabouts. The traffic on Kent Street will cause performance and safety issues at the intersections and upgrades will likely need to be investigated.

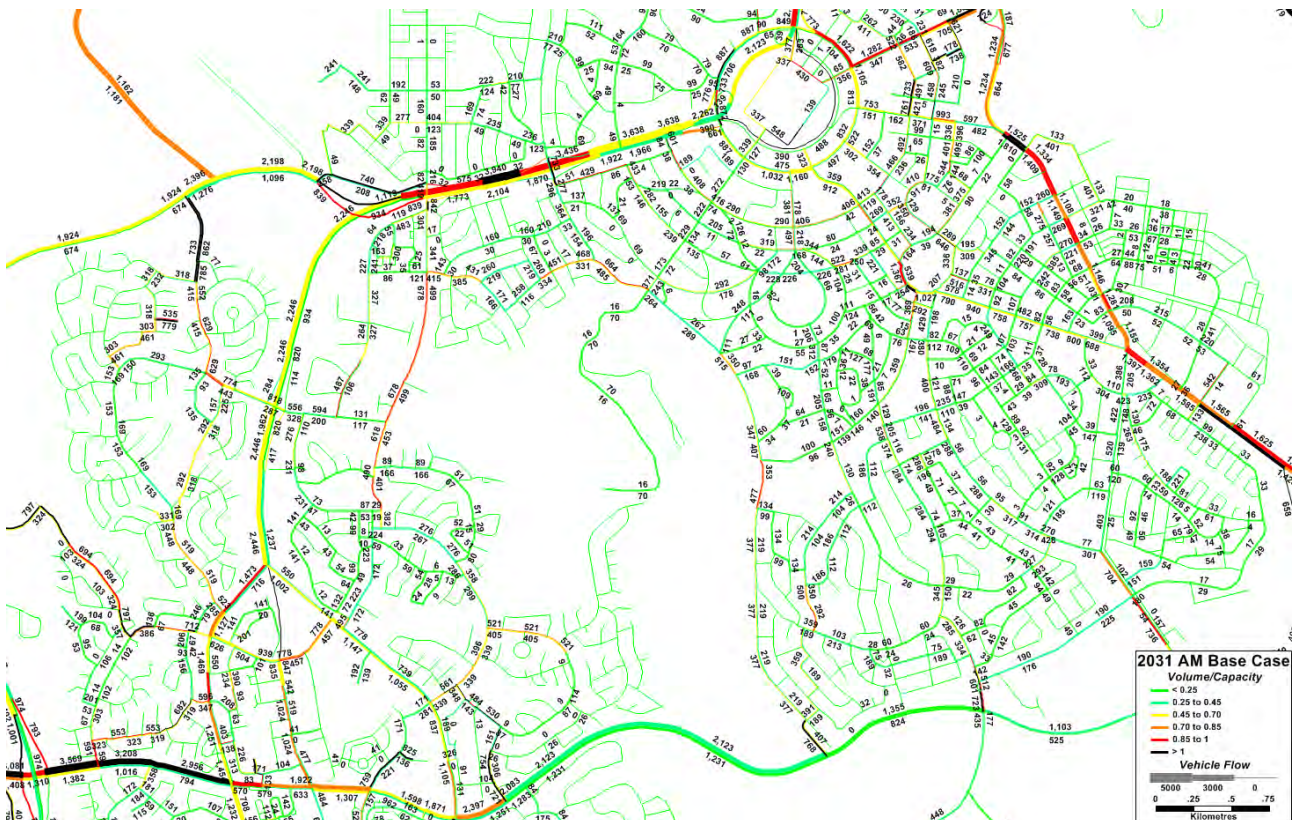


Figure 5: Base Case (CSTM 2011) 2031 AM Hourly Flow and V/C

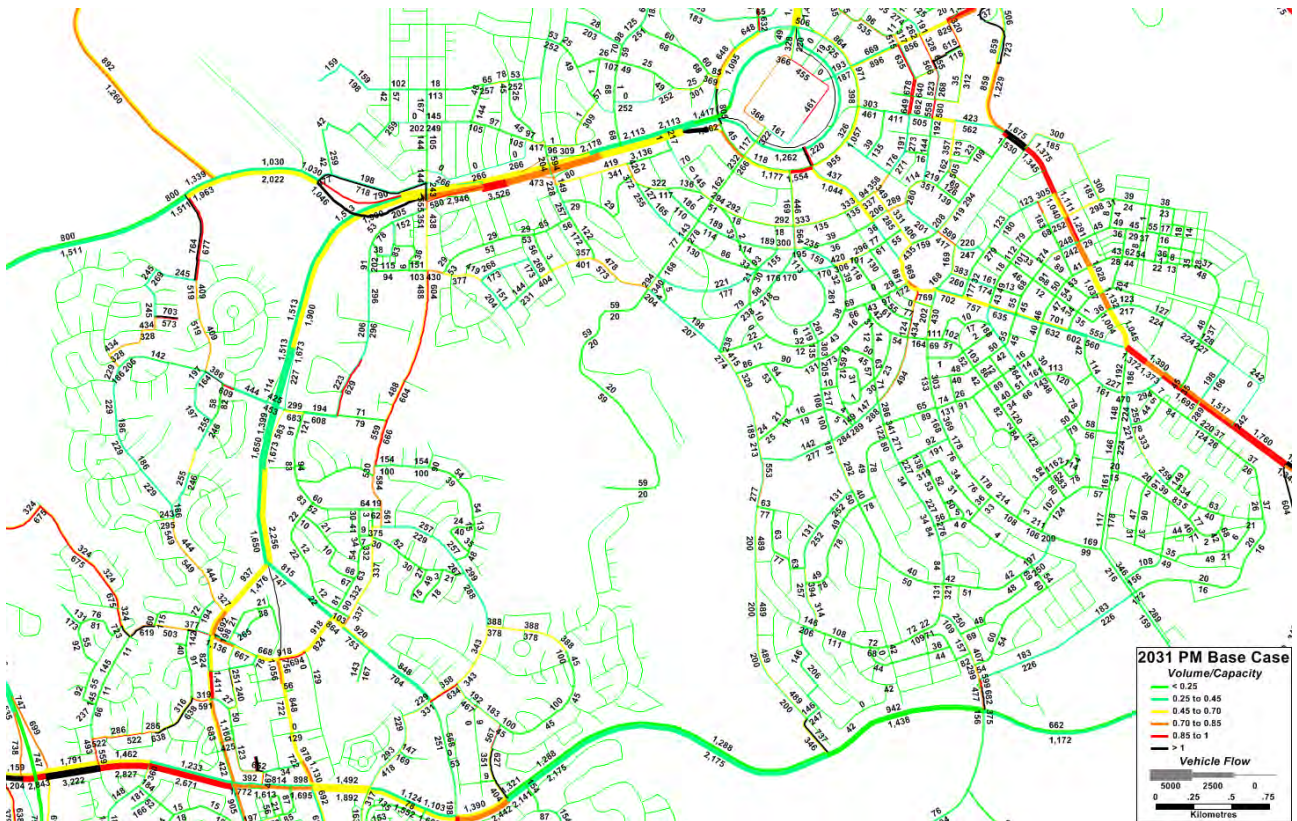


Figure 6: Base Case (CSTM 2011) 2031 PM Hourly Flow and V/C

2.5.2.2 Base Case (CSTM 2016)

The Base Case (CSTM 2016) hourly flow diagrams for 2031 AM and 2031 PM are shown in Figure 7 and Figure 8, respectively. Of the roads surrounding the development sites, significant traffic volumes can be seen on Adelaide Avenue, Yarra Glen, Stonehaven Crescent and Kent Street in both peak periods. The traffic on Kent Street will likely cause performance and safety issues at the intersections and upgrades will need to be investigated before 2031. Similarly, volumes on Stonehaven Crescent, west of Melbourne Avenue, are close to capacity and some interventions might be required before 2031.

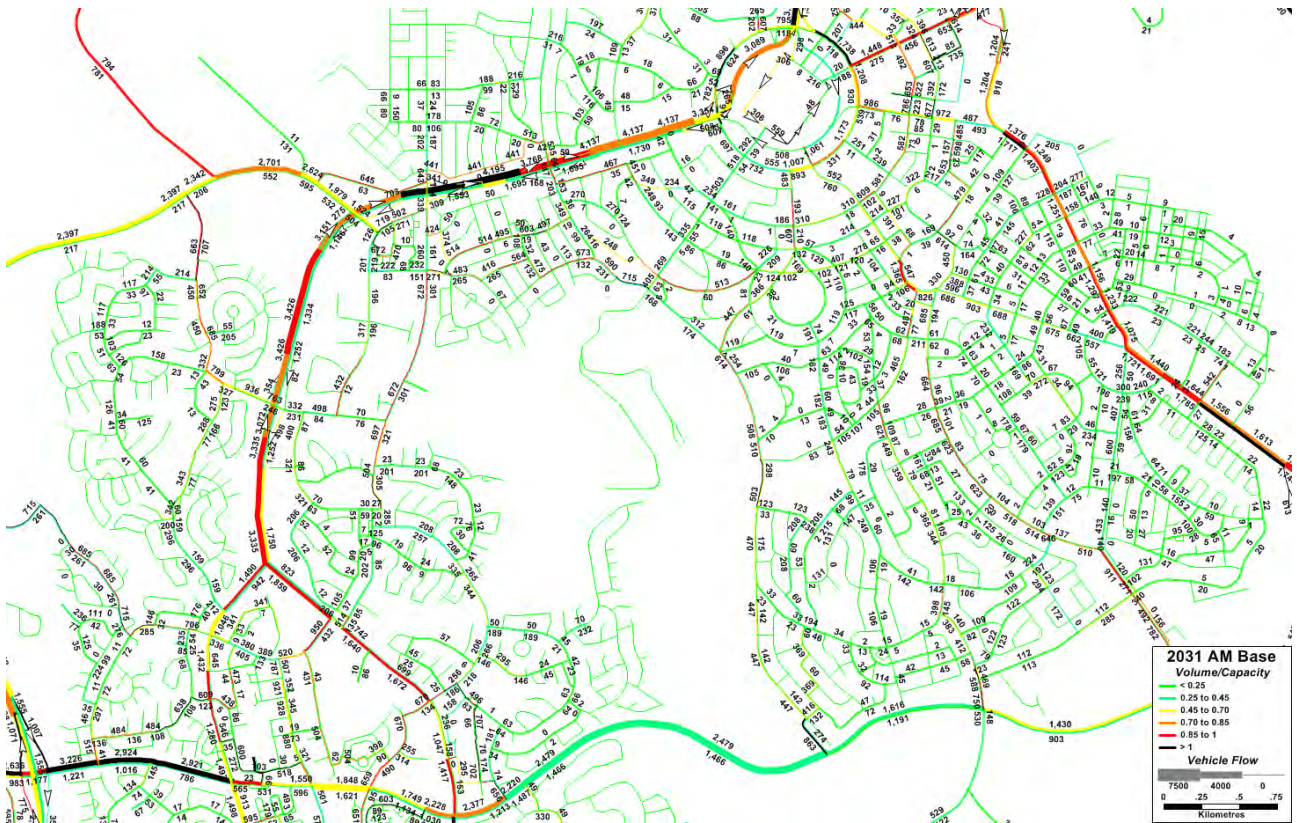


Figure 7: Base Case (CSTM 2016) 2031 AM Hourly Flow and V/C

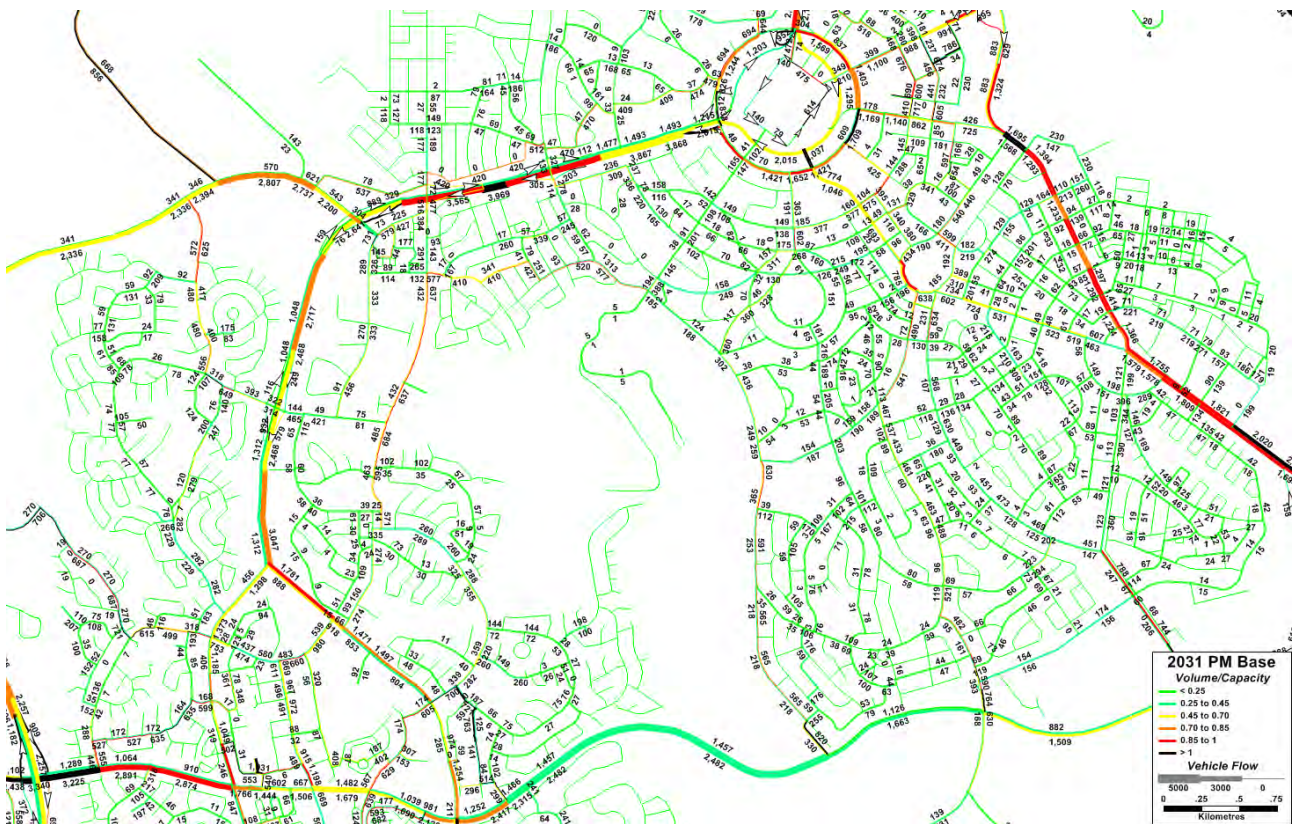


Figure 8: Base Case (CSTM 2016) 2031 PM Hourly Flow and V/C

A comparison of the traffic volumes for the 2031 AM and PM peak periods between the CSTM (2011) and CSTM (2016) are shown in Figure 9 and Figure 10, respectively. For most of the local roads around the study area, the differences between the models are relatively small. Larger differences are apparent on major roads, including Yarra Glen, Adelaide

Avenue, Cotter Road and Hindmarsh Drive. The 2016 CSTM also includes upgrades to the Cotter Road – Adelaide Avenue interchange, allowing all movements and direct access from Cotter Road to Denison Street. Given the small differences in modelled volumes on local roads around the developments, which is where most impact would be felt, it is considered that the findings from the earlier modelling are still current and can be compared to the findings from this current modelling activity.

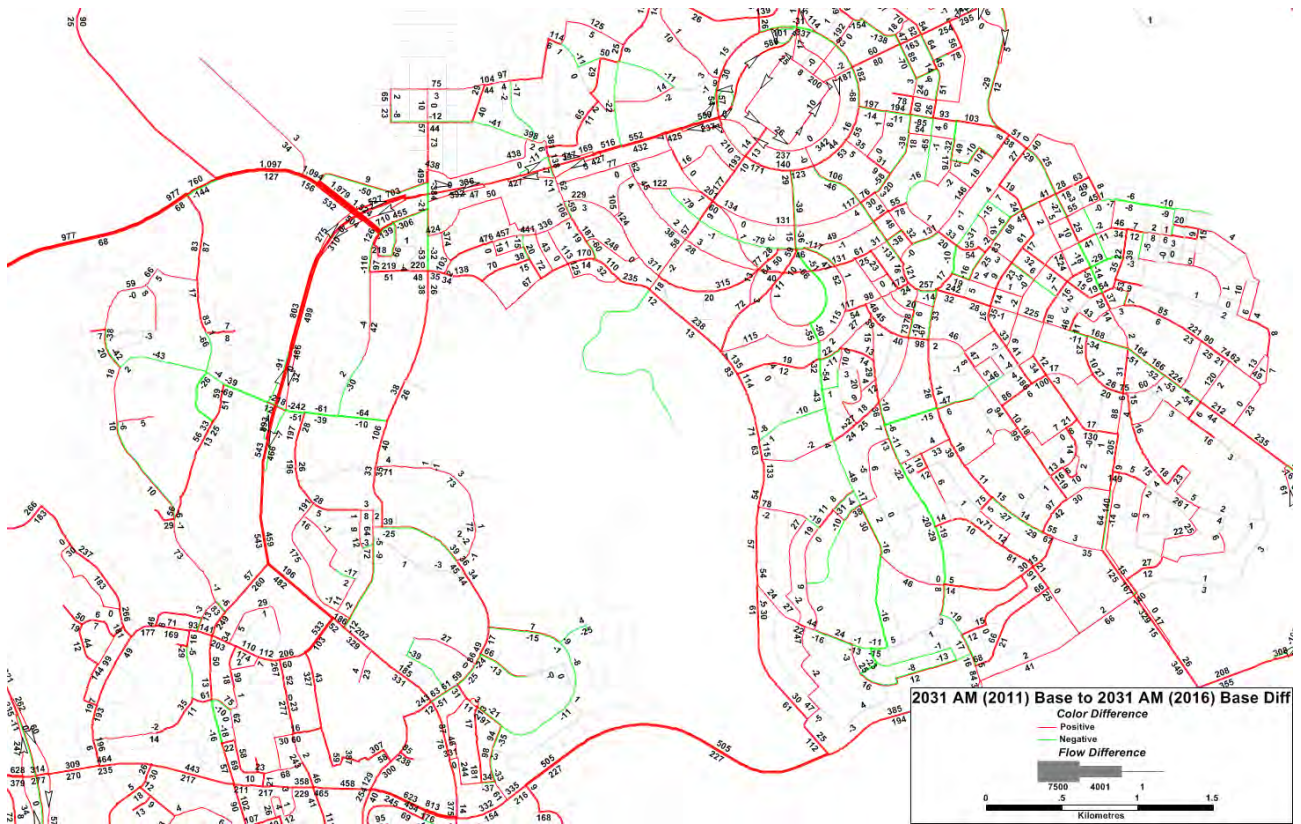


Figure 9: Base Case 2031 AM Difference between CSTM 2011 and CSTM 2016

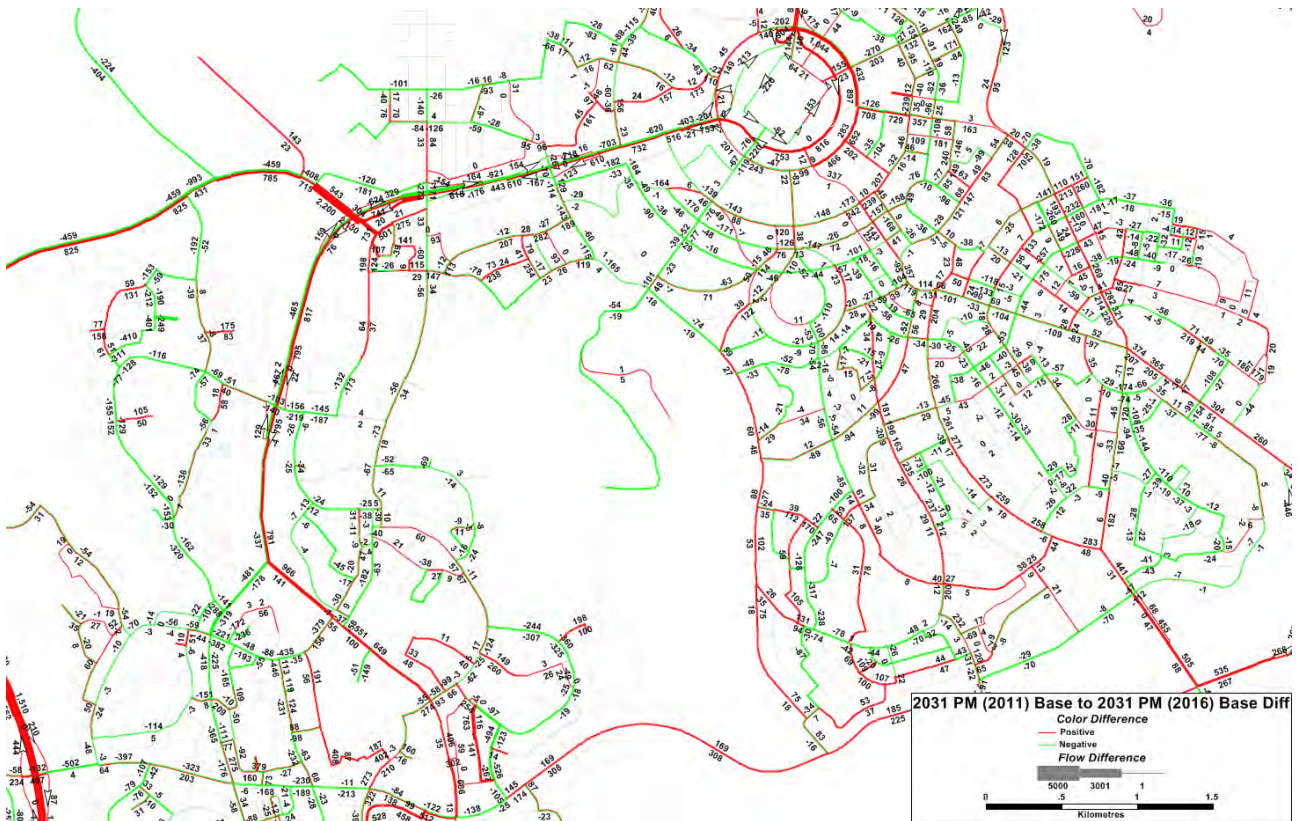


Figure 10: Base Case 2031 PM Difference between CSTM 2011 and CSTM 2016

2.5.2.3 Scenario 6

Scenario 6 includes the closure of Gowrie Drive and a new connection from Federal Golf Club to Birdwood Street. Figures 11 and 12 show the traffic volumes and Volume/Capacity for the network around the study area in the 2031 AM and PM peaks, respectively. As in the Base Case, traffic is largely concentrated on major arterials in the area. However, Kent Street and Stonehaven Crescent operate close to capacity in both peaks.

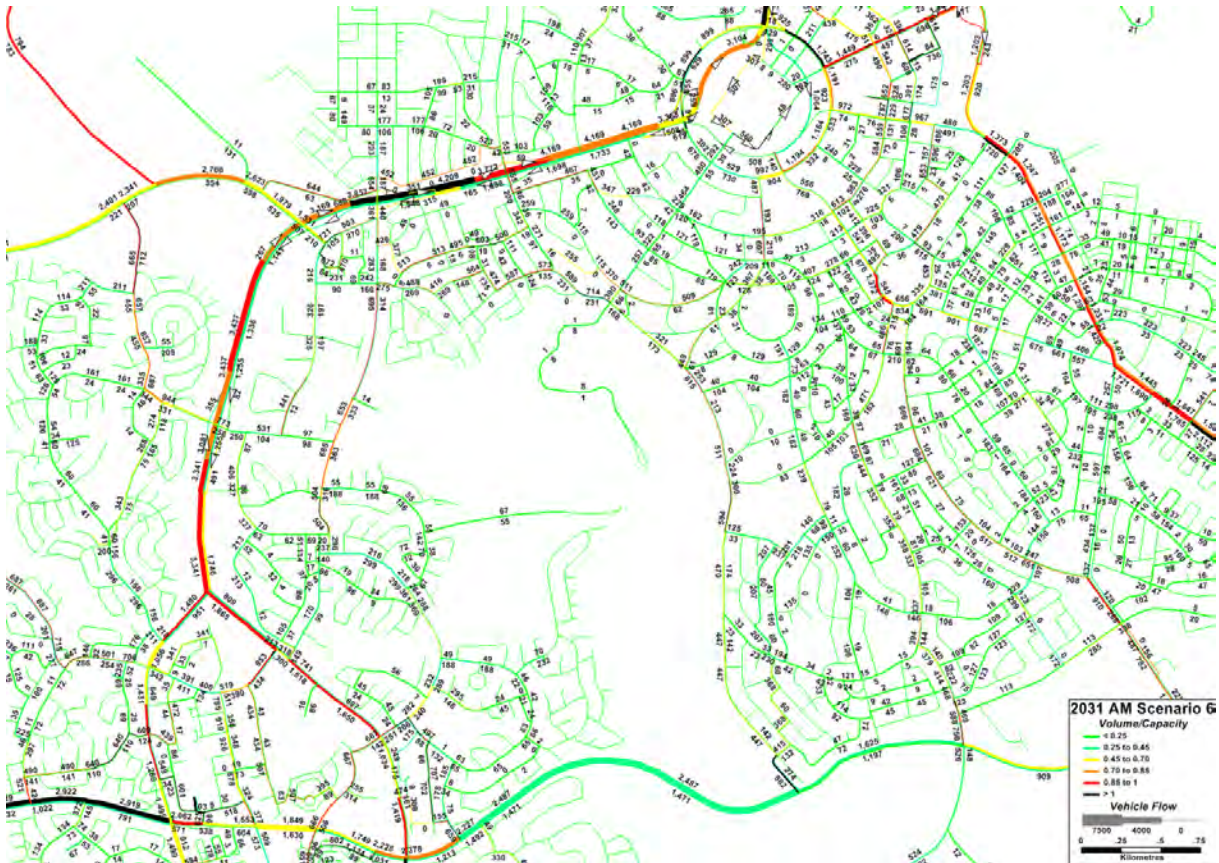


Figure 11: Scenario 6 2031 AM Hourly Flow and V/C

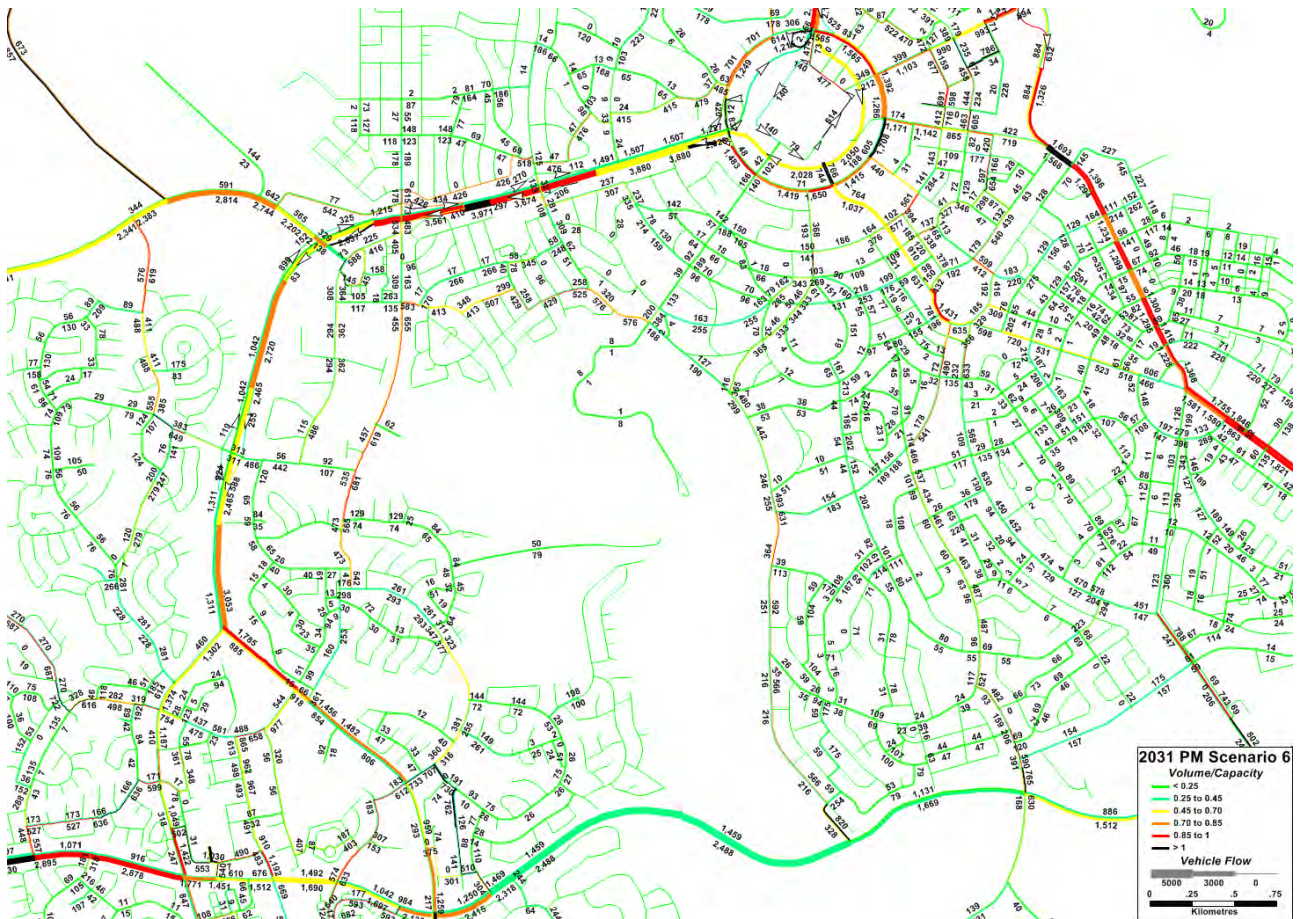


Figure 12: Scenario 6 2031 PM Hourly Flow and V/C

Figures 13 and 14 show the flow difference between Base (CSTM 2016) and Scenario 6 in the 2031 AM and PM peaks, respectively. There is a small amount of additional traffic on Birdwood Street, Kitchener Street and Carruthers Street, generated by the proposed developments. There is a small increase in traffic on Denison Street due to increased congestion on Kent Street. Overall, the impact on the surrounding road network is negligible with traffic volumes increases generally fewer than 30 vehicles per hour. These increases would not be expected to have any significant adverse impacts on network performance.

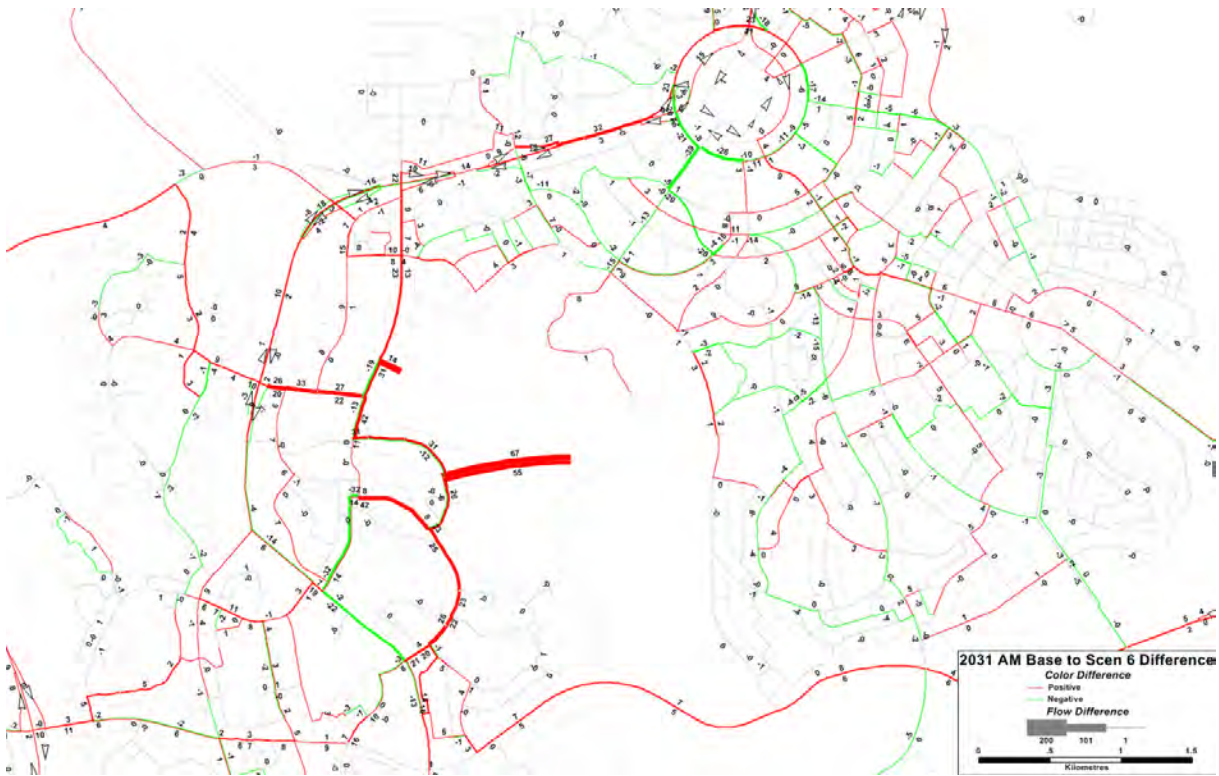


Figure 13: Scenario 6 2031 AM Hourly Flow Difference

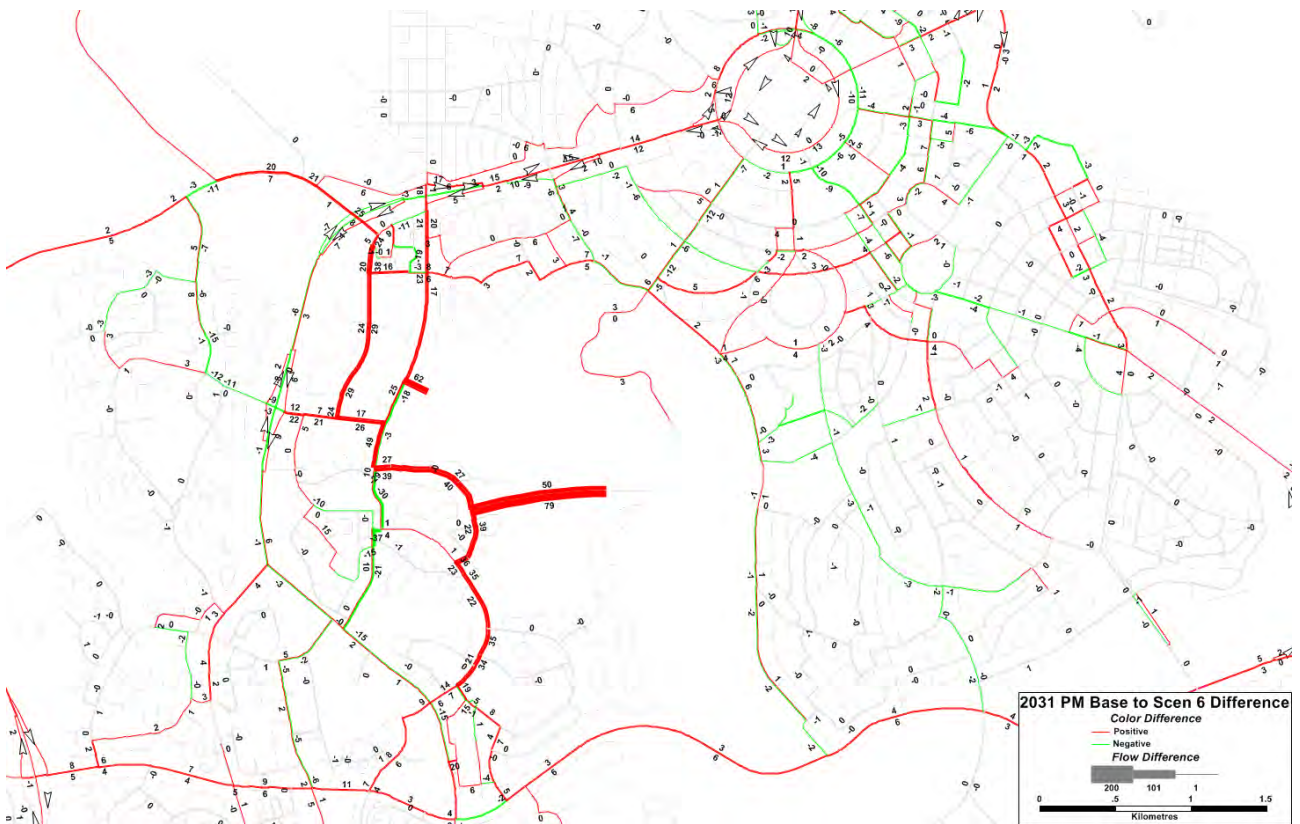


Figure 14: Scenario 6 2031 PM Hourly Flow Difference

2.5.2.4 Scenario 7

Scenario 7 moves the Section 56 Red Hill access from Gowrie Drive to Kitchener Street, which forces the redistribution of ~120 trips in both the 2031 AM and PM peak periods. Figures 15 and 16 show the hourly flow and Volume/Capacity for the 2031 AM and PM peak periods, respectively. As in the Base Case, traffic is largely concentrated on major arterials in the area. However, Kent Street and Stonehaven Crescent operate close to capacity in both peaks.

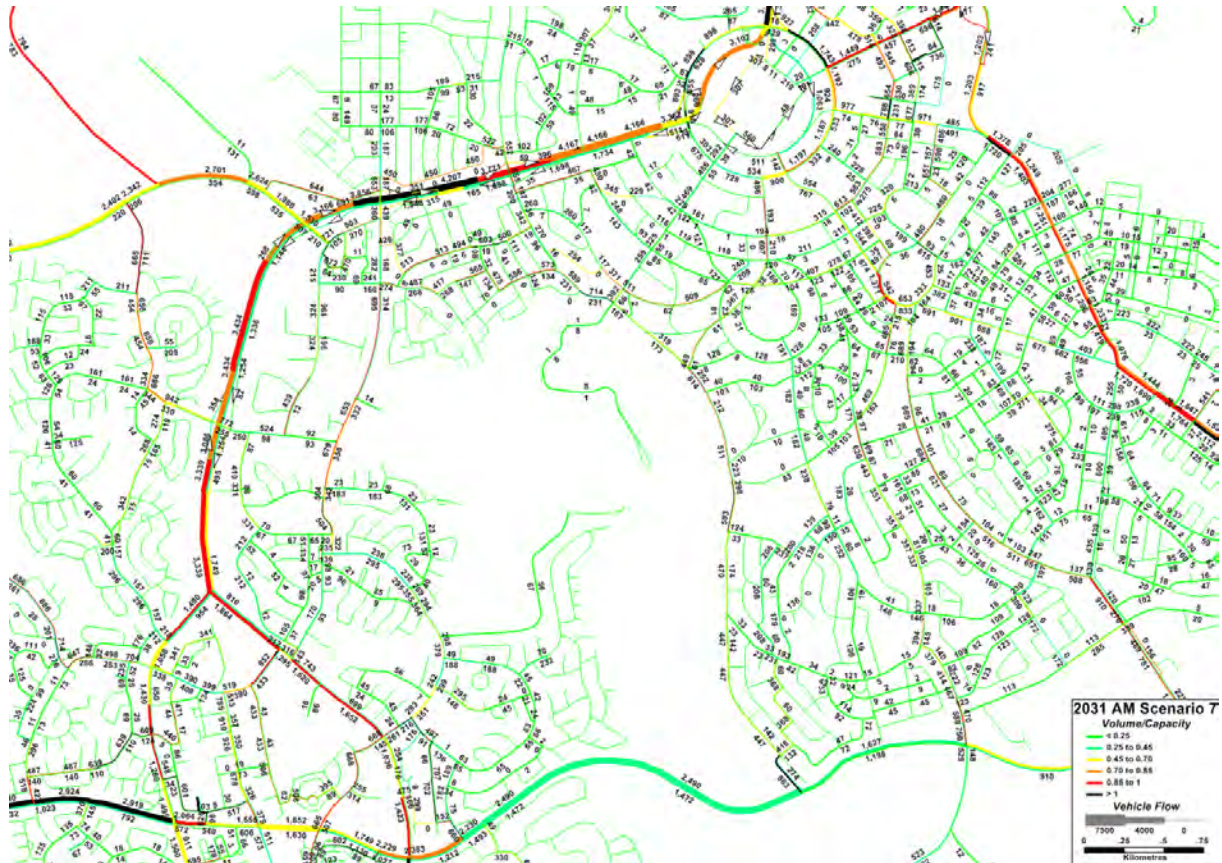


Figure 15: Scenario 7 2031 AM Hourly Flow and V/C

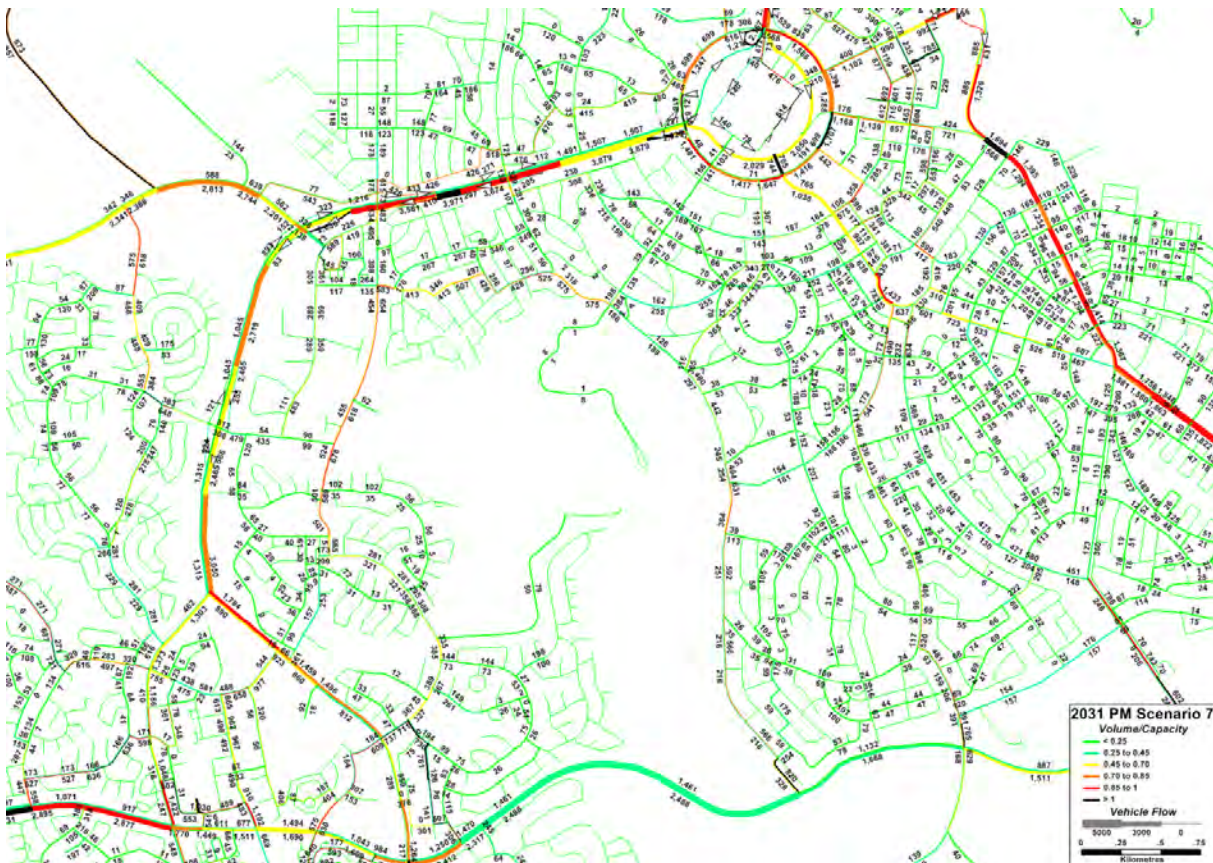


Figure 16: Scenario 7 2031 PM Hourly Flow and V/C

Figures 17 and 18 show the flow difference between Base and Scenario 7 in the 2031 AM and PM peaks, respectively. There is a small amount of additional traffic on Kitchener Street, Kent Street and Carruthers Street, generated by the proposed developments. There is a small increase in traffic on Denison Street due to increased congestion on Kent Street. Overall, the impact on the surrounding road network is negligible with traffic volumes increases generally fewer than 30 vehicles per hour. These increases would not be expected to have any significant adverse impacts on network performance.

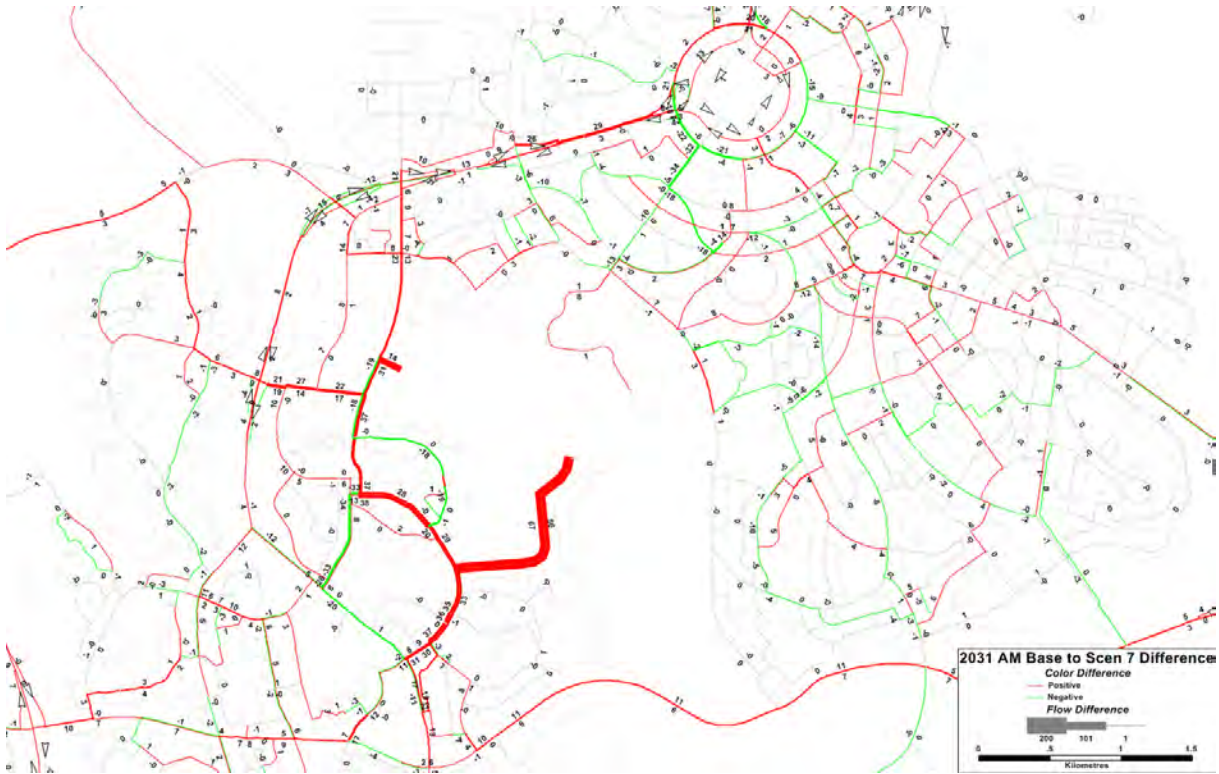


Figure 17: Scenario 7 2031 AM Hourly Flow Difference

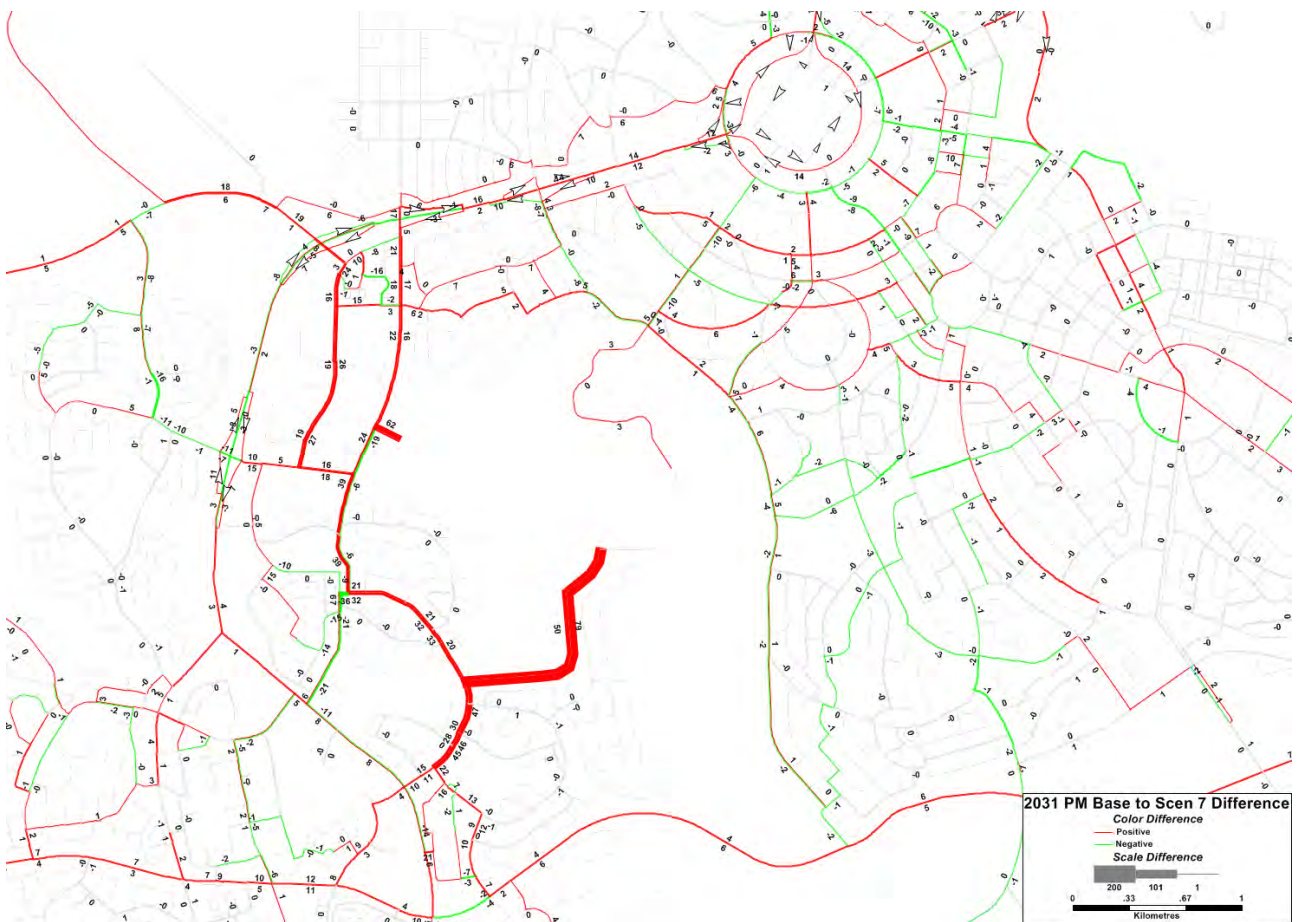


Figure 18: Scenario 7 2031 PM Hourly Flow Difference

2.5.3 Strategic Modelling Summary

A comparison of the traffic volumes for the 2031 AM and PM peak periods between the CSTM (2011) and CSTM (2016) was carried out. For most of the local roads around the study area, the differences between the models are relatively small. Larger differences are apparent on major roads, including Yarra Glen, Adelaide Avenue, Cotter Road and Hindmarsh Drive. Given the small differences in modelled volumes on local roads around the developments, which is where most impact would be felt, it is considered that the findings from the earlier modelling are still current and can be compared to the findings from this current modelling activity.

In both Scenario 6 and 7, given the small amount of additional traffic, the impact on the surrounding network is generally considered to be insignificant. However, Kent Street is already close to its capacity in the 2031 Base Case and the additional traffic generated by the development results in Kent Street coming very close to its capacity in 2031 AM. Given the pre-existing heavy traffic flows on Kent Street, the additional traffic may cause additional delay at the intersections of Carruthers Street, Strickland Crescent and Equinox. Options to address this could be a combination of traffic calming measures (to reduce peak traffic volumes) and signal control at some intersections (to provide better pedestrian access, balance performance at all approaches and induce gaps in the traffic flow along Kent Street).

3 Crash Analysis

SMEC obtained crash data for the suburbs surrounding the developments (Deakin, Forrest, Garran, Hughes and Red Hill) for the period 2012 to present (approximately 7.3 years) from the dataACT Open Data Portal¹. The crash statistics for the area around the proposed developments have been extracted from these records and are shown in Figure 19.

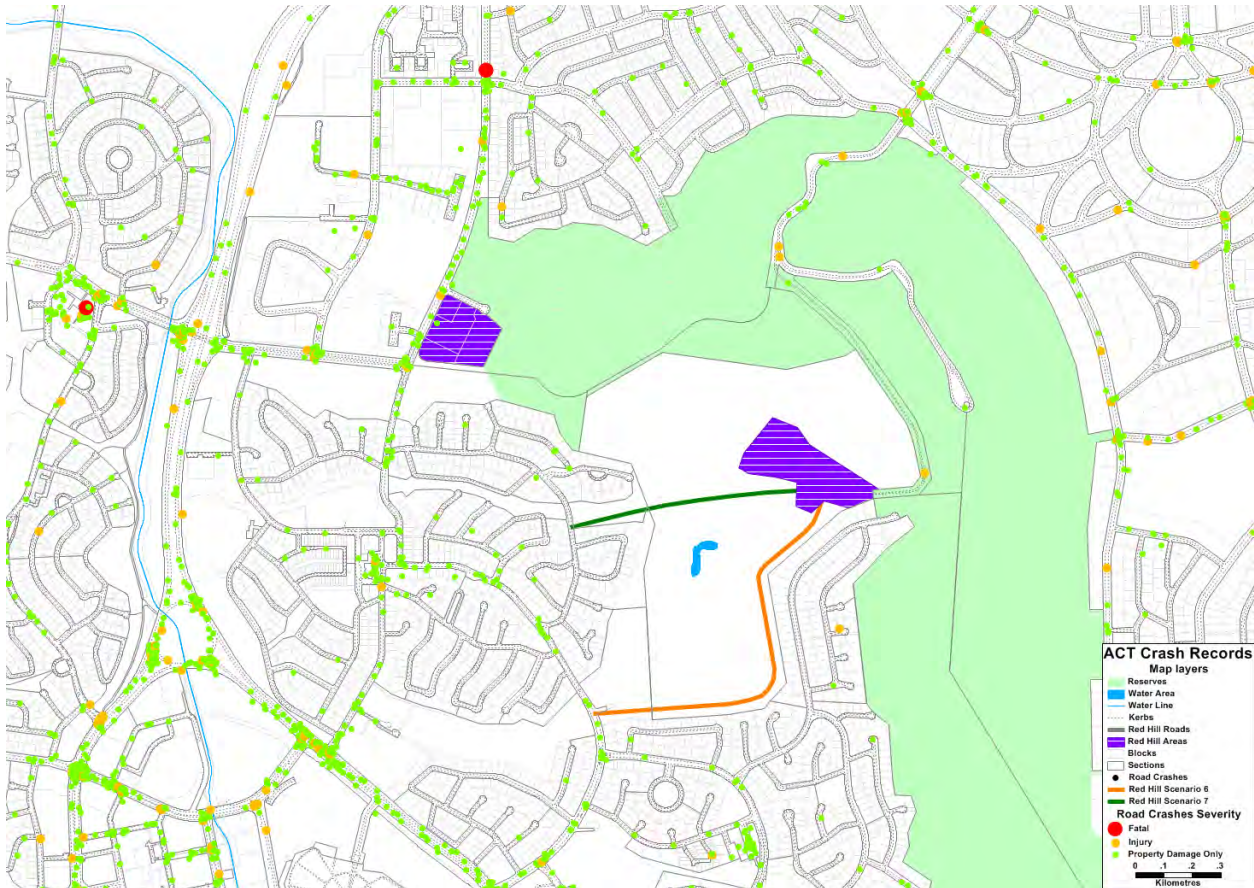


Figure 19: ACT Crash Records 2012-2019

Surveyed traffic counts were used for crash analysis for the following intersections:

- Kitchener Street – Birdwood Street
- Kent Street – Birdwood Street
- Kent Street – Kitchener Street
- Kitchener Street – Gilmore Crescent
- Carruthers Street – Kent Street
- Stonehaven Crescent – Gowrie Drive – Melbourne Avenue
- Gowrie Drive – Red Hill Drive
- Kent Street – Strickland Crescent
- Gilmore Crescent – Brereton Street

To estimate annual traffic from the AM and PM peak period counts, an annualisation factor was developed based on research conducted by Orthongthed, Wang & Legaspi, which provides daily and annual conversion factors for local roads in urban Sydney and four rural regions of NSW, based on a two-hour peak period. In this instance, the average of AM and PM counts has been used. Canberra does not resemble either urban Sydney or rural NSW, instead lying somewhere

¹ <https://www.data.act.gov.au/Transport/ACT-Road-Crash-Data/6jn4-m8rx>

in between in terms of traffic intensity and behaviour, so average factors have been calculated from the rural and urban factors.

Table 10: Traffic Uplift Factors

REGION	DAILY	ANNUAL
Hunter	5.91	1,995
Northern	5.86	1,965
South-west	5.58	1,960
Southern	5.99	2,032
(Rural)	5.84	1,988
Sydney (urban)	7.22	2,469
Average	6.53	2,229

Source: Orthongthed, Wang & Legaspi 2013

The crash records for each intersection have been compiled and are shown in Table 11 and Figure 20. The records cover approximately 7.3 years for the records obtained from dataACT. It was assumed that a crash that occurred within 50 metres of the intersection was associated with the intersection in some way. The annual crash rate was averaged over the recorded period and is expressed in crashes per million vehicle movements.

Table 11: Crash Rates by Intersection (2012-2019)

INTERSECTION	MOVEMENTS				CRASHES [2012-2019]	PERIOD [YEARS]	RATE [CRASHES PER MILLION MOVEMENTS]
	2019 AM	2019 PM	Daily	Annual			
Kitchener Street – Birdwood Street	1,490	1,409	9,465	3,230,936	7	7.3	0.30
Kent Street – Birdwood Street	1,411	1,963	11,016	3,760,323	10	7.3	0.36
Kent Street – Kitchener Street	1,375	1,898	10,686	3,647,759	9	7.3	0.34
Kitchener Street – Gilmore Crescent	1,590	1,423	9,837	3,357,989	9	7.3	0.37
Carruthers Street – Kent Street	2,768	2,418	16,932	5,779,797	23	7.3	0.55
Stonehaven Crescent – Gowrie Drive – Melbourne Avenue	2,413	2,176	14,983	5,114,441	17	7.3	0.46
Gowrie Drive – Red Hill Drive	67	121	614	209,526	2	7.3	1.31
Kent Street – Strickland Crescent	3,275	2,959	20,354	6,947,793	19	7.3	0.37
Gilmore Crescent – Brereton Street	908	786	5,531	1,887,963	3	7.3	0.22

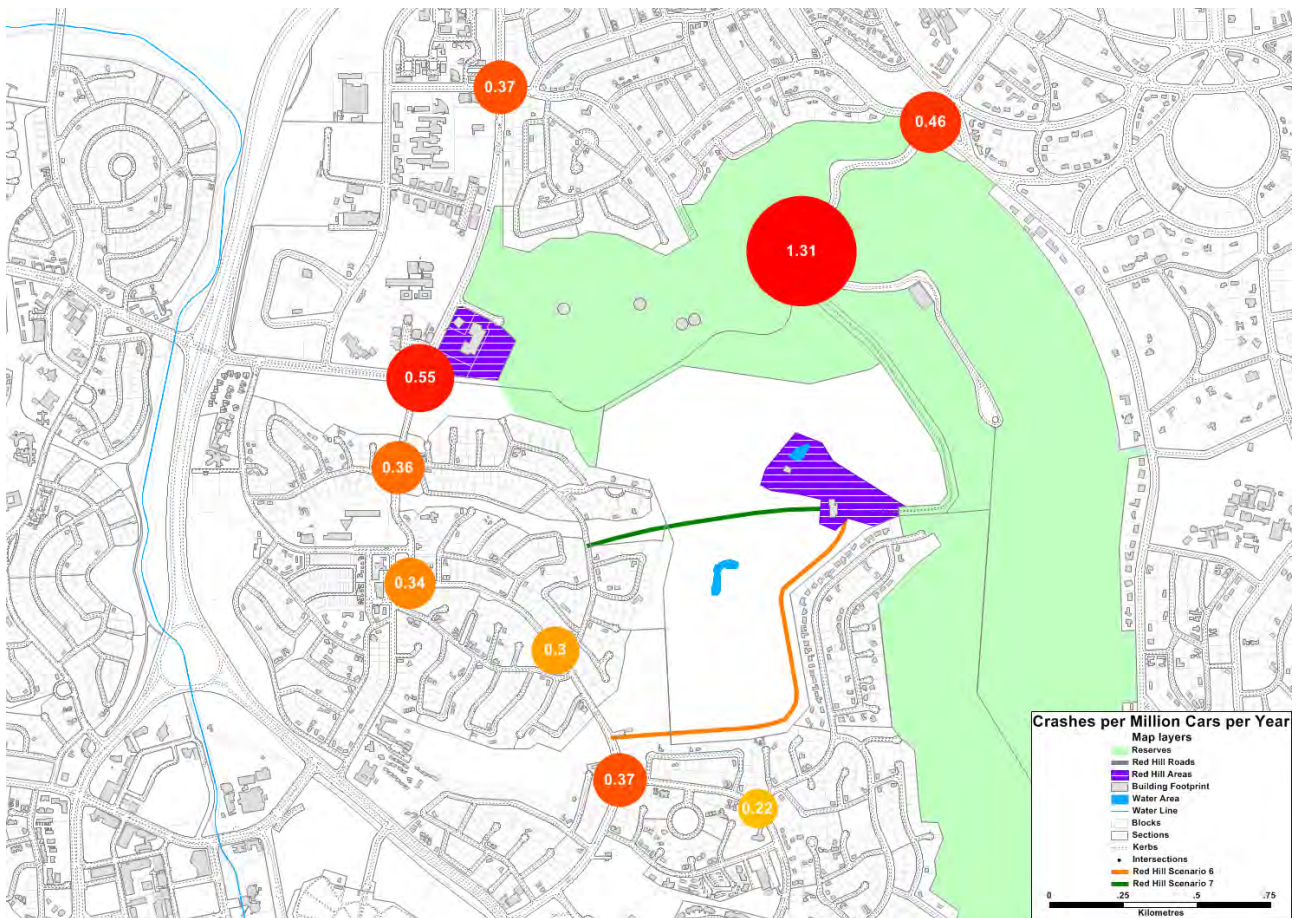


Figure 20: Crashes per Million Vehicle Movements (2012-2019)

The crash records in Table 11 show that there is a range of risk for the intersections around the study area. The intersection of Gilmore Crescent and Brereton Street is the safest, with 0.22 crashes per million vehicle movements. The intersection of Gowrie Drive with Red Hill Drive is the least safe intersection with 1.31 crashes per million vehicle movements. The intersection of Carruthers Street and Kent street has the most crashes over the analysis period and has the second highest number of crashes per million vehicle movements, at 0.52.

A brief analysis of crash factors was also conducted, with the following factors assessed:

- Trend over time
- Wet/dry comparison
- Day/night comparison
- Severity comparison

Figure 21 shows the number of crashes per year for the years 2012 to 2019. From this figure, there does not appear to be a clear trend at any intersection, except the intersection of Kitchener Street and Birdwood Street, where crashes were highest in 2012 and there have not been any recorded crashes since 2015. All other intersections show apparently random variation each year.

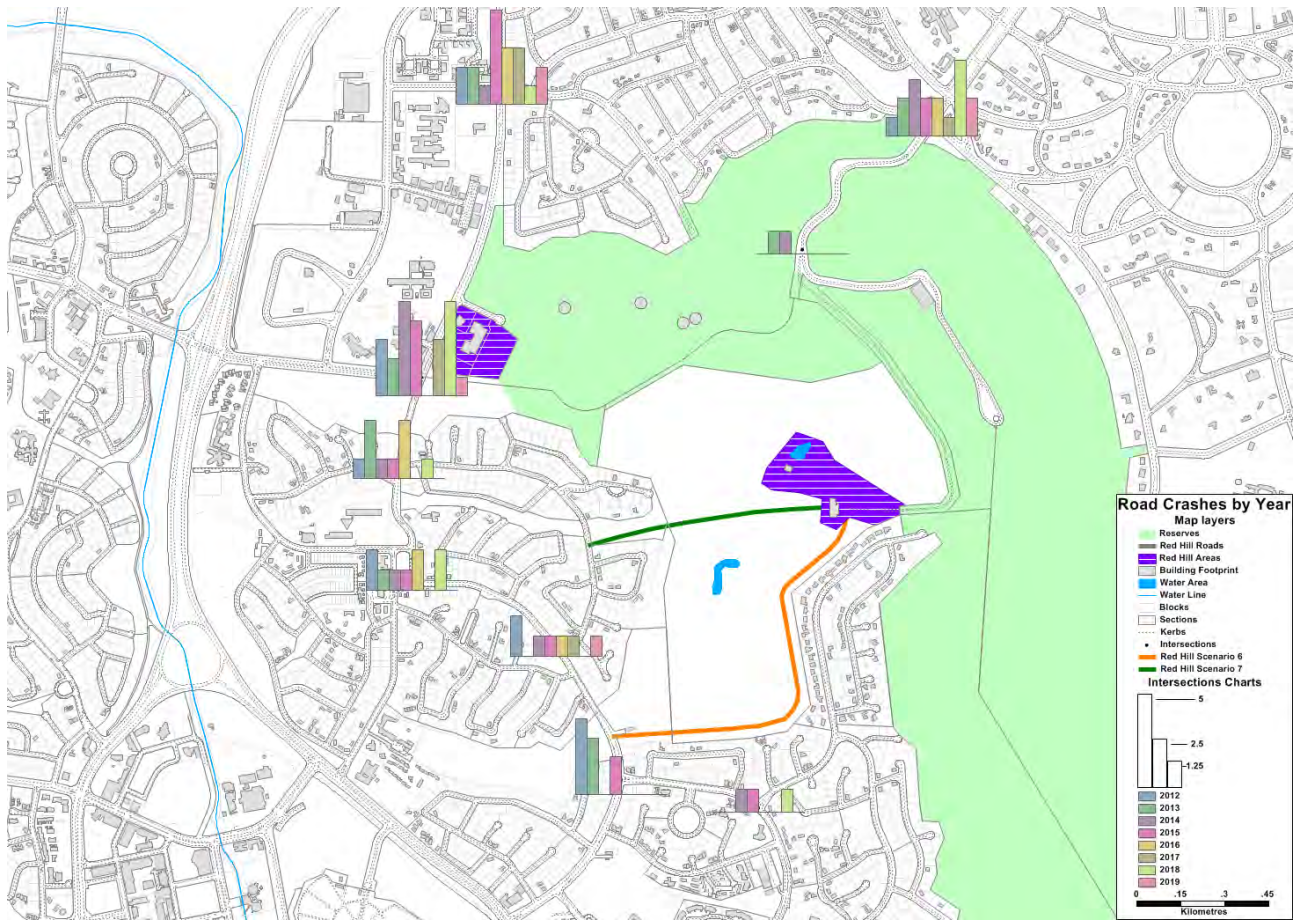


Figure 21: Road Crashes per Year (2012-2019)

Figure 22 shows the proportion of crashes that happen on wet or dry road surface. Most intersection show approximately one quarter of the crashes occurring on a wet road surface. Notable exceptions are the intersections of Brereton Street with Gilmore Crescent and Gowrie Drive with Red Hill Drive, where all crashes occurred on a dry surface. However, the number of crashes at these sites is very low.

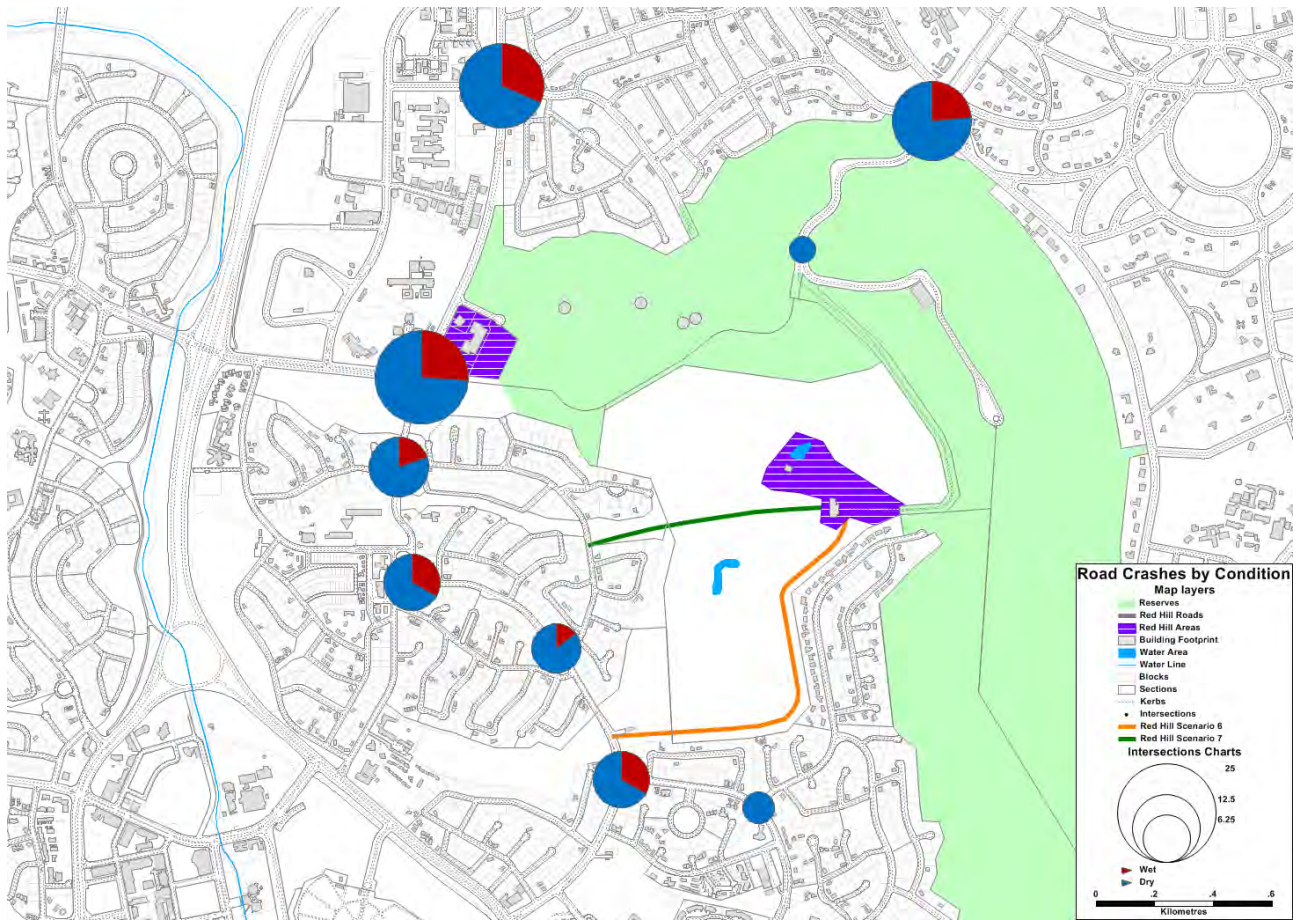


Figure 22: Road Crashes by Wet/Dry Condition (2012-2019)

Figure 23 shows the proportion of crashes that occur during the day and night. Most intersections have a small proportion of crashes at night. However, the intersection of Kitchener Street and Kent Street has more than half of its crashes occurring at night. It is recommended that further investigation be carried out at this location to determine if there is an issue with street lighting or some other factor that increases risk at night time.

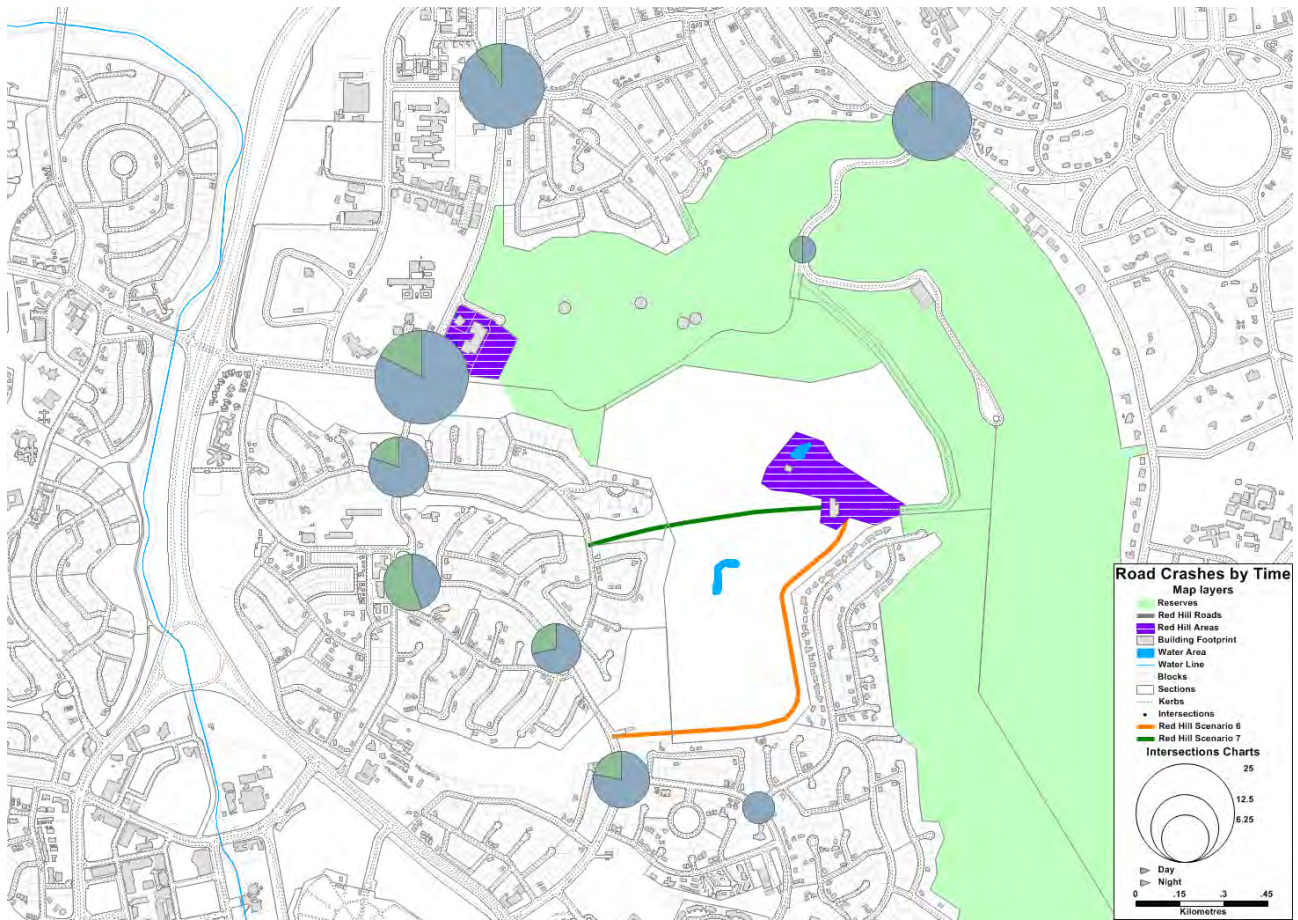


Figure 23: Road Crashes by Time of Day (2012-2019)

Figure 24 shows the proportion of crashes by severity. Most crashes result in property damage only. Larger intersections, with a higher number of vehicles and crashes, have a small number of crashes causing injury or fatality. The notable exception is the intersection of Gowrie Drive and Red Hill Drive. Only two crashes were recorded around this intersection between 2012 and 2019, but both resulted in injury.

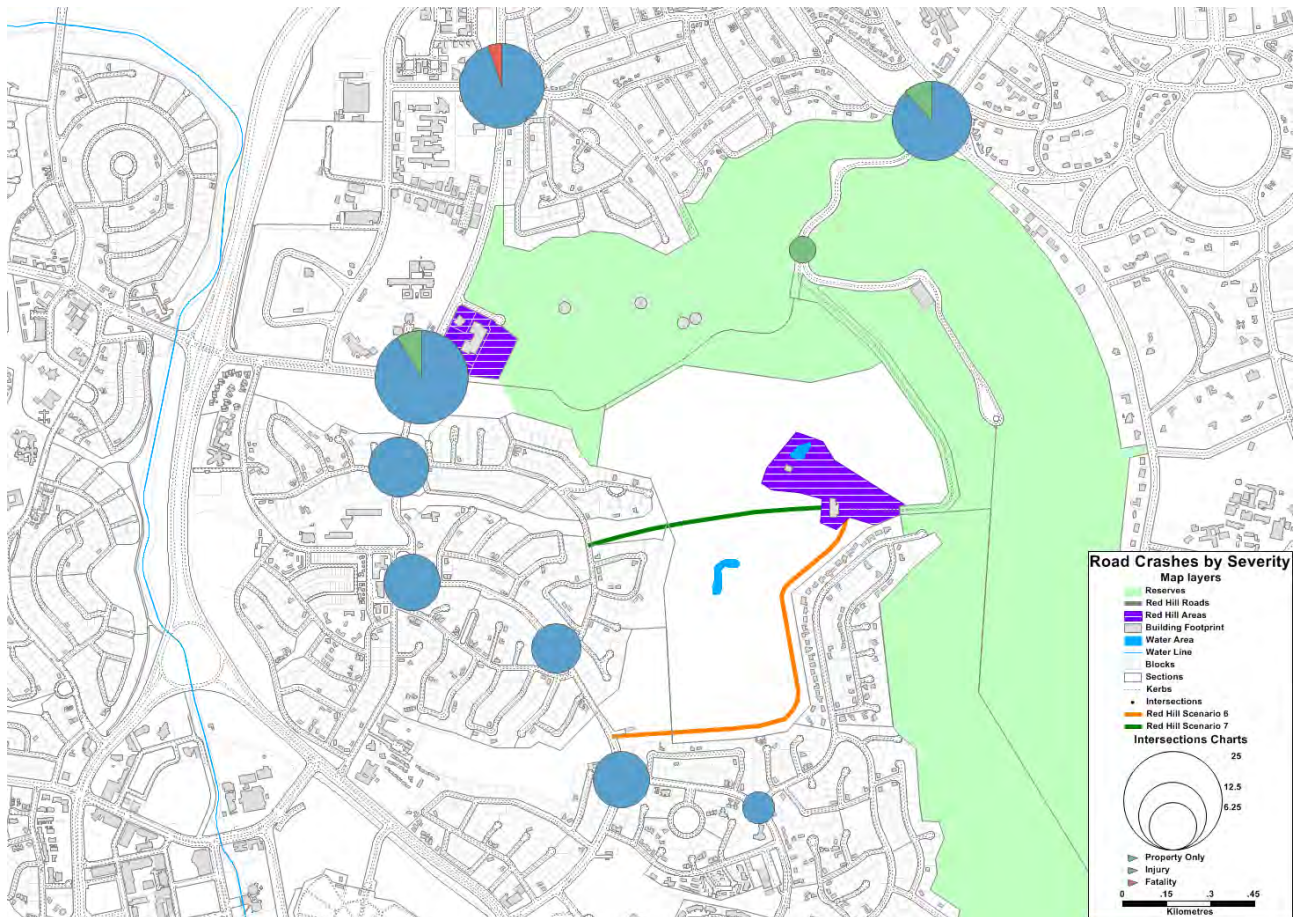


Figure 24: Road Crashes by Severity (2012-2019)

3.1 Summary

The brief crash analysis carried out in this study identified a number of issues that should be investigated further. The identified issues include:

- The intersection of Gowrie Drive with Red Hill Drive is the least safe intersection with 1.31 crashes per million vehicle movements. All the crashes recorded at this intersection resulted in injury, compared to the other intersections which had injury rates of less than 10%. If Gowrie Drive remains connected in the future, investigations should be carried out to identify changes to be made at this intersection to improve its safety. It is noted that the sample size at this intersection is very small.
- The intersection of Carruthers Street and Kent street has the most crashes over the analysis period and has the second highest number of crashes per million vehicle movements, at 0.52. The combination of high crash rate and high traffic volume suggest that further investigation is required.
- The intersection of Kitchener Street and Kent Street has an unusually high proportion of its crashes occurring at night. Further investigation should be undertaken to determine the cause and possible solutions.

4 Public Transport and Active Travel Assessment

4.1 Public Transport Coverage

Figure 25 shows the coverage of bus stops in the current Network 19. For this assessment, it is assumed that local stops have a coverage radius of 500 m and rapid stops have a coverage of 800 m, as per the distances in the Estate Development Code. Most of the area around the proposed development has good public transport coverage. Residents in Deakin, Hughes and Garran largely have access to local routes while some residents in the southern areas of Hughes and Garran have access to the rapid route, R6 – City to Woden via Barton. Routes 57 and 58 also run between City and Woden but do so via slower routes than R6.

The proposed development at Section 56, Red Hill does not have access to public transport, nor does the northern part of Brereton Street.

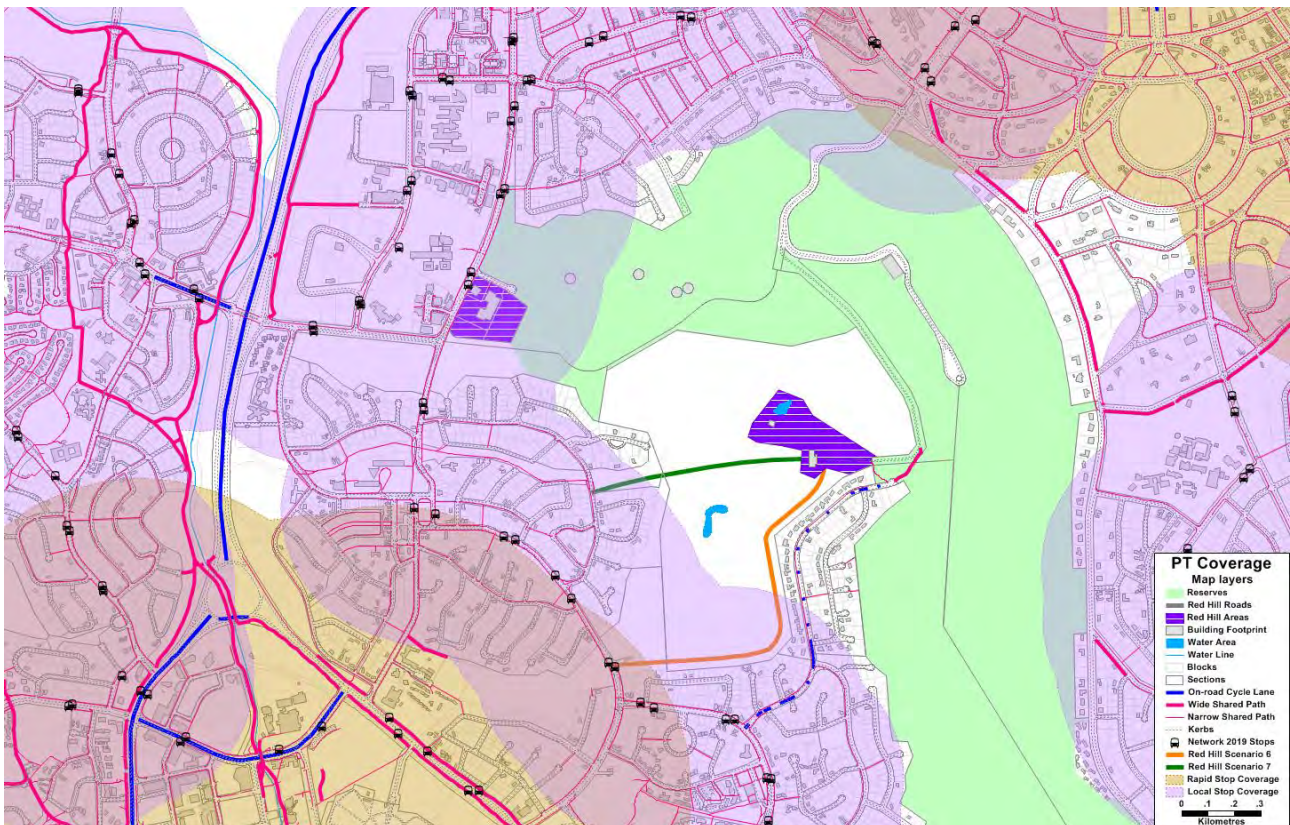


Figure 25: Network 19 Bus Stop Coverage

4.2 Active Travel Network

Figure 25 shows the active travel network around the proposed development area. Most higher order (collector or above) roads in the hierarchy appear to have a footpath/narrow shared path on at least one side of the road. However, many local streets have no footpath at all. Pedestrian access, particularly for people with limited mobility can be very difficult without a footpath. On local streets, verges are often not traversable due to soft surfaces or overgrown gardens and the can be cars parked on the road. Brereton Street has a footpath on only one side and it is often interrupted by driveway ramps, kerb ramps, hedges and garbage bins. It is recommended that the new road accessing the Federal Gold Club development area would have appropriate pedestrian facilities to allow easy walking.

The main off-road shared path network and on-road cycle lane network are connected to most areas via footpaths or rideable local streets.

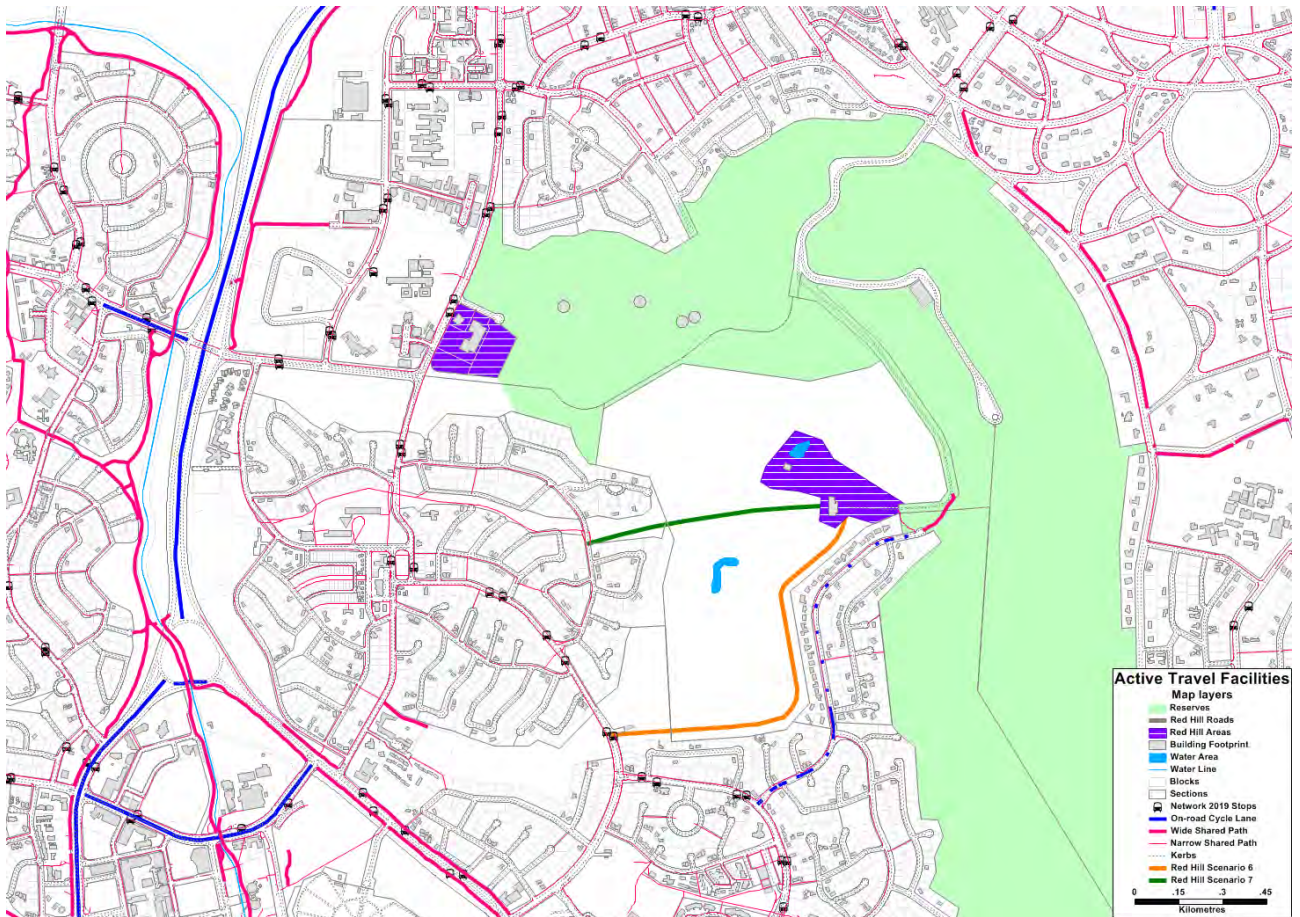


Figure 26: PT and Active Travel Facilities

5 Road Network Assessment

Turning movement counts were obtained for the following six intersections on Wednesday 27 June 2018 and 4 July 2018:

1. Mugga Way/Stonehaven Crescent – Gowrie Drive/Melbourne Avenue
2. Gilmore Crescent – Brereton Street
3. Kitchener Street – Gilmore Crescent
4. Kent Street – Carruthers Street
5. Kent Street – Strickland Crescent
6. Gowrie Drive – Red Hill Drive

Further surveys were carried out on 10 April 2019 for the following three intersections:

7. Kitchener Street – Birdwood Street
8. Kent Street – Birdwood Street
9. Kent Street – Kitchener Street

At all nine locations, the surveys were conducted for the AM (07:30 to 09:30) and PM (16:30 to 18:30) peak periods. The turn count reports are included in Appendix B.

Summary flow diagrams provided by Matrix (the traffic survey contractor) for the 2018 and 2019 AM and PM peak periods are shown in Figure 27 through Figure 30. A qualitative assessment of current intersection performance and intersection type, based on the count data, is included below.

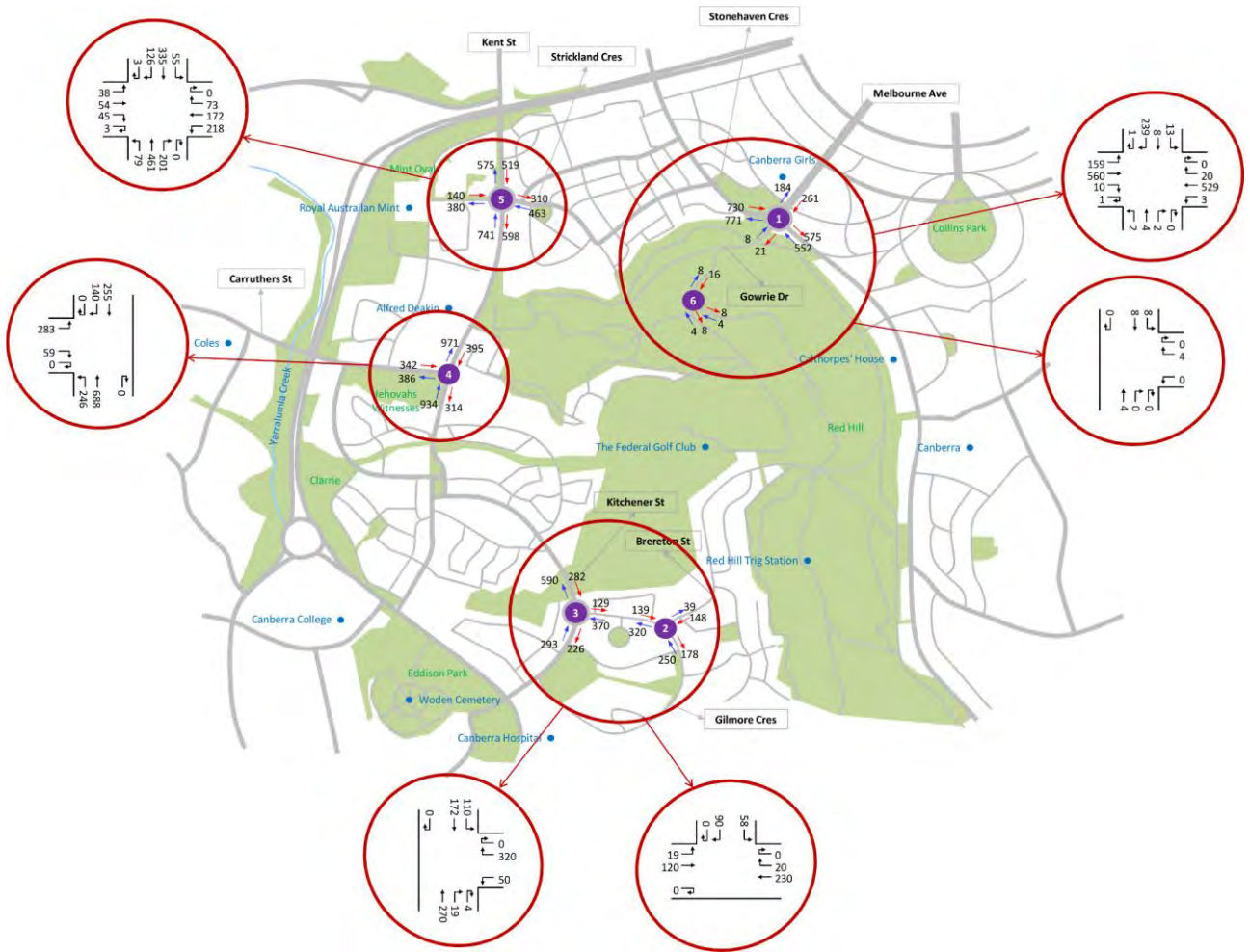


Figure 27: 2018 AM One-hour Peak Intersection Flows

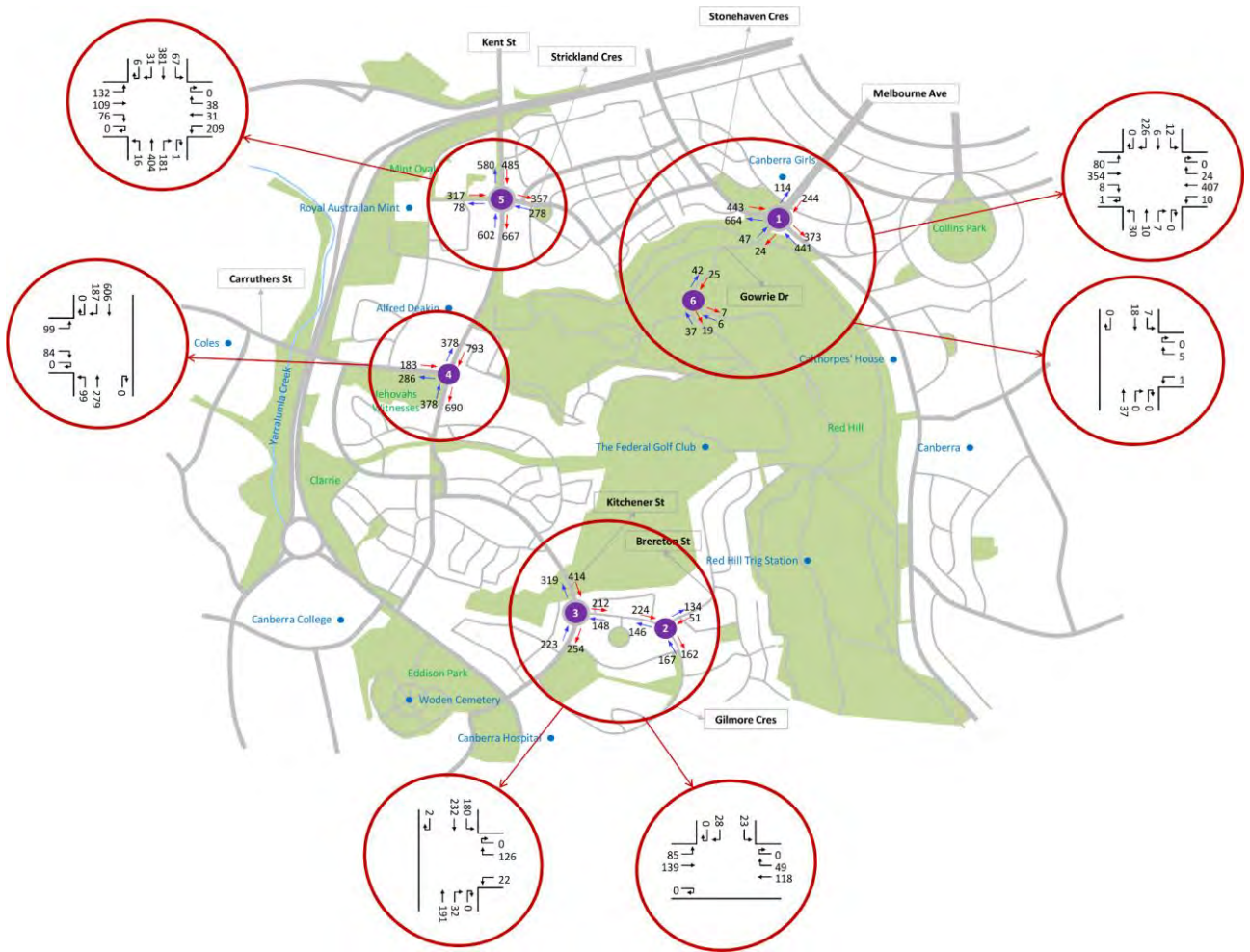


Figure 28: 2018 PM One-hour Peak Intersection Flows

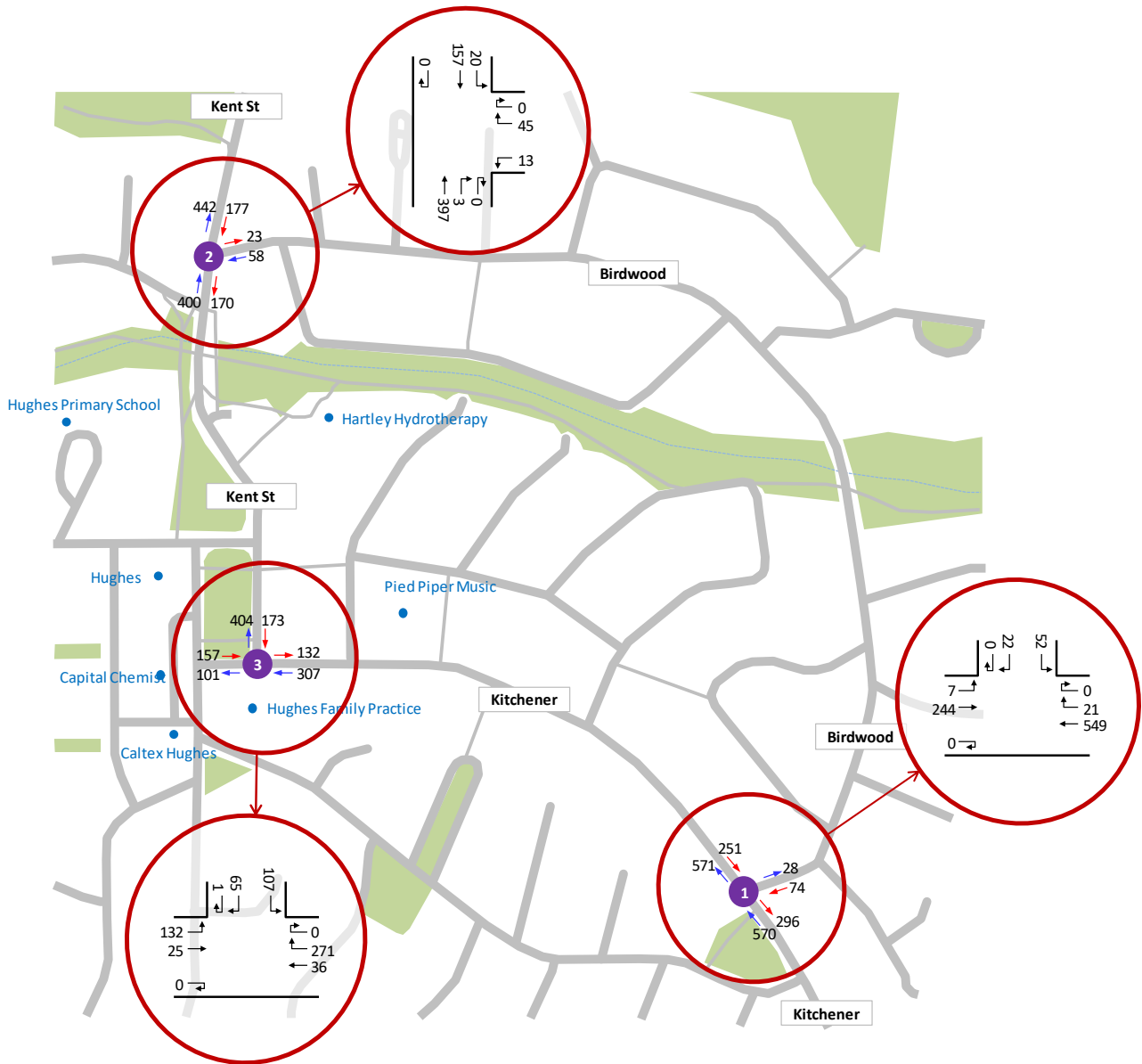


Figure 29: 2019 AM One-hour Peak Intersection Flows

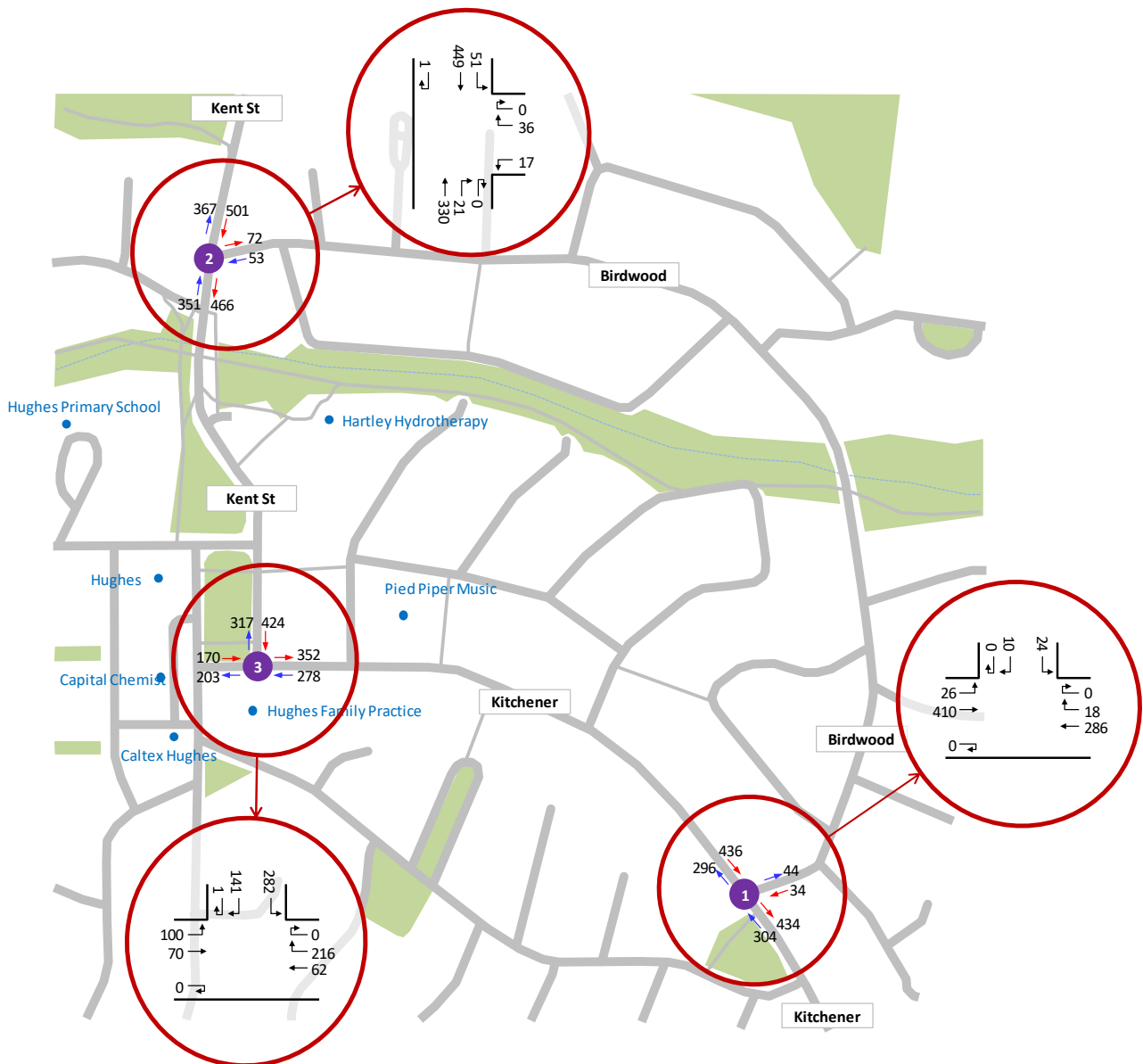


Figure 30: 2019 PM One-hour Peak Intersection Flows

Outside of the town centres, the CSTM is very general in its treatment of individual roads, with capacity dictated by lane count, speed and intersection density. The type of intersections and operating environment are too detailed for a strategic transport model. As such, in some cases the capacity defined in the CSTM will differ from the observed capacity of a road. A particular case that is present in this study is Kent Street, which carries close to 700 vehicles/hour in the 2031 scenario models (its defined capacity in the CSTM), while it is observed to carry almost 1,000 vph in the 2018 AM peak. This might suggest that the road is close to or at capacity in 2018, however the CSTM is best used to determine differences in traffic flow between two scenarios rather than absolute traffic volumes.

5.1 Intersections

5.1.1 Mugga Way/Stonehaven Crescent – Gowrie Drive/Melbourne Avenue

The primary traffic flow at this intersection is east-west along Mugga Way and Stonehaven Crescent. Very little traffic uses Gowrie Drive. The CSTM modelling shows an insignificant amount of additional traffic in Scenarios 6 and 7, which would have no impact at this intersection. Austroads *Guide to Traffic Management* suggests that a roundabout at this location is likely to be an appropriate solution, offering low delays and some traffic calming. However, the very heavy flows along Stonehaven Crescent in both AM and PM peak periods could lead to increased delay on the Gowrie Drive and Melbourne Avenue approaches. Further monitoring and assessment of this intersection might be required.

5.1.2 Gilmore Crescent – Brereton Street

The traffic at this intersection is reasonably low, with 2018 AM and PM peak volumes of 537 and 442 vehicles respectively. The proposed development causes no increase in traffic in either Scenario 6 or 7. Austroads suggests that a give way control at this location is appropriate. Traffic volumes at this intersection are quite low in both peaks and there are not expected to be any significant delays.

5.1.3 Kitchener Street – Gilmore Crescent

The traffic at this intersection is moderate, with 2018 AM and PM peak volumes of 945 and 785 vehicles respectively. Some additional traffic uses this intersection in Scenarios 6 and 7, but the increase is modest and should not have a significant impact. Austroads suggests that a roundabout is appropriate at this location. The relatively balanced traffic volumes on each approach will reduce the likelihood that a single approach would dominate the intersection and increase delays on other approaches.

5.1.4 Kent Street – Carruthers Street

There is currently a fairly significant amount of traffic using this intersection. The total 2018 AM and PM peak volumes are 1671 and 1354 respectively. The right turn out of Carruthers Street is quite small which might reflect the difficulty of executing this movement during peak periods. Signalisation of this intersection would therefore likely change the pattern of turning movements by improving performance of those that currently have low priority. Austroads suggests that priority control of this intersection is not appropriate and it would be better managed with signals or a roundabout. The crash analysis also suggested that this intersection is not operating safely and some intervention is required, both for performance and safety reasons.

5.1.5 Kent Street – Strickland Crescent

There is currently a large amount of traffic using this intersection considering its design. The total 2018 AM and PM peak volumes are 1,863 and 1,682 respectively. It is likely operating at or close to its capacity during the peak periods, and the additional traffic generated by the Section 66 development could potentially impact the performance, although the forecast additional traffic volumes are low. While the intersection control type is appropriate, according to Austroads, signalisation of this intersection could improve capacity and performance. Signalisation would also improve pedestrian and bicycle access through the area, which is important so close to the Deakin employment area.

5.1.6 Gowrie Drive – Red Hill Drive

There is very little traffic at this intersection – 24 vehicles in 2018 AM and 68 in 2018 PM. The Wednesday midday period saw 81 vehicles using the intersection, of which half are travelling to or from the lookout at the end of Red Hill Drive. This very low level of traffic contributes to the low number of crashes. However, the crash rate per vehicle and crash severity is much higher than other intersections in the area and interventions at the intersection should be investigated. In both Scenario 6 and 7, Gowrie Drive is closed, which would remove any risks at this intersection. Austroads suggests that the intersection is best controlled by a stop or give-way sign.

5.1.7 Kitchener Street – Birdwood Street

The traffic surveys showed little traffic at this intersection in 2019. It is unlikely that any vehicle at the intersection would experience significant delay now or in the future. Austroads suggests that priority control of this intersection is appropriate. There is a small amount of additional traffic on Kitchener Street in Scenarios 6 and 7, but this is unlikely to cause any significant issues.

5.1.8 Kent Street – Birdwood Street

The traffic at this intersection is moderate, with 2019 AM and PM peak volumes of 635 and 904 vehicles respectively. Vehicles turning out of Birdwood Street, particularly in the PM peak period, could experience some delays. The developments in Scenarios 6 and 7 would lead to a small increase in traffic along Kent Street, which could further increase delays. Austroads suggests that priority or roundabout control at this location would be appropriate. Further monitoring and assessment might be required to confirm that delays are acceptable.

5.1.9 Kent Street – Kitchener Street

The traffic at this intersection is moderate, with 2019 AM and PM peak volumes of 637 and 872 vehicles respectively. The CSTM modelling showed that a small amount of additional traffic would use this intersection in both Scenarios 6 and 7. However, the small roundabout should have sufficient capacity. Austroads suggests that roundabout control is appropriate at this location.

5.2 Roads

5.2.1 Brereton Street

The intersection counts indicate 2018 AM and PM peak volumes of 187 and 185 vehicles respectively, or approximately 1,860 vehicles per day. There would be no additional traffic on this road in either Scenario 6 or 7. Brereton Street has sporadic cycle lane markings and a footpath on one side. However, the footpath is narrow and often interrupted by driveway ramps and pram ramps. Close hedges along one side of the footpath mean that it can also be blocked by wheelie bins on rubbish collection day. There are no significant capacity concerns on this road.

5.2.2 Gilmore Crescent

Gilmore Crescent between Brereton and Kitchener Streets carries approximately 480 vehicles in 2018 AM and 365 in 2018 PM, or an approximate daily volume of 4,220 vpd. No additional traffic uses Gilmore Crescent in any of the future scenarios tested and there are no capacity concerns in this location.

5.2.3 Kent Street

In both peak periods, traffic demand is greatest between Carruthers Street and Strickland Crescent, coinciding with the concentration of land uses along this section of the road. The additional land use at Section 66 Deakin accesses the network between these two points, adding a small load to a section of road that is likely already congested.

The counted traffic volumes on this section of Kent Street exceed the nominal capacity of Kent Street in the CSTM by up to 270 veh/hr northbound and 90 veh/hr southbound, indicating that it operates somewhat more efficiently in reality than the basic assumption for this category of road in the CSTM, which would be due to a number of factors, not least being the level of conflict with driveways and intersecting streets. It is likely that increasing the capacity to reflect this would continue to show it operating at capacity, however this would have to be tested to be sure.

5.2.4 Birdwood Street

In 2019, Birdwood Street carried between 81-102 veh/hr in the AM peak and 78-125 veh/hr in the PM peak. In the future scenarios, Birdwood Street would carry slightly more traffic in Scenario 6 and slightly less traffic in Scenario 7. The volumes in this location do not suggest any capacity issues, except for the possible congestion at the intersection of Birdwood Street and Kent Street, as discussed earlier.

5.2.5 Kitchener Street

Kitchener Street, between Kent Street and Birdwood Street, carried 439-822 veh/hr in the 2019 AM peak and 630-732 veh/hr in the 2019 PM peak. It appears that some local traffic management has been implemented by line-marking narrow lanes, presumably to manage speed. The volumes along Kitchener Street do not suggest serious capacity concerns, although there could be minor delays to side streets. The traffic increases modelled in the future scenarios do not suggest any serious capacity or performance issues.

6 Conclusion

6.1 Summary

Each proposed development results in a modest increase in traffic at a local level, with no major impacts coming from proposed access points to the road network. Section 56, Red Hill generates a minimal amount of additional traffic and thus its impact on the network is minor. Connecting to either Birdwood Street or Kitchener Street is unlikely to have any substantial impact on congestion.

The CSTM suggests that Kent Street will already be close to its nominal capacity in 2031. The modest additional traffic generated by Section 66, Deakin results in some minor traffic diversions, particularly along Denison Street in the PM peak, as existing Kent Street traffic is displaced by the new development traffic and the volume increase on Kent Street reflects this redistribution. This will have implications for many of the intersections on Kent Street, particularly the low speed roundabouts at Strickland Crescent and Equinox and the give-way intersection with Carruthers Street. If there is significant through traffic on Kent Street heading towards the Adelaide Avenue eastbound on-ramp, traffic calming measures could encourage these vehicles to shift to Yarra Glen.

It is likely that the Kent Street – Carruthers Street intersection would require signal control, however the Kent Street – Strickland Crescent intersection is situated amongst residences and this might cause some complications. The road reserve appears capable of supporting the necessary infrastructure, but the light from the signals themselves and the constant sound of the audio-tactile pedestrian pushbuttons would cause problems for the surrounding residents. However, this might be acceptable due to the improvement to pedestrian safety it would provide. Traffic calming could be achieved through the use of rubber speed cushions, which could be designed to reduce the attractiveness of the route for general traffic while minimally impacting buses or emergency vehicles.

A preliminary crash analysis was conducted using crash data records obtained from the dataACT Open Data Portal. The analysis indicated that the intersection of Gowrie Drive with Red Hill Drive has the highest crash rate. For both scenarios tested in this report, Gowrie Drive is assumed to be closed, which would remove traffic from this dangerous intersection. The location with the next highest crash rate is the intersection of Carruthers Street and Kent Street with 0.55 crashes per million vehicle movements. This intersection has high traffic volumes and requires turning vehicles to cross multiple lanes of traffic. Interventions at this location should be considered.

A brief assessment of crashes over time, by road condition, by time of day and by severity was also carried out. No intersection showed a clear trend of increases in crashes but the intersection of Kitchener Street and Birdwood Street appeared to show a decrease since 2012 and no crashes were recorded since 2015. No intersection showed a clear increase in crashes during wet weather. The intersection of Kent Street and Kitchener Street showed an abnormally high proportion of crashes at night, which might indicate need for better lighting at this location. While all other intersection had less than 10% of crashes resulting in injury or fatality, the intersection of Gowrie Drive with Red Hill Drive had 100% of crashes resulting in injury. While this is an extremely small sample size, the risks at this intersection are clearly demonstrated.

Access to public transport for the proposed development and surrounding areas was assessed using the new Network 19, which came into effect on 29 April, 2019. Section 66, Deakin has a bus stop adjacent to the development, providing access to Civic and Woden. Section 56, Red Hill has no access to public transport. The areas surrounding the development generally have reasonable access but the northern part of Brereton Street does not have any access.

The active travel network around the proposed developments is well connected. However, the footpath on Brereton Street providing access to Section 56, Red Hill is narrow and has many interruptions. It is recommended that good walking and cycling access be provided on either of the new roads proposed in Scenario 6 or 7.

For the intersections assessed in this report, the following comments were made:

- The Mugga Way/Stonehaven Crescent – Gowrie Drive/Melbourne Avenue intersection performance is unlikely to be affected by the proposed development and access in the scenarios tested in this report. Unbalanced flows at this intersection could lead to high delays for some approaches and further monitoring or assessment of this intersection might be required.
- The Gilmore Crescent – Brereton Street intersection currently has a low level of traffic and would experience no change in the scenarios tested in this report.

- The Kitchener Street – Gilmore Crescent intersection currently carries moderate levels of traffic and its volumes would only increase slightly in the scenarios tested in this report. There are not expected to be any issues at this location.
- The Kent Street – Carruthers Street intersection currently experiences a significant amount of traffic, with performance for low priority movements likely to be poor during the peak periods and risky behaviour might be increased. Austroads standards suggest that an intersection of this type should not be priority controlled and signalisation should be considered to better control the performance and safety at this intersection.
- The Kent Street – Strickland Crescent intersection also currently experiences a significant amount of traffic, especially considering its current roundabout configuration. It is likely operating close to its capacity during the peak periods and the additional traffic generated by Deakin Section 66 could be enough to push it to an unacceptable level of performance. Signalisation might be necessary to manage performance and improve access for pedestrians and cyclists in the area.
- The Gowrie Drive – Red Hill Drive intersection carries very little traffic. The busiest period is the Wednesday midday golf course peak of 81 vehicles per hour, of which only half are travelling to or from the golf course. This very low level of traffic likely contributes to the low number of accidents, although the accident rate is very much higher than other intersections in the area. For the scenarios tested in this report, it is assumed that Gowrie Drive is closed. If this does not occur, interventions should be undertaken to improve safety at this location.
- The intersection of Kitchener Street and Birdwood Street is generally low and only increases slightly for both scenarios tested. It is unlikely that any interventions would be required at this intersection.
- Traffic volumes at the intersection of Kent Street with Birdwood Street are moderate, and there could be some delays for traffic turning out of Birdwood Street, particularly in the PM peak. If Scenario 6 is adopted, some upgrades at this intersection might be necessary.
- Traffic at the intersection of Kent Street and Kitchener Street is moderate and a small amount of additional traffic would use this intersection in both scenarios. However, it is likely that the existing intersection would have sufficient capacity.

For the road sections assessed in this report, the following comments were made:

- Brereton Street carries very little traffic, currently fewer than 2,000 vehicles per day. No additional traffic would use this road in either scenario tested in this report.
- Gilmore Crescent between Brereton and Kitchener Streets currently carries just over 4,000 vpd, by which classification it operates as a major collector. No additional traffic would use this road in either scenario tested in this report.
- Kent Street carries a lot of traffic, with demand greatest between Carruthers Street and Strickland Crescent, due to the concentration of trip generators within this section. The additional land use at Section 66 Deakin accesses the network between these two points, adding additional load to a section of road that is likely already congested.
- Birdwood Street, while narrow, does not currently carry substantial traffic and the development scenarios would not significantly increase traffic. The volumes on this road do not suggest any capacity issues, except for the possible congestion at the intersection of Birdwood Street and Kent Street.
- Kitchener Street carries a moderate amount of traffic, and some traffic calming has already been implemented. In the scenarios tested in this report, there is a small increase in traffic but this is not expected to lead to any serious performance issues.

6.2 Challenges

The following challenges are noted:

- Kent Street traffic is heavy, which is likely to cause problems at some intersections, particularly Carruthers Street and Strickland Crescent

- The Section 66 Deakin development would increase delay on Kent Street and lead to a small diversion in traffic onto Denison Street

A map of the challenges is included in Figure 31.

6.3 Recommendations

Based on the outcomes of the transport modelling and analysis, SMEC recommends the following:

Investigation of upgrade options for intersections on Kent Street, to address both performance and safety concerns, including:

- Assess lighting at the intersection of Kent Street and Kitchener Street
- Assess capacity improvements at Birdwood Street, Carruthers Street, Strickland Crescent
- Investigation of options to improve the performance and/or reduce the attractiveness of Kent Street
- Closure or upgrade of the intersection of Gowrie Drive and Red Hill Drive (dependant on whether Scenario 6, 7 or another option is selected)
- The new roads provided for Scenario 6 or 7 should include good active travel facilities
- Cost estimates for road and intersection upgrades

A recommendations map is included in Figure 32.

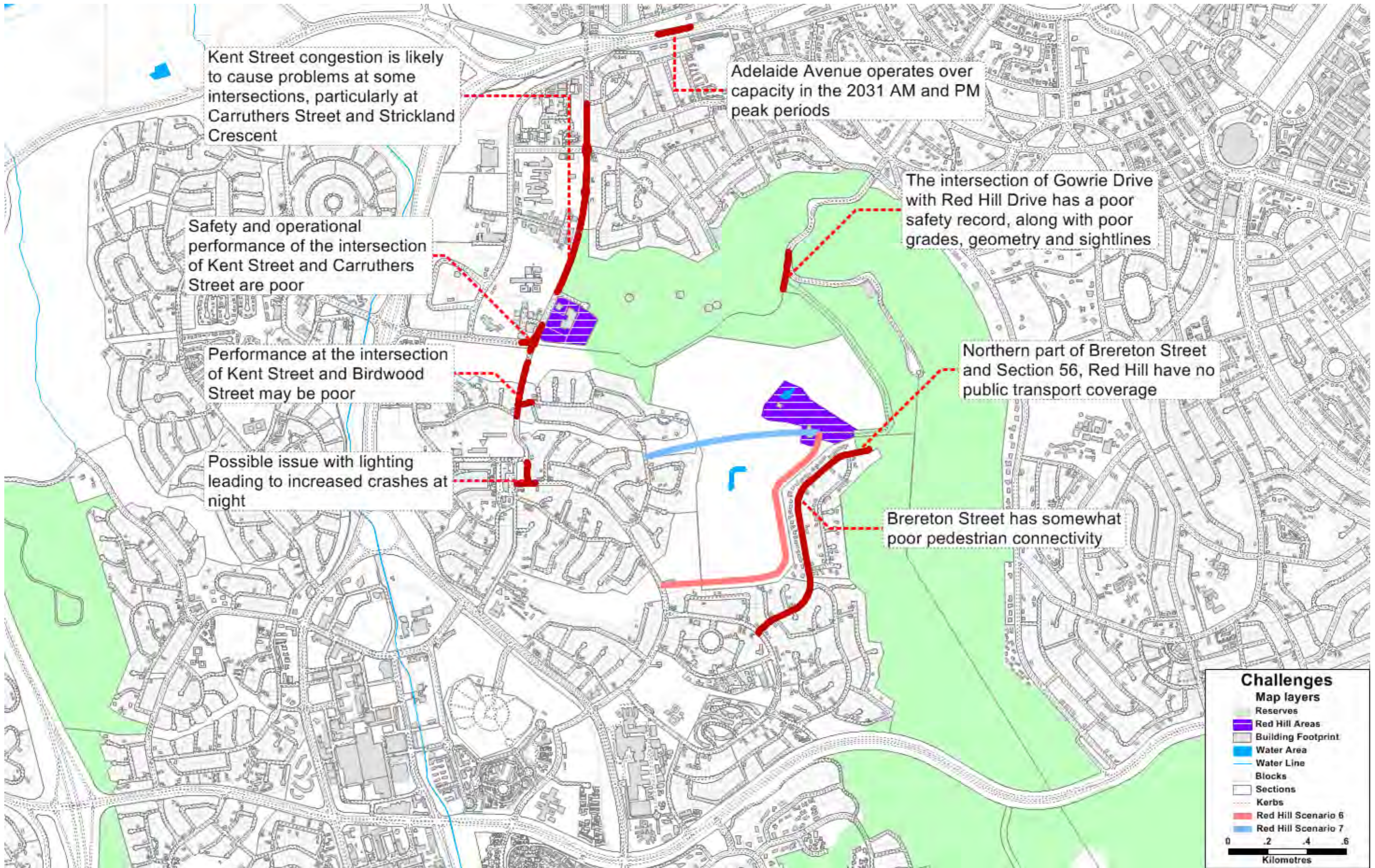


Figure 31: Red Hill Reserve Surrounds Challenges

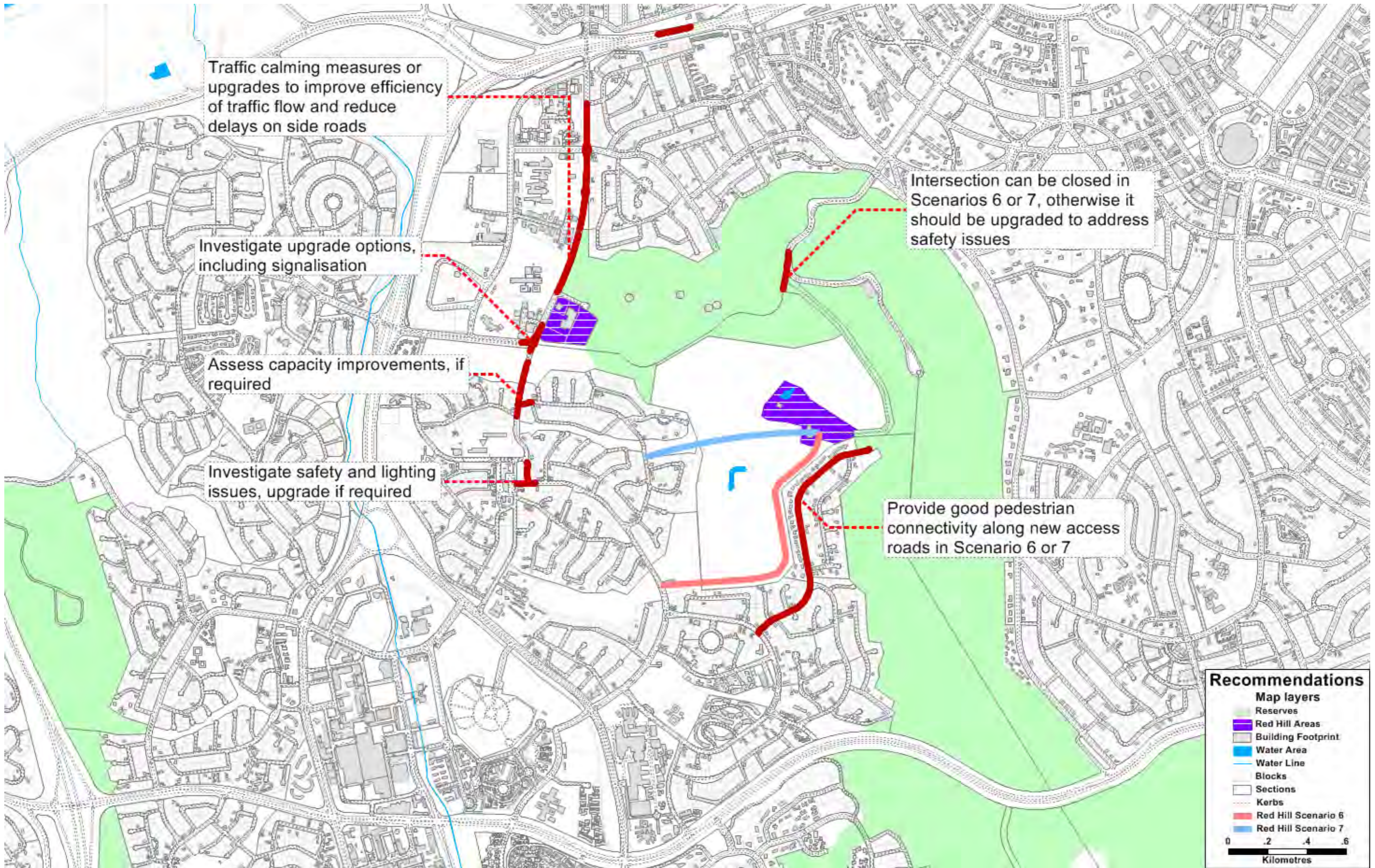


Figure 32: Red Hill Reserve Surrounds Recommendations

7 References

Orthongthed, Wang & Legaspi 2013. *Estimating cost expansion factors in the Sydney urban and NSW rural road networks for economic evaluation of road projects*. Australasian Transport Research Forum 2013 Proceedings. Available: http://atrf.info/papers/2013/2013_orthongthed_wang_legaspi.pdf

Appendix A Future Road Network Assumptions

2021 Assumed Road Network Improvements

Network Item	Description
Taylor Local Roads	Added
Horse Park Drive Duplication	Duplication of Horse Park Drive between Federal Highway and Roden Cutler Drive- for 2018 completion. Anthony Rolfe Avenue to Well Station Drive
Hibberson Street pedestrian and light rail zone	Pedestrian and light rail only zone between Kate Crace Street and Gungahlin Place
Hibberson Street one-way shared zone	Shared zone between pedestrians and vehicles on Hibberson Street between Gungahlin Place and Gozzard Street
Manning Clark Crescent Extension	New road connecting Flemington Road to Anthony Rolfe Avenue
Ernest Cavanagh Street Extension	Extension of Ernest Cavanagh Street from Hinder Street to Manning Clark Crescent
The Valley Avenue Extension and Manning Clark Crescent Extension	Extension of The Valley Avenue from Kate Crace Street to Manning Clark Crescent and the extension of Manning Clark Cres from Flemington Rd to Anthony Rolfe Avenue
New road to the south of The Valley Avenue	Following up SLA (Darren Benson) for details where it connects to including extension of Gungahlin Place and 4 th leg of Valley Avenue/Kate Crace St intersection (both intersections now signalised)
Light Rail Stage 1	Light rail from Gungahlin to City
Flemington Road changes due to Light Rail Stage 1	Lane configuration changes between Well Station Drive and Federal Highway
Throsby Local Roads	Added (Copied from speed zones shapefile)
Gundaroo Drive Duplication Stage 1	Duplication between Gungahlin Drive and Mirrabai Drive/Anthony Rolfe Avenue
Gundaroo Drive Duplication Stage 2	Duplication between Gungahlin Drive and Barton Highway Roundabout.
Kuringa Drive/Owen Dixon Drive Signalisation	Intersection signalisation
Lawson Local Roads	Added (Copied from speed zones shapefile)
University of Canberra Hospital Access Road off Aikman Drive	A new road and associated intersection works to provide access to the hospital
Aikman Drive Duplication	Duplication between Ginninderra Drive and Emu Bank
Southern Cross Drive/Starke Street Signalisation	Intersection signalisation
Dickson Group Centre intersection upgrade	Antill Street/Cowper Street and Cowper Street/Dickson shops access road works, plus signalisation of Antill St/Badham St

Network Item	Description
Cape Street Extension	Extension of Cape Street from Challis Street to Northbourne Avenue – (Bus Access Only)
Northbourne Avenue/ London Circuit Intersection	Intersection upgrade
Parkes Way to Allara Street Exit	Added
West Belconnen Stage 1	New arterial road (Road 100) northwest of Stockdill Drive including multiple intersections located along the new arterial road. Also include other works proposed along Drake Brockmann Drive and Stockdill Drive
John Gorton Drive Stage 3	New roadworks providing access to Whitlam including signalisation of John Gorton Drive/William Hovell Drive/Coulter Drive intersection. (John Gorton Drive-William Hovell Drive Intersection Layout awaiting)
Molonglo Roads Stage 2	New roadways providing access to residential development
Weston Creek Group Centre	Brierly Street and Trenerry Square upgrade
Launceston Street / Irving Street Signalisation	Intersection signalisation
Cotter Road Duplication	Duplication from Tuggeranong Parkway to Yarralumla Creek
Dudley Street upgrade	Dudley St upgrade and Canberra Brickworks precinct access road from Dudley Street via a roundabout to boundary of new estate development
IKEA Northern Access Road	Mustang Avenue extension to north of IKEA called 'Dharaban Road'
Majura link road (Spitfire Avenue)	Link road between Majura Road and Majura Parkway Construction called 'Meddhung Road'
Tomsitt Drive Extension	Connect Tomsitt Drive to Yass Road (Ellerton Drive) in Queanbeyan
Monaro Highway – additional northbound lane	From Isabella Drive to Lanyon Drive
Hindmarsh Drive intersection upgrades	Signalisation at intersection with Launceston Street and Eggleston Crescent
Ashley Drive Duplication	Duplication of Ashley Drive from Erindale Drive to Johnson Drive
Anketell Street Upgrade	
Googong/Tralee Link	Connect Googong/Tralee area to Lanyon Drive West of Tomsitt Street Agreed

2026 Assumed Road Network Improvements

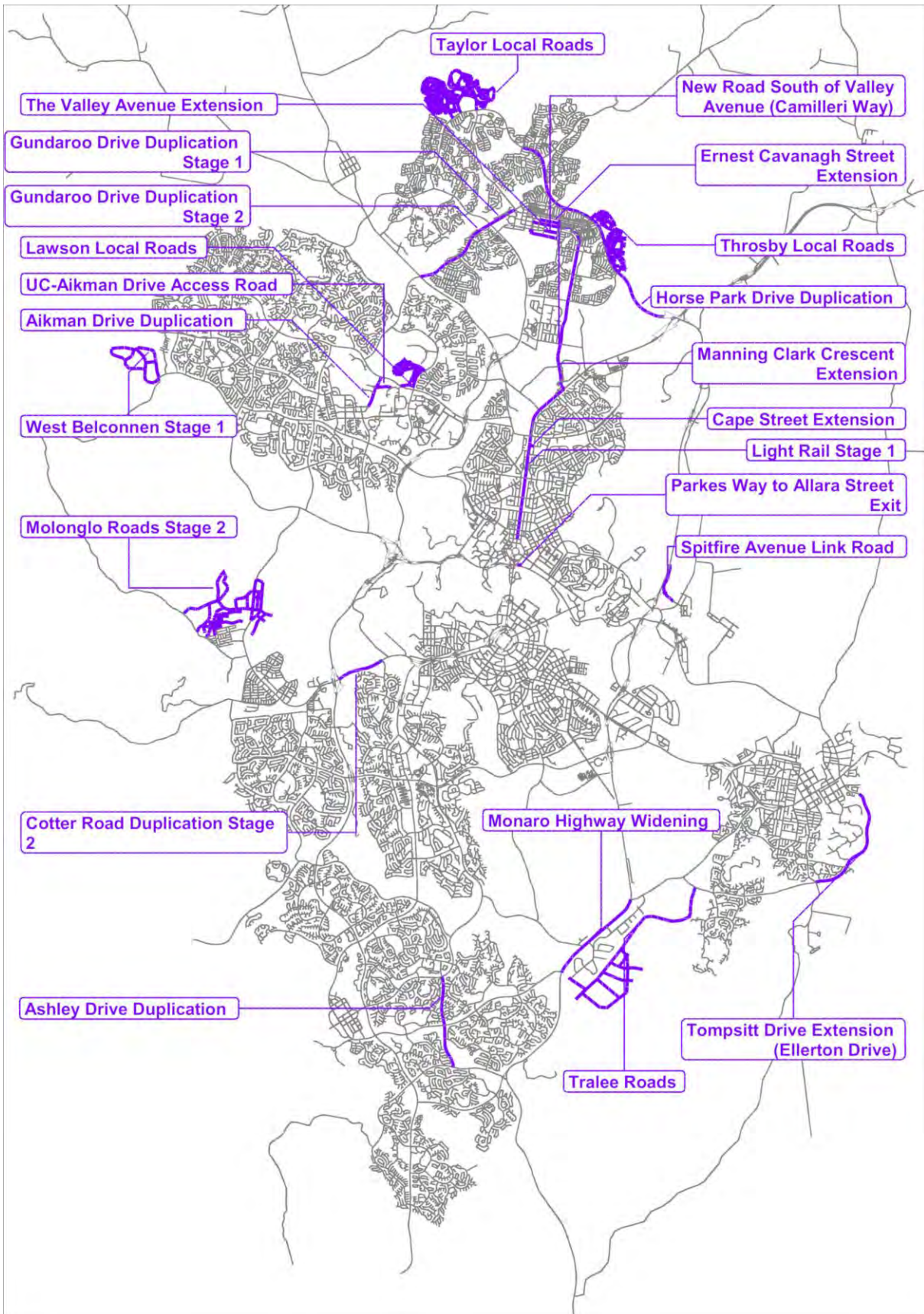
Network Item	Description
Horse Park Drive Duplication	From Mulligans Flat Road to Roden Cutler Drive
Mirrabei Drive Duplication (parts)	From Paul Coe Crescent to Yama Way (Mirrabei Drive corridor upgrade (including Shoalhaven intersection signalisation))
Old Well Station Road Upgrade	Old Well Station Road Upgrade between Federal Highway and Morisset Road
Sandford/Morisset Street Extension	Extension of Morisset Road to Federal Highway (Watson roundabout)
Nudurr Drive Extension	Connect Nudurr Drive from Grampians Street to Gungahlin Drive
Mouat Street, Lyneham	Additional lane for public transport including queue jump lane. (Mouat Street duplication (between Challis Street & Ginninderra Drive))
William Slim Drive Upgrade	Duplication from Barton Highway to Ginninderra Drive
Belconnen Way/ Springvale Drive Signalisation	Intersection signalisation
William Hovell Drive augmentation	New roadworks duplicating William Hovell Drive from John Gorton Drive to Drake Brockman Drive (William Hovell Drive northbound widening (Drake-Brockman Dr to Coppins Crossing Road))
John Gorton Drive Extension and Molonglo River Bridge	John Gorton Drive Arterial Road Approaches and Bridge Crossing of the Molonglo River
Fairbairn Avenue – additional westbound lane	From Majura Road to Majura Parkway
Fairbairn Avenue Augmentation	Additional Lane on Fairbairn Avenue Between Majura Parkway and Nomad Drive (Fairbairn Avenue additional lane (Majura Parkway to Majura Road))
Fairbairn Avenue Duplication	Duplication from Treloar Crescent to Majura Parkway (Fairbairn Avenue Duplication (between Majura Parkway and Northcott Drive))
Pialligo Avenue Duplication	Duplication between Airport (Brindabella Circuit) and NSW Border (including Sutton Road Drivers Training Centre entry) (East- West Corridor Study/Pialligo Avenue Duplication (Airport to NSW Border))
Monaro Highway – additional lanes	From Canberra Avenue to Johnson Drive (both directions) (Monaro Highway Duplication from Canberra Ave to Johnson Dr as part of North-South Corridor study)
Cotter Road – Stage 3	From Dunrossil Dr to Adelaide Avenue (including the Mint Interchange) – by 2031 to link with Light Rail

Network Item	Description
Tuggeranong Parkway – additional northbound lane	From Cotter Road to the Glenloch Interchange
Athllon Drive Duplication	Athllon Drive Duplication between Sulwood Drive and Drakeford Drive –
Erindale Drive Duplication	From Ashley Drive to Drakeford Drive
Tharwa Drive Duplication	Tharwa Drive Duplication between Woodcock Drive and Pocket Avenue

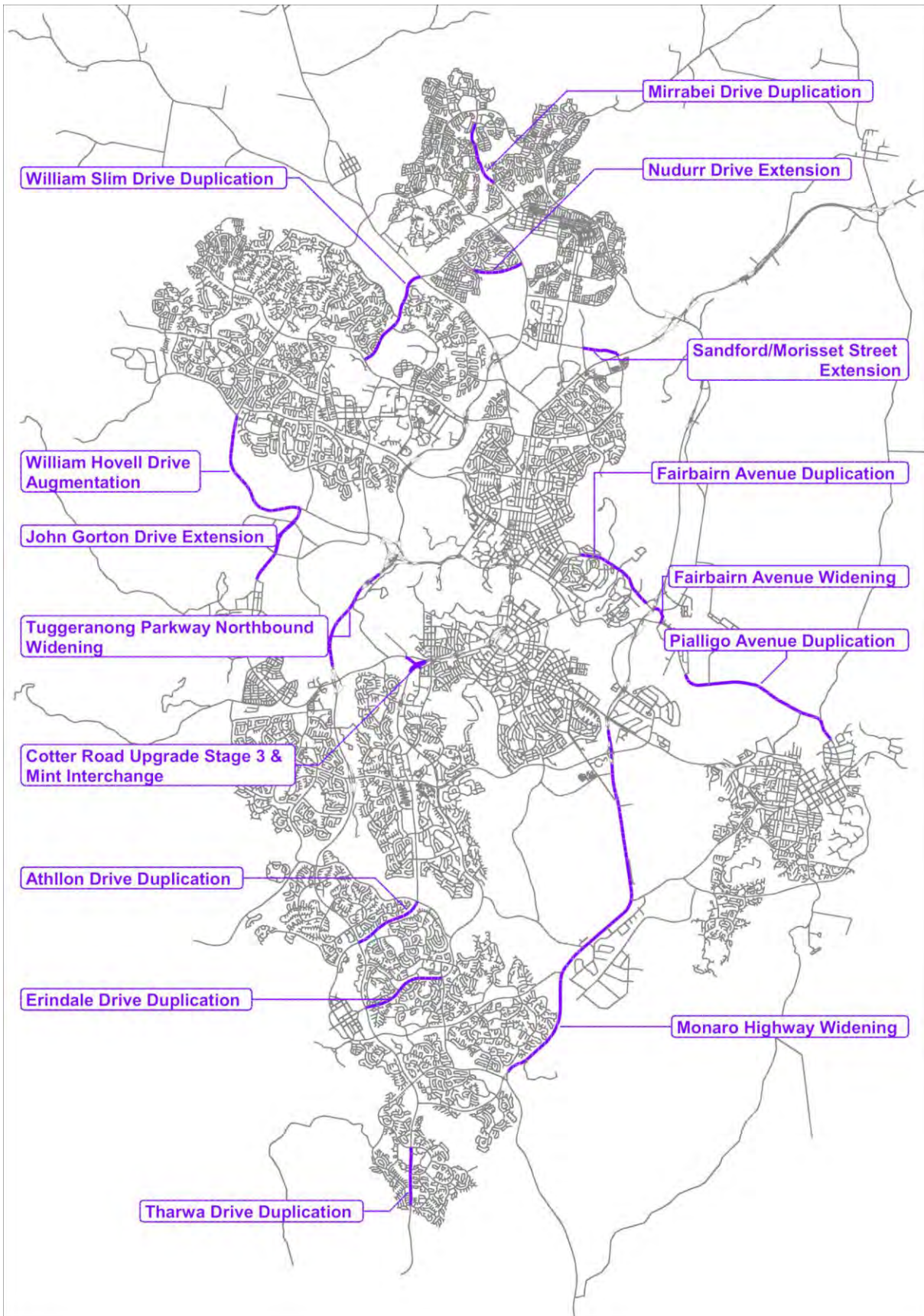
2031 Assumed Road Network Improvements

Network Item	Description
Horse Park Drive Duplication	From Roden Cutler Drive to Clarrie Hermes Drive
CSIRO Access Roads	Access roads to CSIRO development; no access via Barton Highway
Gungahlin Drive Duplication	From Gundaroo Drive to Horse Park drive (Gungahlin Drive augmentation (Horse Pak Drive to The Valley Avenue))
Clarrie Hermes Drive Duplication	From Horse Park Drive to the Barton Highway (Clarrie Hermes Drive Duplication (Gunghalin Drive to Barton Highway))
Barton Highway Interchange	Grade separation of Barton Highway and Gundaroo Drive
Lawson West Road Network	Road network in Lawson West, linking Lawson to the Ginninderra Drive – Aikman Drive intersection
Bindubi Street Extension	New roadworks linking John Gorton Drive and Bindubi Street
Kuringa Drive Duplication	Kuringa Drive Duplication between Kingsford Smith and Barton Highway
West Belconnen Stage 2	Roads to service West Belconnen Stage 2; link to Parkwood Drive (Duplication of part of Parkwood Road and Southern Cross Drive up to Florey Drive)
Drake Brockman Drive Upgrade	Duplication of Drake Brockman Drive
Southern Cross Drive Duplication	From Moyes Crescent to Spofforth Street
Molonglo Stage 3 Collector Roads	New roads providing access to the suburbs of Molonglo Stage 3
Light Rail Stage 2	Light rail from City to Woden Agreed
Commonwealth Avenue / Albert Street Signalisation	Staggered T arrangement with northbound to eastbound right turns at Albert Street. (Turn penalties to allow and ban the mentioned movements) Part of City to the Lake, Parkes Way upgrade and associated new roads.
Commonwealth Avenue / Corkhill Street Signalisation	Staggered T arrangement with south to west right turns at Corkhill Street. (Turn penalties to allow and ban the mentioned movements) Part of City to the Lake, Parkes Way upgrade and associated new roads

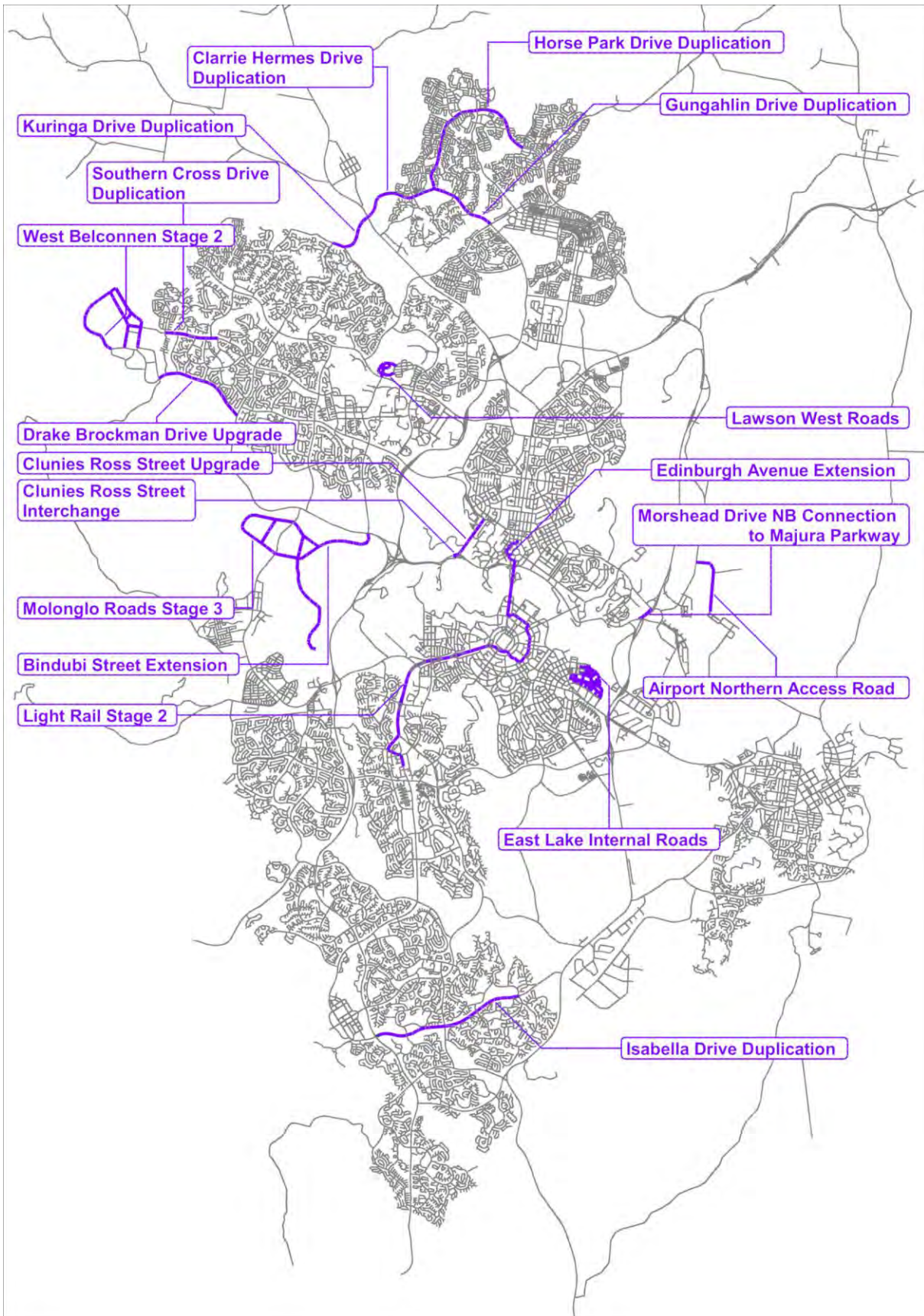
Network Item	Description
Edinburgh Avenue extensions to Vernon Circle	Part of City to the Lake, Parkes Way upgrade and associated new roads
New at-grade intersection between Commonwealth Avenue and London Circuit	Part of City to the Lake, Parkes Way upgrade and associated new roads
Removal of the Commonwealth Avenue to London Circuit loop ramp	Part of City to the Lake, Parkes Way upgrade and associated new roads
New west facing ramps at the Parkes Way/Clunies Ross Street interchange	Part of City to the Lake, Parkes Way upgrade and associated new roads
Clunies Ross Street Upgrade	Duplication of Clunies Ross Street between Barry Drive and Parkes Way
Sturt Avenue/MacMillan Crescent Signalisation	Intersection signalisation
East Lake Internal Roads	Primary transport access connections from Wentworth Avenue and Canberra Avenue Access/egress: extension of Dawes Street/Sandalwood Street, Cunningham Street, Burke Crescent and extension of the Causeway to a connection at Mildura Street
Morshead Drive	Northbound connection to the Majura Parkway
Airport Northern Access Road	Connect Glenora Drive to Majura Road (Northern Access to RAAF Fairbairn (Canberra Airport as part of Canberra Airport Master Plan 2014-2034 p181))
Isabella Drive Duplication	From Hambidge Crescent to Drakeford Drive (Isabella Drive Duplication (from Drakeford Drive to Chisholm Shops))



2021 Road Network Upgrades



2026 Road Network Upgrades



2031 Road Network Upgrades

Appendix B Intersection Turning Movement Counts

**local people
global experience**

SMEC is recognised for providing technical excellence and consultancy expertise in urban, infrastructure and management advisory. From concept to completion, our core service offering covers the life-cycle of a project and maximises value to our clients and communities. We align global expertise with local knowledge and state-of-the-art processes and systems to deliver innovative solutions to a range of industry sectors.

From: Baines, Greg
Sent: Wednesday, 29 May 2019 4:03 PM
To: Watts, Michaela; Larson, Eliza
Subject: Federal Golf Course [SEC=UNCLASSIFIED]
Attachments: Federal Golf Club ecological values.docx

Out of Scope

Greg Baines
Senior Ecologist, Conservation Research
Environment, Planning and Sustainable Development Directorate
Building 3, 9 Sandford Street, Mitchell 2911
Phone: (02) 6207 2116

Federal Golf Club ecological values

Background

Ecologists from the Conservation Research Unit of ESPDD undertook a rapid assessment of the ecological values of 21 hectares of the southern end of the Federal Golf Course between the 13th and 17th of May 2019. This assessment was undertaken to support the development of an Integrated Plan for Red Hill, the assessment does not negate the need for a comprehensive assessment required by the development application process.

Ecological values

The assessment identified 115 remnant eucalypts that meet the definition of Mature Trees given in the Conservation Advice (Notifiable instrument NI2018–536) that supports the listing of the Loss of Mature Trees (including hollow bearing trees) and a lack of recruitment as a Key Threatening Process under the Nature Conservation Act (2014). Of these trees, 43 were of medium size (DBH 50-80cm) and 72 were large trees (DBH >80cm), included in this count were 35 trees with a DBH >100cm. All remnant trees were either Yellow Box (*Eucalyptus melliodora*), Blakely's Red Gum (*E. blakelyi*) or Apple Box (*E. bridgesiana*).

Fifty-two of these Mature Trees had visible hollows, this is likely to be an underestimate of the actual number of Mature Trees bearing hollows. At least 128 hollows were counted in the Mature Trees, this total is also likely to be an underestimate.

Native grasses and forbs dominated the groundcover of nearly all of the "rough areas" of the golf course. It is estimated that approximately 12 hectares of the study area would meet the definition of native vegetation under the Nature Conservation Act (2014). These areas were dominated by a variety of native grasses such as Wallaby Grass (*Rytidosperma* spp.), Speargrass (*Austrostipa bigeniculata* and *A. scabra*), Weeping grass (*Microlaena stipoides*) and Couch (*Cynodon dactylon*). Native forbs were also sparsely distributed in these areas. None of the areas had a diversity of forbs sufficient to meet the EPBC requirements for classification as part of the box gum woodland endangered ecological community.

Bird surveys were not undertaken as part of this assessment however two significant species were observed; Superb Parrot and Gang-gang Cockatoo.

Thirteen Superb Parrots (listed as vulnerable in the ACT and nationally) were observed using the "rough" areas along the western border of the golf course. The birds were feeding in areas of native and exotic grass and roosting in a variety of remnant and planted trees. Birds were also observed moving from the golf course to the adjacent urban open space west of the course. Superb Parrots have also recently been recorded on the northern portion of the golf course (Canberra Nature Map records).

Three Gang-gang Cockatoos (listed as vulnerable in NSW) were observed in the same general area as the Superb Parrots. The Gang-gangs were roosting in remnant eucalypts on the golf course and moving between the golf course and the urban open space. Gang-gang Cockatoo's were recorded in 2014 undertaking breeding behaviour within 200 metres of the assessment area and Red Hill Nature reserve is an important breeding area for Gang-gang Cockatoo's, with over 40 breeding records recorded within 2km of the assessment area.

Planning considerations

There are two main statutory documents that apply to the conservation of the ecological values outlined above. These are the; of Notifiable instrument NI2018–536 (Loss of Mature Native Trees) and the Draft Superb Parrot Action Plan.

One of the key objective of Notifiable instrument NI2018–536 (Loss of Mature Native Trees) is to restrict as far as possible, the loss of Mature Trees over 50cm DBH and hollow bearing trees.

Notifiable instrument NI2018–536 (Loss of Mature Native Trees) also states that;

- the loss of mature trees, especially scattered Blakely's Red Gum, is a key threatening process to the persistence of Super Parrot.
- Mature Trees such as those found in the assessment area are valued as stepping stones encouraging fauna movement and provide landscape and aesthetic values as well as socio-economic benefits.
- the largest trees, with a DBH of 80cm or more are particularly valuable for birds, 29% of ACT bird species are recorded exclusively in trees of this size.
- that the loss of Mature Trees on foothills and plains is a particular concern in the ACT.
- that hollows take at least 125 years to form in local eucalypt species and large hollows suitable for nesting of birds such as Gang-gang Cockatoo take at least 200 years to form.

Considering the ecological values of the assessment area the following recommendations are made to mitigate against the loss of Mature Trees;

- All mature trees should be retained. If this cannot be achieved priority should be given to the retention of the 72 remnant trees in the large size class but smaller trees should also be retained to ensure that this key habitat is maintained into the future.
- Approximately 14 hectares of the assessment area is classified as lower slopes and this area supports the majority of Mature Trees. Red Hill Nature Reserve does not contain any lower slope areas, so the presence of this landscape, containing large numbers of Mature Trees well connected to the reserve is likely to be important in the reserves overall ecological function. Priority should be given to the retention of Mature Trees in this landscape position along with improving their connectivity to the Nature Reserve.
- The Mature Trees in the assessment area contain at least 128 hollows. It is likely that the assessment area provides important habitat for Gang-gang Cockatoos and retention of trees with large hollows as well as those likely to form large hollows in the future is critical to maintaining the local population of Gang-gang Cockatoos. All trees with hollows of 10 cm diameter or larger should be retained.
- Superb Parrots use the assessment area and removal of Mature Trees is Key Threatening Process for these birds. It is likely that development of this area will require referral to the Commonwealth Government under the EPBC Act.

The Draft Superb Parrot Action Plan seeks to protect this species known breeding habitat and movement corridors. The assessment area is not currently regarded as breeding or movement habitat. The Draft Action Plan also states that the ACT Government will explore options to protect potential future Superb Parrot breeding habitat or movement corridors on Territory Land. Due to the presence of Superb Parrots on golf course and highly suitable habitat (Scattered Blakely's Red Gum, grassy understorey, wide variety of food resources and lots of hollows) it is reasonable that the area be considered possible future breeding habitat. If the lease was returned to the ACT Government the assessment areas could receive formal protection. More research is required to determine where the Superb Parrots that use the golf course breed, and what corridors they use to move to and from the site.

The Draft Action Plan aims to manage woodland habitat to ensure the persistence of Superb Parrot breeding and foraging resources. If the assessment areas was to be developed, consideration would have to be given to how some Superb Parrot habitat could be maintained and improved on the area.

Conclusion

The 21 hectares of land assessed in the southern section of the Federal Golf Club supports valuable habitat for two threatened birds, is likely to contribute to the overall fauna diversity and function of Red Hill Nature Reserve and includes 115 trees whose removal for development purposes would constitute a Key Threatening Process under the Nature Conservation Act. Additional surveys of Superb Parrot movement and overall bird diversity on the site are required before any final decision is made on the future of the assessment site.

**Environment, Planning and Sustainable
Development Directorate**

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To:	Minister for Planning and Land Management	Tracking No.: 19/04037
Date:	15 May 2019	
From:	Executive Director, Planning, Land and Building	
Subject:	Integrated Plan for Red Hill Nature Reserve and surrounds	
Critical Date:	31 May 2019	
Critical Reason:	This will enable the Directorate to consult with the stakeholder groups and finalise the integrated plan in a timely manner	

- DG .../.../...
- DDG, Land Strategy and Environment .../.../...

Recommendations

That you:

1. **Note** the information contained in this brief including the update on the proposed content of the Integrated Plan at Attachment A;

Noted / Please Discuss

2. **Note** that option 4 is the preferred option for inclusion in draft Integrated Plan subject to final sign-off of minor technical matters by ACT government agencies;

Noted / Please Discuss

3. **Agree** a preferred approach to consultation from options 1 and 2 provided in paragraphs 13-15 of this brief.

Agreed / Not Agreed/ Please Discuss *AS*

Mick Gentleman MLA *[Signature]* *30/5/19*

Minister's Office Feedback	<i>CABINET SUB COMMITTEE</i>
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Background

1. At the weekly Minister's meeting on Monday 6 May 2019 you were updated on the progress of the Integrated Plan for Red Hill Nature Reserve and surrounds which is nearing completion. Attachment A contains the power point presentation that was discussed at that meeting.
2. The Directorate received the final traffic analysis on 13 May 2019. Consultation is currently underway with Roads ACT for final endorsement of this traffic analysis.
3. The Directorate is also awaiting confirmation from the Conservator of Flora and Fauna in relation to the potential environmental impacts of the Kitchener Street access option contained in the traffic analysis. Once these investigations are completed the four options may be revised, but these revisions will be minor and do not prevent a preferred option being identified.
4. It is recommended that the draft Integrated Plan focus on the preferred option 4 (Attachment A), but it will also provide information on all options considered and why the preferred option was selected.
5. The Directorate also undertook to provide you with an update on the consultation and engagement processes for the integrated plan, including discussion of the final consultation to occur shortly, as the four options are complete and have been evaluated.
6. This brief also includes the recommended steps to complete the integrated planning process consistent with the Legislative Assembly resolution of 25 October 2017. This is particularly relevant to achieving a 'reasonable likelihood of majority community support'. A copy of the resolution is included at Attachment B for your information.

Issues

Integrated Plan – preferred option 4

7. As outlined in Attachment A, there are four options under consideration for the Integrated Plan. At this point in time option 4 is likely to be the preferred option, pending final advice from the Conservator of Flora and Fauna, and agreement to the traffic analysis by Roads ACT.
8. Common to all four options are the following recommendations:
 - The Plan of Management for the Canberra Nature Park was recently reviewed and will be relied upon to inform the integrated plan about the Red Hill Nature Reserve.
 - Funding has been obtained to cap the Deakin tip most of which is within the Red Hill Nature Reserve. It is recommended that the capping include the parts of the tip located within part of Deakin section 66.
 - From the traffic analysis, it is recommended that upgrades to Kent Street be investigated to better accommodate existing and future anticipated traffic in the area.
 - The existing low density residential areas adjoining the reserve; the existing heritage registered sites and areas; and the public open space network are to be retained and

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protected.

- The only potential areas identified for urban development within the study are at Deakin 66 and at the Federal Golf Course.

9. The table below provides details of the four options contained in Attachment A and the reasons for selecting option 4 as the preferred option:

Options (illustrated in Attachment A)	Sensitivities
<p>Option 1 – retain the current zonings of land</p> <ul style="list-style-type: none"> • TZS2 services zone at Deakin section 66 and • PRZ2 restricted access open space at the Federal Golf Club 	<p>This is not the preferred option because:</p> <ul style="list-style-type: none"> • The range of uses permitted in the transport services zone do not reflect the current offices on part of the site and may threaten ecological values on the undeveloped part of the site. • The range of uses permitted under the restricted access recreation zone limit the development potential of the golf course site; may threaten the existing bushland adjoining the nature the reserve on the site; and may impact on residential amenity of the surrounding areas.
<p>Option 2 – allow development as currently proposed</p> <ul style="list-style-type: none"> • CZ5 mixed use commercial, office and residential development at Deakin section 66 including a retirement village • 125 unit retirement village at the Federal Golf Club integrated with the redevelopment of the club house and facilities • Incorporate existing bushland in the north eastern corner of the Federal Golf Club into the nature reserve 	<p>This is not the preferred option because:</p> <ul style="list-style-type: none"> • There are constraints to residential development at Deakin section 66 including bushfire, traffic, and proximity to services. The proposal may also threaten ecological values on the undeveloped part of the site. • There are constraints to residential development in the location proposed at the Federal Golf Club including bushfire, access and emergency access and proximity to services. The proposal may also threaten ecological values as a result of road upgrades for require for access to the site.
<p>Option 3 – rezone land consistent with existing uses</p> <ul style="list-style-type: none"> • Rezone the existing offices at Deakin section 66 to CZ2 business and incorporate the site in the Deakin office park. • Incorporate existing bushland in the north eastern corner of the Federal Golf Club into the nature reserve • Introduce a 50metre wide buffer between golf course uses and the surrounding low density residential areas. 	<p>This is not the preferred option because:</p> <ul style="list-style-type: none"> • While the CZ2 business rezoning of Deakin section 66 brings the site in line with the surrounding Deakin office park, it may threaten ecological values on the undeveloped part of the site. • The range of uses permitted under the restricted access recreation zone limit the development potential of the golf course site.
<p>Option 4 - rezone land consistent with existing uses and values, and future development opportunities.</p> <ul style="list-style-type: none"> • Rezone the existing offices at Deakin section 66 to CZ2 business and incorporate the site in the Deakin office park. • Rezone the undeveloped portion of Deakin section 66 to PRZ1 urban open space to protect existing ecological values • Permit a retirement village at the southern end of the Federal Golf Club with access off Kitchener Street. • Incorporate existing bushland in the north eastern corner of the Federal Golf Club into the nature reserve • Introduce a 50-metre wide buffer between golf course uses and the surrounding low density residential area. 	<p>This is the preferred option because:</p> <ul style="list-style-type: none"> • Reflect the current offices at Deakin section 66 and is consistent with the Deakin office park in the surrounding area. Also protect ecological values on the undeveloped part of the site. • This option realizes the future development potential of the golf course site in proximity to services; protects the existing bushland adjoining the nature the reserve on the site; reduces potential impact on residential amenity of the surrounding areas.

Community consultation and engagement in relation to the integrated plan

10. Community support is difficult to measure. It should be noted that it may not be possible to obtain or to demonstrate 'majority community support' for the draft plan. This is because there are inevitably impacts resulting from any and all options for future development in the area.
11. To date, community and stakeholder consultation undertaken in the course of developing and refining the options has been extensive. This targeted consultation and stakeholder input has been a key component in the preparation of the integrated plan to date. Meetings and workshops have been held with key community and stakeholder groups, and with lessees to obtain the following:
 - determining the extent of the study area;
 - supply of written reports and input on the scope of the integrated plan; and
 - feedback on the four draft options for the future of the plan.
12. Two options for consultation are possible to finalise the draft plan:

Option 1 – Consultation with key stakeholders

13. The Directorate has committed to further workshops with the stakeholder groups to advise of the preferred option for the plan.
14. Once the stakeholder groups have been consulted, the draft integrated plan can be finalised for your consideration. You may choose to submit the draft integrated plan to the Legislative Assembly at that time. The planning elements of the resolution will be completed.

Option 2 – Consultation with key stakeholders and the public

15. Alternatively, you may opt to proceed with the workshops with stakeholders (outlined in Option 1) and undertake broader public consultation for the draft integrated plan. It is anticipated that the signatories to the two petitions lodged with the Legislative Assembly are representative of the broader community rather than the stakeholder groups. This public notification may include:
 - Public notification of the draft integrated plan for a minimum of four weeks with an invitation for written submissions;
 - A letter of notification to all lessees within the study area;
 - Drop in sessions at the Garran, Hughes and Deakin shops; and
 - Online quick polls and/or surveys.

Reporting the results to the Legislative Assembly

16. It is usual practice for the Directorate to prepare and make public a 'report on consultation' in response to all issues raised during public notification and consultation processes. The draft Integrated Plan may be revised in response to the issues raised in public submissions.
17. It is recommended that the revised draft Integrated Plan be tabled in the Legislative Assembly along with the report on consultation and copies of all submissions received.

The role of the Legislative Assembly

18. The Legislative Assembly will be advised of the consultation undertaken to date and will likely determine if there is 'reasonable likelihood of majority community support'.
19. The Legislative Assembly will be requested to consider the final draft Integrated Plan and endorse it, if agreed. Alternatively, the Legislative Assembly may refer the draft plan to the Standing Committee on Planning and Urban Development should it consider an inquiry is warranted.

Next steps

20. Should the final draft Integrated Plan be endorsed, either by the Legislative Assembly or by Cabinet if the draft plan was referred to the Standing Committee on Planning and Urban Development, the draft plan could be integrated into the Territory Plan in the Territory Plan review process.

Financial Implications

21. There are no financial implications as a result of this brief. However, there are potential costs associated with the options to achieve 'majority community support', particularly if a voting system is selected (online survey).

Consultation

Internal

22. The draft integrated plan options have been circulated to all relevant internal sections of EPSDD. Final sign off is pending from the Conservator of Flora and Fauna due to the additional traffic analysis that was undertaken in relation to Kitchener Street access to the golf course. However as commented earlier in this brief, any revision required to be included as a result of the Conservator's consideration is expected to be minor.

Cross Directorate

23. The draft integrated plan options have been circulated to all relevant ACT Government agencies. Final sign off is pending from TCCS due to the additional traffic analysis that was undertaken in relation to Kitchener Street access to the golf course.

External

24. The draft integrated plan options have been circulated to the National Capital Authority. Key community and stakeholder groups, and lessees have been consulted as the options for the draft plan were developed.
25. This brief also recommends two options for further consultation, for your consideration.

Benefits/Sensitivities

26. Benefits and sensitivities of the integrated plan options are identified in the table above and in the Attachment A.
27. Further consultation to finalise the draft plan is recommended, in line with the approaches provided in this brief. This will assist the Legislative Assembly in determining whether the draft plan has majority community support.

From: Baines, Greg
Sent: Wednesday, 5 January 2022 1:30 PM
To: Sayers, Caroline
Subject: RE: Red Hill - Kitchener St potential access to the Federal Golf Course [SEC=UNCLASSIFIED]

Thank you!

From: Sayers, Caroline <Caroline.Sayers@act.gov.au>
Sent: Wednesday, 5 January 2022 1:30 PM
To: Baines, Greg <Greg.Baines@act.gov.au>
Subject: FW: Red Hill - Kitchener St potential access to the Federal Golf Course [SEC=UNCLASSIFIED]

Hi Greg,

Here it is. Yell if you need anything else.

Thanks
Caroline

Caroline Sayers | Territory Plan Section

Phone: 02 6207 1719 | Email: caroline.sayers@act.gov.au

Planning and Urban Policy | Environment, Planning and Sustainable Development Directorate | ACT Government

480 Northbourne Avenue, Dickson | GPO Box 158 Canberra ACT 2601 | www.act.gov.au



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From: ConservatorFloraFauna <ConservatorFloraFauna@act.gov.au>
Sent: Friday, 31 May 2019 10:17 AM
To: Sayers, Caroline <Caroline.Sayers@act.gov.au>

Cc: Watts, Michaela <Michaela.Watts@act.gov.au>

Subject: RE: Red Hill - Kitchener St potential access to the Federal Golf Course [SEC=UNCLASSIFIED]

Hi Caroline,

Please find attached the report on the ecological values of the southern section of the Federal Golf Course. As noted in the report, this was a rapid assessment and is indicative only. Comprehensive assessments would still be required were any development to be considered.

Kind regards,

Eliza Larson | Project Officer | Conservator Liaison

Phone: +61 2 6207 7009 | Email: eliza.larson@act.gov.au

From: Sayers, Caroline

Sent: Monday, 13 May 2019 11:31 AM

To: Watts, Michaela <Michaela.Watts@act.gov.au>

Cc: Baines, Greg <Greg.Baines@act.gov.au>

Subject: Red Hill - Kitchener St potential access to the Federal Golf Course [SEC=UNCLASSIFIED]

Importance: High

Hi Michaela,

Just following up on our discussion about the Kitchener Street option for access to the Federal Golf Course.

With the traffic analysis pending, it would be appreciated if we could gain an appraisal of the ecological values that may be impacted should the Kitchener St access option be pursued.

The Hughes residents association have an active interest in this area and indicate there are high values including potential superb parrot habitat and nesting in the area.

Is this possible to be undertaken by the Conservator's ecologists as a priority?

Many thanks

Caroline

Caroline Sayers | Territory Plan Section

Phone 02 6207 1719

Planning Policy | Environment, Planning and Sustainable Development Directorate | ACT Government

Dame Pattie Menzies House, Challis Street Dickson | GPO Box 158 Canberra ACT 2601 | www.planning.act.gov.au

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Sent: Friday, 31 May 2019 10:17 AM
To: Sayers, Caroline
Cc: Watts, Michaela
Subject: RE: Red Hill - Kitchener St potential access to the Federal Golf Course [SEC=UNCLASSIFIED]
Attachments: Federal Golf Club ecological values.docx

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Eliza Larson | Project Officer | Conservator Liaison
Phone: +61 2 6207 7009 | Email: eliza.larson@act.gov.au

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Federal Golf Club ecological values

Background

Ecologists from the Conservation Research Unit of ESPDD undertook a rapid assessment of the ecological values of 21 hectares of the southern end of the Federal Golf Course between the 13th and 17th of May 2019. This assessment was undertaken to support the development of an Integrated Plan for Red Hill, the assessment does not negate the need for a comprehensive assessment required by the development application process.

Ecological values

The assessment identified 115 remnant eucalypts that meet the definition of Mature Trees given in the Conservation Advice (Notifiable instrument NI2018–536) that supports the listing of the Loss of Mature Trees (including hollow bearing trees) and a lack of recruitment as a Key Threatening Process under the Nature Conservation Act (2014). Of these trees, 43 were of medium size (DBH50-80cm) and 72 were large trees (DBH >80cm), included in this count were 35 trees with a DBH>100cm. All remnant trees were either Yellow Box (*Eucalyptus melliodora*), Blakely's Red Gum (*E. blakelyi*) or Apple Box (*E. bridgesiana*).

Fifty-two of these Mature Trees had visible hollows, this is likely to be an underestimate of the actual number of Mature Trees bearing hollows. At least 128 hollows were counted in the Mature Trees, this total is also likely to be an underestimate.

Native grasses and forbs dominated the groundcover of nearly all of the “rough areas” of the golf course. It is estimated that approximately 12 hectares of the study area would meet the definition of native vegetation under the Nature Conservation Act (2014). These areas were dominated by a variety of native grasses such as Wallaby Grass (*Rytidosperma* spp.), Speargrass (*Austrostipa bigeniculata* and *A. scabra*), Weeping grass (*Microlaena stipoides*) and Couch (*Cynodon dactylon*). Native forbs were also sparsely distributed in these areas. None of the areas had a diversity of forbs sufficient to meet the EPBC requirements for classification as part of the box gum woodland endangered ecological community.

Bird surveys were not undertaken as part of this assessment however two significant species were observed; Superb Parrot and Gang-gang Cockatoo.

Thirteen Superb Parrots (listed as vulnerable in the ACT and nationally) were observed using the “rough” areas along the western border of the golf course. The birds were feeding in areas of native and exotic grass and roosting in a variety of remnant and planted trees. Birds were also observed moving from the golf course to the adjacent urban open space west of the course. Superb Parrots have also recently been recorded on the northern portion of the golf course (Canberra Nature Map records).

Three Gang-gang Cockatoos (listed as vulnerable in NSW) were observed in the same general area as the Superb Parrots. The Gang-gangs were roosting in remnant eucalypts on the golf course and moving between the golf course and the urban open space. Gang-gang Cockatoo's were recorded in 2014 undertaking breeding behaviour within 200 metres of the assessment area and Red Hill Nature reserve is an important breeding area for Gang-gang Cockatoo's, with over 40 breeding records recorded within 2km of the assessment area.

Planning considerations

There are two main statutory documents that apply to the conservation of the ecological values outlined above. These are the; of Notifiable instrument NI2018–536 (Loss of Mature Native Trees) and the Draft Superb Parrot Action Plan.

One of the key objective of Notifiable instrument NI2018–536 (Loss of Mature Native Trees) is to restrict as far as possible, the loss of Mature Trees over 50cm DBH and hollow bearing trees.

Notifiable instrument NI2018–536 (Loss of Mature Native Trees) also states that;

- the loss of mature trees, especially scattered Blakely's Red Gum, is a key threatening process to the persistence of Super Parrot.
- Mature Trees such as those found in the assessment area are valued as stepping stones encouraging fauna movement and provide landscape and aesthetic values as well as socio-economic benefits.
- the largest trees, with a DBH of 80cm or more are particularly valuable for birds, 29% of ACT bird species are recorded exclusively in trees of this size.
- that the loss of Mature Trees on foothills and plains is a particular concern in the ACT.
- that hollows take at least 125 years to form in local eucalypt species and large hollows suitable for nesting of birds such as Gang-gang Cockatoo take at least 200 years to form.

Considering the ecological values of the assessment area the following recommendations are made to mitigate against the loss of Mature Trees;

- All mature trees should be retained. If this cannot be achieved priority should be given to the retention of the 72 remnant trees in the large size class but smaller trees should also be retained to ensure that this key habitat is maintained into the future.
- Approximately 14 hectares of the assessment area is classified as lower slopes and this area supports the majority of Mature Trees. Red Hill Nature Reserve does not contain any lower slope areas, so the presence of this landscape, containing large numbers of Mature Trees well connected to the reserve is likely to be important in the reserves overall ecological function. Priority should be given to the retention of Mature Trees in this landscape position along with improving their connectivity to the Nature Reserve.
- The Mature Trees in the assessment area contain at least 128 hollows. It is likely that the assessment area provides important habitat for Gang-gang Cockatoos and retention of trees with large hollows as well as those likely to form large hollows in the future is critical to maintaining the local population of Gang-gang Cockatoos. All trees with hollows of 10 cm diameter or larger should be retained.
- Superb Parrots use the assessment area and removal of Mature Trees is Key Threatening Process for these birds. It is likely that development of this area will require referral to the Commonwealth Government under the EPBC Act.

The Draft Superb Parrot Action Plan seeks to protect this species known breeding habitat and movement corridors. The assessment area is not currently regarded as breeding or movement habitat. The Draft Action Plan also states that the ACT Government will explore options to protect potential future Superb Parrot breeding habitat or movement corridors on Territory Land. Due to the presence of Superb Parrots on golf course and highly suitable habitat (Scattered Blakely's Red Gum, grassy understorey, wide variety of food resources and lots of hollows) it is reasonable that the area be considered possible future breeding habitat. If the lease was returned to the ACT Government the assessment areas could receive formal protection. More research is required to determine where the Superb Parrots that use the golf course breed, and what corridors they use to move to and from the site.

The Draft Action Plan aims to manage woodland habitat to ensure the persistence of Superb Parrot breeding and foraging resources. If the assessment areas was to be developed, consideration would have to be given to how some Superb Parrot habitat could be maintained and improved on the area.

Conclusion

The 21 hectares of land assessed in the southern section of the Federal Golf Club supports valuable habitat for two threatened birds, is likely to contribute to the overall fauna diversity and function of Red Hill Nature Reserve and includes 115 trees whose removal for development purposes would constitute a Key Threatening Process under the Nature Conservation Act. Additional surveys of Superb Parrot movement and overall bird diversity on the site are required before any final decision is made on the future of the assessment site.

From: Baines, Greg
Sent: Wednesday, 5 January 2022 1:30 PM
To: Sayers, Caroline
Subject: RE: Red Hill - Kitchener St potential access to the Federal Golf Course [SEC=UNCLASSIFIED]

Thank you!

From: Sayers, Caroline <Caroline.Sayers@act.gov.au>
Sent: Wednesday, 5 January 2022 1:30 PM
To: Baines, Greg <Greg.Baines@act.gov.au>
Subject: FW: Red Hill - Kitchener St potential access to the Federal Golf Course [SEC=UNCLASSIFIED]

Hi Greg,

Here it is. Yell if you need anything else.

Thanks
Caroline

Caroline Sayers | Territory Plan Section

Phone: 02 6207 1719 | Email: caroline.sayers@act.gov.au

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From: ConservatorFloraFauna <ConservatorFloraFauna@act.gov.au>
Sent: Friday, 31 May 2019 10:17 AM
To: Sayers, Caroline <Caroline.Sayers@act.gov.au>

Cc: Watts, Michaela <Michaela.Watts@act.gov.au>

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Kind regards,

Eliza Larson | Project Officer | Conservator Liaison

Phone: +61 2 6207 7009 | Email: eliza.larson@act.gov.au

From: Sayers, Caroline

Sent: Monday, 13 May 2019 11:31 AM

To: Watts, Michaela <Michaela.Watts@act.gov.au>

Cc: Baines, Greg <Greg.Baines@act.gov.au>

Subject: Red Hill - Kitchener St potential access to the Federal Golf Course [SEC=UNCLASSIFIED]

Importance: High

Hi Michaela,

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Many thanks

Caroline

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Phone 02 6207 1719

Planning Policy | Environment, Planning and Sustainable Development Directorate | ACT Government

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From: [REDACTED]
Sent: Monday, 3 June 2019 10:53 PM
To: Brady, Erin
Cc: Cusack, Kathy; Sayers, Caroline; [REDACTED]
Subject: Red Hill Integrated Plan
Attachments: FGC Series - June 2019.pdf

Hello Erin

Please find attached a series of images which I believe amply demonstrate why the suggested location for the proposed Federal Golf Club (FGC) residential development is totally unacceptable. Along with a range of important features, this set of images also shows the area of the golf course occupied by a significant population of the threatened Superb Parrot. If any large development or other disturbing activity is allowed within the vicinity of this Superb Parrot population this area would no longer be viable habitat for the Parrot.

Together with the other information we have previously provided I believe the images make it clear that the northern part of the FGC lease area is not suitable for any major development activity. Providing proper protection for this northern part of the FGC lease area will also allow for this area to be assigned an appropriate conservation status in the future, in the event that the FGC ceased to operate as a golf club. Given that the great bulk of the area is adjacent to the Red Hill Nature Reserve this could involve incorporation of the area into the Nature Reserve.

On a related matter I thought I should let you know that several Hughes residents have advised me that they have been asked to provide their views on the possibility of a **housing development** being located at the Hughes end of the FGC with road access to the development from Kitchener Street. The residents were advised that this is an option being looked at by the Directorate in the context of developing the Integrated Plan.

Once again if we can be of any further assistance please let us know.

Kind Regards
[REDACTED]

**Progressively Layered Plans of the Federal Golf Club (FGC)
and Surrounds Illustrating:**

IMAGE 1 – FGC Concessional Lease Area and adjacent land including the Red Hill Nature Reserve.

IMAGE 2 - Area within the FGC Lease Area proposed for the over 55s Retirement Village.

IMAGE 3 – Critically endangered Yellow Box/Red Gum Grassy Woodland within the FGC Lease Area.

IMAGE 4 – Buffer Zone required to protect the critically endangered woodland area.

IMAGE 5 – Suggested Residential Amenity Buffer Zone.

IMAGE 6 – Bushfire Prone Area.

IMAGE 7 – Superb Parrot Roosting Spine and Roosting/Foraging Areas within the FGC Lease Area.

IMAGE 8 – Larger scale plan showing the Superb Parrot Roosting Spine and Roosting/Foraging Areas.

IMAGE 1

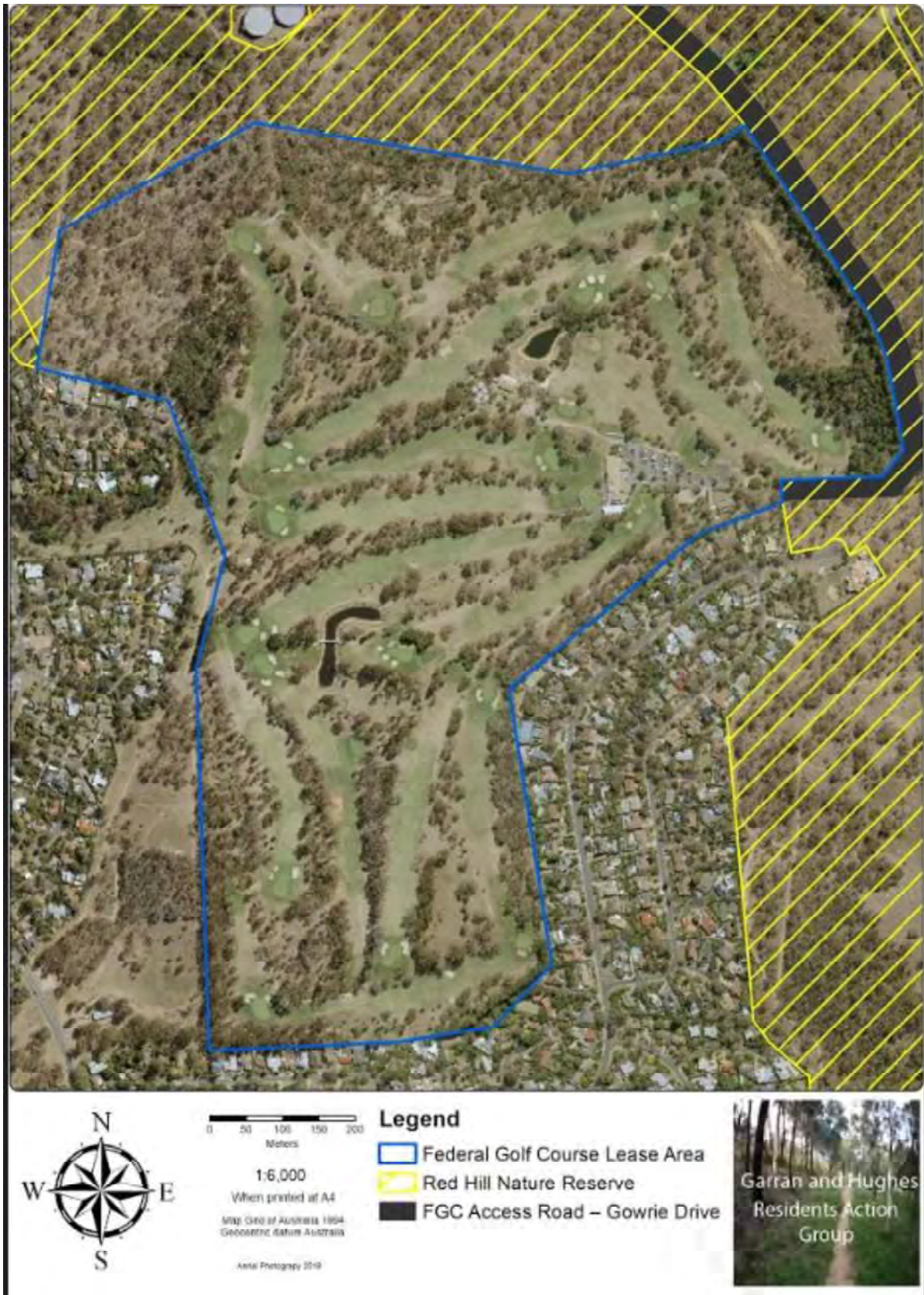


IMAGE 2



1:6,000





When printed at A4

Map Grid of Australia 1304

Geocentric datum Australia

©erial Photography 2018

Legend

-  Federal Golf Course Lease Area
-  Proposed FGC Development Area
-  Red Hill Nature Reserve
-  FGC Access Road – Gowrie Drive



Garran and Hughes
Residents Action
Group

IMAGE 3

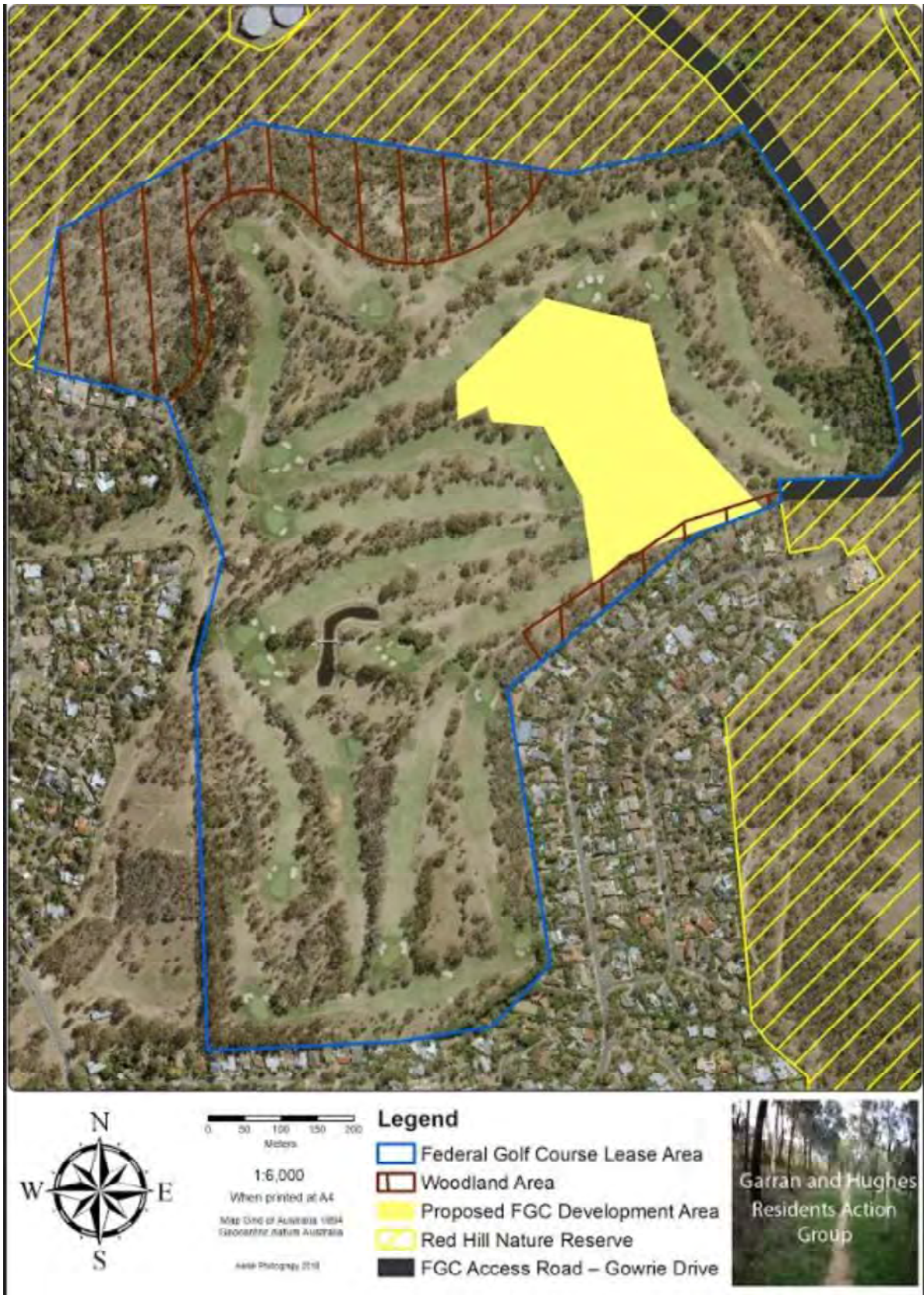
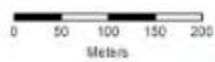


IMAGE 4



IMAGE 5



1:6,000

When printed at A4

Map G14 of Australia 1994
Geocentric datum Australia

Aerial Photography 2019

Legend

- | | |
|---------------------------------|--------------------------------|
| Federal Golf Course Lease Area | Proposed FGC Development Area |
| Residential Amenity Buffer Area | Red Hill Nature Reserve |
| Woodland Buffer Area | FGC Access Road – Gowrie Drive |
| Woodland Area | |

IMAGE 6



IMAGE 7

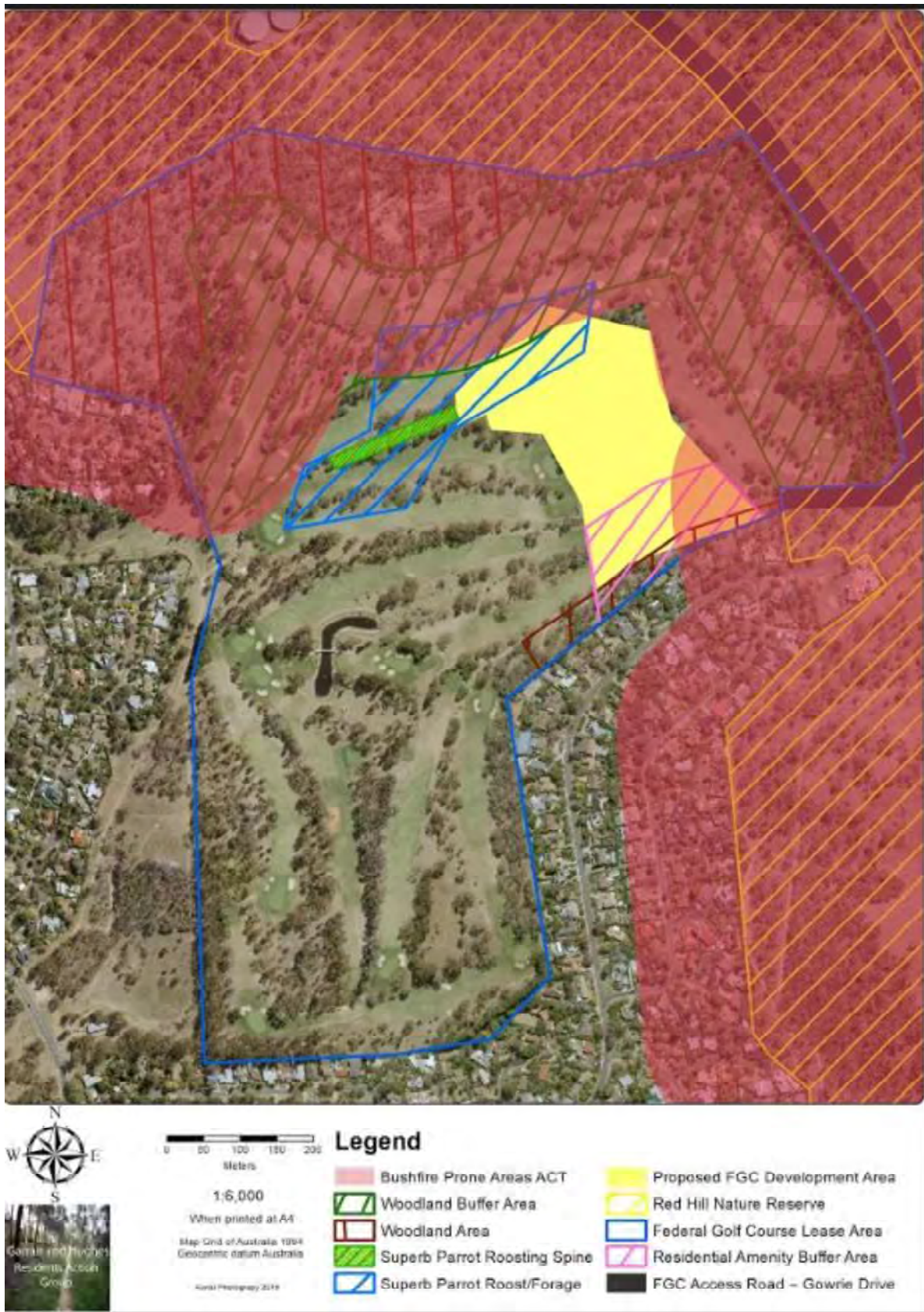


IMAGE 8



From: Watts, Michaela
Sent: Thursday, 6 June 2019 3:57 PM
To: Walker, IanS
Cc: ConservatorFloraFauna; Coghill, Stacey
Subject: FOR CLEARANCE: Red Hill Integrated Plan - Kitchener St potential access to the Federal Golf Course [SEC=UNCLASSIFIED]

Ian: Can you please provide email clearance to send these comments up to TP team about Red Hill Integrated Plan?

...

Thank you for the opportunity to update my comments on the draft options for the Integrated Plan for Red Hill and Surrounds.

The ecological values of the southern section of the Federal Golf Course had not been previously assessed, which made it difficult to ascertain the impact that access via Kitchener Street (and any resulting development) may have. To gain a better understanding of this, ACT Government ecologists undertook a rapid assessment of the site. The following comments provide an indication of the ecological values on site, however a comprehensive assessment will still be required as part of further consideration of the site.

The main findings below do not change my original comments, but emphasize the ecological importance of the area.

Main findings of assessment:

- 115 remnant eucalypts are present which meet the definition of Mature Trees given in the Conservation Advice (Notifiable instrument NI2018–536) that supports the listing of the Loss of Mature Trees (including hollow bearing trees) and a lack of recruitment as a Key Threatening Process under the *Nature Conservation Act 2014*.
- At least 128 visible hollows were counted from 52 of these trees and there are likely to be more upon a closer and more detailed inspection.
- Approximately 12 ha of the study area would meet the definition of native vegetation under the *Nature Conservation Act 2014*.
- Bird surveys were not undertaken, however, Superb Parrots and Gang-gang Cockatoos were observed utilising trees and grassy areas.

Updated comments:

- Retention of trees (particularly mature hollow bearing trees) is a priority, both for connectivity and for the valuable habitat provided for two threatened bird species.
- Areas classified as lower slopes (approx. 14 ha of southern area) should also be protected and maintained due to its likely importance to the overall ecological function of Red Hill Nature Reserve.
- Development of the southern section will likely require referral to the Commonwealth Government under the EPBC Act due to the impact on Superb Parrot habitat.
- Option 3 remains the preferred option to protect and maintain an area which is likely to be future breeding habitat for Superb Parrots.

- Additional surveys of Superb Parrot movement and breeding in addition to overall bird density are required before any final decision is made on the future of the site.

From: Sayers, Caroline
Sent: Friday, 31 May 2019 10:21 AM
To: ConservatorFloraFauna <ConservatorFloraFauna@act.gov.au>
Cc: Watts, Michaela <Michaela.Watts@act.gov.au>
Subject: RE: Red Hill - Kitchener St potential access to the Federal Golf Course [SEC=UNCLASSIFIED]

Hi Eliza,

Many thanks for this information.

Could you please let us know if the Conservator would like to update his advice in response to this new information.

Thanks
Caroline

From: ConservatorFloraFauna
Sent: Friday, 31 May 2019 10:17 AM
To: Sayers, Caroline <Caroline.Sayers@act.gov.au>
Cc: Watts, Michaela <Michaela.Watts@act.gov.au>
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Phone: +61 2 6207 7009 | Email: eliza.larson@act.gov.au

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Sent: Monday, 13 May 2019 11:31 AM

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Cc: Baines, Greg <Greg.Baines@act.gov.au>

Subject: Red Hill - Kitchener St potential access to the Federal Golf Course [SEC=UNCLASSIFIED]

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Phone 02 6207 1719

Planning Policy | Environment, Planning and Sustainable Development Directorate | ACT Government

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From: Coghill, Stacee
Sent: Wednesday, 10 July 2019 12:43 PM
To: Sayers, Caroline
Cc: Larson, Eliza
Subject: FW: FOR CLEARANCE: Red Hill Integrated Plan - Kitchener St potential access to the Federal Golf Course [SEC=UNCLASSIFIED]

UNCLASSIFIED

Dear Caroline,

Apologies for the delay, the below comments on Red Hill Integrated Plan are approved to progress by Executive Group Manager Ian Walker. Please let me know if you require anything further.

Thanks

Stacee Coghill

Executive Assistant to Executive Group Manager, Ian Walker
Environment, Planning and Sustainable Development Directorate
ACT Government | Phone 02 6205 9274 | Stacee.Coghill@act.gov.au
Dame Pattie Menzies House, 16 Challis Street, Dickson
www.environment.act.gov.au |

From: Walker, IanS <IanS.Walker@act.gov.au>
Sent: Wednesday, 10 July 2019 9:11 AM
To: Coghill, Stacee <Stacee.Coghill@act.gov.au>
Subject: RE: FOR CLEARANCE: Red Hill Integrated Plan - Kitchener St potential access to the Federal Golf Course [SEC=UNCLASSIFIED]

UNCLASSIFIED

Can you please progress

Ian Walker
Executive Group Manager, Environment
Phone: +61 6205 9027 | Email: IanS.Walker@act.gov.au
Environment, Planning and Sustainable Development Directorate | ACT Government
Dame Pattie Menzies House, Challis Street, Dickson | GPO Box 158 Canberra ACT 2602 www.environment.act.gov.au

We acknowledge and celebrate the Ngunnawal peoples whose traditional lands we work on and pay our respect to elders past and present

From: Watts, Michaela <Michaela.Watts@act.gov.au>
Sent: Thursday, 6 June 2019 3:57 PM
To: Walker, IanS <IanS.Walker@act.gov.au>
Cc: ConservatorFloraFauna <ConservatorFloraFauna@act.gov.au>; Coghill, Stacey <Stacey.Coghill@act.gov.au>
Subject: FOR CLEARANCE: Red Hill Integrated Plan - Kitchener St potential access to the Federal Golf Course [SEC=UNCLASSIFIED]

Ian: Can you please provide email clearance to send these comments up to TP team about Red Hill Integrated Plan?

...

Thank you for the opportunity to update my comments on the draft options for the Integrated Plan for Red Hill and Surrounds.

The ecological values of the southern section of the Federal Golf Course had not been previously assessed, which made it difficult to ascertain the impact that access via Kitchener Street (and any resulting development) may have. To gain a better understanding of this, ACT Government ecologists undertook a rapid assessment of the site. The following comments provide an indication of the ecological values on site, however a comprehensive assessment will still be required as part of further consideration of the site.

The main findings below do not change my original comments, but emphasize the ecological importance of the area.

Main findings of assessment:

- 115 remnant eucalypts are present which meet the definition of Mature Trees given in the Conservation Advice (Notifiable instrument NI2018–536) that supports the listing of the Loss of Mature Trees (including hollow bearing trees) and a lack of recruitment as a Key Threatening Process under the *Nature Conservation Act 2014*.
- At least 128 visible hollows were counted from 52 of these trees and there are likely to be more upon a closer and more detailed inspection.
- Approximately 12 ha of the study area would meet the definition of native vegetation under the *Nature Conservation Act 2014*.
- Bird surveys were not undertaken, however, Superb Parrots and Gang-gang Cockatoos were observed utilising trees and grassy areas.

Updated comments:

- Retention of trees (particularly mature hollow bearing trees) is a priority, both for connectivity and for the valuable habitat provided for two threatened bird species.

- Areas classified as lower slopes (approx. 14 ha of southern area) should also be protected and maintained due to its likely importance to the overall ecological function of Red Hill Nature Reserve.
- Development of the southern section will likely require referral to the Commonwealth Government under the EPBC Act due to the impact on Superb Parrot habitat.
- Option 3 remains the preferred option to protect and maintain an area which is likely to be future breeding habitat for Superb Parrots.
- Additional surveys of Superb Parrot movement and breeding in addition to overall bird density are required before any final decision is made on the future of the site.

From: Sayers, Caroline
Sent: Friday, 31 May 2019 10:21 AM
To: ConservatorFloraFauna <ConservatorFloraFauna@act.gov.au>
Cc: Watts, Michaela <Michaela.Watts@act.gov.au>
Subject: RE: Red Hill - Kitchener St potential access to the Federal Golf Course [SEC=UNCLASSIFIED]

Hi Eliza,

Many thanks for this information.

Could you please let us know if the Conservator would like to update his advice in response to this new information.

Thanks
Caroline

From: ConservatorFloraFauna
Sent: Friday, 31 May 2019 10:17 AM
To: Sayers, Caroline <Caroline.Sayers@act.gov.au>
Cc: Watts, Michaela <Michaela.Watts@act.gov.au>
Subject: RE: Red Hill - Kitchener St potential access to the Federal Golf Course [SEC=UNCLASSIFIED]

Hi Caroline,

Please find attached the report on the ecological values of the southern section of the Federal Golf Course. As noted in the report, this was a rapid assessment and is indicative only. Comprehensive assessments would still be required were any development to be considered.

Kind regards,

Eliza Larson | Project Officer | Conservator Liaison

From: Sayers, Caroline

Sent: Monday, 13 May 2019 11:31 AM

To: Watts, Michaela <Michaela.Watts@act.gov.au>

Cc: Baines, Greg <Greg.Baines@act.gov.au>

Subject: Red Hill - Kitchener St potential access to the Federal Golf Course [SEC=UNCLASSIFIED]

Importance: High

Hi Michaela,

Just following up on our discussion about the Kitchener Street option for access to the Federal Golf Course.

With the traffic analysis pending, it would be appreciated if we could gain an appraisal of the ecological values that may be impacted should the Kitchener St access option be pursued.

The Hughes residents association have an active interest in this area and indicate there are high values including potential superb parrot habitat and nesting in the area.

Is this possible to be undertaken by the Conservator's ecologists as a priority?

Many thanks

Caroline

Caroline Sayers | Territory Plan Section

Phone 02 6207 1719

Planning Policy | Environment, Planning and Sustainable Development Directorate | ACT Government

Dame Pattie Menzies House, Challis Street Dickson | GPO Box 158 Canberra ACT 2601 | www.planning.act.gov.au

From: Sayers, Caroline
Sent: Tuesday, 23 July 2019 10:07 AM
To: Paynter, Patrick; Lashkari, Mohammadali; Walter, Stephan
Subject: RE: Red Hill Traffic Study Report [SEC=UNOFFICIAL]

This sounds good to me.

Thanks
C

From: Paynter, Patrick
Sent: Monday, 22 July 2019 4:37 PM
To: Lashkari, Mohammadali <Mohammadali.Lashkari@act.gov.au>; Sayers, Caroline <Caroline.Sayers@act.gov.au>; Walter, Stephan <Stephan.Walter@act.gov.au>
Subject: RE: Red Hill Traffic Study Report [SEC=UNOFFICIAL]

People,

Following this lengthy email exchange I propose we simplify the finalisation of SMECs work – acknowledging that it is limited to traffic issues and does not extend to detailed design issues, construction costs or environment impacts.

Table 12 needs to be questioned as I am not confident they have the right scores for each option. I am happy to talk to SMEC on this along the lines of my mark up and notes below.

Table 12 also needs to be qualified by stating that it does not include an assessment of construction costs or environmental impacts. (nor Carolines issues below)

I suggest they include a list of further work (by others – perhaps in a Planning Report) that would include;

Sketch development of feasible options including an estimate of order-of-cost for each and an assessment of the likely environmental impact of each option.

A holistic assessment of the options including the issues Caroline described below.

Your thoughts before I talk to SMEC ??

Patrick

From: Paynter, Patrick
Sent: Monday, 15 July 2019 12:19 PM
To: Sayers, Caroline <Caroline.Sayers@act.gov.au>
Cc: Lashkari, Mohammadali <Mohammadali.Lashkari@act.gov.au>; Walter, Stephan <Stephan.Walter@act.gov.au>
Subject: RE: Red Hill Traffic Study Report [SEC=UNOFFICIAL]

Caroline,

Yes –thanks. I will query them on some of their scores but other than that I think we can finalise.

Patrick

From: Sayers, Caroline
Sent: Monday, 15 July 2019 10:58 AM
To: Paynter, Patrick <Patrick.Paynter@act.gov.au>
Cc: Lashkari, Mohammadali <Mohammadali.Lashkari@act.gov.au>; Walter, Stephan <Stephan.Walter@act.gov.au>
Subject: RE: Red Hill Traffic Study Report [SEC=UNOFFICIAL]

I have no idea! But thinking it through:

1. SMEC has dealt with traffic impacts which have identified implications for various access points to the golf course; and
2. The various access points to the golf course have implications for the location of development within the golf course.
3. However, there are also other considerations that have informed the preferred location of development on the golf course (above and beyond traffic and access).

I am happy with the findings of the SMEC traffic report as it has been conducted independently of my analysis and yet we have come to similar conclusions.

Does this help answer your question?

Thanks
Caroline

From: Paynter, Patrick
Sent: Monday, 15 July 2019 10:11 AM

To: Sayers, Caroline <Caroline.Sayers@act.gov.au>
Cc: Lashkari, Mohammadali <Mohammadali.Lashkari@act.gov.au>
Subject: RE: Red Hill Traffic Study Report [SEC=UNOFFICIAL]

Caroline,

Thanks for your detailed response. In light of your and my comments, how can we best finalise the SMEC report as a traffic report only?

Regards

Patrick

From: Sayers, Caroline
Sent: Sunday, 14 July 2019 12:07 PM
To: Paynter, Patrick <Patrick.Paynter@act.gov.au>; Lashkari, Mohammadali <Mohammadali.Lashkari@act.gov.au>; Walter, Stephan <Stephan.Walter@act.gov.au>
Subject: RE: Red Hill Traffic Study Report [SEC=UNOFFICIAL]
Importance: High

Hi Patrick,

I think these are important considerations. However, I have been working on other aspects of the matters you have raised outside of the transport analysis. Three key considerations have been investigated:

1. Governance: The NCA works approval is required for the Gowrie Drive and Brereton Street options as both options traverse National Capital Land
2. Emergency access: both the Brereton Street and Gowrie Drive options require construction of secondary emergency access because both are located within the bush fire prone area.
3. The suitability of the location 'within the golf course' for the proposed retirement village. Our considerations have involved:
 - **Bushfire risk** – location of the retirement village near the existing club house creates problems with access being through the bushfire prone area (Brereton St or Gowrie Drive). However, if the retirement village were located closer to the existing suburbs of Garran or Hughes it would be more attractive to access the village from Kitchener or Birdwood Streets which are well outside the bushfire prone area.
 - **Access to services and facilities** – The golf club house is as far removed from existing services, local centres and public transport routes as is possible. This end of the golf Course is also at a higher contour to the surrounding suburbs. This limits options for alternative transport such as walking or cycling to the shops etc. However, if the retirement village were located closer to the existing suburban of Garran or Hughes access to these services is greatly increased, along with more viable options for alternative transport such as walking, public transport and the like.
 - **Ecological impacts** – There are going to be impacts regardless of whether the village is located near the existing club house or closer to the suburbs Garran or Hughes. The Conservator of Flora and Fauna has expressed a preference for no residential development on the Golf Course on the basis of ecological values. Notwithstanding this, the land is included in the PRZ2 restricted access recreation zone. This means that there are a range of uses of that could be

developed on the golf course site via a development application. Any such proposal is likely to trigger EPBC referral. However, there is some 10 ha of land within the existing golf course that has been earmarked to be returned to the Red Hill Nature Reserve. It would need to be determined if this land is suitable as an environmental offset under EPBC. While this land has never been utilised by the golf club, its current zoning is of PR2 restricted access recreation means that it could potentially be developed for other recreation uses.

- **Impacts on surrounding residential areas** – There are going to be potential impacts regardless of whether the village is located near the existing club house or closer to the suburbs Garran or Hughes. We have been considering introduction of a buffer between 50 and 100metres between any existing dwellings and the retirement village.
- **Retention of the golf course** – Location of the retirement village near the existing club house creates the least impact on the golf course. Locating the retirement village closer to the suburbs Garran or Hughes will require significant changes to the existing golf course. Sport and Recreation has advised that the golf course is most likely to survive in the longer term if it can retain a full 18holes. Nine (9) hole golf courses are much less likely to survive in the longer term.
- **Loss of the golf course in the longer term** – if the golf course closes, other uses under the PRZ2 restricted access recreation zoning would be explored. It is considered that the land closest to the Red Hill Nature Reserve is more suitable for recreation uses than urban residential uses. In this regard, the land within the golf course closest to the existing suburbs of Garran and Hughes is more suitable or a wider range of urban and residential uses than the local close to the Nature Reserve.

Thanks
Caroline

From: Paynter, Patrick

Sent: Friday, 12 July 2019 5:11 PM

To: Sayers, Caroline <Caroline.Sayers@act.gov.au>; Lashkari, Mohammadali <Mohammadali.Lashkari@act.gov.au>; Walter, Stephan <Stephan.Walter@act.gov.au>

Cc: Kaucz, Alix <Alix.Kaucz@act.gov.au>

Subject: Red Hill Traffic Study Report [SEC=UNOFFICIAL]

People,

SMEC want finalise their consultancy on this project and I believe they have provided a very good report for the \$25K budget.

Before we let them go however, I would like to query them on some of their ranking/scoring of options and, add to their assessment by adding an item on Extent and cost of roadworks and, Environmental impact and disturbance. These are outside of their brief but important elements in distinguishing options.

Referring to my mark up of Table 12 in the SMEC report (attached).

The width of each road should be included as this gives an important impression and indicator of a roads capacity and classification. Kitchener and Brereton are the same width.

While the SMEC report ranks a new road to Kitchener St as number 1 the table excludes two other important factors; cost and environmental impact/disturbance. Once these are added in the distinction is less clear.

I question the score for Brereton St proportion of maximum capacity as it is a wide street with little existing traffic.

I would also argue that all options have impacts on residents. Any new road on the edge of golf course land adjacent to existing residents is likely to have high impact on residents – possibly exceeding the impact on increased traffic on their street as for Birdwood (scored incorrectly) and Brereton.

I would like us to consider these conclusions before finalising the report with SMEC.

My position at the moment would be that the use of Brereton Street as the future access to the golf course development is the best option. It involves minimal cost, disturbance and environmental impact and the capacity and classification of Brereton appears acceptable (need to confirm with SMEC). A new internal road intersecting with Kitchener St would rank second in my view. While I am aware of the particular concerns of the Brereton St mob and obvious aspirations for the golf course developers, I have tried to be objective here – placing no particular groups concerns above those of the community at large.

In terms of future opportunities for further development at the golf course, Brereton St option may get to a capacity constraint earlier while Kitchener St would offer opportunities for further development of the golf course land along its route or elsewhere.

For discussion.

Patrick

Patrick Paynter | Director | Infrastructure Planning

Phone: 02 6207 2434 | Email: patrick.paynter@act.gov.au

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Environment, Planning and Sustainable Development Directorate | ACT Government

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Meeting with the Conservator of Flora and Fauna

Red Hill Integrated Plan options

6 August 2019

1. Deakin Section 66

Preferred option:

Parts of blocks 7 and 8 section 66 and block 13 section 78 Deakin are recommended to be included in the PRZ1 urban open space zone for incorporation into the surrounding open space network.

This is because:

- The Conservator of Flora and Fauna advised that the site contains 0.9ha of Yellow Box – Blakey’s Red Gum woodland.
- Part of the site is contaminated from prior use as the old Deakin land fill.
- The nature park fencing is located across part of the site.

2. Federal Golf Club

Preferred option:

Allow the following development on the land:

- Include some 10ha of woodland into the adjoining Canberra Nature Park.
- Retain the existing Gowrie Drive access to the golf course and club facilities.
- 125 unit retirement village in the southern portion of the Federal Golf Course with access via Kitchener.
- Implement a 50 to 100metre to protect the Brereton woodland.
- No public through road between the retirement village and the golf club.
- Reconfigure the golf course to retain 18holes.

This is because:

- The southern portion of the golf course has the following features:
 - It is removed from the bushfire prone area
 - It is removed from the nature park
 - Kitchener Street provides short and ready access to higher order roads
 - It is close to established residential communities
 - It is close to public transport, services and local centres.
- Should the golf course fail in the longer term, other recreation uses could be located in the northern portion of the site.

From: Sayers, Caroline
Sent: Wednesday, 7 August 2019 12:01 PM
To: Paynter, Patrick; Lashkari, Mohammadali; Walter, Stephan
Subject: Red Hill Integrated Plan - traffic analysis [SEC=UNCLASSIFIED]

Importance: High

Hi Patrick,

As discussed, we are keen to consider the Kitchener Street option under a scenario where the retirement village is located at the southern end of the golf course.

We have identified that option because access to the norther part of the golf course (with the retirement village next the existing club house) would involve:

- The need for a primary access and a secondary access for fire and emergency situations
- The Brereton Street and Gowrie Drive accesses both involve traversing the Canberra Nature Park and the bushfire prone area. Furthermore both would require works approval of the National Capital Authority
- The Kitchen Street option would result in a long driveway to the northern part of the site.

I hope this clarifies the situation.

Thanks
Caroline

Caroline Sayers | Territory Plan Section

Phone: 02 6207 1719 | Email: caroline.sayers@act.gov.au

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From: Watts, Michaela
Sent: Wednesday, 7 August 2019 2:13 PM
To: Sayers, Caroline
Cc: ConservatorFloraFauna
Subject: Red Hill integrated plan

Hi Caroline,

Thanks for meeting with us yesterday with an update on the Red Hill integrated plan. In relation to a few of the points discussed – I would like to reiterate the following:

- Trees that are habitat (nesting, roosting, foraging) for Superb Parrots will need to be considered for assessment under the EPBC Act. A an example of how Superb Parrot habitat trees were treated in the ACT is via the Gungahlin Strategic Assessment in Throsby, where known Superb Parrot nesting trees were avoided and protected by a 100m buffer from Urban Development.
- The treatment of Remnant and Mature trees will need to be considered in the context of Loss of Mature Trees and a lack of recruitment as a Key Threatening Process under the Nature Conservation Act. The removal of remnant and mature trees identified in previous advice would constitute a KTP.
- The removal of Native Vegetation is an EIS trigger under the Planning and Development Act.
- Unavoidable impacts on protected matters will need to consider mitigation and offset requirements in both the EPBC and P&D Act context.

I hope this helps. Regards

Michaela

Michaela Watts

Conservator Liaison | Conservator of Flora and Fauna

Phone: +61 2 6207 1831 | Email: michaela.watts@act.gov.au

Environment Division | Environment, Planning and Sustainable Development Directorate | ACT Government

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From: Walter, Stephan
Sent: Tuesday, 13 August 2019 2:36 PM
To: Sayers, Caroline; Paynter, Patrick
Cc: Lashkari, Mohammadali
Subject: RE: Red Hill Traffic Study Report [SEC=UNOFFICIAL]
Attachments: 20190813 Red Hill Reserve Surrounds Update Report Rev2 (epsdd REVIEW).docx; 20190812 New Section SMEC report.docx

UNOFFICIAL

Hi Caroline & Patrick

Based on our meeting discussions of last week I have made comments in the attached draft report. The comments include;

- Revising the rating of access options in table 12 (the suggested revisions are contained in the separate attached word document titled - 20190812 New Section SMEC Report)
- The options rating table includes an additional option – Kitchener Street with short access road to alternative site development location (southern boundary)
- New Executive Summary Section text introducing the Alternative Section 56 Development Location option and preference.
- Comments include various other edits and amendments including adjustments to maps.

In summary our comments identify:

- The preferred option as Kitchener St: Short Access route to alternative development area location near southern boundary of the site
- The second ranked options as Brereton Street and
- The 3rd options as Kitchener St long route access.

Please review:

1. The new text and revised table (I have questioned the relevance of a couple of criteria) in attached file 20190812 New Section SMEC Report
2. The comments in the draft report attached.

When we are happy with our comments we can pass these to SMEC. If we need to meet and discuss Ali and I can arrange.

Regards
Stephan

From: Lashkari, Mohammadali <Mohammadali.Lashkari@act.gov.au>
Sent: Friday, 2 August 2019 5:25 PM
To: Paynter, Patrick <Patrick.Paynter@act.gov.au>; Sayers, Caroline <Caroline.Sayers@act.gov.au>
Cc: Walter, Stephan <Stephan.Walter@act.gov.au>
Subject: FW: Red Hill Traffic Study Report [SEC=UNOFFICIAL]

Hi Patrick & Caroline,

Please find attached an objective link to the *Red Hill Reserve Surrounds Strategic Traffic Study* revised draft report for your review and comment.

Kind regards,

Ali

Mohammadali Lashkari | Engineer

☎ (02) 6205 4586 📧 Mohammadali.Lashkari@act.gov.au

Infrastructure Planning | Planning, Land and Building Policy | Environment, Planning and Sustainable Development Directorate | ACT Government
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From: [REDACTED] <[REDACTED]@smec.com>
Sent: Friday, 2 August 2019 4:07 PM
To: Lashkari, Mohammadali <Mohammadali.Lashkari@act.gov.au>
Cc: Paynter, Patrick <Patrick.Paynter@act.gov.au>
Subject: RE: Red Hill Traffic Study Report [SEC=UNOFFICIAL]

Ali,

As discussed with Patrick, I have updated the report based on feedback from EPSDD. I've been through the option rating procedure and given each option a standalone rating, rather than a comparative rating as I did previously. The updated process means that the Brereton street option is slightly preferred over Kitchener or Birdwood. I think that this makes sense as it is using spare capacity on an existing road. The impact on residents of a small amount of additional traffic will be far less than the cost and impact of construction of a new road (the old assessment only looked at the number of residents affected, not the scale of the impact).

I've uploaded a draft of the report [here](#) for your review/comment. If you're happy with the report, let me know and I'll issue it formally as Final, otherwise let me know what changes you need.

Have a good weekend.

Cheers,

[Redacted]
[Redacted]
SMEC (Member of the Surbana Jurong Group)
T [Redacted]

From: Paynter, Patrick [<mailto:Patrick.Paynter@act.gov.au>]
Sent: Wednesday, 24 July 2019 4:50 PM
To: [Redacted] [@smec.com](mailto:[Redacted]@smec.com)>
Cc: Lashkari, Mohammadali <Mohammadali.Lashkari@act.gov.au>
Subject: Red Hill Traffic Study Report [SEC=UNOFFICIAL]

[Redacted]

We are keen to finalise the work on Red Hill as I'm sure SMEC is.

We thank you for the report of 28 June and we are generally happy with it. There are however a few items we would like you to consider before finalising the report. I describe these below and have attached a rough mark-up of Table 12 for you to consider also.

I query some of the ranking/scoring of options as in the attached mark-up of Table 12. I initially wanted to include some criteria around extent and cost of roadworks and, environmental impact and disturbance. Once these are added in to the comparison, the distinction between what option would be preferred is less clear. However, these are outside of the brief - even if they are important elements in distinguishing options. As such – please note but do not include the last two rows in the attachment.

The width of each road should be included as this gives an important indicator of street capacity and classification. Kitchener and Brereton are the same width (both about 10m) so why would the capacity of Brereton be poor. Also why is the capacity of Birdwood St (at 7.3m width) ranked good?

I question the score for Brereton St proportion of maximum capacity as it is a wide street with little existing traffic.

I would also argue that all options have impacts on residents and it is difficult to distinguish which residents would be more greatly impacted than others. Any new road on the edge of golf course land adjacent to existing residents (Kitchener St option) is likely to have high impact on residents – possibly exceeding the impact on increased traffic on Brereton Street. Birdwood St option looks like it is scored incorrectly as it is the narrowest street with similar traffic to Brereton St.

The Brereton Street option as the future access to the golf course development could be argued as the best option. It would involve minimal cost, minimal disturbance and environmental impact from roadworks and the capacity and classification of Brereton St appears acceptable. A new internal road at the golf course intersecting with Kitchener St would rank second in my view. I am aware of the particular concerns of the Brereton St residents but would also note that Birdwood St residents (or the broader community) have not been consulted at this stage.

In terms of future opportunities for further development at the golf course, Brereton St option may get to a capacity constraint earlier while Kitchener St would offer opportunities for further development of the golf course land along its route or elsewhere.

For discussion.

Regards

Patrick

Patrick Paynter | Director | Infrastructure Planning

Phone: 02 6207 2434 | Email: patrick.paynter@act.gov.au

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Environment, Planning and Sustainable Development Directorate | ACT Government

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Transport Study Report

Red Hill Reserve Surrounds Update

Reference No. A1896053
Prepared for EPSDD
28 June 2019

Document Control

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1	28 June 2019			
2	2 August 2019			

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FOR DISCUSSION

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Executive Summary

Introduction

SMEC was commissioned by EPSDD to update earlier analysis using the Canberra Strategic Transport Model (CSTM) to evaluate the likely road network impacts of residential developments in Section 66 Deakin and Section 56 Red Hill on the surrounding road network.

The CSTM has recently been recalibrated to 2016 conditions and new road connection options for the proposed development in Section 56 Red Hill have also been developed. EPSDD has therefore requested an update to the earlier assessment.

Figure ES-1 shows the context area for this study, including intersections selected for assessment, Red Hill development areas and access roads for Scenarios 6 and 7.

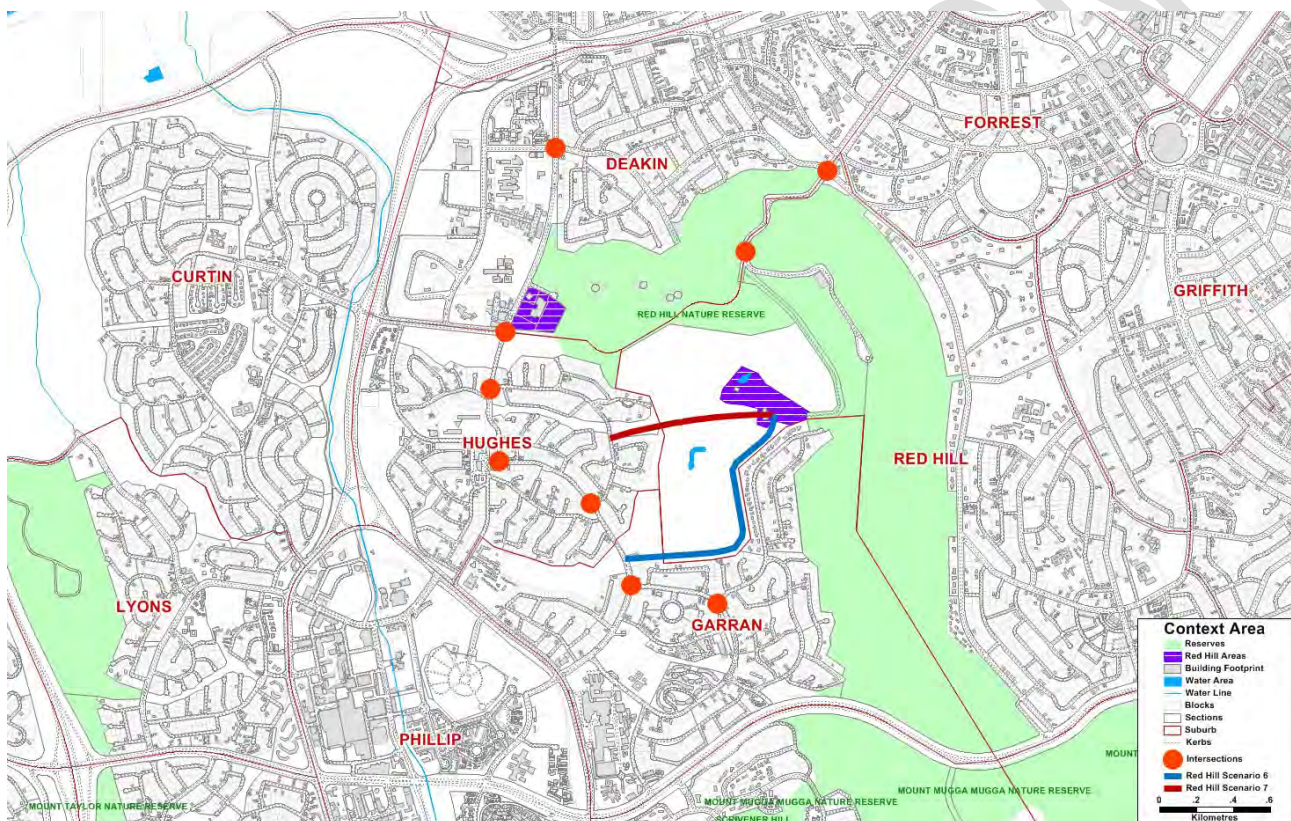


Figure ES-1: Context Area

Strategic Transport Modelling

The Red Hill Reserve Surrounds Traffic Study aims to determine the impact of various road network options alongside additional land use in both development areas. In addition to an updated base case using the recalibrated CSTM, two combinations of land use and road network changes were evaluated, using strategic transport modelling methods:

- **Base Case (CSTM 2011):** Land use and transport network assumptions for 2031 without the proposed developments using the previous CSTM calibrated to 2011 conditions
- **Base Case (CSTM 2016):** Current land use and transport network assumptions for 2031 using the CSTM calibrated to 2016 conditions. This scenario also assumes no developments in the Section 66 Deakin and Federal Golf Club sites
- **Scenario 6:** Base Case plus Mbark-Federal Golf Club Development and Section 66 Deakin Development, with access via a new road connecting to Birdwood Street, Hughes. Existing access to the Federal Golf Club via Gowrie Drive is removed.

- **Scenario 7:** Base Case plus Mbark-Federal Golf Club Development and Section 66 Deakin Development, with access via a new road connecting to Kitchener Street, Hughes. Existing access to the Federal Golf Club via Gowrie Drive is removed.

The strategic transport modelling analysis found the following:

- Section 56 Red Hill generates a minimal amount of additional traffic and thus its impact on the network is minor. Connecting to either Birdwood Street or Kitchener Street is unlikely to have any substantial impact on congestion.
- The CSTM suggests that Kent Street will already be close to its nominal capacity in 2031. The additional traffic generated by Section 56 Deakin results in some minor traffic diversions, particularly along Denison Street in the PM peak, as existing Kent Street traffic is displaced by the new development traffic. Some form of traffic calming and upgrades to intersections along Kent Street will likely be required in future.

Crash Analysis

A preliminary crash analysis was conducted using crash data records obtained from the dataACT Open Data Portal. Crashes around the key intersections in the study area were assessed and compared to the counted traffic volumes. For the nine intersections surveyed, crash rates range from 0.22 to 1.31 crashes per million vehicle movements. The analysis indicated that the intersection of Gowrie Drive with Red Hill Drive has the highest crash rate. For both scenarios tested in this report, Gowrie Drive is assumed to be closed, which would remove traffic from this dangerous intersection. The location with the next highest crash rate is the intersection of Carruthers Street and Kent Street with 0.55 crashes per million vehicle movements. This intersection has high traffic volumes and requires turning vehicles to cross multiple lanes of traffic. Interventions at this location should be considered.

A brief assessment of crashes over time by road condition, time of day and severity was also carried out. No intersection showed a clear trend of increases in the occurrence of crashes. The intersection of Kitchener Street and Birdwood Street appeared to show a decrease since 2012, with no crashes recorded since 2015. None of the intersections showed a clear increase in the occurrence of crashes during wet weather. The intersection of Kent Street and Kitchener Street showed an abnormally high proportion of crashes at night, which might indicate need for better lighting at this location. While all other intersections had less than 10% of crashes resulting in injury or fatality, the intersection of Gowrie Drive with Red Hill Drive had 100% of crashes resulting in injury. This is an extremely small sample size, however the risks at this intersection are clearly demonstrated.

Public Transport and Active Travel Assessment

Proximity to public transport stops was assessed qualitatively for the proposed development and surrounding areas was assessed using the new Network 19, which came into effect on 29 April, 2019. A bus stop is adjacent to the Section 66, Deakin development, providing access to Civic and Woden. Section 56, Red Hill has no access to public transport. The areas surrounding the development generally have reasonable access but the northern part of Brereton Street does not have any access. Note that Network 19 is not yet incorporated in the CSTM.

The active travel network around the proposed developments is well connected. However, the footpath on Brereton Street providing access to Section 56, Red Hill is narrow and has many interruptions. It is recommended that good walking and cycling access be provided on either of the new roads proposed in Scenario 6 or 7.

Intersection Assessment

As part of this project, intersection turning movement counts were collected at nine intersections within the study area in 2018 and 2019:

1. Mugga Way/Stonehaven Crescent – Gowrie Drive/Melbourne Avenue
2. Gilmore Crescent – Brereton Street
3. Kitchener Street – Gilmore Crescent
4. Kent Street – Carruthers Street
5. Kent Street – Strickland Crescent

6. Gowrie Drive – Red Hill Drive
7. Kitchener Street – Birdwood Street
8. Kent Street – Birdwood Street
9. Kent Street – Kitchener Street

The surveys covered the weekday AM and PM peak periods and a qualitative analysis of the intersections and connected roads was conducted based on these traffic counts.

Intersection Analysis

- The Mugga Way/Stonehaven Crescent – Gowrie Drive/Melbourne Avenue intersection performance is unlikely to be affected by the proposed development and access in the scenarios tested in this report. Unbalanced flows at this intersection could lead to high delays for some approaches and further monitoring or assessment of this intersection might be required.
- The Gilmore Crescent – Brereton Street intersection currently has a low level of traffic and would experience no change in the scenarios tested in this report.
- The Kitchener Street – Gilmore Crescent intersection currently carries moderate levels of traffic and its volumes would increase only slightly in the scenarios tested in this report. No issues are expected at this location.
- The Kent Street – Carruthers Street intersection currently experiences a significant amount of traffic, with performance for low priority movements likely to be poor during the peak periods, potentially leading to increased risky behaviour. Austroads standards suggest that an intersection of this type should not be priority controlled and signalisation should be considered to better control the performance and safety at this intersection.
- The Kent Street – Strickland Crescent intersection also currently experiences a significant amount of traffic, especially considering its current roundabout configuration. It is likely operating close to its capacity during the peak periods and the additional traffic generated by Section 66, Deakin could be enough to push it to an unacceptable level of performance. Signalisation might be necessary to manage performance and improve access for pedestrians and cyclists in the area.
- The Gowrie Drive – Red Hill Drive intersection carries very little traffic. The busiest period is the Wednesday midday golf course peak of 81 vehicles per hour, of which only half are travelling to or from the golf course. This very low level of traffic likely contributes to the low number of accidents, although the accident rate is very much higher than other intersections in the area. For the scenarios tested in this report, it is assumed that Gowrie Drive is closed. If this does not occur, interventions to improve safety at this location should be investigated.
- The intersection of Kitchener Street and Birdwood Street is generally low and only increases slightly for both scenarios tested. It is unlikely that any interventions would be required at this intersection.
- Traffic volumes at the intersection of Kent Street with Birdwood Street are moderate, and there could be some delays for traffic turning out of Birdwood Street, particularly in the PM peak. If Scenario 6 is adopted, some upgrades at this intersection might be necessary.
- Traffic at the intersection of Kent Street and Kitchener Street is moderate and a small amount of additional traffic would use this intersection in both scenarios. However, it is likely that the existing intersection has sufficient capacity.

Road Analysis

- Brereton Street carries very little traffic, currently fewer than 2,000 vehicles per day. No additional traffic would use this road in either scenario tested in this report.
- Gilmore Crescent between Brereton and Kitchener Streets currently carries just over 4,000 vpd, by which classification it operates as a major collector. No additional traffic would use this road in either scenario tested in this report.
- Kent Street carries a lot of traffic, with demand greatest between Carruthers Street and Strickland Crescent, due to the concentration of trip generators within this section. The additional land use at Section 66, Deakin accesses the network between these two points, adding traffic to a section of road that is likely already congested.

- Birdwood Street, while narrow, does not currently carry substantial traffic and the development scenarios would not significantly increase traffic. The volumes on this road do not suggest any capacity issues, except for the possible congestion at the intersection of Birdwood Street and Kent Street.
- Kitchener Street carries a moderate amount of traffic, with some traffic calming measures already implemented. In the scenarios tested in this report, there is a small increase in traffic but this is not expected to lead to any serious performance issues.

Summary and Conclusions

The findings of this report include:

- Additional traffic generated by the proposed developments at Section 66, Deakin and Section 56, Red Hill do not significantly impact on the local road network for either of the scenarios tested in this report.
- The intersection of Gowrie Drive with Red Hill Drive shows an accident rate and severity much higher than all other intersections in the area. Alternative access to the golf course should be provided (as in both Scenario 6 and 7) or the intersection should be upgraded. It is noted that a previous study in 2014 investigated four possible upgrade options but none of these options met the sight lines required by Austroads.
- The intersection of Kent Street and Kitchener Street showed a higher than expected proportion of night time crashes. Further assessment of lighting at this location should be undertaken.
- Kent Street operates close to capacity and upgrades might be required, particularly at its intersections with Birdwood Street, Carruthers Street and Strickland Crescent.
- Birdwood Street or Kitchener Street each have sufficient capacity to carry the increased traffic from Section 56 Red Hill. However, the intersection of Birdwood Street and Kent Street is likely to perform worse than the intersection of Kitchener Street and Kent Street so Scenario 7 might be slightly preferable to Scenario 6.

The traffic analysis for these two proposed developments indicates that they have distinct impacts on the road network, and therefore further detailed traffic assessments for each development can be assessed independently.

Challenges

- Kent Street traffic is heavy, which is likely to cause problems at some intersections, particularly Carruthers Street and Strickland Crescent
- The Section 66, Deakin development would increase delay on Kent Street and lead to a small diversion in traffic onto Denison Street

Recommendations

Based on the outcomes of the transport modelling and analysis, SMEC recommends the following:

- Consider the benefits to access and traffic impact of locating development to the southern area of the site with access from Kitchener Street. This has benefits and further assessment is warranted.
- Scenario 2 (access via Brereton Street) is the second ranked option and preferred option if the location of development remains near the existing clubhouse. Scenario 7 (long access via Kitchener St) should also be included for further assessment.
- Investigation of upgrade options for intersections on Kent Street, to address both performance and safety concerns, including:
 - Assess lighting at the intersection of Kent Street and Kitchener Street
 - Assess capacity improvements at Birdwood Street, Carruthers Street, Strickland Crescent
- Investigation of options to improve the performance and/or reduce the attractiveness of the Kent Street corridor to encourage traffic to use Yarra Glen and Adelaide Avenue for north/south travel. Possible options include speed reduction or construction of one or more roundabouts to reduce the priority for north-south traffic along the corridor. Any changes to the corridor should also consider Light Rail Stage 2, which is expected to run along the Adelaide Avenue/Yarra Glen corridor.

- Closure or upgrade of the intersection of Gowrie Drive and Red Hill Drive (dependant on whether Scenario 6, 7 or another option is selected)
- Any new road(s) provided for the preferred option should include good active travel facilities and meet relevant emergency services design standards
- Cost estimates for road and intersection upgrades
- Discuss options to improve access to public transport for residents of Brereton Street with TCCS PT team, noting that the number of residents not served by public transport is relatively small.
- Ensure good pedestrian access to the Kent Street bus stops from Section 66, Deakin

FOR DISCUSSION

1 Introduction

SMEC was commissioned by the Environment, Planning and Sustainable Development Directorate (EPSDD) to extend modelling and assessment work for two land use developments adjacent the Red Hill Nature Reserve undertaken in 2018. These developments are in Section 66, Deakin and part Section 56, Red Hill. These developments have already been the subject of traffic impact studies, by Opus in 2017 and Graeme Shoobridge Advisory Services (GSAS) in 2018, respectively. In addition, an options analysis for critical safety upgrades to the intersection of Red Hill Drive and Gowrie Drive, which provides access to the Red Hill site, was conducted by AECOM in 2014.

The Section 66, Deakin adds a medium density residential development including 256 dwellings, preserving the existing office buildings.

The Section 56, Red Hill development is a redevelopment of the land currently occupied by the Federal Golf Club's existing clubhouse and will include a new clubhouse and facilities, along with an active seniors and retirement village containing 125 dwellings.

The previous studies undertaken by other consultants looked at largely localised traffic issues. SMEC then undertook an analysis of the wider area network implications and consequences of a number of road network options supporting the developments using the Canberra Strategic Transport Model (CSTM).

This study summarises the findings of SMEC's earlier report and assesses two additional road network options using the most recent version of the CSTM. Also included is a qualitative assessment of selected intersections, a crash analysis and a brief assessment of active travel and public transport coverage in the area.

The context area covered by this study are shown in Figure 1.

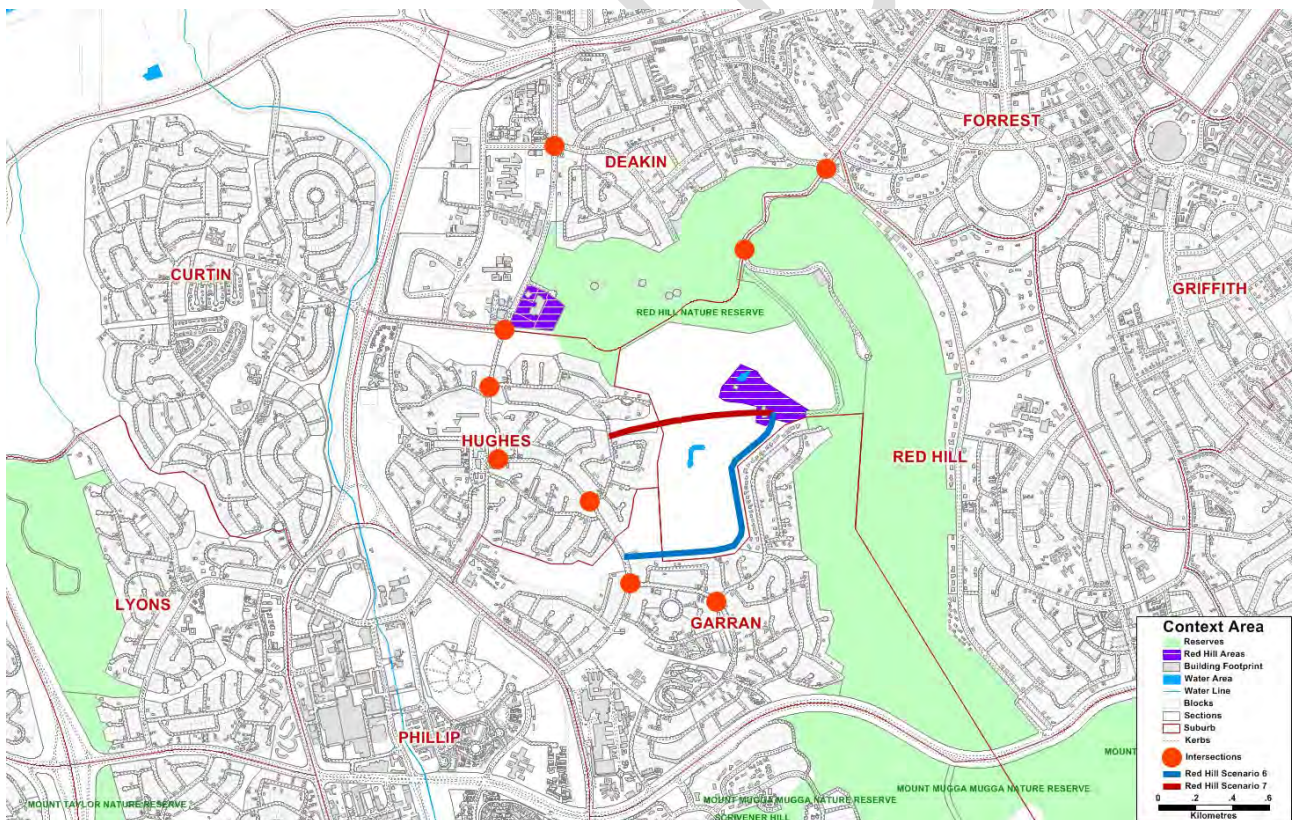


Figure 1: Context Area

2 Strategic Transport Modelling

The analysis has been conducted using the Canberra Strategic Transport Model (CSTM), updated in 2018-19 using the 2016 Census and 2017 ACT Household Travel Survey. This model contains a complete representation of the urban road networks of Canberra, Queanbeyan, Murrumbateman and Yass.

The model is an equilibrium model, in which travel decisions (origin/destination, mode, route etc.) are related to cost, where the cost of travel is minimised for every road user. As such, any changes to the model inputs and assumptions can have impacts far from where the change was made, the severity decreasing with distance, as the traffic adjusts and redistributes to minimise the individual user costs.

The modelling was conducted for the 2031 AM and PM peak periods and included modelling of the traffic impacts of both Section 56, Red Hill and Section 66, Deakin, assessing two new access options developed following the modelling works undertaken by SMEC in 2018.

2.1 Summary of Previous Modelling

The Red Hill Reserve Surrounds Traffic Study conducted by SMEC in 2018 aimed to determine the impact of various road network options alongside additional land use in both development areas. In addition to a base case, five combinations of land use and road network changes were evaluated, using the CSTM calibrated to 2011 conditions:

- **Base Case:** The current land use and transport network assumptions for 2031. This scenario assumes no developments in the Section 66, Deakin and Section 56, Red Hill sites
- **Scenario 1:** Base Case plus Section 56, Red Hill with access from Gowrie Drive only
- **Scenario 2:** Base Case plus Section 56, Red Hill with access from Brereton Street only
- **Scenario 3:** Base Case plus Section 56, Red Hill with access from both Gowrie Drive and Brereton Street
- **Scenario 4:** Base Case plus Section 66 Deakin
- **Scenario 5:** Base Case plus both developments, with the preferred access option selected from Scenarios 1-3 (access from Gowrie Drive only was selected)

The previous strategic transport modelling analysis found the following:

- Section 56 Red Hill generates a minimal amount of additional traffic and thus its impact on the network is insignificant. However, the major issue with this route option is the existing safety issues surrounding the geometry of Gowrie Drive and its intersection with Red Hill Drive.
- Connecting to Brereton Street instead of Gowrie Drive (Scenario 2) would result in a modest increase in traffic on Brereton Street (~1,400 vpd), with the possibility of exceeding the traffic limit for Brereton Street's existing classification. This option has already met opposition from the community.
- Connecting both Gowrie Drive and Brereton Street (Scenario 3) opens a very attractive alternative north-south route between Woden Valley and South Canberra. This results in approximately 8,000 vpd additional traffic on both roads, which greatly exceeds the traffic limits for their respective classifications. This would also cause major safety issues and would meet strong resistance from the community.
- The CSTM suggests that Kent Street will already be close to its nominal capacity in 2031. The additional traffic generated by Section 56 Deakin pushes it to capacity and results in noticeable traffic diversions as existing Kent Street traffic is displaced by the new development traffic. Some form of traffic calming and upgrades to intersections along Kent Street will likely be required in future.

2.2 Model Scenarios

The modelling considered land use developments in two locations:

1. **Mbark-Federal Golf Club Development in Block 1 Section 56, Red Hill**
Redevelopment of the club facilities and inclusion of an active seniors and retirement village
2. **Blocks 7 & 8 Section 66, Deakin**
Redevelopment of the existing site for mixed residential and commercial use (existing offices will be retained)

The following scenarios were modelled and are presented in this report:

- **Base Case (CSTM 2011):** Land use and transport network assumptions for 2031 using the CSTM calibrated to 2011 conditions (as used in SMEC's 2018 study). This scenario assumes no developments in the Section 66 Deakin and Federal Golf Club sites.
- **Base Case (CSTM 2016):** Current land use and transport network assumptions for 2031 using the CSTM calibrated to 2016 conditions. This scenario also assumes no developments in the Section 66 Deakin and Federal Golf Club sites.
- **Scenario 6:** Base Case plus Mbark-Federal Golf Club Development and Section 66 Deakin Development, with access via a new road connecting to Birdwood Street, Hughes. Existing access to the Federal Golf Club via Gowrie Drive is removed.
- **Scenario 7:** Base Case plus Mbark-Federal Golf Club Development and Section 66 Deakin Development, with access via a new road connecting to Kitchener Street, Hughes. Existing access to the Federal Golf Club via Gowrie Drive is removed.

For the modelling task, eight scenarios were tested using different versions of the CSTM, as shown in Table 1.

Table 1: Modelled Scenarios

SCENARIO	2031 AM	2031 PM
Base Case (CSTM 2011)	✓	✓
Base Case (CSTM 2016)	✓	✓
Scenario 6 (CSTM 2016)	✓	✓
Scenario 7 (CSTM 2016)	✓	✓

2.3 Model Assumptions

2.3.1 Zone Structure

The development areas within Section 66 Deakin and Section 56 Red Hill respectively fall within the existing CSTM Zones 050304 and 051001, as shown in Figure 2. The location of the development areas and proposed access routes are also shown.

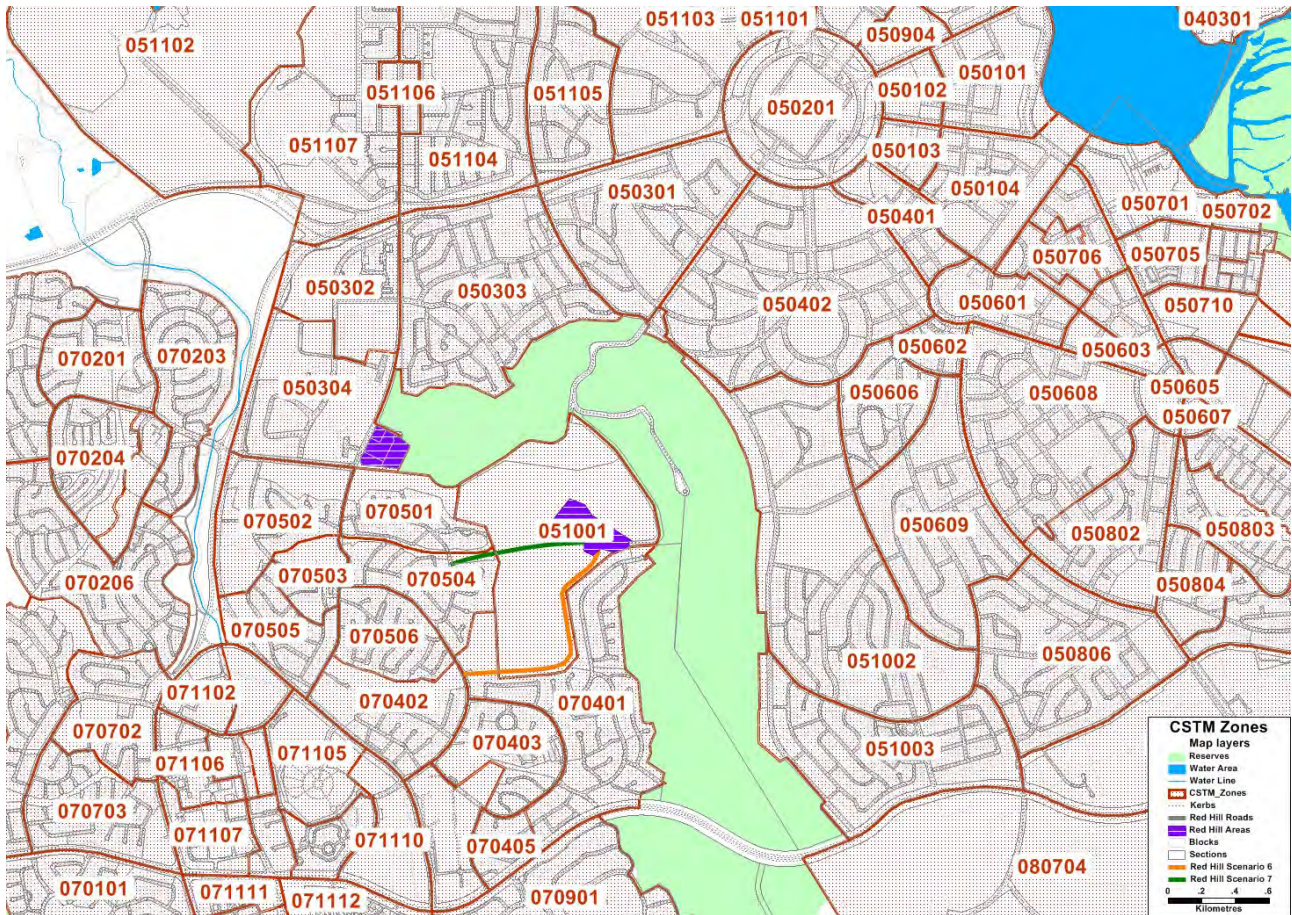


Figure 2: CSTM Zones in Development Areas

FOR DISCUSSION

2.3.2 Road Network

The road network infrastructure improvements assumed to be present in each year from 2016 to 2041 have been confirmed with TCCS in 2018, when the current version of the CSTM was completed. Diagrams showing the upgrades in 2021 and 2031 are included in Appendix A.

Intersections are represented in the CSTM at a high level, with those that require vehicles to stop or give way being modelled through a reduction in capacity on the approaching roads. No discrimination is made by intersection control method.

A diagram showing the basic CSTM link attributes is included in Figure 3. The lane count is shown as line thicknesses, the signposted speed limit as shown as line colours and the hourly capacity is shown numerically.

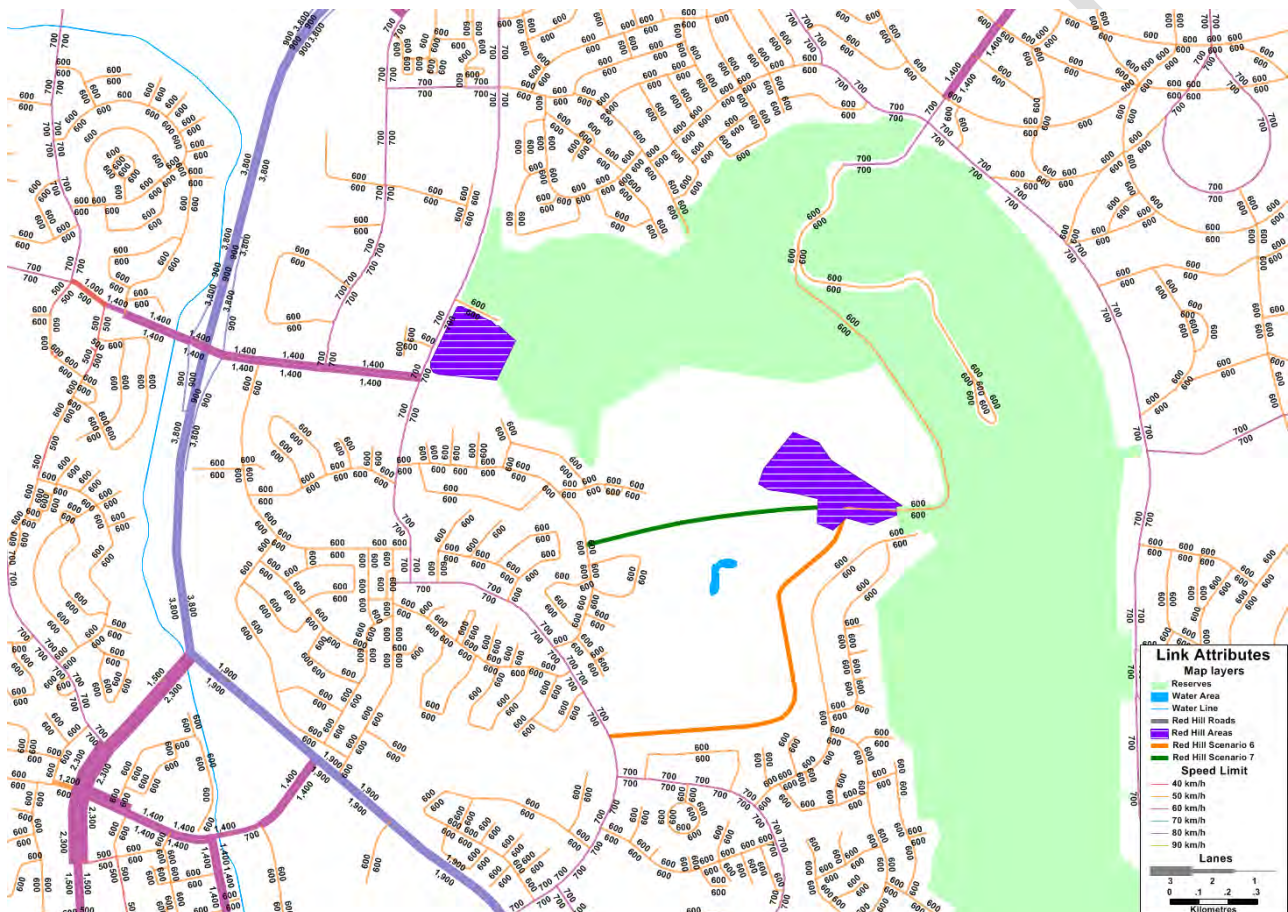


Figure 3: CSTM Basic Link Attributes

2.3.3 Public Transport

The public transport network in 2021 onwards is based on Transport Canberra's proposed Network 2018 provided to SMEC in March 2017, with the addition of Light Rail Stage 1 (LRS1) and the removal of bus routes operating along the LRS1 corridor. Light Rail Stage 2 (LRS2), assumed to be between Civic and Woden, is added in 2031.

2.3.4 Land Use

The base land use data was provided by TCCS and is dated 8 October 2018. The planned land use for 2031 (without the proposed developments) is shown in Table 2.

Table 2: CSTM 2031 Base Case Land Use

ZONE	DESCRIPTION	POPULATION	EMPLOYMENT	RETAIL SPACE	SCHOOL ENROLMENTS	TERTIARY ENROLMENTS
050304	Deakin	0	1,811	4,318	96	0
051001	Red Hill	0	42	0	0	0

The land use assumptions include the current understanding of the Yarralumla Brickworks development, as per the agreed land use in the CSTM.

2.4 Model Updates

2.4.1 Zone Structure

The developments within Section 56, Red Hill and Section 66, Deakin required the addition of Zones 050305 and 051004 to the CSTM, respectively. The updated zones are shown in Figure 4.

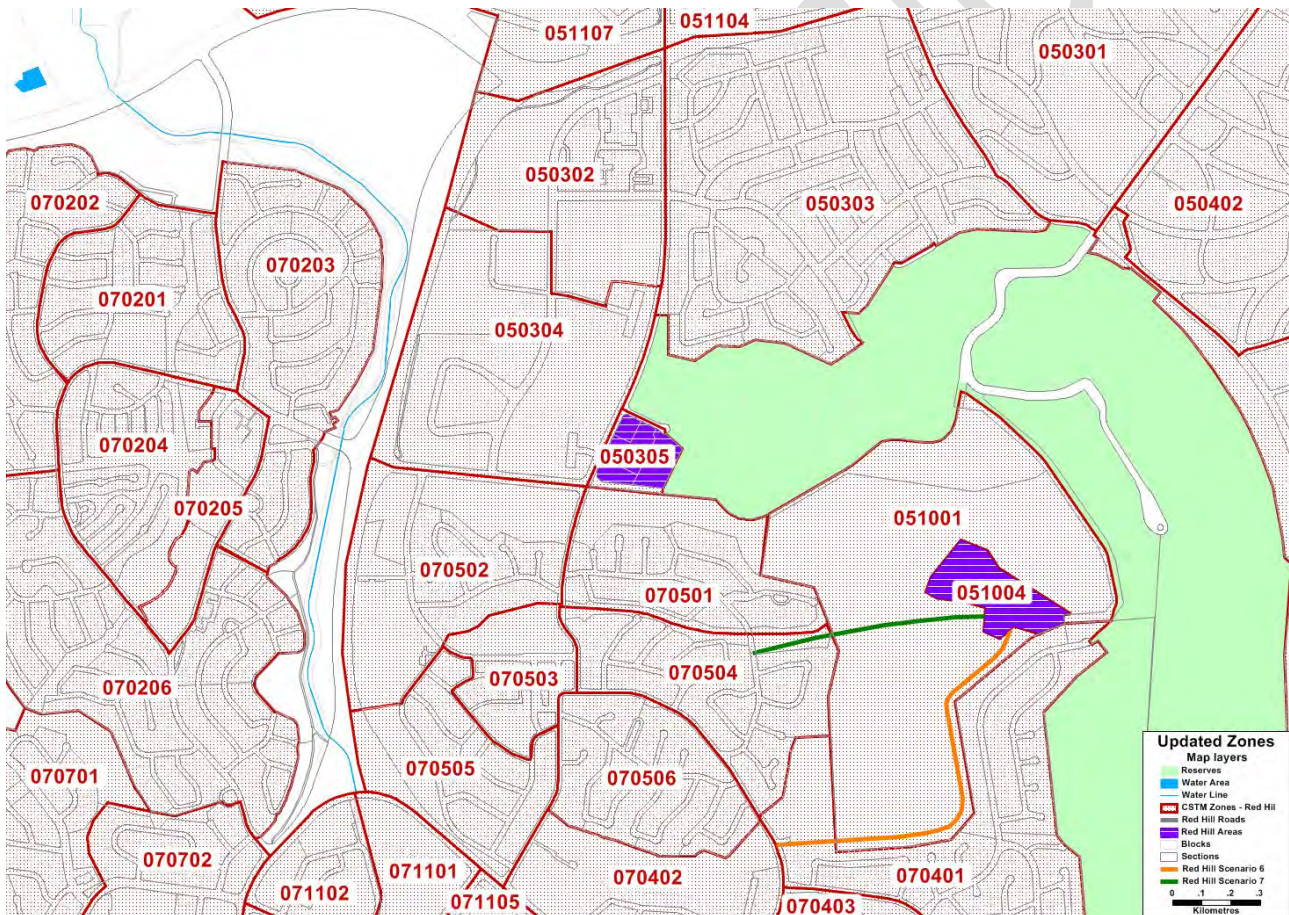


Figure 4: Updated Zone Layout

2.5 Land Use

The additional population in the new two zones was determined by calculating the average occupancy of each combination of dwelling type and size (number in bedrooms) for each suburb, using the 2016 Census records. The results of this process are shown in Tables 3 and 4. These values have been added to the CSTM, which has been allowed to conduct its standard trip generation and distribution procedures. In reality, the nature of the Section 56, Red Hill development (active seniors and retirees) is expected to generate less traffic than the average residential development. For this type of development, the RMS *Guide to Traffic Generating Developments* specifies 2 vehicle trips per day (250 total), 0.1 trips per AM peak (12.5 total) and 0.2 trips per PM peak (25 total). While this is a development for active seniors rather than an assisted care facility, the trip generation modelled by the CSTM should be treated as an upper limit to the expected traffic.

At the advice of EPSDD, the Section 66, Deakin development assumption shown in Table 3 has been reduced from 574 dwellings, as used by Opus, to 256 dwellings. The proportional distribution of dwelling types and sizes assumed by Opus has been retained.

Table 3: Section 66 Deakin Population Calculations

TYPE	BEDROOMS	COUNT	OCCUPANCY	POPULATION
Apartment	1	63	1.24	78
Apartment	2	175	1.90	332
Apartment	3	13	2.00	26
Townhouse	3	5	1.98	11
Total		256	1.74	447

Table 4: Section 56 Red Hill (Mbark) Population Calculations

TYPE	BEDROOMS	COUNT	OCCUPANCY	POPULATION
House	3	62	2.33	144
Apartment	1	9	1.18	11
Apartment	2	12	1.60	19
Apartment	3	18	2.89	52
Townhouse	2	12	1.47	18
Townhouse	3	12	2.83	34
Total		125	2.22	278

The population in Zones 050305 and 051004 in each scenario is given in Table 5. No changes have been made to the land use of any existing zones. This means that the trips generated by the proposed developments are added to the trips generated by the base land use forecasts for 2031.

Table 5: Zone Population by Scenario

ZONE	SCENARIO 6	SCENARIO 7
050305	278	278
051004	447	447

2.6 Strategic Transport Modelling Results

2.6.1 Aggregated Outputs

Tables 6 and 7 show bulk summary results for the Base case using the 2011 CSTM and the 2016 CSTM. After the recalibration to 2016 conditions and the updates to the 2031 scenario, there is a reduction in person trips of approximately 8%. However, there is a much larger reduction in HBW PT usage, and the forecast HBW PT mode share reduces to 12.8% from 16.8% in the AM peak. In the PM peak, HBW public transport usage increase from 7.7% to 13.4% in the recalibrated model. Recent changes to the bus network (implemented in April 2019) are not yet included in the CSTM and it is not yet known what impact these fundamental changes to PT travel in Canberra will have in the future. In both peak periods, the average car trip length increases from approximately 9.5 km to 12.5 km in the recalibrated model.

Table 6: 2031 AM Base Bulk Scenario Results

OUTPUT	BASE (CSTM 2011)	BASE (CSTM 2016)
Person Trips	200,612	183,461
PT Trips	22,476	19,104
Bicycle Trips	9,555	10,856
Car Trips	150,226	125,239
HBW PT Trips	8,266	9,416
HBW PT %	16.8%	12.8%
Car VKT	1,409,038	1,577,806
Δ VKT	-	+168,768
Car VHT	44,835	43,106
Δ VHT	-	-1,729

Table 7: 2031 PM Base Bulk Scenario Results

OUTPUT	BASE (CSTM 2011)	BASE (CSTM 2016)
Person Trips	174,833	166,815
PT Trips	9,155	14,961
Bicycle Trips	2,651	8,754
Car Trips	139,143	122,330
HBW PT Trips	3,345	11,359
HBW PT %	7.7%	13.4%
Car VKT	1,324,868	1,513,781
Δ VKT	-	+188,913
Car VHT	33,453	33,958
Δ VHT	-	+505

A summary of the bulk outputs of the models is included in Tables 8 and 9. The Red Hill and Deakin developments generate 216 additional person trips in the AM peak and 197 in the PM peak.

The change in Vehicle Kilometres Travelled (VKT) and Vehicle Hours Travelled (VHT) in each scenario is largely a reflection of the increased population. Of the 216 additional person trips in the AM peak, 8-9 use public transport and 16-17 use bicycle. The remainder travel by car. In the PM peak, of the 197 additional trips, 15-17 use public transport and 5-6 use bicycle.

In Scenario 6, there is an additional 1,210 car VKT and 62 car VHT in the AM peak with an additional 1,154 car VKT and 40 car VHT in the PM peak.

In Scenario 7, there is an additional 1,245 car VKT and 58 car VHT in the AM peak with an additional 1,221 car VKT and 40 car VHT in the PM peak.

Table 8: 2031 AM Bulk Scenario Results

OUTPUT	BASE (CSTM 2016)	SCENARIO 6	SCENARIO 7
Person Trips	183,461	183,677	183,677
PT Trips	19,104	19,112	19,113
Bicycle Trips	10,856	10,873	10,872
Car Trips	125,239	125,369	125,369
HBW PT Trips	9,416	9,415	9,416
HBW PT %	12.8%	12.8%	12.8%
Car VKT	1,577,806	1,579,016	1,579,051
Δ VKT	-	+1,210	+1,245
Car VHT	43,106	43,168	43,164
Δ VHT	-	+62	+58

Table 9: 2031 PM Bulk Scenario Results

OUTPUT	BASE (CSTM 2016)	SCENARIO 6	SCENARIO 7
Person Trips	166,815	167,012	167,012
PT Trips	14,961	14,978	14,976
Bicycle Trips	8,754	8,759	8,760
Car Trips	122,330	122,450	122,452
HBW PT Trips	11,359	11,371	11,370
HBW PT %	13.4%	13.4%	13.4%
Car VKT	1,513,781	1,514,936	1,515,002
Δ VKT	-	1,154	1,221
Car VHT	33,958	33,998	33,998
Δ VHT	-	40	40

2.6.2 Detailed Individual Scenario Results

Diagrams extracted from the CSTM showing hourly peak volumes and volume/capacity for each scenario, as well as peak volume differences for the scenarios, are shown below. Except for the Base Case, both the peak traffic and peak traffic difference (compared to the Base Case) are included for each scenario.

2.6.2.1 Base Case (CSTM 2011)

The Base Case hourly flow diagrams for 2031 AM and 2031 PM are shown below. Of the roads surrounding the development sites, significant traffic volumes can be seen on Adelaide Avenue, Kent Street and Stonehaven Crescent in both peak periods. The performance on Kent Street in particular suggests that intervention will be required at some of the intersections along its length. Currently, all are priority controlled, with two low-speed roundabouts. The traffic on Kent Street will cause performance and safety issues at the intersections and upgrades will likely need to be investigated.

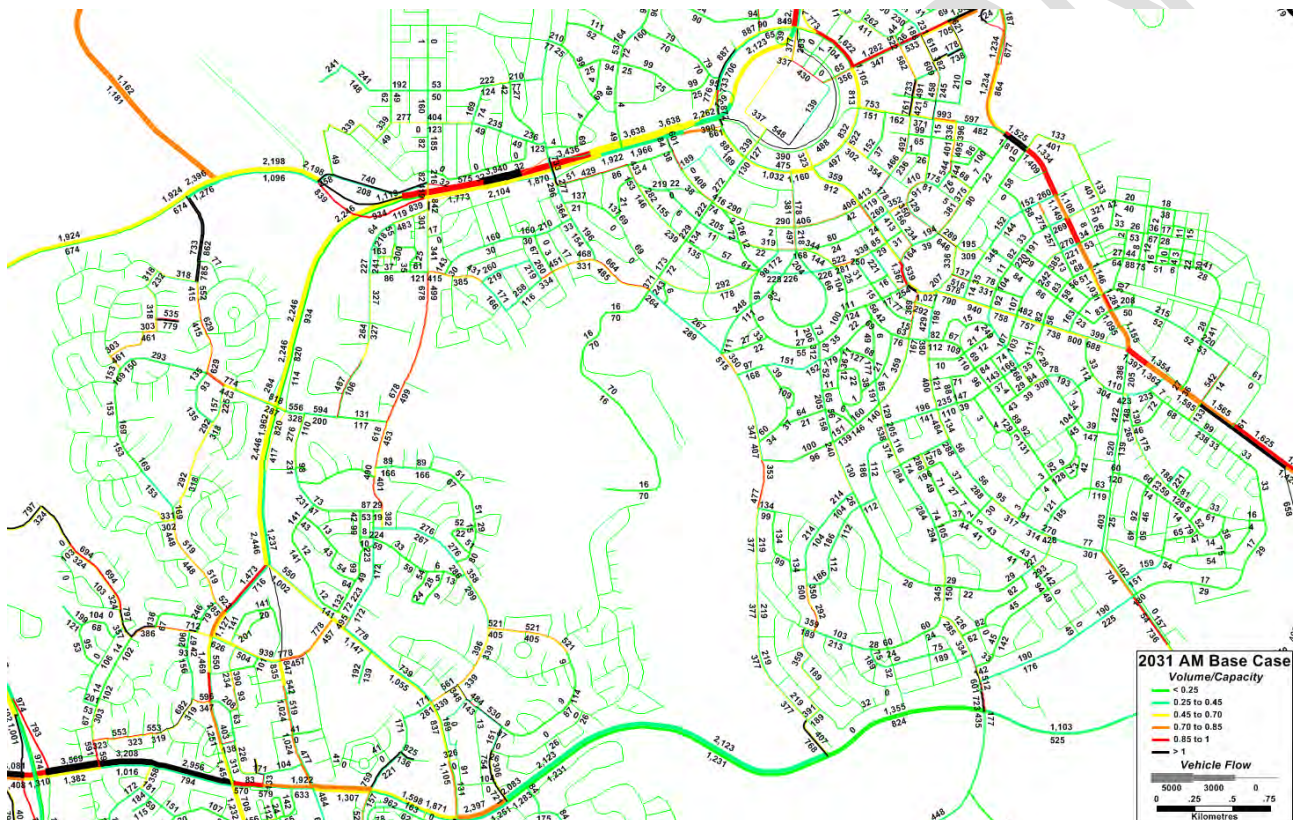


Figure 5: Base Case (CSTM 2011) 2031 AM Hourly Flow and V/C

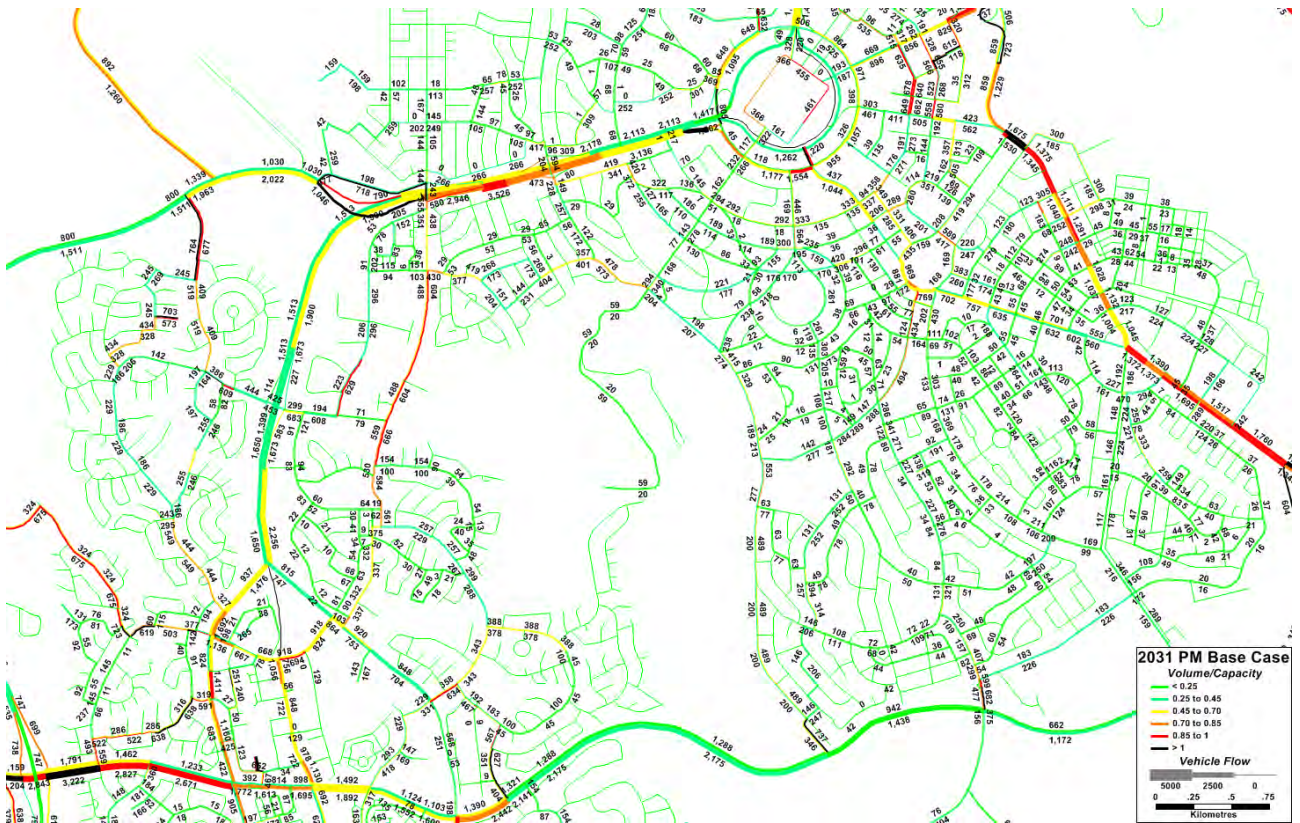


Figure 6: Base Case (CSTM 2011) 2031 PM Hourly Flow and V/C

2.6.2.2 Base Case (CSTM 2016)

The Base Case (CSTM 2016) hourly flow diagrams for 2031 AM and 2031 PM are shown in Figure 7 and Figure 8, respectively. Of the roads surrounding the development sites, significant traffic volumes can be seen on Adelaide Avenue, Yarra Glen, Stonehaven Crescent and Kent Street in both peak periods. The traffic on Kent Street will likely cause performance and safety issues at the intersections and upgrades will need to be investigated before 2031. Similarly, volumes on Stonehaven Crescent, west of Melbourne Avenue, are close to capacity and some interventions might be required before 2031.

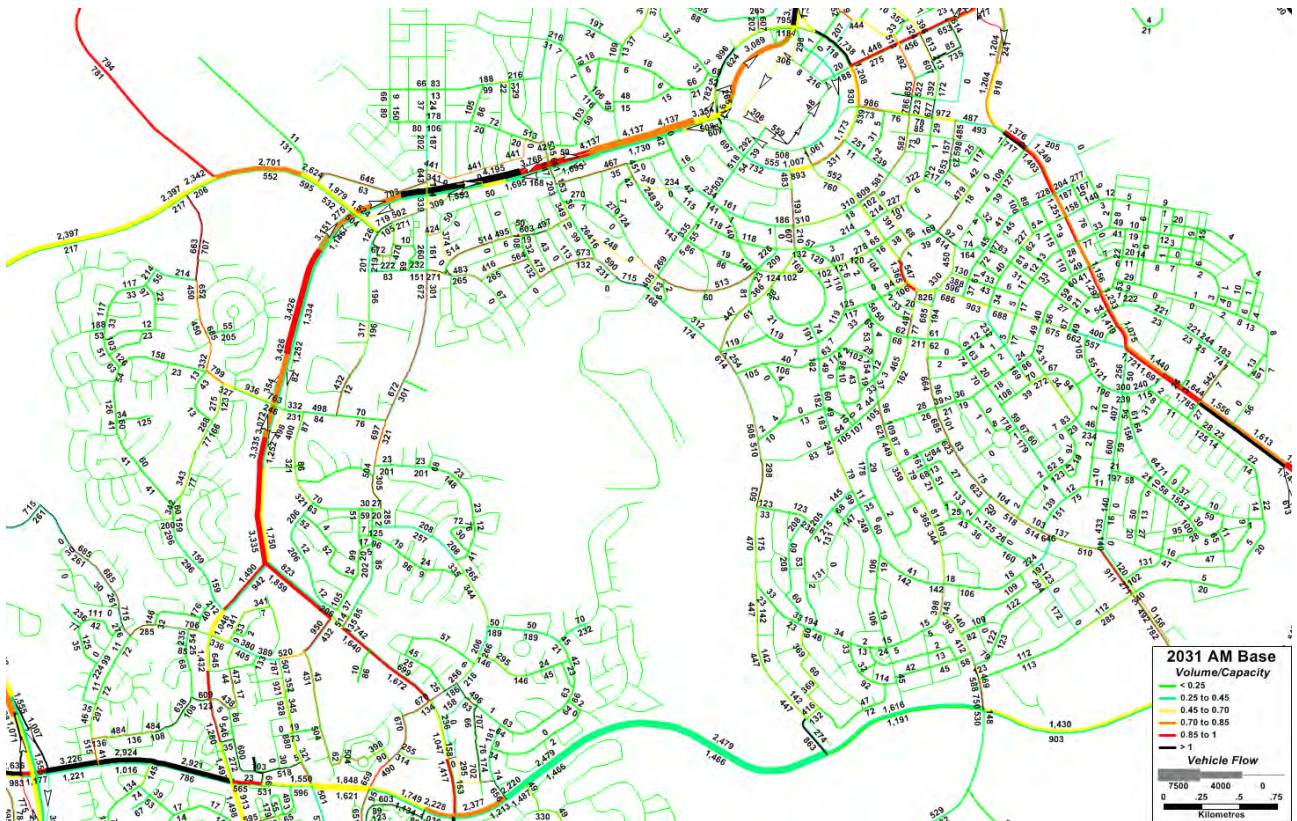


Figure 7: Base Case (CSTM 2016) 2031 AM Hourly Flow and V/C

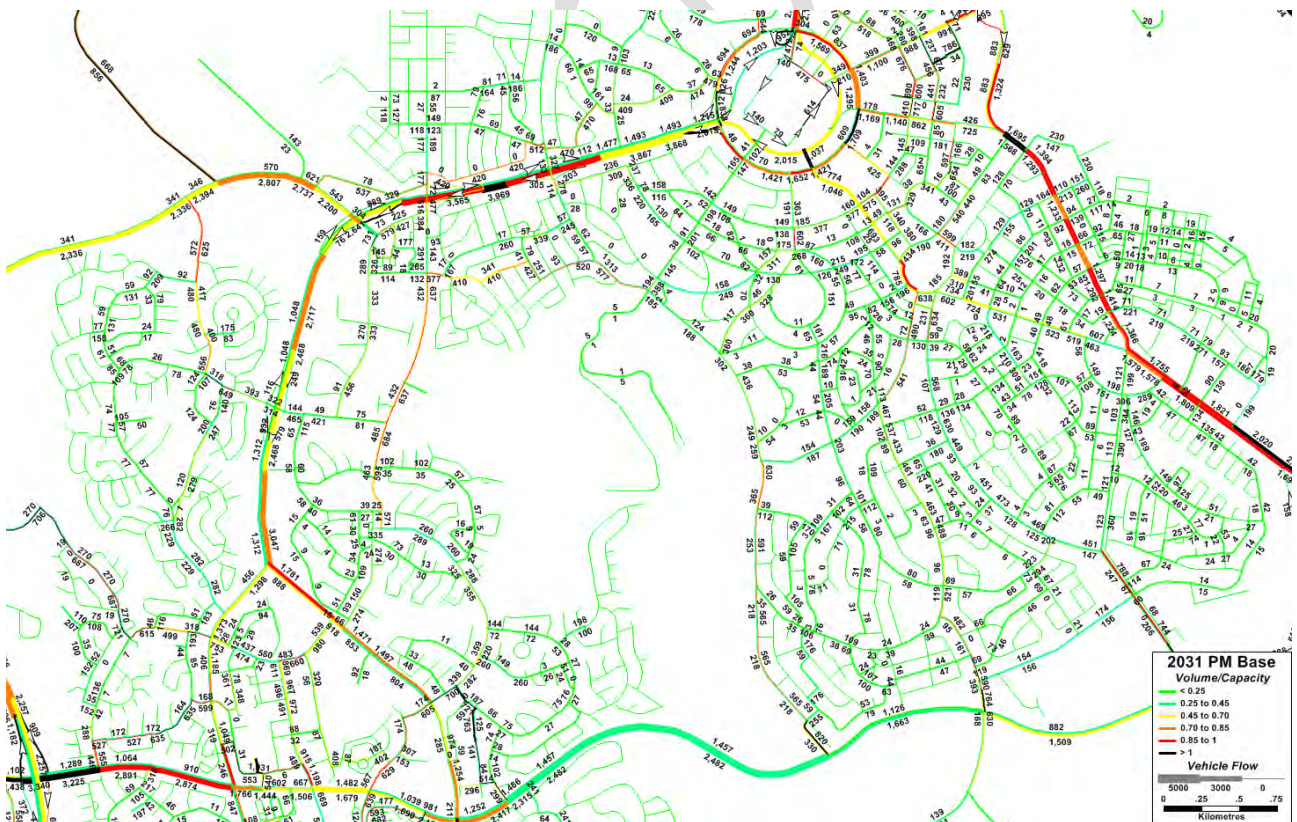


Figure 8: Base Case (CSTM 2016) 2031 PM Hourly Flow and V/C

A comparison of the traffic volumes for the 2031 AM and PM peak periods between the CSTM (2011) and CSTM (2016) are shown in Figure 9 and Figure 10, respectively. For most of the local roads around the study area, the differences between the models are relatively small. Larger differences are apparent on major roads, including Yarra Glen, Adelaide

Avenue, Cotter Road and Hindmarsh Drive. The 2016 CSTM also includes upgrades to the Cotter Road – Adelaide Avenue interchange, allowing all movements and direct access from Cotter Road to Denison Street. Given the small differences in modelled volumes on local roads around the developments, which is where most impact would be felt, it is considered that the findings from the earlier modelling are still current and can be compared to the findings from this current modelling activity.

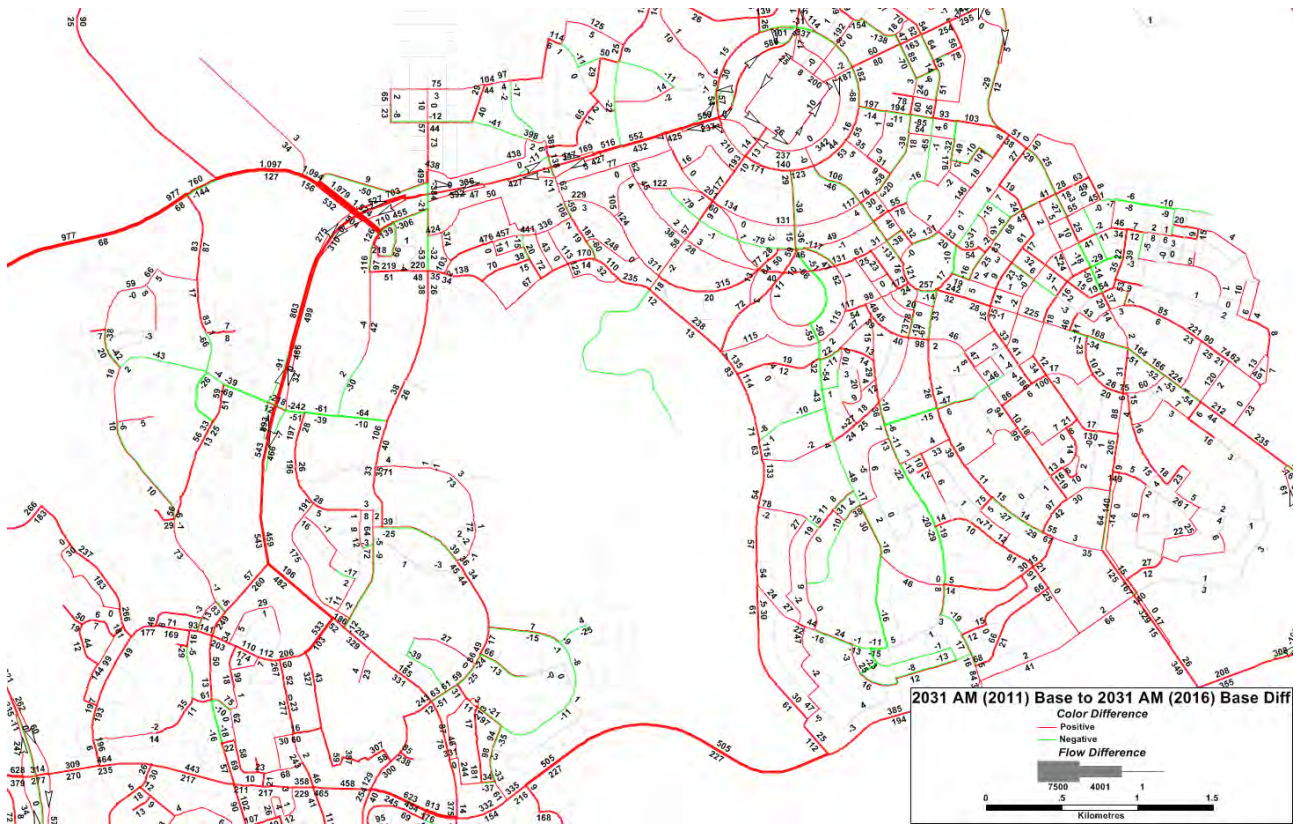


Figure 9: Base Case 2031 AM Difference between CSTM 2011 and CSTM 2016

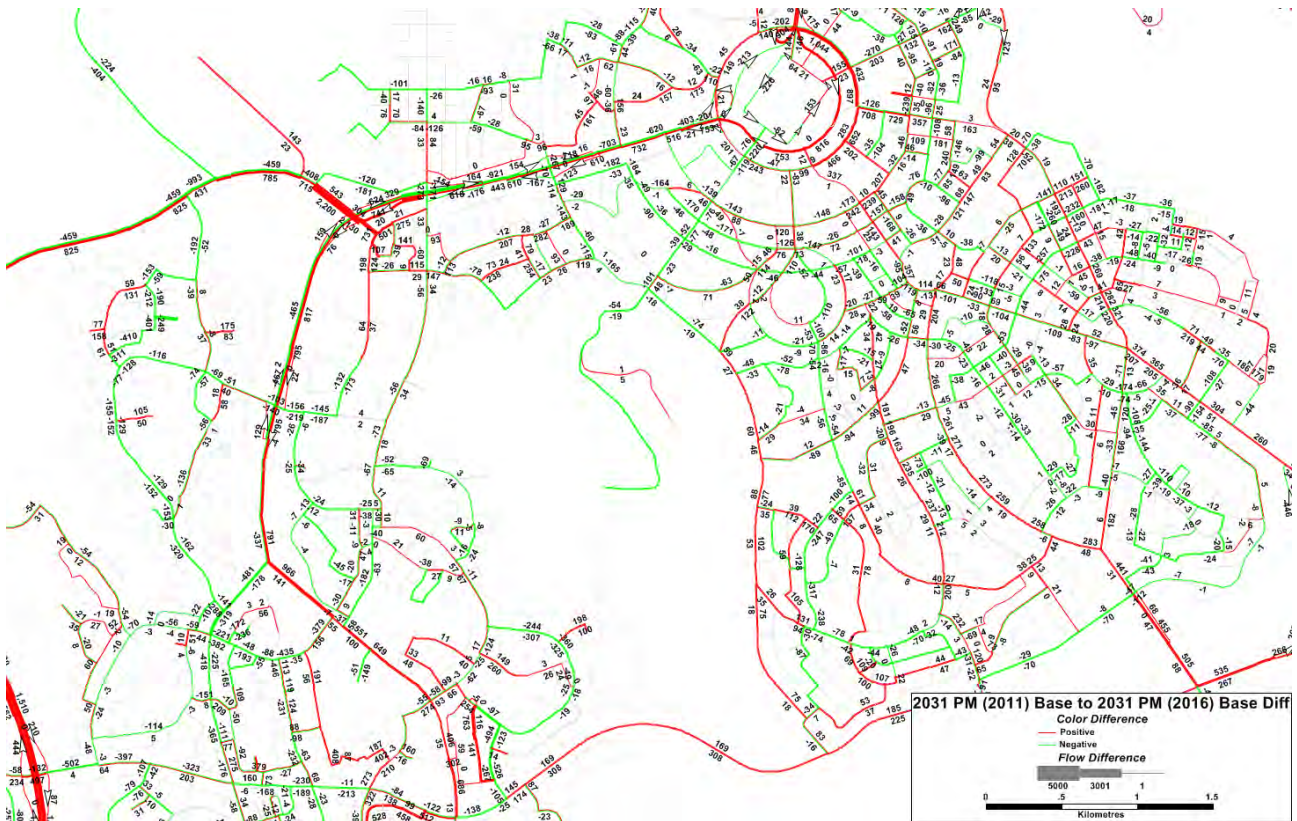


Figure 10: Base Case 2031 PM Difference between CSTM 2011 and CSTM 2016

2.6.2.3 Scenario 6

Scenario 6 includes the closure of Gowrie Drive and a new connection from Federal Golf Club to Birdwood Street. Figures 11 and 12 show the traffic volumes and Volume/Capacity for the network around the study area in the 2031 AM and PM peaks, respectively. As in the Base Case, traffic is largely concentrated on major arterials in the area. However, Kent Street and Stonehaven Crescent operate close to capacity in both peaks.

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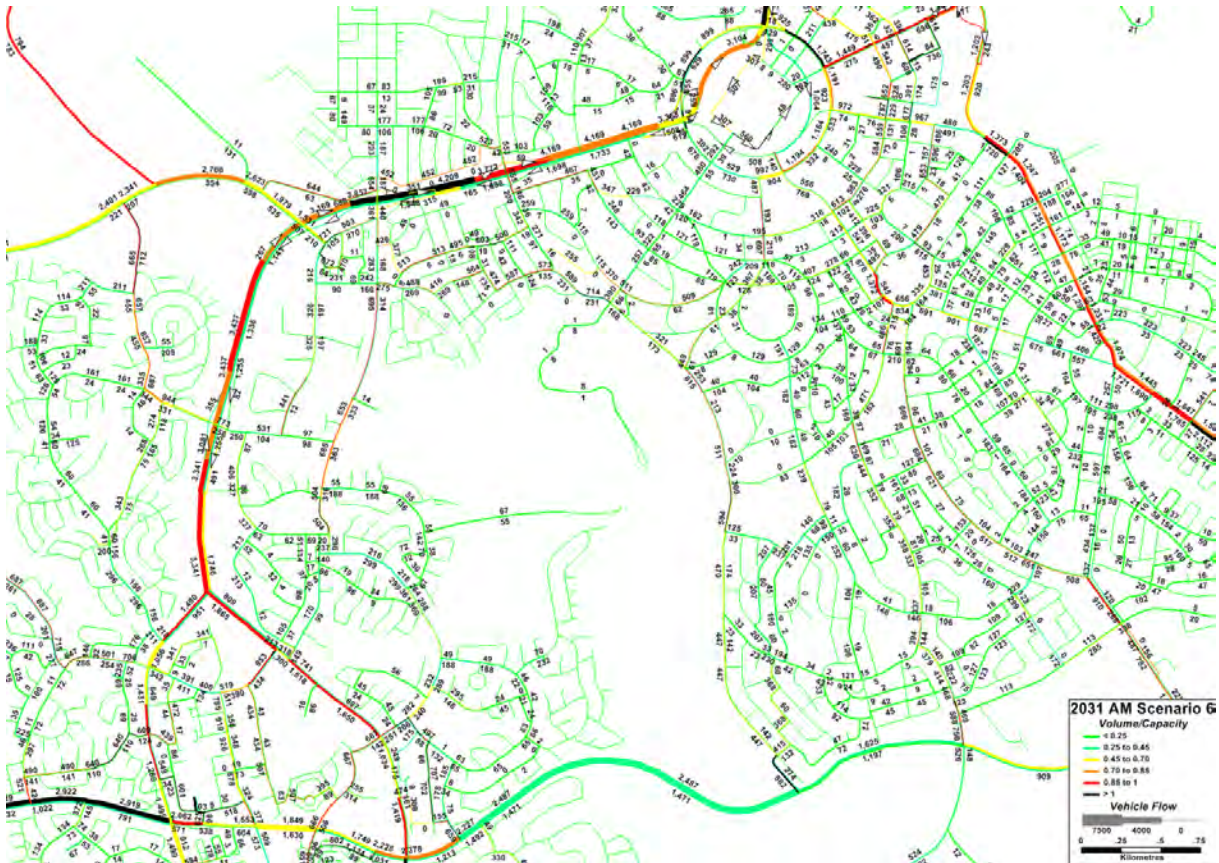


Figure 11: Scenario 6 2031 AM Hourly Flow and V/C

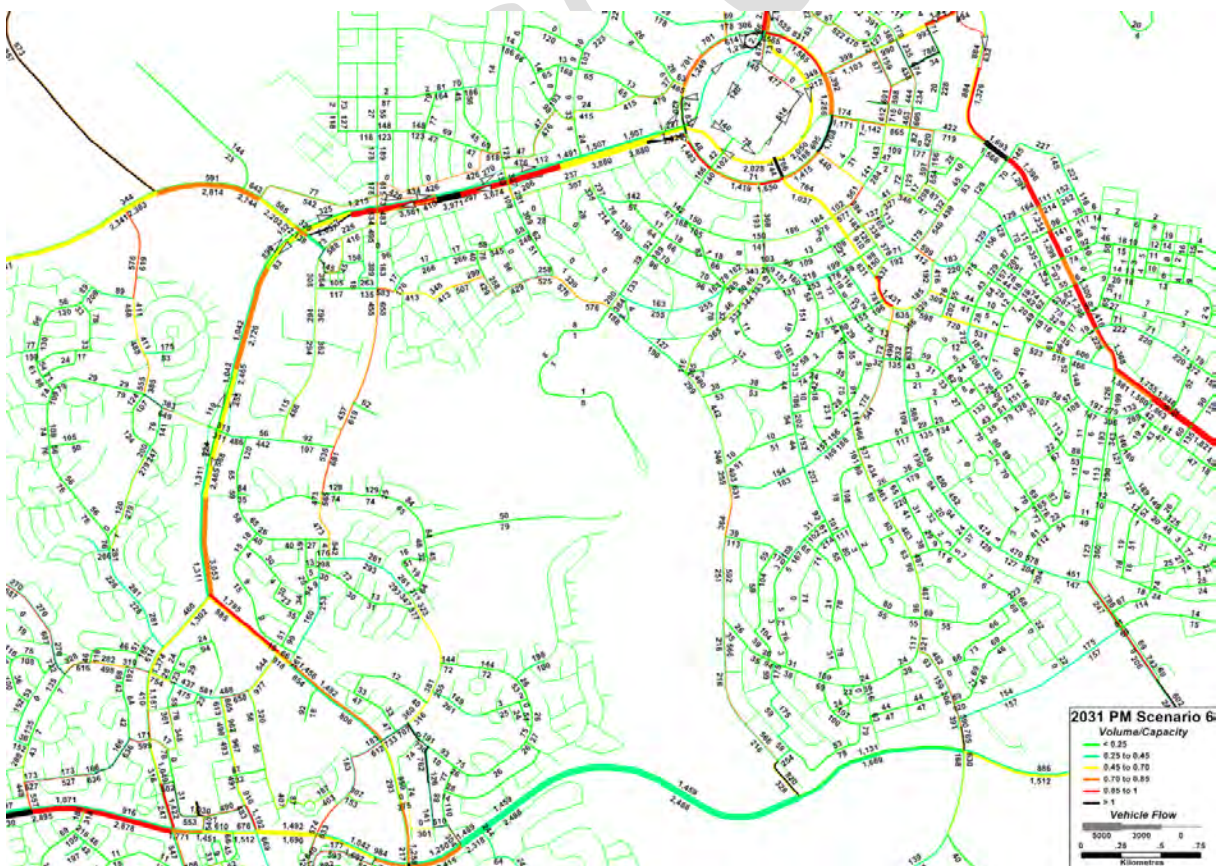


Figure 12: Scenario 6 2031 PM Hourly Flow and V/C

Figures 13 and 14 show the flow difference between Base (CSTM 2016) and Scenario 6 in the 2031 AM and PM peaks, respectively. There is a small amount of additional traffic on Birdwood Street, Kitchener Street and Carruthers Street, generated by the proposed developments. There is a small increase in traffic on Denison Street due to increased congestion on Kent Street. Overall, the impact on the surrounding road network is negligible with traffic volumes increases generally fewer than 30 vehicles per hour. These increases would not be expected to have any significant adverse impacts on network performance.

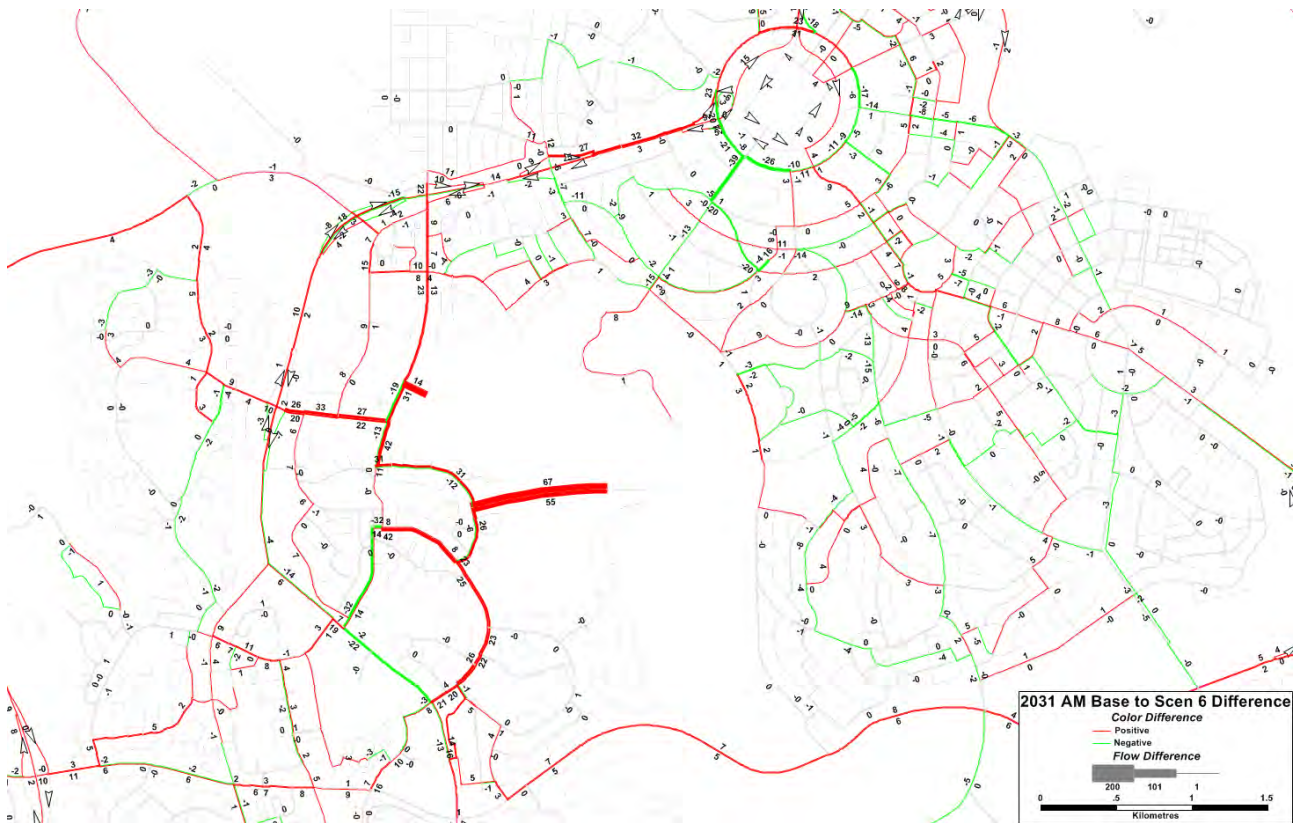


Figure 13: Scenario 6 2031 AM Hourly Flow Difference

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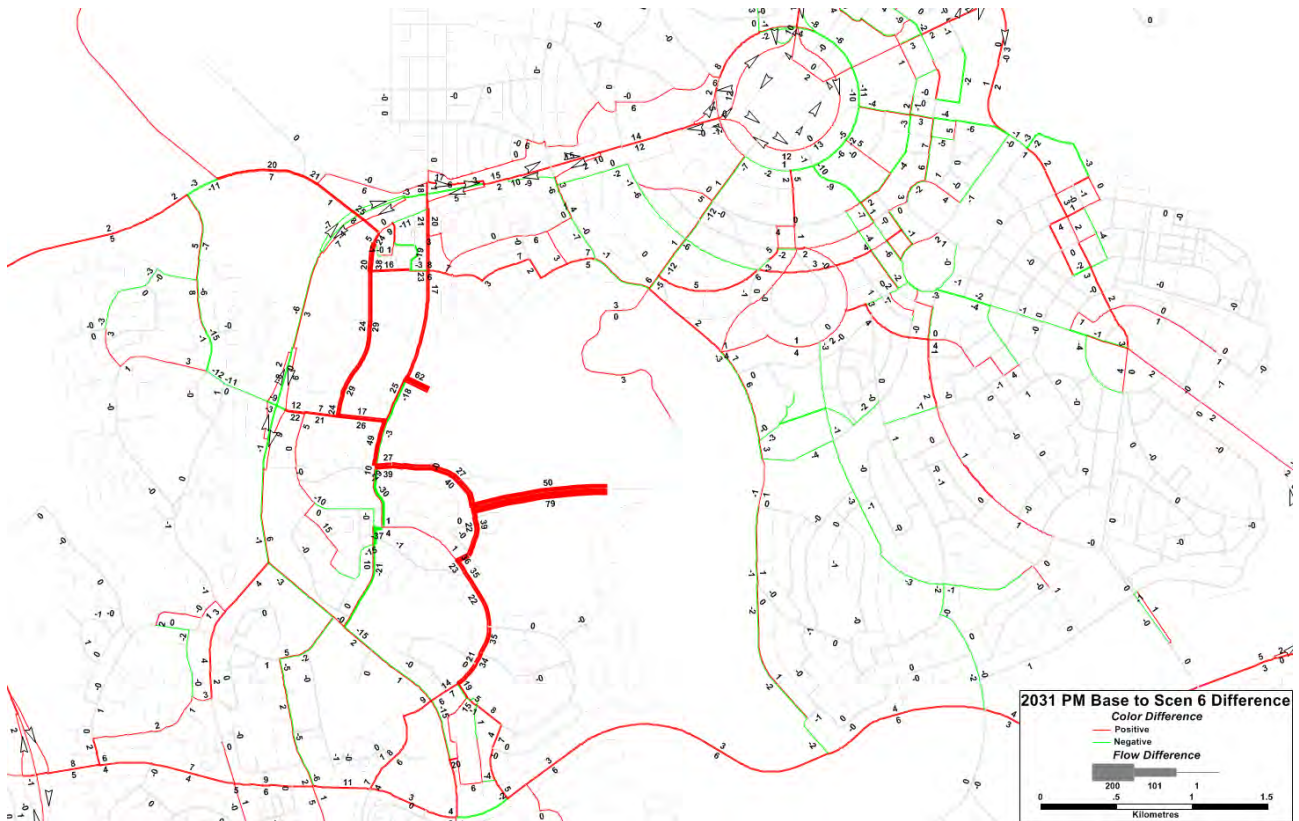


Figure 14: Scenario 6 2031 PM Hourly Flow Difference

2.6.2.4 Scenario 7

Scenario 7 moves the Section 56 Red Hill access from Gowrie Drive to Kitchener Street, which forces the redistribution of ~120 trips in both the 2031 AM and PM peak periods. Figures 15 and 16 show the hourly flow and Volume/Capacity for the 2031 AM and PM peak periods, respectively. As in the Base Case, traffic is largely concentrated on major arterials in the area. However, Kent Street and Stonehaven Crescent operate close to capacity in both peaks.

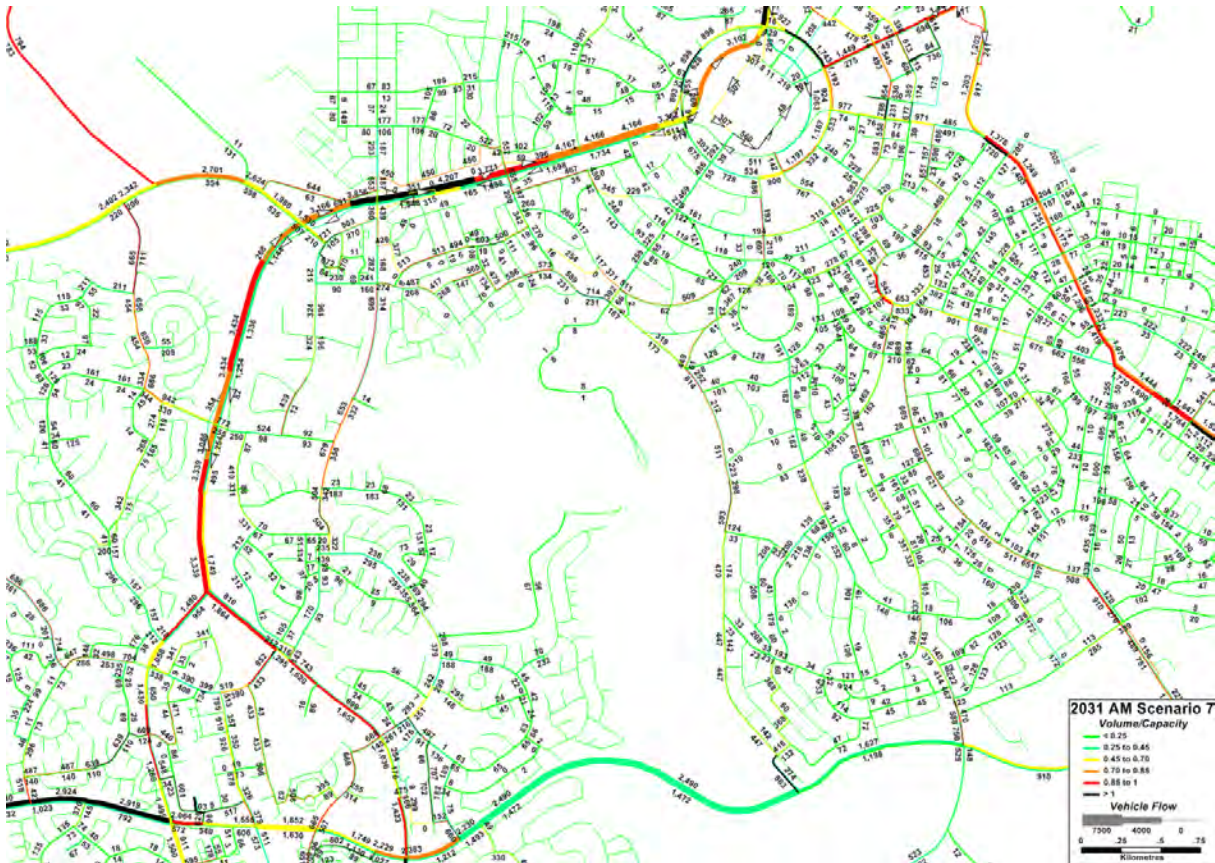


Figure 15: Scenario 7 2031 AM Hourly Flow and V/C

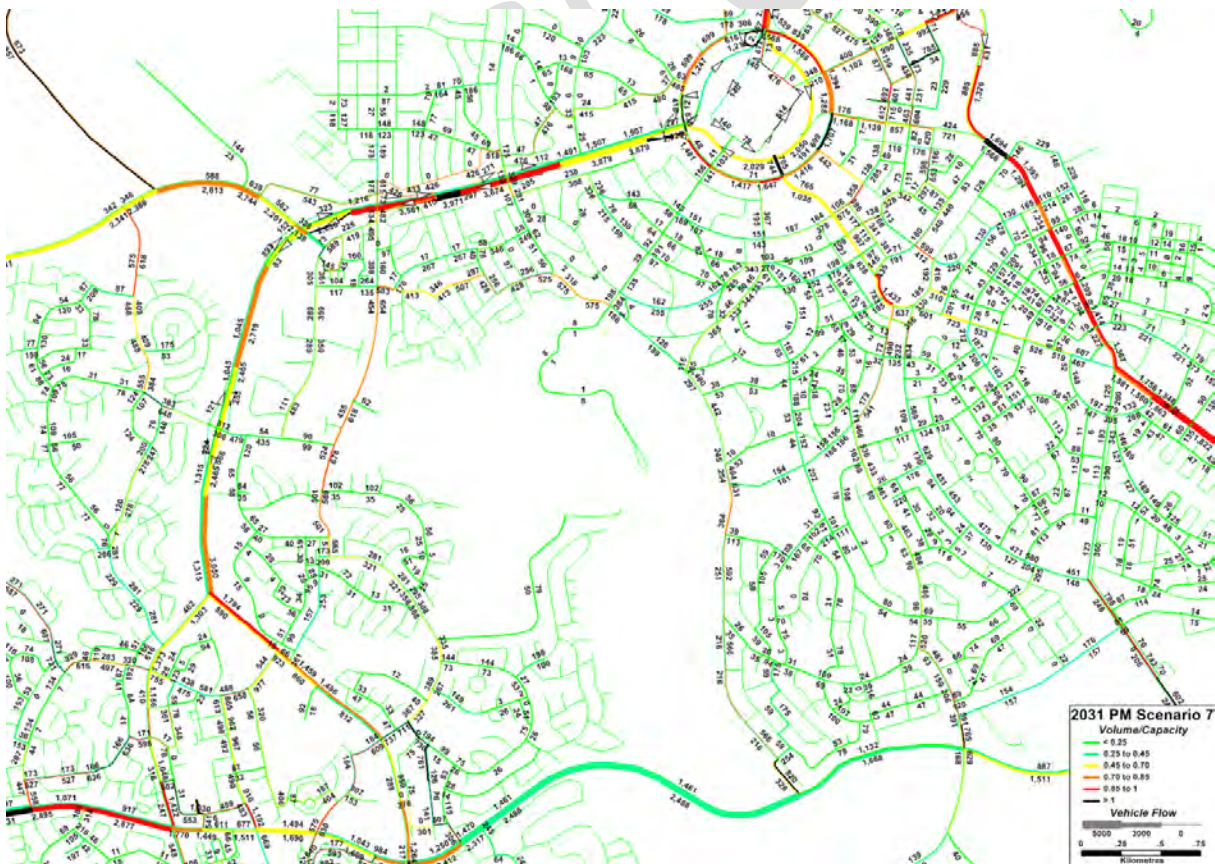


Figure 16: Scenario 7 2031 PM Hourly Flow and V/C

Figures 17 and 18 show the flow difference between Base and Scenario 7 in the 2031 AM and PM peaks, respectively. There is a small amount of additional traffic on Kitchener Street, Kent Street and Carruthers Street, generated by the proposed developments. There is a small increase in traffic on Denison Street due to increased congestion on Kent Street. Overall, the impact on the surrounding road network is negligible with traffic volumes increases generally fewer than 30 vehicles per hour. These increases would not be expected to have any significant adverse impacts on network performance.

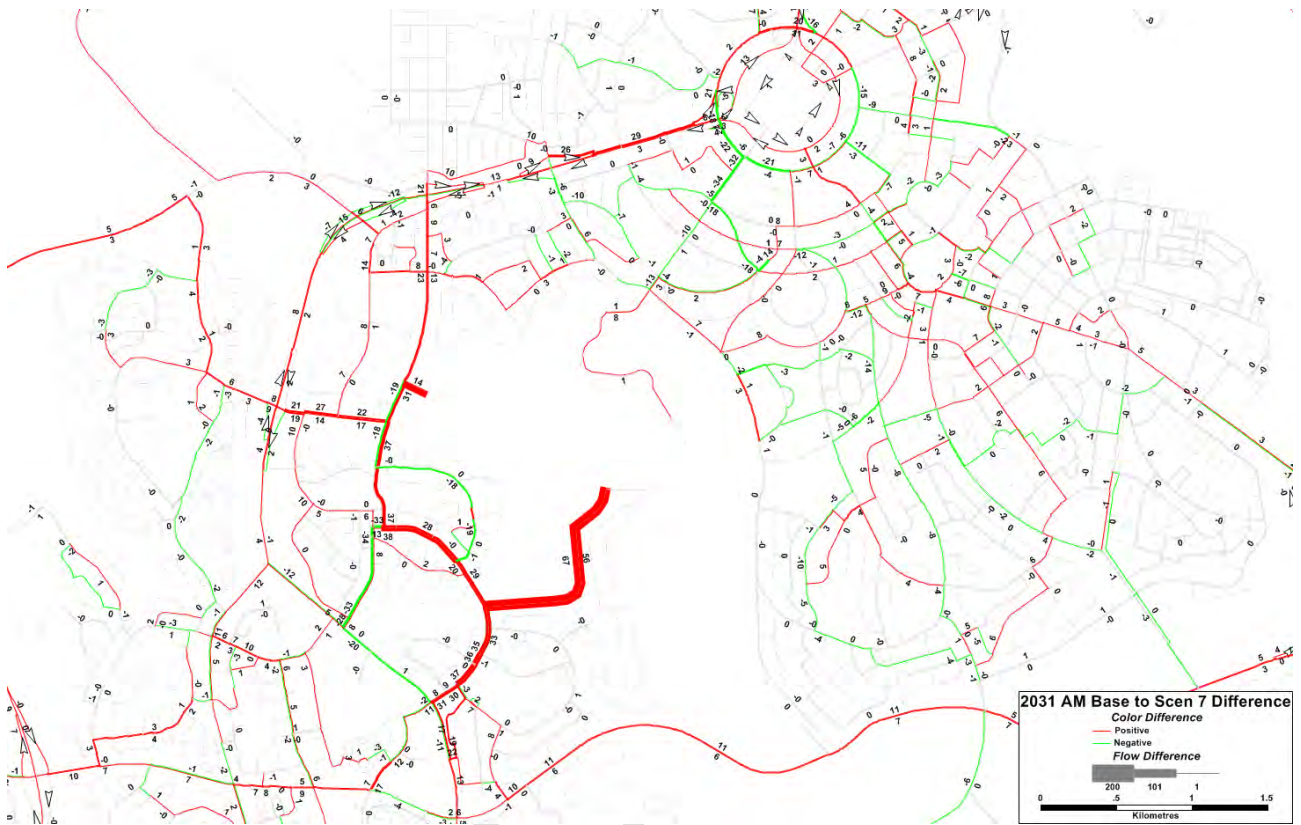


Figure 17: Scenario 7 2031 AM Hourly Flow Difference

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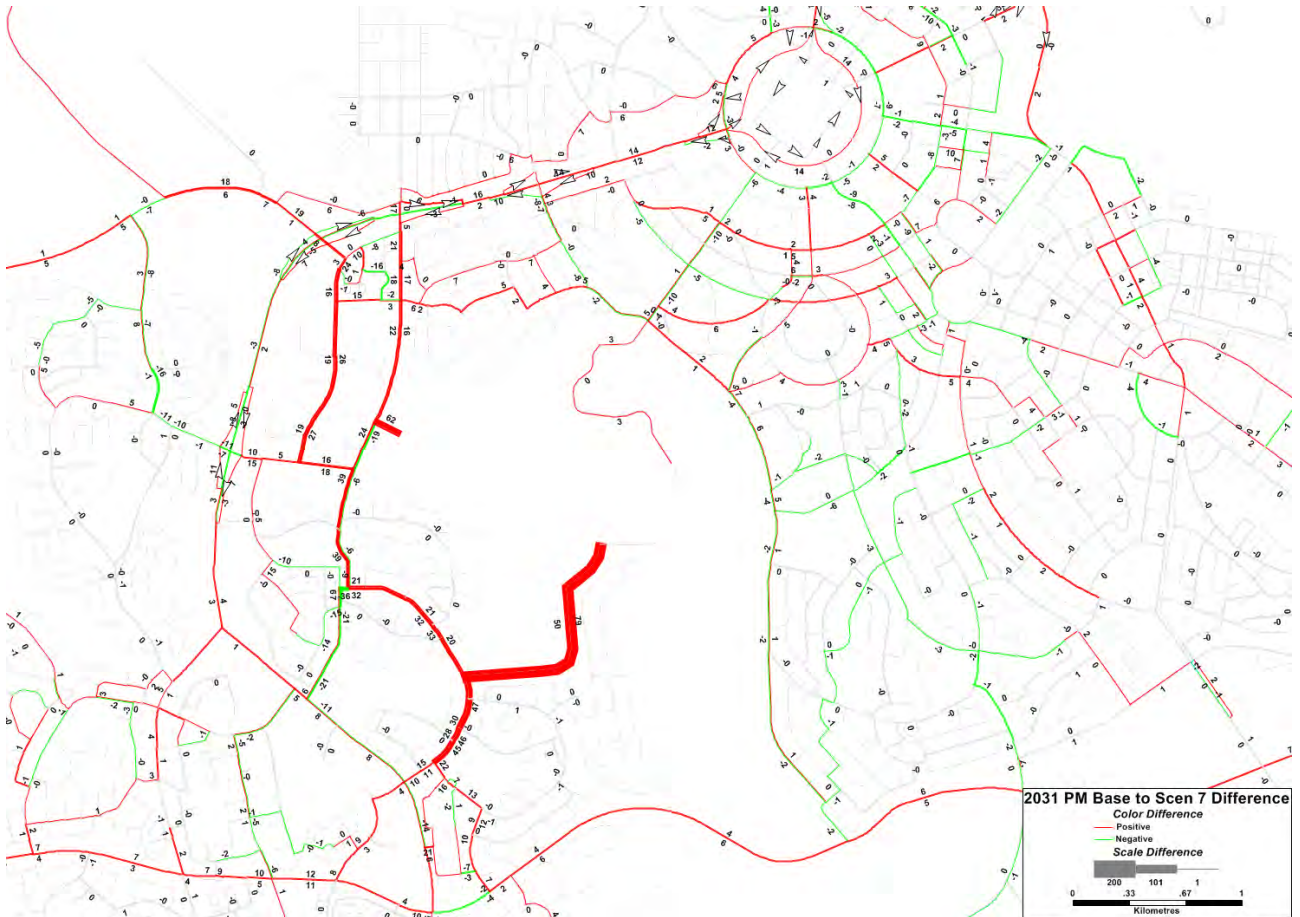


Figure 18: Scenario 7 2031 PM Hourly Flow Difference

FOR DISC

2.6.3 Strategic Modelling Summary

A comparison of the traffic volumes for the 2031 AM and PM peak periods between the CSTM (2011) and CSTM (2016) was carried out. For most of the local roads around the study area, the differences between the models are relatively small. Larger differences are apparent on major roads, including Yarra Glen, Adelaide Avenue, Cotter Road and Hindmarsh Drive. Given the small differences in modelled volumes on local roads around the developments, which is where most impact would be felt, it is considered that the findings from the earlier modelling, particularly Scenario 5, which includes both proposed developments, are still current and can be compared to the findings from this current modelling activity.

In Scenarios 5, 6 and 7, given the small amount of additional traffic, the impact on the surrounding network is generally considered to be insignificant. However, Kent Street is already close to its capacity in the 2031 Base Case and the additional traffic generated by the development results in Kent Street coming very close to its capacity in 2031 AM. Given the pre-existing heavy traffic flows on Kent Street, the additional traffic may cause additional delay at the intersections of Carruthers Street, Strickland Crescent and Equinox. Options to address this could be a combination of traffic calming measures (to reduce peak traffic volumes) and signal control at some intersections (to provide better pedestrian access, balance performance at all approaches and induce gaps in the traffic flow along Kent Street).

Comparisons of scenarios for the rest of this report will be limited to Scenarios 5, 6 and 7 as these represent full development of both sites, which will have the greatest impact on the network.

FOR DISCUSSION

3 Crash Analysis

SMEC obtained crash data for the suburbs surrounding the developments (Deakin, Forrest, Garran, Hughes and Red Hill) for the period 2012 to present (approximately 7.3 years) from the dataACT Open Data Portal¹. The crash statistics for the area around the proposed developments have been extracted from these records and are shown in Figure 19.

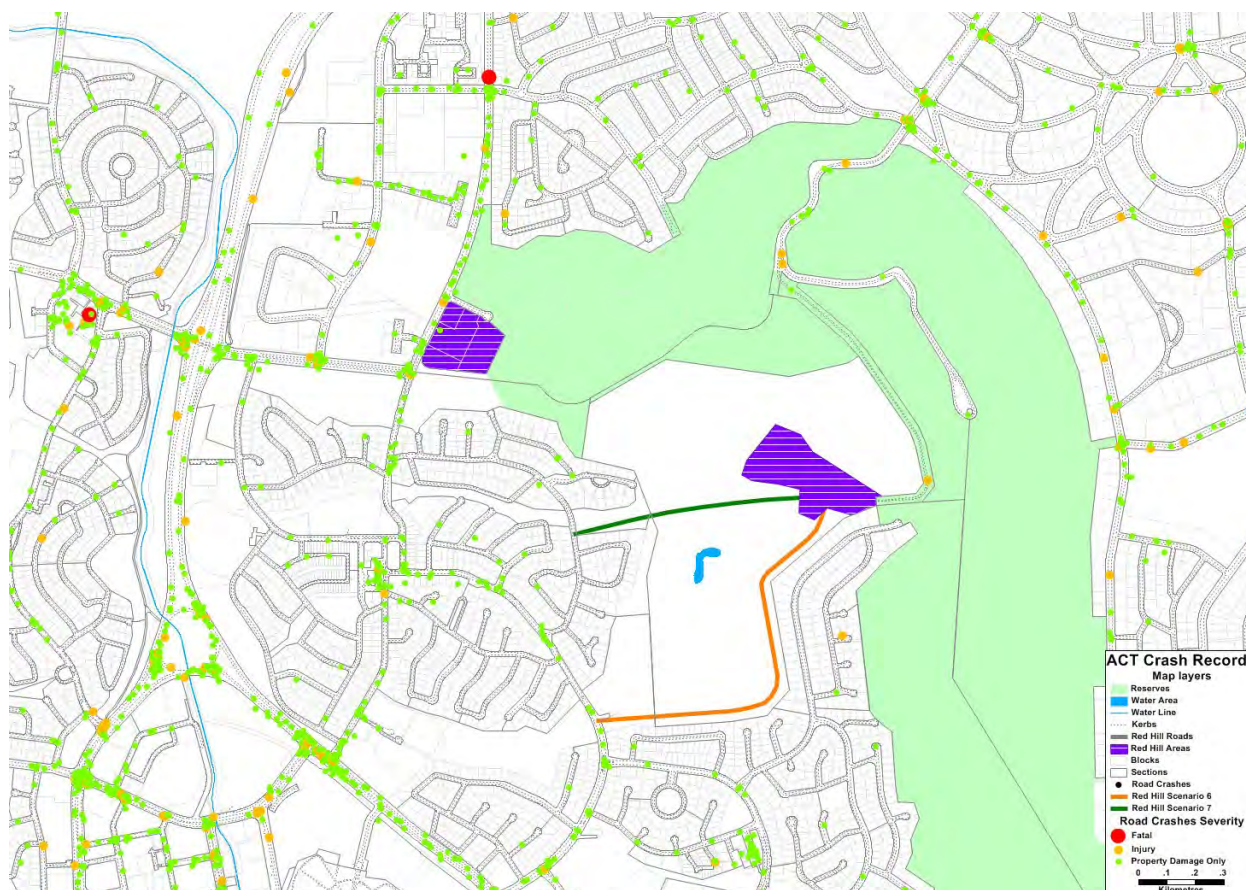


Figure 19: ACT Crash Records 2012-2019

Surveyed traffic counts were used for crash analysis for the following intersections:

- Kitchener Street – Birdwood Street
- Kent Street – Birdwood Street
- Kent Street – Kitchener Street
- Kitchener Street – Gilmore Crescent
- Carruthers Street – Kent Street
- Stonehaven Crescent – Gowrie Drive – Melbourne Avenue
- Gowrie Drive – Red Hill Drive
- Kent Street – Strickland Crescent
- Gilmore Crescent – Brereton Street

To estimate annual traffic from the AM and PM peak period counts, an annualisation factor was developed based on research conducted by Orthongthed, Wang & Legaspi, which provides daily and annual conversion factors for local roads in urban Sydney and four rural regions of NSW, based on a two-hour peak period. In this instance, the average of AM and PM counts has been used. Canberra does not resemble either urban Sydney or rural NSW, instead lying somewhere

¹ <https://www.data.act.gov.au/Transport/ACT-Road-Crash-Data/6jn4-m8rx>

in between in terms of traffic intensity and behaviour, so average factors have been calculated from the rural and urban factors.

Table 10: Traffic Uplift Factors

REGION	DAILY	ANNUAL
Hunter	5.91	1,995
Northern	5.86	1,965
South-west	5.58	1,960
Southern	5.99	2,032
(Rural)	5.84	1,988
Sydney (urban)	7.22	2,469
Average	6.53	2,229

Source: Orthongthed, Wang & Legaspi 2013

The crash records for each intersection have been compiled and are shown in Table 11 and Figure 20. The records cover approximately 7.3 years for the records obtained from dataACT. It was assumed that a crash that occurred within 50 metres of the intersection was associated with the intersection in some way. The annual crash rate was averaged over the recorded period and is expressed in crashes per million vehicle movements (C/MVM), calculated as:

$$\text{CrashRate} = \frac{\text{Crashes}}{\text{AnnualTraffic} \times \text{Years} / 1,000,000}$$

Table 11: Crash Rates by Intersection (2012-2019)

INTERSECTION	MOVEMENTS				CRASHES	PERIOD [YEARS]	RATE [C/MVM]
	2019 AM	2019 PM	Daily	Annual			
Kitchener Street – Birdwood Street	1,490	1,409	9,465	3,230,936	7	7.3	0.30
Kent Street – Birdwood Street	1,411	1,963	11,016	3,760,323	10	7.3	0.36
Kent Street – Kitchener Street	1,375	1,898	10,686	3,647,759	9	7.3	0.34
Kitchener Street – Gilmore Crescent	1,590	1,423	9,837	3,357,989	9	7.3	0.37
Carruthers Street – Kent Street	2,768	2,418	16,932	5,779,797	23	7.3	0.55
Stonehaven Crescent – Gowrie Drive – Melbourne Avenue	2,413	2,176	14,983	5,114,441	17	7.3	0.46
Gowrie Drive – Red Hill Drive	67	121	614	209,526	2	7.3	1.31
Kent Street – Strickland Crescent	3,275	2,959	20,354	6,947,793	19	7.3	0.37
Gilmore Crescent – Brereton Street	908	786	5,531	1,887,963	3	7.3	0.22

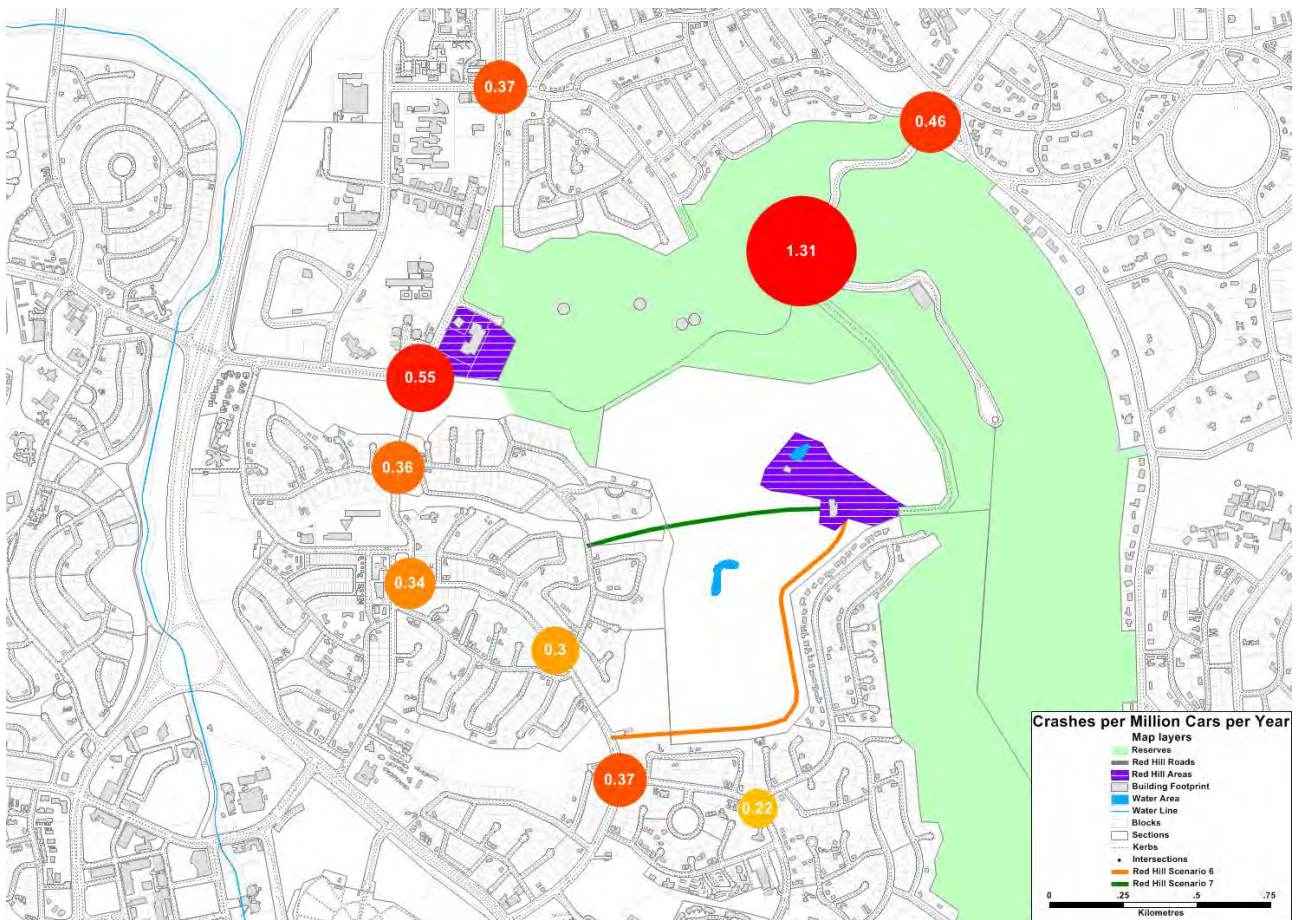


Figure 20: Crashes per Million Vehicle Movements (2012-2019)

The crash records in Table 11 show that there is a range of risk for the intersections around the study area. The intersection of Gilmore Crescent and Brereton Street is the safest, with 0.22 crashes per million vehicle movements. The intersection of Gowrie Drive with Red Hill Drive is the least safe intersection with 1.31 crashes per million vehicle movements. The intersection of Carruthers Street and Kent Street has the most crashes over the analysis period and has the second highest number of crashes per million vehicle movements, at 0.55.

A brief analysis of crash factors was also conducted, with the following factors assessed:

- Trend over time
- Wet/dry comparison
- Day/night comparison
- Severity comparison

Figure 21 shows the number of crashes per year for the years 2012 to 2019. From this figure, there does not appear to be a clear trend at any intersection, except the intersection of Kitchener Street and Birdwood Street, where crashes were highest in 2012 and there have not been any recorded crashes since 2015. All other intersections show apparently random variation each year.

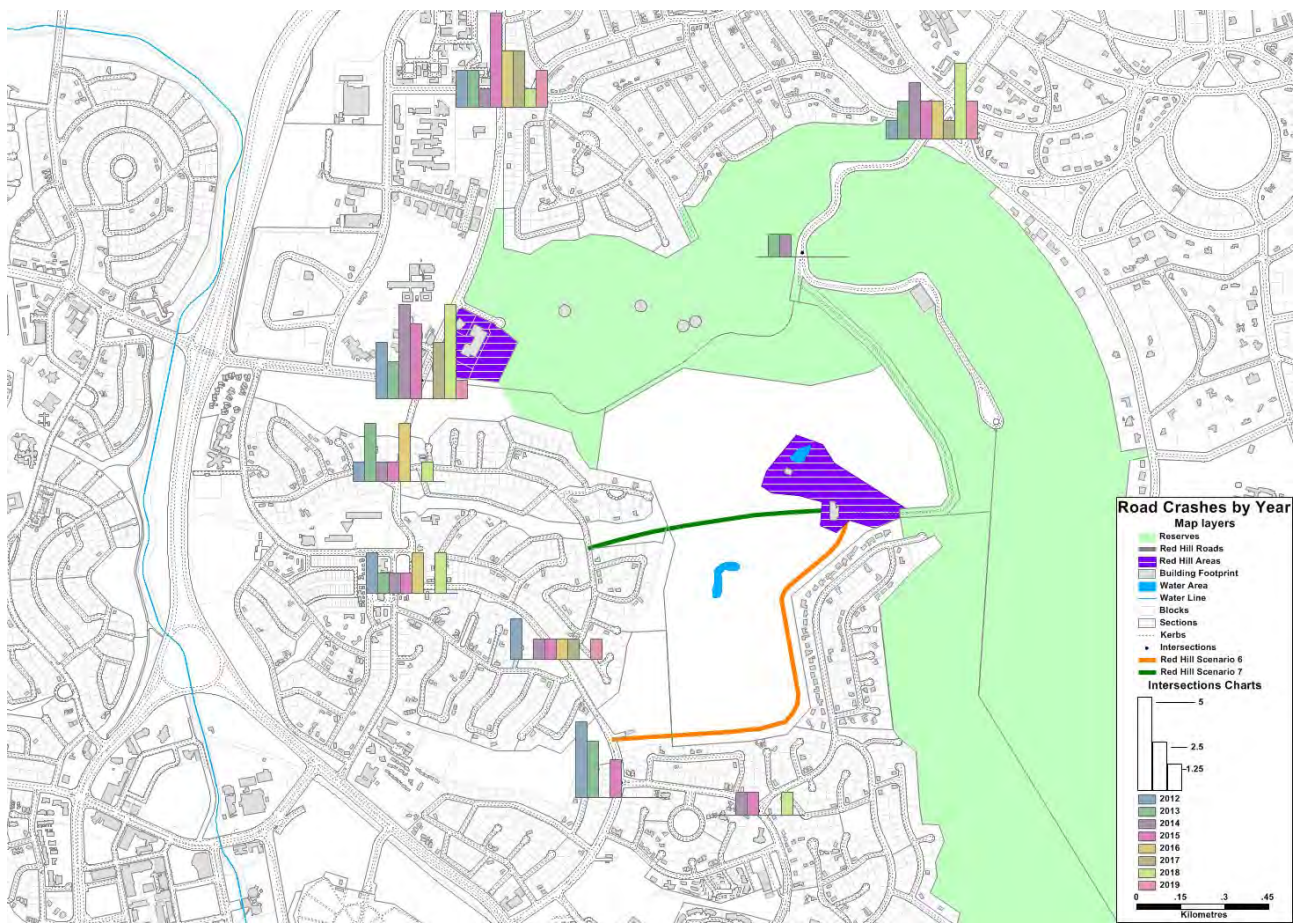


Figure 21: Road Crashes per Year (2012-2019)

FOR DRAFT

Figure 22 shows the proportion of crashes that happen on wet or dry road surface. Most intersection show approximately one quarter of the crashes occurring on a wet road surface. Notable exceptions are the intersections of Brereton Street with Gilmore Crescent and Gowrie Drive with Red Hill Drive, where all crashes occurred on a dry surface. However, the number of crashes at these sites is very low.

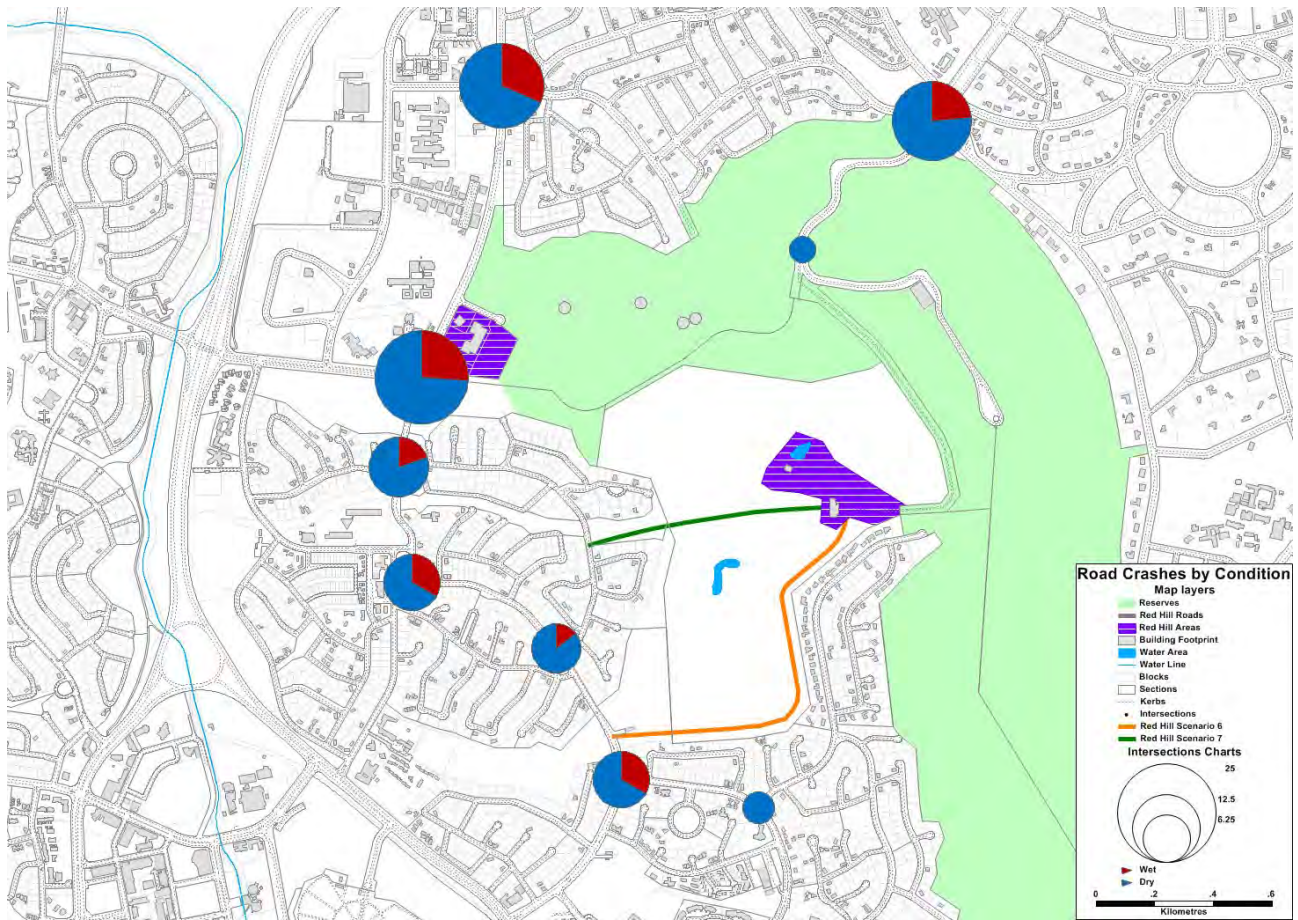


Figure 22: Road Crashes by Wet/Dry Condition (2012-2019)

FOR DRAFT

Figure 23 shows the proportion of crashes that occur during the day and night. Most intersections have a small proportion of crashes at night. However, the intersection of Kitchener Street and Kent Street has more than half of its crashes occurring at night. It is recommended that further investigation be carried out at this location to determine if there is an issue with street lighting or some other factor that increases risk at night time.

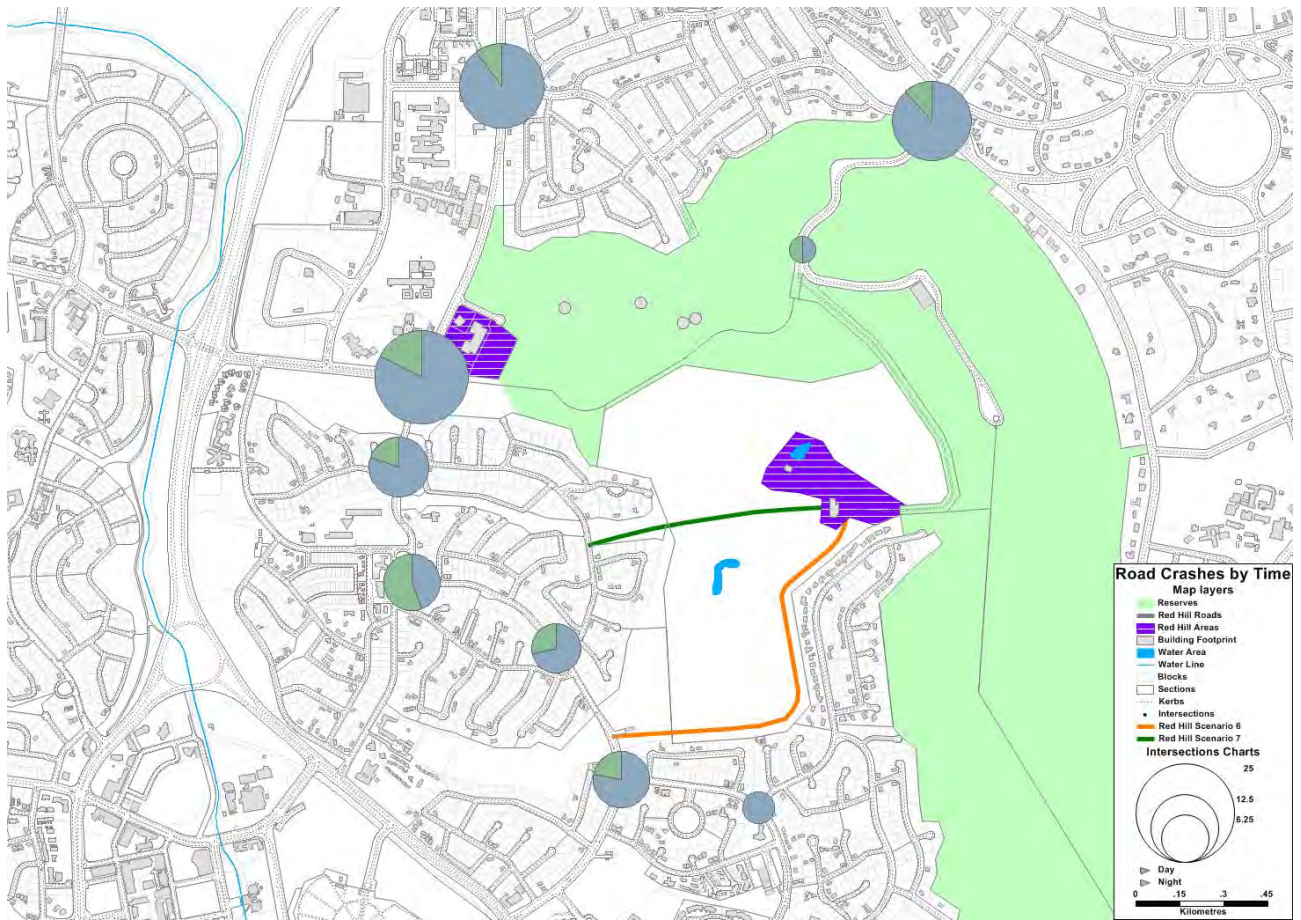


Figure 23: Road Crashes by Time of Day (2012-2019)

FOR DISCUSSION

Figure 24 shows the proportion of crashes by severity. Most crashes result in property damage only. Larger intersections, with a higher number of vehicles and crashes, have a small number of crashes causing injury or fatality. The notable exception is the intersection of Gowrie Drive and Red Hill Drive. Only two crashes were recorded around this intersection between 2012 and 2019, but both resulted in injury.

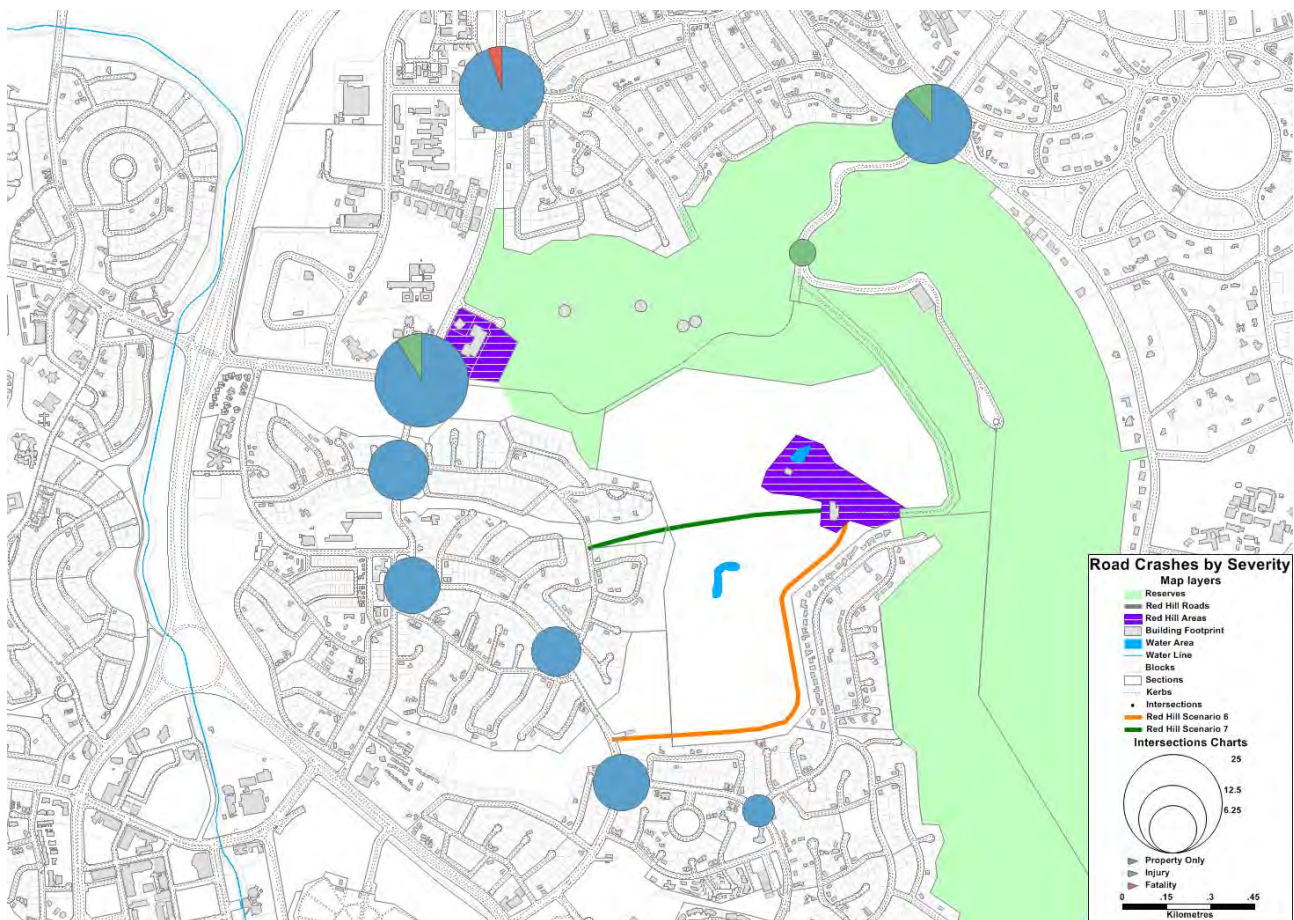


Figure 24: Road Crashes by Severity (2012-2019)

3.1 Summary

The brief crash analysis carried out in this study identified a number of issues that should be investigated further. The identified issues include:

- The intersection of Gowrie Drive with Red Hill Drive is the least safe intersection with 1.31 crashes per million vehicle movements. All the crashes recorded at this intersection resulted in injury, compared to the other intersections which had injury rates of less than 10%. If Gowrie Drive remains connected in the future, investigations should be carried out to identify changes to be made at this intersection to improve its safety. It is noted that the sample size at this intersection is very small.
- The intersection of Carruthers Street and Kent street has the most crashes over the analysis period and has the second highest number of crashes per million vehicle movements, at 0.52. The combination of high crash rate and high traffic volume suggest that further investigation is required.
- The intersection of Kitchener Street and Kent Street has an unusually high proportion of its crashes occurring at night. Further investigation should be undertaken to determine the cause and possible solutions.

4 Public Transport and Active Travel Assessment

4.1 Public Transport Coverage

Figure 25 shows the coverage of bus stops in the current Network 19. For this assessment, it is assumed that local stops have a coverage radius of 500 m and rapid stops have a coverage radius of 800 m, as per the distances in the Estate Development Code. Most of the area around the proposed development has good public transport coverage. Residents in Deakin, Hughes and Garran largely have access to local routes while some residents in the southern areas of Hughes and Garran have access to the rapid route, R6 – City to Woden via Barton. Routes 57 and 58 also run between City and Woden but do so via slower routes than R6.

The proposed development at Section 56, Red Hill does not have access to public transport, nor does the northern part of Brereton Street.

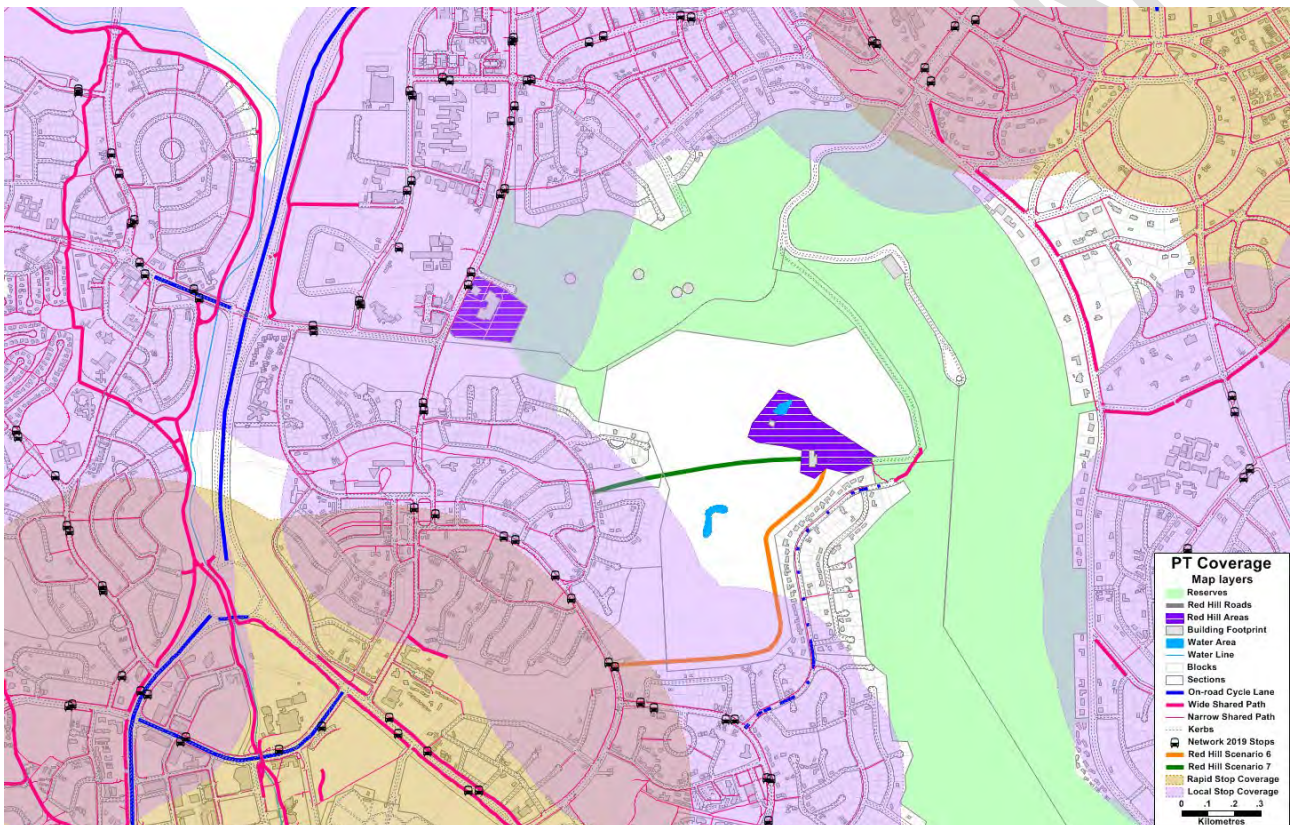


Figure 25: Network 19 Bus Stop Coverage

4.2 Active Travel Network

Figure 25 shows the active travel network around the proposed development area. Most higher order (collector or above) roads in the hierarchy appear to have a footpath/narrow shared path on at least one side of the road. However, many local streets have no footpath at all. Pedestrian access, particularly for people with limited mobility can be very difficult without a footpath. On local streets, verges are often not traversable due to soft surfaces or overgrown gardens and the can be cars parked on the road. Brereton Street has a footpath on only one side and it is often interrupted by driveway ramps, kerb ramps, hedges and garbage bins. It is recommended that the new road accessing the Federal Gold Club development area would have appropriate pedestrian facilities to allow easy walking.

The main off-road shared path network and on-road cycle lane network are connected to most areas via footpaths or rideable local streets.

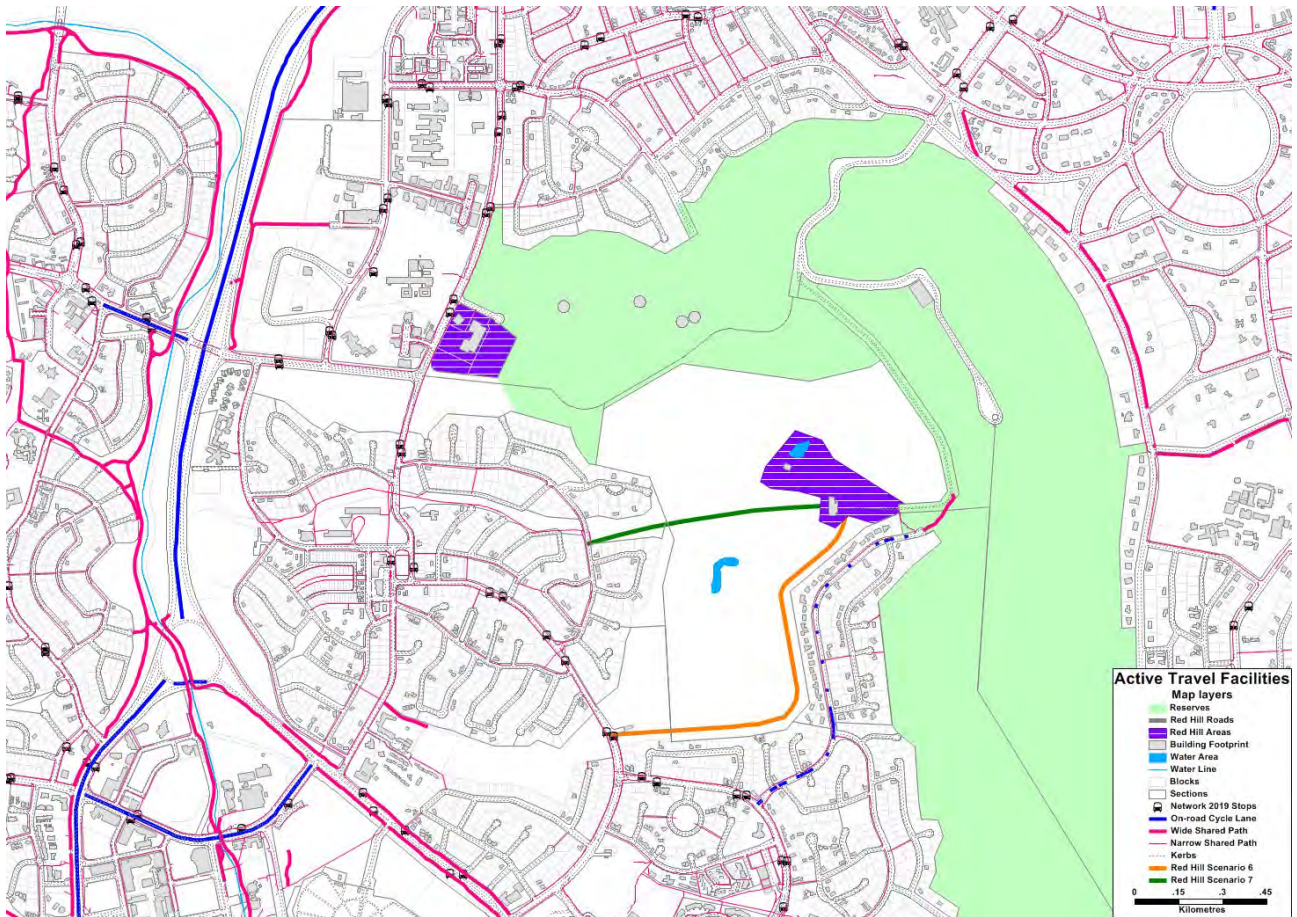


Figure 26: PT and Active Travel Facilities

The two nearest local centres to the Section 56, Red Hill development are Hughes and Garran, both of which are approximately 2 km away. This is about a 30 minute walk for many users and it is unlikely that many people will walk that far. Nevertheless, good pedestrian accessibility should be provided, whichever access option is chosen.

FOR DISCUSSION

5 Road Network Assessment

Turning movement counts were obtained for the following six intersections on Wednesday 27 June 2018 and 4 July 2018:

1. Mugga Way/Stonehaven Crescent – Gowrie Drive/Melbourne Avenue
2. Gilmore Crescent – Brereton Street
3. Kitchener Street – Gilmore Crescent
4. Kent Street – Carruthers Street
5. Kent Street – Strickland Crescent
6. Gowrie Drive – Red Hill Drive

Further surveys were carried out on 10 April 2019 for the following three intersections:

7. Kitchener Street – Birdwood Street
8. Kent Street – Birdwood Street
9. Kent Street – Kitchener Street

At all nine locations, the surveys were conducted for the AM (07:30 to 09:30) and PM (16:30 to 18:30) peak periods. The turn count reports are included in Appendix B.

Summary flow diagrams provided by Matrix (the traffic survey contractor) for the 2018 and 2019 AM and PM peak periods are shown in Figure 27 through Figure 30. A qualitative assessment of current intersection performance and intersection type, based on the count data, is included below.

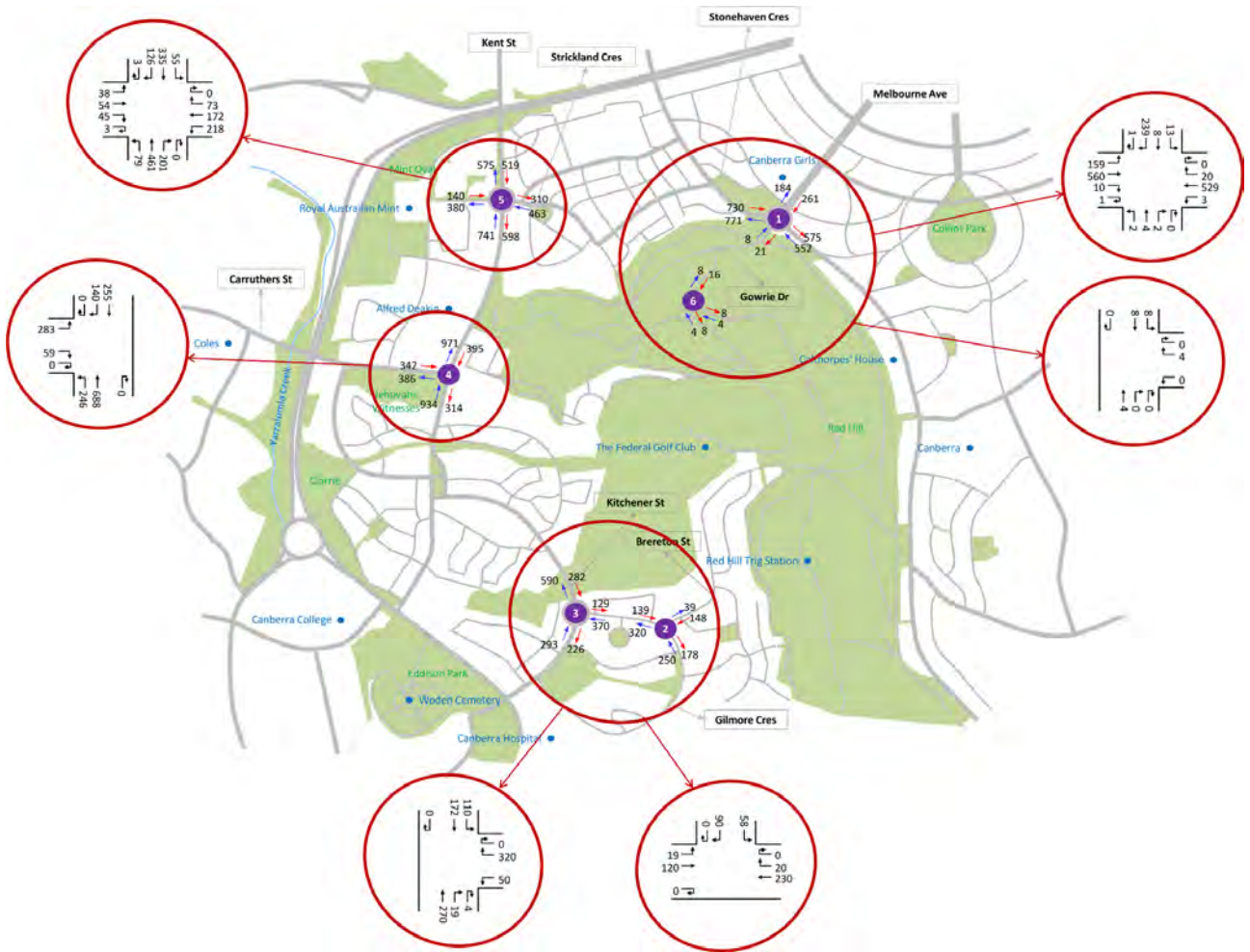


Figure 27: 2018 AM One-hour Peak Intersection Flows